IBM Planning Analytics
Version 2 Release 0

*IBM Cognos TM1 Performance Modeler*
Note
Before you use this information and the product it supports, read the information in “Notices” on page 215.

Product Information
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Use IBM® Cognos® TM1® Performance Modeler to build models that use dimensions, cubes, links, and rules. Create applications from cube views, assign workflow, and setup security. You can then deploy, administer, and maintain your applications.

Finding information
To find documentation on the web, including all translated documentation, access IBM Knowledge Center (http://www.ibm.com/support/knowledgecenter).

Accessibility features
Accessibility features help users who have a physical disability, such as restricted mobility or limited vision, to use information technology products. IBM Cognos TM1 has some components that support accessibility features. IBM Cognos TM1 Performance Modeler, IBM Cognos Insight, and Cognos TM1 Operations Console have accessibility features.

See Appendix A, “Accessibility features,” on page 175.

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. Getting started with Cognos TM1 Performance Modeler

In IBM Cognos TM1 Performance Modeler, you can design models, which are then used to create applications. The applications can be shared with a wide audience for a variety of uses.

A model is designed in response to a business need. For example, a company wants to plan its expenses for the next 12 months by expense line. The company collects the information from a number of departments that are spread across a wide geographical area. A model comprises the following basic building blocks: dimensions, cubes, and links. Business logic is built in by using cube and dimension calculations. Data and metadata is created and maintained by using processes.

You create an application from the model. An application is the interface for users to interact with the model. You create and administer applications, assign security, and establish a workflow by using Cognos TM1 Performance Modeler.

Multidimensional cubes are central to the model. You create views from the cubes to present the user with just the information that they need, and you can have many different views of the same cube. For example, a regional manager might want to review data at a consolidated level, and a department manager might want to input the detailed data for their department. They use the same cube but see different views.

Dimensions give the cubes structure. A cube must have a minimum of two dimensions, but the total number of dimensions a cube can have is determined by its use. A cube that stores data can have many dimensions. A cube that is viewed by a user should have enough dimensions to define the data, but not so many dimensions that the cube is difficult to navigate.

If two cubes share data, then a link can be created either to share the data dynamically, or to move the data from one cube to another, and then break the link.

You can quickly add business logic and formats, such as links and calculations, by using TM1 Performance Modeler. When you create links, cube calculations, and dimension calculations, rules and feeders are automatically created. You can write rules and feeders manually to customize and extend the model, but the most commonly used logic can be created by using automated calculations. Some frequently used logic is available as functions inside the calculations.

You can load data into applications by using Guided import. Guided import automatically creates TurboIntegrator processes, which can be either rerun manually, or in a scheduled job.

Create an application by selecting views from the model in addition to a specific dimension (approval hierarchy) which is used to set up a workflow. You assign the application to user groups by using the approval hierarchy and this determines how contributors interact with the application. Not all applications require an approval hierarchy, for example, the central application type does not require an approval hierarchy. You can share an approval hierarchy across applications by using a control dimension.

Define the default presentation of the application, including layout and languages to be used. Set up group-based security to define the actions that group members can take within an application. You can use either IBM Cognos Access Manager security or Cognos TM1 security.

As an administrator, you can modify an existing application. For example, you can update model objects, add and remove users, and change access settings. You can also manage the updating of runtime cubes, including importing data and metadata.

Using Performance Modeler on a WAN

Use of Performance Modeler over a wide area network (WAN) or a network with significant latency is not recommended.

Although Performance Modeler can be provisioned to client computers from the TM1 Applications portal, this delivery is primarily intended as a means of simplifying deployment for modelers that are working on...
a local area network (LAN). Users who are situated remotely from the TM1 Server should access TM1 Performance Modeler by using a Remote Desktop session (or similar thin client technology) to a computer that is local to the TM1 Server.

Logging on to Cognos TM1 Applications

Before you can start IBM Cognos TM1 Performance Modeler from within IBM Cognos TM1 Applications, you must specify several configuration parameters for your specific implementation.

After these parameters are set, subsequent logon attempts require you to provide only a valid username and password for the IBM Cognos TM1 server on which your Cognos TM1 Applications resides.

Procedure

1. In a web browser, enter the web address for your Cognos TM1 Applications installation, typically http://server_name:9510/pmpsvc.
2. Enter your user name and password and click OK.
   To create and manage Cognos TM1 Applications, the user name you enter must be a member of the ADMIN group on the Cognos TM1 server. If you want to create and manage applications across multiple Cognos TM1 servers, you must use the same administrative user name and password on all servers.
3. The Planning Applications box lists all of the Cognos TM1 servers registered on the Admin Server. Select the server you want to use for your Cognos TM1 Applications and click OK.

Starting Cognos TM1 Performance Modeler from TM1 Applications

You can start IBM Cognos TM1 Performance Modeler directly from the IBM Cognos TM1 Applications portal. You can then use Performance Modeler to create and manage TM1 Applications.

Before you begin
To create and manage Cognos TM1 Applications, you must be a member of the ADMIN group on the TM1 server.

Procedure

1. Log on to Cognos TM1 Applications.
2. Click the Performance Modeler icon to start Cognos TM1 Performance Modeler.
   If you select the icon in the toolbar, you are asked to select a TM1 Server to use.
   Note:
   If Performance Modeler is opened against a TM1 server that contains corrupted cube views, a warning is issued and none of the views (whether valid or invalid) are shown for the affected cube.

Starting Cognos TM1 Performance Modeler from the Windows Start menu or desktop shortcut

You can start IBM Cognos TM1 Performance Modeler from the Windows Start menu or desktop icon. When you use this procedure to start Performance Modeler, you are authenticated against the TM1 Application Server, which allows you to use the Application Design component in Performance Modeler.

Before you begin
You must only connect Performance Modeler to a server which is running on the same version of TM1 as your installation of Performance Modeler. For example, if the version of Performance Modeler is 10.2.2,
then the server must be running on a version 10.2.2 installation of TM1. If you do not do this, users on a lower version of Performance Modeler may be unable to open the model.

**Procedure**

1. Begin the logon procedure using either of the following methods:
   - From the **Start** menu, click **IBM Cognos TM1, IBM Cognos TM1 Performance Modeler**.
   - Double-click the **IBM Cognos TM1 Performance Modeler** shortcut on the desktop.
2. On the Connect to IBM Cognos TM1 System dialog box, confirm the URL for your IBM Cognos TM1 system. The URL specifies the location of the TM1 Application Server for your system and uses the format `http://<machine_name>:<port>/pmpsvc/services`.
3. Click **Log on as**, enter a valid **Username** and **Password**, and click **Login**.

**Connecting directly to a TM1 server**

You can start Performance Modeler by connecting directly to a TM1 server. When you use this procedure to start Performance Modeler, the Application Design component is not available, as the TM1 server is accessed directly without involving the Application Server. You connect directly to Performance Modeler if you want to access the Model Design or Transfer Design components.

**Procedure**

1. Begin the logon procedure using either of the following methods:
   - From the **Start** menu, click **IBM Cognos TM1, IBM Cognos TM1 Performance Modeler**.
   - Double-click the **IBM Cognos TM1 Performance Modeler** shortcut on the desktop.
2. On the Connect to IBM Cognos TM1 System dialog box, click **Connect directly**.
3. Confirm the **TM1 Adminhost** and modify if necessary.
4. Select the **TM1 Server** you want to connect to.
5. Enter a valid **Username** and **Password** for the TM1 server.

When Cognos TM1 Performance Modeler opens, it allows access only to the Model Design and Transfer Design components of Performance Modeler.

**Organizing your content using folders**

Use folders to categorize and organize your content. By default, initially, existing objects on the TM1 server are grouped into folders organized by content type as follows:

- Dimensions
- Cubes
- Links
- Processes
- Chores
- Control Objects
- Model Security
- Scorecards

Subsequently, new objects go into the root, unless you specifically create them in a folder. You can then file them in a folder.

You can change how your content is organized to suit your needs. For example, you may want to name your folders after the applications that you are building. All the content for each application can then be...
stored in the appropriate folder. Or you may want to create a folder named Shared Dimensions that contains dimensions used by multiple applications.

Your folder structure should complement the way in which your organization works. Such a folder structure can improve the efficiency of many concurrent users.

You can change the view to list objects grouped by dimension, cubes, links, processes, chores, and data flow diagrams by clicking the **Switch Model Design folder display** button 🕵️ in the Model Design pane.

**Creating folders**

Use folders to store your content in a way that suits you.

**Procedure**

1. In the Model Design pane, from the **New** list 🌟, click **Folder**.
2. Enter a name for the new folder and click **OK**.

**Viewing control objects**

Control objects are generated by IBM Cognos TM1 server to perform special tasks. When you make them visible, control objects appear in the Model Design pane. Their names always begin with a right curly brace (}). For example, you configure security for the cells in a cube named plan_budget. A cell security cube named }CellSecurity_plan_budget appears under **Control Objects > Cubes**.

**Procedure**

1. Click the **Actions menu** icon 🌟 and then click **Show Control Objects**.
   A check mark displays next to the option name. The **Control Objects** folder is displayed, with subfolders that contain control objects.
2. To create a view for a control cube, double-click the control cube.
3. If you want to hide control objects, click the **Actions menu** icon 🌟 and then click **Show Control Objects**.
   The check mark next to the option name and the **Control Objects** folder both disappear.

**Viewing object details**

View details of objects in the object viewer and in the **Properties** pane.

Organize objects in the Model Design Pane or in the Application Design pane. As you design your model or application, you can view objects in the pane in more detail by double clicking them. When you double click an object, details about the object appear in two places:

- the object viewer
- the Properties pane

**The object viewer**

Each object viewer has a tab with the name of the object and an icon that denotes one of the object types shown in the following table:

<table>
<thead>
<tr>
<th>Table 1: Object type icons</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Object type</strong></td>
</tr>
<tr>
<td>Dimension</td>
</tr>
<tr>
<td>Subset</td>
</tr>
</tbody>
</table>
Table 1: Object type icons (continued)

<table>
<thead>
<tr>
<th>Object type</th>
<th>Icon</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cube</td>
<td>![Cube Icon]</td>
</tr>
<tr>
<td>Cube view</td>
<td>![Cube View Icon]</td>
</tr>
<tr>
<td>Link</td>
<td>![Link Icon]</td>
</tr>
<tr>
<td>Process</td>
<td>![Process Icon]</td>
</tr>
<tr>
<td>Chore</td>
<td>![Chore Icon]</td>
</tr>
<tr>
<td>Rules</td>
<td>![Rules Icon]</td>
</tr>
</tbody>
</table>

A visual representation of the object's structure appears as well. The view is different for each object type. For example, cubes viewers show a grid of two dimensions plus context filters for additional dimensions. Dimension viewers show a grid of members and properties. And link viewers show two objects being linked plus directional arrows that show how elements of the objects link to each other.

The Properties pane

The Properties pane lists properties of the currently selected object, such as name, object type, number of elements, and related objects. Some of the related objects contain hyperlinks. If you click one of the hyperlinks, the linked object opens in the object viewer.

One way you can use the Properties pane is to compare the object in the viewer with an object in the Model Design pane. For example, a cube appears in the object viewer. You click once on a second cube in the Model Design pane. The second cube's dimensions are listed in the Properties pane. You can now compare the Property pane dimensions with the object viewer dimensions.

Looking at multiple views

Look at multiple views to help you decide which view is most suitable or to create a new view that presents the data exactly as you wish.

Procedure

1. Open an object.
   The object appears in the object viewer.
2. Repeat step 1 for additional objects.
   The tabs for each viewer appear are visible in the pane. However, the entire contents of only the most recently opened view are displayed. When views are displayed in this orientation, you can see only one view at a time.
3. Stack the views on top of each other.
   a) Click the tab of a view, and drag it until the cursor changes from a layered object icon to a down arrow.
   b) Release the mouse button.
   c) Repeat these steps to stack additional views.
Model design

In the Model design pane of IBM Cognos TM1 Performance Modeler, you create dimensions, cubes, and links to define the business logic for an application.

The model design tab shows a summary of the steps needed to build models. The steps to build a model are as shown:

**Design dimensions**
To make the data available for input and analysis, you must first create dimensions. Some examples of dimensions are Chart of Accounts, Products, Time, and Versions.

For more information, see Chapter 3, “Creating and formatting dimensions,” on page 19.

**Build cubes**
Use the dimensions that you have defined to build cubes. A cube is a store of data within a model. It is multidimensional and contains rows, columns, and any number of pages. You use one or more cubes to create an application. Some examples of cubes are: Sales Planning or Expense Analysis.

For more information, see Chapter 4, “Creating cubes,” on page 37.

**Link cubes**
Links establish a relationship that moves data from one cube to another. You can create links, for example, to reference assumption data in a planning cube.

Links can be implemented either as rules or processes. When a link is implemented as a rule, data is stored solely in the source cube, but is used and displayed in the target cube as required. When a link is implemented as a process, data from the source cube is copied to the target cube.

For more information, see Chapter 5, “Creating links,” on page 57.

**Create cube calculations**
Cube calculations simplify the creation of rules to complete common modeling operations, such as managing and maintaining the model. You can add a calculation to make your model meaningful by deriving more information from the data source.

For more information, see “Cube calculations” on page 48.

**Create rules and processes**
Dimension calculations, cube calculations and links generate rules automatically and will generate feeders if this property has not been disabled for the server (by default it is on). Links can also generate processes. Optionally, you can create rules for advanced calculations, and processes for managing and maintaining the model. Processes can then be grouped into chores for ongoing maintenance.

For more information, see Chapter 6, “Managing rules and feeders,” on page 67.

**Filter and search for objects in the Model Design view**
You can find and filter on objects that match specific criteria in the Model Design view. For example, you find all objects that include sales, including rules, cubes, processes, subsets, links, views, dimensions, and chores. You can also do a selective search where you specify which objects that you want to search on. For example, you might want to list all rules which contain the word tent.

**Procedure**
1. Right-click the server name in the tree, and select **Search Model**.
2. Select the types of object that you want to search: cube, view, dimension, subset, link, process, diagram, or chore.
3. Select if you want to include control objects.
4. Type a few characters that you want to search on and click OK.
After you have modeled your business process, in the Application design pane of IBM Cognos TM1 Performance Modeler, you can create an application so that users can review and contribute to it. The application identifies the cube views, websheets, and other objects a reviewer or contributor needs to complete their work. After the application is designed, it is deployed so that it is available and security is defined so that only the authorized users have access to the part of the plan they need.

The steps to create an application are as shown:

**Define views and websheets**
You can design different views to be used for Review or Contributor users. Targeted views also facilitate the deployment of reporting cubes. Reporting cubes can deliver improved performance when large numbers of nodes need to be reviewed. To improve performance, a TM1 TurboIntegrator process based on a cube with many rules can report into a cube with only a few rules for review.

For more information, see “Defining a cube view” on page 43, or “Websheets in Cognos TM1 Applications” on page 78.

**Define an approval hierarchy**
An approval hierarchy determines the workflow of your application. For Approval and Responsibility applications, specify a dimension subset to use as an approval hierarchy. Other types of applications do not need an approval hierarchy.

For more information, see “Defining an approval hierarchy” on page 80.

**Define a control dimension**
Define a control dimension to share an approval hierarchy across applications.

For more information, see “Defining a control dimension” on page 81.

**Deploy the application**
Before reviewers or contributors can use the application, it must be deployed to the IBM Cognos TM1 Application Service. Deploy the application to the portal to make it available to users from the selected clients.

For more information, see “Validating and deploying the application” on page 90.

**Set application rights**
After a TM1 application has been deployed, you must define rights for all user groups that you want to have access to the application.

For more information, see “Managing rights for the application” on page 90.

**Activate the application**
The final step is to activate the application in the IBM Cognos Applications portal. Activating the application makes it visible to users who are not administrators.

For more information, see “Activating an application in a portal” on page 93.
Chapter 2. Importing data

In IBM Cognos TM1 Performance Modeler, you can import source data, map it to target data, and add the new objects to the Model Design pane immediately.

By importing data, you can quickly create and populate cubes and dimensions.

When you import data, the Guided Import wizard saves your actions as a TurboIntegrator process. The process appears as an object in the Model Design pane. If you want to repeat your actions later, you can run the process to avoid having to specify the same settings again.

You can also create a process that, when run, imports source data, maps it to target data, and adds the new objects to the Model Design pane. The process appears as an object in the Model Design pane and does not run until you invoke it. This allows you to further modify the process before you run it. You can also schedule processes to perform administrative tasks automatically. For more information, see "Managing processes" on page 165.

You can also transfer dimensions between IBM Cognos TM1 Performance Modeler and IBM Cognos Business Viewpoint.

How Cognos TM1 Performance Modeler maps the data

When you import data, IBM Cognos TM1 Performance Modeler maps your data depending on the type of data that you are importing. During the import, you can override any of the choices that are made about how to map your data.

If you import a Cognos list report or package, the model that was defined in the source is used. Data from other data sources is mapped in the following ways by default:

- The first column in the source file, and the measures appear in a crosstab. The other columns are available as dimensions in the overview area.
- Columns of text are added as dimensions.
- Columns of numbers are added as measures if they are values. For example, a column called Revenue can be interpreted as a measure, and a column called Telephone number can be interpreted as an attribute.

Import data sources

You can import data from a number of different sources into IBM Cognos TM1 Performance Modeler to create or populate cubes and dimensions.

For all data sources except relational data sources, if your source data contains decimal values but there are no decimal values within the first 100 records, the data is detected as integers. However, the decimal places are preserved, and you can apply formatting to add the decimals.

You can import the following data types into Performance Modeler:

Delimited text files

You can import files of the following file formats: CSV, TAB, CMA, ASC, and TXT.

Cognos TM1 Performance Modeler does not support importing TXT and CSV files with legacy encoding if the Microsoft Windows regional settings and system locale do not match the file encoding. To resolve this issue, save the file with UTF-8 encoding, or change the Microsoft Windows regional settings and system locale to match the file’s encoding.

Microsoft Excel files

Some formulas and functions that are used in Microsoft Excel workbooks are not imported. The solution is to create a copy of the affected column in the Microsoft Excel workbook and to use the
Paste Special command to paste the values of the column. You can also save the workbook as a .csv file and then import the .csv file.

**Relational data sources (ODBC)**

To import relational data into Cognos TM1 Performance Modeler, it is important that you understand your relational data source and be able to define queries. Ensure also that ODBC connections are set up for the data sources that you want to import from.

**IBM SPSS Statistics**

Before you can import from an IBM SPSS® data source, you must ensure that you have downloaded the ODBC driver, which is included in the IBM SPSS Access Pack Package. The SPSS Access Pack Package is available when you purchase IBM SPSS Statistics or IBM SPSS Modeler. After you have downloaded the ODBC driver, you must also define an ODBC connection to the data source. For more information about defining ODBC connections, see the user documentation for your operating system.

**IBM Cognos reports**

Only list reports that were created in IBM Cognos Report Studio and IBM Cognos Workspace Advanced can be imported. If the report contains prompts, you must answer the prompts before you can import the report. Prompts with default values can simply be accepted. Single-value and multi-value prompts offer a list of possible answers to select from. For other prompt types, such as text or date prompts, you must answer the prompts by typing the prompt value in the format that the prompt expects.

If you import a Cognos report that includes layout calculations, the layout calculations will not be imported. This is because reports are converted to CSV format during import, and CSV does not support layout calculations. To resolve this issue, change any layout calculations to query calculations prior to import.

When you import a report, the data extraction performance is similar to exporting a Cognos Report Studio report to a CSV file.

**IBM Cognos packages**

When you import a package, the data extraction performance is similar to exporting a Cognos Report Studio report to a CSV file.

**Note:** IBM Cognos packages are not available as a data source if you are using Performance Modeler in a Cloud environment.

**IBM Cognos TM1 cube views**

Two import sources are available: IBM Cognos TM1 Cube View and IBM Cognos TM1 Dimension Subset. Cognos TM1 cube views and dimension subsets are defined by the Cognos TM1 administrator.

To import a cube that contains a dimension in a deployed application, you must first have ownership of the approval hierarchy or deactivate the application.

## Importing data using Guided Import

When the source data includes many columns, examine the source data and identify which columns should be defined as dimensions, levels, attributes, or measures. You can choose to import dimensions only or to import both dimensions and measures in a cube. The source data can be a file, a list report, a cube view, a dimension subset, or a relational data source.

**Procedure**

1. Right-click the model root in the Model Design pane, then click **Guided Import**.
2. Select either **Dimensions** or **Cube**.
3. The import you create is saved as a TurboIntegrator process. Enter a name in the **Process name** box.
4. In the **Import Data - Select Data Source** window, complete one of the following actions:

<table>
<thead>
<tr>
<th>Table 2: Source types</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Goal</strong></td>
<td><strong>Action</strong></td>
</tr>
</tbody>
</table>
| Import a Microsoft Excel file | In the **Type** field, select **File**.  
Browse for the file that you want to import.  
Expand **File details** to specify the details of the file that you are importing. |
| Import a delimited text file | In the **Type** field, select **File**.  
Browse for the file that you want to import.  
Expand **File details** to specify the details of the file that you are importing.  
If you want to use the decimal separator and thousands separator for a specific locale, select that locale from the **Format** field.  
If you are working in connected mode and you want to schedule running a process that re-imports data, specify the location of the file to be accessed by the remote IBM Cognos TM1 server. |
| Import report data from a simple tabular list that was created in IBM Cognos Business Intelligence and that does not contain unresolved prompts | In the **Type** field, select **IBM Cognos Report Data**.  
Specify the connection details for the report in the **IBM Cognos BI Server Address** field in the following format: `http://<host>/ibmcognos/cgi-bin/cognos.cgi`. You can test the connection.  
Enter the location and name of the report that you want to import in the **Report Location** field, or click **Select** to select the report. |
| Import a Cognos TM1 cube view | In the **Type** field, select **IBM Cognos TM1 Cube View**.  
Select the cube and view that you want to import. |
| Import from IBM SPSS Statistics. There must be an ODBC source specified on the server. | In the **Type** field, select **IBM SPSS Statistics**.  
In the **Connection details** field, specify your data source connection details.  
To define or change the queries for the data source, open the query builder. |
| Import a Cognos TM1 dimension subset  
This option is available only when you use the **Import Dimensions** command. | In the **Type** field, select **IBM Cognos TM1 Dimension Subset**.  
Select the dimension and subset that you want to import. |
| Import from a relational data source | See “Importing data from a relational data source” on page 16. |

5. By default, all columns in your data source are selected to be imported. Clear or select the **Import** check boxes in the Columns pane so that only the columns that you want to import are selected.
6. For cube import only: If a column is misidentified as either a regular dimension or a measure dimension, clear or select the **Measure** check box. When the **Measure** check box is selected, the column is treated as a metric dimension and the data in the column is used to populate the cube. When the **Measure** check box is cleared, the column is treated as a basic dimension.

7. To specify advanced details, follow the procedure specified in “Selecting advanced import options” on page 12.

8. Click **Finish**.

**Results**
For each column you selected, Cognos TM1 Performance Modeler creates a new dimension. If your source data includes column labels, the labels are used for dimension names. If your source data does not include column labels, dimensions are named column1, column2, column3, and so on.

If you imported a new cube, Cognos TM1 Performance Modeler, populates it with data, and opens the cube in the cube viewer.

The Guided Import is saved as a TurboIntegrator process, using the name that you specified when you identified the data source.

**Related concepts**
- **Managing processes**
  Manage processes to create, modify, and schedule how data is imported and used in IBM Cognos TM1 Performance Modeler.

**Selecting advanced import options**
You can specify advanced options in the Guided Import wizard in IBM Cognos TM1 Performance Modeler. The advanced options enable you to customize mappings to create multiple dimensions, add levels to dimensions, identify attributes, and identify or create measures. You can also create a cube from the mappings that you create.

**Before you begin**
Define the import data source. For more information see, “Importing data using Guided Import” on page 10.

**Procedure**
1. In the Guided Import wizard, click **Advanced**.
   The **Import Dimensions** window displays the following panes:
   - **Data Preview** - Shows the columns and contents of your data source.
   - **Mapping** - Shows the columns to be imported (Source Items) and allows you to identify the contents of a column as either Dimension, Level, or Attribute. The Mapping pane also illustrates how columns in your source (Mapped Source Items) map to objects (Target Items) on your TM1 server.
   Cognos TM1 Performance Modeler creates mappings for columns that are most likely to be imported. You can modify any of the mappings that are created.

2. Click **Show Properties** at the lower right side of the screen.
   In the **Properties** pane, you can view and set properties for a selected source item or target item.

3. To modify mappings, complete one of the following actions:
   - To remove the default mapping, click **Clear All Mappings**.
   - When you are importing reports or files, to map your data to a single level, click **Recreate All Mappings**, and then click **Do not Detect Hierarchies**.
   - When you are importing reports or files, to return the mappings to the default mappings, click **Recreate All Mappings**, and then click **Detect Hierarchies**.
   - You can also modify mappings by dragging an item from the **Source Items** section of the Mapping pane to a new location on the **Target Items** section. Similarly, you can drag an item from one
location on the Target Items section to a new location within the section. As you drag an item, the
cursor indicates where and how the item will be dropped. You can drop it as a new dimension, as a
level of an existing dimension, or as an attribute.

4. If you want to add a calculated column, complete the following actions:
   a) Click Add calculated column.
   b) In the Source Items section of the Properties pane, enter a Source item name for the column and
      select the Data type for the column.
   c) Specify a Mapping type for the calculated column.
   d) Type the expression that defines the calculated column in the Expression field. Expressions must
      end with a semicolon (;).
      For example, to add a calculated column for Employee Name that concatenates Last Name and
      First Name, define the following expression:
      \[ v\_Expression = v\_Last\_Name\_0 \ | \ ', ' \ | v\_First\_Name\_1; \]
      You can also use a calculated column to rename members, for example, to have the source match
      the target names or to remove extraneous characters from the source.
      For more information about formulas for the expression, see the IBM Cognos TM1 Reference Guide.
   e) To view the results of the expression, click Preview.

5. To customize the properties of a dimension, select the dimension in the Target Items section of the
   Mappings pane.
   For more information, see “Customizing the properties of dimensions when importing data” on page
   14.

6. To modify a level, select the level in the Target Items section of the Mappings pane.
   a) In the Target Item section of the Properties pane, enter a name for the level.
   b) In the Advanced section of the Properties pane, select the Owner Dimension to specify the
      dimension that this level belongs to.
   c) To move the level in the structure, change the Level Index value.

7. To modify an attribute, select the attribute in the Target Items section of the Mappings pane.
   a) In the Target Item section of the Properties pane, select an Attribute type.
      If the column mapping to the attribute contains numeric values, the attribute type must be
      Numeric.
      If the column mapping to the attribute contains text, the attribute can be one of the following types:
      • Text - Provides descriptive information.
      • Caption - Provides a translated name for an object, as described in Chapter 12, “Translating your
        model,” on page 171. A caption does not require a unique name.
      • Alias - Can be used as an alternative name. Each alias must be unique.
   b) If you select Caption, select the appropriate Locale.
      For example, if the column mapping to the Caption attribute contains product names in Brazilian
      Portuguese, select Portuguese (Brazil) as the locale.
   c) In the Advanced section of the Properties pane, select the Owner dimension and Owner level that
      this attribute belongs to.

8. If you initiated the guided import by clicking Guided Import > Cube, you can customize the cube
   properties. For more information, see “Customizing the properties of cubes when importing data” on
   page 15.

9. Click Finish.
Results
Cognos TM1 Performance Modeler creates the dimensions, levels, and attributes that are defined in the guided import. If you chose to create a cube, the cube is created as well and is optionally populated with data.

The import definition is saved as a TurboIntegrator process by using the name you specified when you identified the data source.

Customizing the properties of dimensions when importing data
When you specify advanced options in the Guided Import wizard in IBM Cognos TM1 Performance Modeler, you can customize the properties of dimensions.

Before you begin
Define the import data source. For more information see, “Importing data using Guided Import” on page 10.

Procedure
1. In the Guided Import wizard, click Advanced.
2. Click Show Properties.
3. Select the dimension in the Target Items section of the Mappings pane.
4. In the Target Item section of the Properties pane, modify the Dimension name and Dimension type as necessary.
   For example, a Benefits dimension might be a calculation dimension. For more information, see “Creating new dimensions” on page 19.
5. Specify an Update the dimensions action. Select Add the new elements to append any new elements in the source to an existing dimension. Select Repopulate dimension to completely rebuild the dimension by using only the elements present in the source. Select Do not update to leave the dimension as-is without any updates from the source.
6. If you are importing a dimension with multiple levels and the element names are not unique, select the Include the names of parent elements check box and specify a character for the separator.
   The separator character differentiates the parent name from the element name.
   An example of non-unique elements at the same level is the Years dimension. Each year contains a first quarter and each first quarter contains January.
   An example of non-unique elements at different levels is the North America dimension. Ontario is listed as a city in California and Ontario is listed as a province in Canada.
7. To create default captions for each element, select Use the element names as captions if they are unique.
8. To create an element that displays a total for the dimension, ensure that the Create total element check box is selected.
9. To create named levels, select the Create named levels check box.
10. To identify the source data as an unbalanced hierarchy, select the Unbalanced source data check box, and then choose whether to balance the hierarchy by making all of the child elements the same depth, or leave the hierarchy unbalanced.
11. To identify the source data as a ragged hierarchy, select the Ragged source data check box, and then choose whether to keep the ragged structure and what placeholder data to insert in the blank cells.
12. To move the dimension in the structure, change the Dimension Index field.
   You can also drag the dimension to a new location.
13. Specify how the leaf or child elements will be sorted in Element sorting.
14. Specify how the component elements will be sorted in Component sorting. For more information, see “Element and component sorting in dimensions” on page 15
You can also modify levels, attributes, and cubes in the **Properties** window. When you have completed all your changes, click **Finish**.

**Element and component sorting in dimensions**

When you import data by using guided import, and select **Advanced**, you can specify how to sort elements in a dimension and how to sort components within elements.

**Element sorting**

Element sorting determines the order of the parent data items in a dimension. The default element sorting of **None** preserves the order in which the elements were input from the source data. Sorting by level or by hierarchy can be used for advanced scripting purposes. For example, within the Product Line dimension, you have the following elements: Golf Equipment, Camping Equipment, and Outdoor Protection. You can sort these elements alphabetically by name or leave them in this order.

**Component sorting**

Component sorting determines the order of the child items of the elements in a dimension. The default component sorting of **None** preserves the order in which the components were input from the source data. You can also sort components alphabetically by name. For example, the Camping Equipment element includes the following components: Tents, Sleeping Bags, and Lanterns. You can sort these components alphabetically by name or leave them in this order.

**Customizing the properties of cubes when importing data**

You can customize the properties of cubes if you chose the **Guided Import > Cube** option when initiating Guided Import in IBM Cognos TM1 Performance Modeler.

**Before you begin**

Define the import data source. For more information see “Importing data using Guided Import” on page 10.

**Procedure**

1. In the Guided Import wizard, click **Advanced**.
2. Click **Show Properties**.
3. Select the cube at the top of the Target Items section of the Mapping pane.
4. Enter a name for the cube. This name can be an existing cube name or a new cube name.
5. If your mappings do not identify any measure dimensions in the data source, click **Create measure dimension**.
   
   If your source data contains only one measure, you can remove the default measures dimension by clearing the **Create measure dimension** check box.

   **Important:** If you choose to remove the default measures dimension during import, you cannot add new measures to this cube at a later time.
6. Select a **Data update** behavior for the import operation.
   
   - **Add the data** adds the values in your data source to any existing cube values.
   - **Replace the data** replaces any existing cube values with the values in your source.
7. To change the measure to a dimension, under **Mapping Type**, click **Member Attribute**.
   
   The object becomes a dimension as part of the cube.
8. To add existing dimensions to the cube, in the Advanced section of the Properties pane, click **Select dimensions**.
9. Select the dimensions that you want to add, and then click **Add to cube**.
10. You can also modify dimensions, levels, and cubes in the **Properties** window. When you have completed all your changes, click **Finish**.
Importing data from a relational data source

Before you import data from a relational data source, ensure that you understand your relational data source and how to build SQL queries. Ensure that the ODBC connections have been defined. When you are working in connected mode, you can use the ODBC relational data sources that are defined on the server.

Procedure

1. If you are creating a process, go to the next step. If you are running a Guided Import, complete one of the following actions:
   • If you are importing dimensions only, right-click the model root in the Model Design pane, and then click Guided Import > Dimensions.
   • If you are importing a new cube, right-click the model root in the Model Design pane, and then click Guided Import > Cube.
2. In the Type field, select Relational data source (ODBC) and specify the connection details.
3. Select an ODBC relational data source from the list that is defined for your system.
4. Open the Query Builder.
   An alternative is to type the SQL code for the query.
5. To specify the columns to use in the query to get data, click the Data View tab and drag the columns or tables from the Metadata Explorer field to the grid.
   You can add the columns themselves or tables. The query uses the columns that you add directly to the grid to get data. The query also uses the columns that belong to the tables that you add to the grid.
6. To create joins based on relationships between columns in the tables, click the Query Diagram tab and do the following actions:
   a) Drag tables from the Metadata Explorer field to the diagram.
      The query uses the tables that you add to the diagram to connect other tables. The query does not use the columns that belong to these tables to get data.
   b) Select the items for the relationship and click the Create Relationship icon.
   c) Specify the cardinality for the relationship.
      Cardinality is used to avoid double-counting fact data, to support loop joins that are common in star schema models, to optimize access to the underlying data source system, and to identify items that behave as facts or dimensions.
      For more information about relationships and cardinality, see the IBM Cognos Framework Manager User Guide that is available from the IBM Knowledge Center Cognos Business Intelligence welcome page (http://www.ibm.com/support/knowledgecenter/SSEP7J/welcome) in the PDF section.
7. To edit the SQL query manually, click the SQL View tab. The actions that you complete in the Data View tab or the Query Diagram tab are reflected in the SQL View tab.
8. If you are satisfied with the query, click OK.
9. To preview the data that is returned by the query that you created manually or in the Query Builder, click Refresh.
10. If you want to map the dimensions, click Next.
    For information on mapping, see “Selecting advanced import options” on page 12.
11. Click Finish.

Results

The source data is imported, mapped to target data and added to the Model Design pane. In addition, your actions are saved as a process that appears in the Model Design pane.
If you were creating a process, it appears as an object in the Model Design pane and does not run until you explicitly invoke it.

**What to do next**

You can modify the process by editing its procedures, or you can schedule the process as part of a chore. For more information, see “Editing procedures” on page 168, and “Scheduling processes” on page 169.

**Related concepts**

- Managing processes
  Manage processes to create, modify, and schedule how data is imported and used in IBM Cognos TM1 Performance Modeler.
Chapter 3. Creating and formatting dimensions

To make data available for input and analysis, you must first create dimensions.

A dimension is a broad grouping of related data about a major aspect of your business, such as product, time, and region. Each dimension includes levels of members in one or more hierarchies and an optional set of calculated members or special categories. Dimensions define the grid of a tab in IBM Cognos TM1 Applications, forming the rows, columns, and context. Before you create a dimension, you must determine what aspects of your data are related and decide what data will be required in rows and columns of your plans. IBM Cognos TM1 Performance Modeler will guide you by providing relevant properties for each dimension type.

Creating new dimensions

When you create a dimension, you specify its dimension type.

**Calculation dimensions**

A calculation dimension contains formulas that perform mathematical and other operations on your data. For example, use calculation dimensions to set up profit and loss statements for your company or when you want to use pick lists to provide structured data entry to end users.

**Time dimensions**

A time dimension contains time members that are meaningful to your users, such as financial accounting periods or the dates of sales transactions. These include:

- conventional date periods, such as years, quarters, months, and weeks
- industry-specific periods, such as 13 week manufacturing periods
- custom periods, such as fiscal years
- lunar time periods, such as lunar years or months

**Versions dimensions**

A versions dimension contains data from various iterations of a member in an application. For example, you want to see the differences in current budget versions for the cost of supplies and compare the budgets to costs for prior years. The data in a versions dimension should not be aggregated, because it contains multiple data entries for the same item.

**Hierarchy dimensions**

A hierarchy dimension contains a representation of the reporting structure of your business, department, or enterprise. This dimension determines the workflow of your application. As work is completed on leaf nodes in the approval hierarchy, the workflow logic guides submissions upward through the approval hierarchy, until the top node is reached. At each step in the ascension through the approval hierarchy, users can selectively edit, review, or submit views in the application, dependent upon access rights.

**Generic dimensions**

A generic dimension contains general members, such as lists of departments, products, or customers. A generic dimension can be used when you do not know the precise dimension type. The dimension type can be changed at a later stage.
**Metric dimensions**

A metric dimension contains a collection of important measures or key performance indicators (KPI) that you want to monitor in your business or organization. Metric dimensions are used in Cognos TM1 Scorecarding solutions. For more information, see “Metric dimension” on page 128.

**Metric Indicators dimensions**

A Metric indicators dimension provides more information about your key performance indicators (KPI) or metrics. Examples of metric indicators include Score, Status, and Trend. Metric Indicators dimensions are used in Cognos TM1 Scorecarding solutions. For more information, see “Metric indicator dimension” on page 130.

**Creating calculation dimensions**

Create a calculation dimension when you need to do calculations and measurements on numerical data.

A calculation dimension contains formulae for mathematical operations on your data. For example, use a calculation dimension to set up a profit and loss statement for your company. A calculation dimension can also be considered the dimension to use for measures dimensions. A calculation dimension has two type, N and C. An N calculation is a simple calculation performed at the dimension level between two members of the that dimension that have input values. A C calculation is a calculation performed on aggregated results to give a consolidated total. A calculation dimension has the following attributes:

- **Name**, the member name.
- **Format**, user defined: number, date/time and text formats.
- **Pick List**, a link to a predefined dimension or subset.
- **Nature of positive variance**, the result of a positive value, either favorable or unfavorable. This attribute is only used in conjunction with a version dimension. For example, a positive value for sales and price would be favorable, but a positive value for cost of sales would be unfavorable.
- **N Calculation**, a simple calculation performed at the leaf level derived from two input values. For example: Projected Revenue = Quantity * Price.
- **C Calculation**, a calculation performed on aggregated results. A consolidated calculation derived from the results of the simple calculations. For example, Average Price = Total Revenue / Total Quantity. The expression editor helps in the selection of commonly used aggregation behaviors for a C calculation; Force to Zero, Weighted Average, and Time Average.
- **Weight**, a factor applied usually of minus 1 to change a positive value to a negative value. For example, if the unit price for a product is EUR 50 and the discount is EUR 5, a weight of -1 applied to the discount keeps an addition result logical.
- **Index**, a numerical value to allow quick access to the members.

**C Calculation aggregation types**

The expression editor has 3 aggregation types to help resolve the summation of leaves at the consolidated level to help resolve these consolidated values.

- **Weighted average**: The consolidated vale has a further calculation if the value to be consolidated is A, B is the numerator, and C is the denominator, so A = B/C.
- **Time average**: The sum of values of all periods / number of periods.
- **Force to zero**: The consolidated value is forced to zero.

Example 1: If you have a fixed price for a product showing at the leaf level, you do not want this value to be aggregated together for all months at the consolidated level. To get a calculation in the form A = B/C, the unit sales price is A, the gross sales value is B and quantity is C. Unit sales price = gross sales value / quantity. The weighted value in this case is quantity.

Example 2: If you have Margin % for a product for each month, at the aggregated level an addition of these values needs a further calculation. A time average is the cumulative gross margin / the number of
time periods. An aggregation of 4 quarter periods for Margin % yields P1 = 4.5%, P2 = 6.4%, P3 = 3.6%, P4 = 5.2%. A time average yields 19.7 / 4 = 4.93%.

Example 3: If you do not want a consolidated value for a dimension, you can set the consolidation to Zero.

Creating calculation dimensions with arithmetic N calculations
An N calculation is a simple calculation performed at the dimension level between two members of the dimension that have input values.

Procedure

1. In the Model Design pane, right-click the Dimensions folder and click the New icon.
2. Click the Dimension icon.
3. Type the name of the new dimension and select Calculation from the Dimension type list.
4. Add the members of the dimension to the Name attribute either by typing the list or doing a copy/paste action.
   For example: Quantity, Price, Revenue, Cost of Sales, Net Sales.
5. Save the dimension.
6. Open the calculation dimension to edit.
   You can either add simple formulae directly to the appropriate members, or you can add formulae with the expression editor.
7. To add a formula directly for a simple calculation, in the column N Calculation for a member, type =<member1>*<member2> where <member1> and <member2> are members with input values.
   The result gives the product of the members at the leaf level.
8. To add a formula with the expression editor, click the cell where you want to add the formula.
   a) Click the More button in that cell.
      The expression editor opens.
   b) Select Arithmetic from the Operation type field.
   c) Select the operation type +(Sum)-(Difference)*(Multipication)/(Division)
   d) In the Expression field, double-click the operand1 in the expression ("<operand1>*"<operand2>").
      Type the name of the member for operand1.
      The name of the member must be identical to the member name in the name attribute. If the name has two words, the name shows in single quote marks.
      You can also drag and drop members into the expression editor, either individually or by selecting multiple members at a time.
   e) Repeat the previous step for <operand2>.
9. Save the dimension.

Creating calculation dimensions with N calculations using dimension functions
An 'N' calculation using a dimension function is a calculation performed at the dimension level between an input value of a member of that dimension and the function selected.

The expression editor has built-in functions that use member values as input for calculations. A function expression is derived from the dimension function and an input value and in some instances also a pad value. The expression editor helps in the selection of the dimension functions.

Procedure

1. In the Model Design pane, right-click the Dimensions folder and click the New icon.
2. Click the **Dimension** icon.

3. Type the name of the new dimension and select **Calculation** from the **Dimension type** list.

4. Add the members of the dimension to the **Name** attribute either by typing the list or doing a copy/paste action.
   
   For example: Quantity, Price, Revenue, Cost of Sales, Net Sales.

5. Save the dimension.

6. Open the calculation dimension to edit.

7. To add a function with the expression editor, click the cell where you want to add the function.

8. Click the **More** button in that cell.

   The expression editor opens.

9. Click the **Functions** tab and expand the **Dimension Functions** tree.

10. Select the function type and drag the function to the expression editor.

    If you click the **Tips** tab, the power editing support opens that gives a detailed explanation of the function selected.

11. In the **Expression** field, drag and drop the member into the expression editor over the `<Input>` field.

    You can also type the name of the member for the field. The name of the member must be identical to the member name in the name attribute. If the name has two words, the name shows in single quote marks.

12. Save the dimension.

**Related concepts**

- **Functions**
  
  The functions that are available for leaf-level and consolidated-level calculations are described.

- **Creating calculation dimensions with arithmetic C calculations**
  
  A 'C' calculation is a calculation performed on aggregated results to give a consolidated total.

**Procedure**

1. In the Model Design pane, right-click the **Dimensions** folder and click the **New** icon.

2. Click the **Dimension** icon.

3. Type the name of the new dimension and select **Calculation** from the **Dimension type** list.

4. Add the members of the dimension to the **Name** attribute either by typing the list or doing a copy/paste action.

   For example: Quantity/year, Unit price, Total Revenue, Total cost of Sales, Total net Sales.

5. Save the dimension.

6. Open the calculation dimension.

   You can either add simple formulae directly to the appropriate members, or you can add formulae with the expression editor.

7. To add a formula directly to give aggregated results, in the column **C Calculation** for a member, type `= <member3> / <member4>` where `<member3>` and `<member4>` are calculated values.

   The result gives a consolidated calculation of the aggregated total.

8. To add a formula with the expression editor, click the cell where you want to add the formula.

   a) Click the **More** button in that cell.

      The expression editor opens.
b) Select Arithmetic from the **Operation type** field.

c) Select the operation type \(+\)(Sum)-(Difference)*\((\text{Multipication})/(\text{Division})\)

d) In the **Expression** field, double-click the operand1 in the expression \('<\text{operand1}>'\*'<\text{operand2}>'\).
   Type the name of the member for operand1.
   The name of the member must be identical to the member name in the name attribute. If the name has two words, the name shows in single quote marks.
   You can also drag and drop members into the expression editor, either individually or by selecting multiple members at a time.

e) Repeat the previous step for \(<\text{operand2}>\).

9. Save the dimension.

**Creating time dimensions**

A time dimension defines the time periods that define the workflow of your application.

A time dimension contains time members, such as financial accounting periods or the dates of sales transactions. Almost all applications will require a time dimension. Using the **Time dimension** tool, you can add in multiple levels of members. For example, you can add in quarters, months, and days.

**Note:** When more than one time dimension is used in a cube, the time-related calculation only applies to the first time dimension in the cube.

A time dimension has the following attributes:

- **Name**, the member name.
- **N Calculation**, a simple calculation performed at the leaf level.
- **Start Date**, the first date of the dimension.
- **End Date**, the last date of the dimension.
- **Last Period**, the final period in the sequence.
- **First Period**, the initial period in the sequence.
- **Previous Period**, the previous period in the sequence.
- **Next Period**, the next period in the sequence.
- **Weight**, a factor applied usually of -1 to change a positive value to a negative value.

**Procedure**

1. In the Model Design pane, right-click the **Dimensions** folder and click the **New** icon.

2. Click the **Dimension** icon.

3. Type the name of the new dimension and select **Time** from the **Dimension type** list.

4. You can populate the time dimension by using the Populate time dimension tool, or by manually adding members. For more information about the Populate time dimension tool, see “Adding members with the Populate time dimension tool” on page 24. To add members manually, perform the following steps.

5. Add the members of the dimension to the **Name** attribute either by typing the list or doing a copy/paste action from a spreadsheet. For example Year, Q1, Q2, Q3, Q4

6. Using the example shown, for the member Year, select the **First Period** attribute and type Q1.

7. For the same member select the **Last Period** attribute and type Q4.

8. From the same example, select the member Q1 and select the attribute **Start Date**. From the drop down calendar, select the first date for Q1.

9. Repeat for the attribute **End Date** and select the last date for Q1.

10. Repeat these steps for Q2, Q3 and Q4.

11. For the member Q1, select the attribute **Next Period** and type Q2.
12. For the member Q2, select the attribute **Previous Period** and type Q1.
13. For the same member, select the attribute **Next Period** and type Q3.
14. Repeat for the members Q3 and Q4.
15. Save the dimension.

**Adding members with the Populate time dimension tool**
You can use the Populate time dimension tool to add multiple levels of members and specify the hierarchy of the members. Using the tool simplifies adding members. For example, you can add quarters, months, and days. Before you can use the Add time period and attribute tool, create a time dimension.

**Procedure**
1. In the Model design pane, double-click a time dimension.
2. In the object viewer toolbar, click the Populate time dimension icon.
3. Click **1. Period level**.
4. Choose whether to include years, quarters, months, and days in the dimension by selecting the required levels.
5. If you chose to include years, pause the pointer over **Year**. If your organization uses calendar years, select Calendar years of 365 (or 366) days. If your organization uses lunar years, select Lunar year of 52 Weeks.
   - The choices available for quarters, months, and weeks depend upon the selection that you made for years. If you chose to use calendar years, quarters will always contain 3 months and months will always conform to the calendar. If you chose to use lunar years, quarters always contain 13 weeks.
6. If you chose to use lunar years, pause the pointer over **Months**. Choose how weeks are distributed over the months in a quarter.
7. If you choose to use calendar years, pause the pointer over **Weeks**. Choose how a week that spans two months should be split between months.
8. Click **2. Duration**.
9. In the **Start date** box, set the start date of the first period to include in the dimension.
   - For example, this could be the first day of a fiscal year.
10. In the **End date** box, set the end date of the last period to include in the dimension.
   - For example, this could be the last day of a fiscal year.
11. Select a switchover date.
   - The switchover date can be the start date, or it can be between the start and end date. If the switchover date falls within or before a defined time period, that period is treated as a future period. If the switchover date occurs after the end of a defined time period, that period is treated as historic.
12. If you want to force the month to end at a calendar end date, click **Yes** in the Align month end with calendar option.
13. Click **3. Member names**.
   - You can set formatting options for the member levels that you include in the dimension.
14. Select the member level that you want to apply formatting options to. For example, you may want to apply formatting to years.
15. In the **Format** box, select the formatting that you want to apply to the member level.
16. In the **Prefix** and **Suffix** boxes, optionally set prefixes and suffixes that will be added to the presentation of the data. For example, add FY as a prefix to years to indicate fiscal years. The year 2011-2012 would then display as FY 2011-2012.
17. Apply formatting options to other member levels as required. Click **OK**.
18. Save the dimension.
Creating versions dimensions

Create a versions dimension when you need to compare different versions of similar data. A versions dimension contains different versions of similar data for comparison, for example, the differences in current budget to the costs in former years. The data in versions dimensions is not usually aggregated, because multiple data entries for the same item are included. A versions dimension has the following attributes:

- **Name**, the member name.
- **Format**, user defined: number, date/time and text formats.
- **Version Calculation**

Procedure

1. In the Model Design pane, right-click the **Dimensions** folder and click the **New** icon.
2. Click the **Dimension** icon.
3. Type the name of the new dimension and select **Versions** from the **Dimension type** list.
4. Add the members of the dimension to the **Name** attribute either by typing the list or doing a copy/paste action from a spreadsheet.
5. Save the dimension.

What to do next

After creating a versions dimension, you can write simple expressions. For example, =Budget - Forecast, to compare similar types of data, or to use the dimension functions, VARIANCE and VARIANCEPERCENT to make use of the "Nature of positive variance" attribute in a Calculation dimension.

Creating hierarchy dimensions

Create a hierarchy dimension in IBM Cognos TM1 Performance Modeler to contain lists of members in a hierarchical structure.

An application may need to contain lists of items that need a hierarchical structure. For example, Continent, Region, and City. The hierarchy dimension makes use of the Promote and Demote functions. You can also drag and drop members to a parent member. Multiple parent hierarchies can be created using copy and paste or by CTRL and dragging a member to a parent member or group of members. The **Expand** and **Collapse** context menu commands give the ability to view and hide members of a hierarchy. A hierarchy dimension has the following attributes:

- **Name**, the member name.
- **Weight**, a factor applied usually of minus 1 to change a positive value to a negative value.

Procedure

1. In the Model Design pane, right-click the **Dimensions** folder and click the **New** icon.
2. Click the **Dimension** icon.
3. Type the name of the new dimension and select **Hierarchy** from the **Dimension type** list.
4. Add the members of the dimension to the **Name** attribute either by typing the list or doing a copy/paste action from a spreadsheet.
   For example, Africa, Egypt, Sudan, Uganda.
5. Using the example, highlight the members Egypt, Sudan, Uganda and click the **Demote Selected Items** icon.
   The selected members become members of the member Africa.
6. Save the dimension.
What to do next
After creating a hierarchy dimension, you can manually create more members or import members into it. You can also apply security.

Creating generic dimensions
Create a generic version of a dimension in IBM Cognos TM1 Performance Modeler when you are not sure of the precise dimension type. When dimensions are used in a cube, the cube is sequenced according to the dimension type, therefore it is a good policy not to have many generic type dimensions. A generic dimension has the following attributes:

- **Name**, the member name.
- **Format**, user defined: number, date/time, and text formats.
- **Pick List**, a link to a predefined dimension or subset.
- **N Calculation**, a simple calculation performed at the leaf level.
- **C Calculation**, a calculation performed on aggregated results.
- **Weight**, a factor applied usually of minus 1 to change a positive value to a negative value.

Procedure
1. In the Model Design pane, right-click the Dimensions folder and click the New icon.
2. Click the Dimension icon.
3. Type the name of the new dimension and select Generic from the Dimension type list.
4. Add the members of the dimension to the Name attribute either by typing the list or doing a copy/paste action.
5. Save the dimension.

What to do next
The generic dimension type should be changed to the required type before use in a cube.

Changing the dimension type
After a generic dimension is created, you can change the dimension type from generic to the dimension type you require.

You can change a generic dimension type before you use it in a cube, the generic dimension type is available for when the final dimension type is not known. When a cube is created, the cube is sequenced in the following order:

1. Basic
2. Hierarchy
3. Generic
4. Time
5. Versions
6. Calculation

This order is always consistent and puts Versions and Calculation last because these dimensions can contain string elements in the form of pick lists or members with text formats. In normal use, the dimensions Versions and Calculation are not used together.

Procedure
1. Open the generic dimension.
2. Right-click the dimension name and click Change the dimension type.
3. Select the new dimension type from the list. Click **OK**.
4. Save the dimension.

## Editing dimensions

The dimension editor in IBM Cognos TM1 Performance Modeler can be used to add, delete, and change the attributes and members of the dimension.

You can add more attributes of the type **Numeric**, **Text**, and **Alias** to the columns of attributes available.

You can add new members to a dimension, these can be hidden or shown and the position can be changed and the hierarchy of the members can be defined. Members can be added singularly or pasted in from a spreadsheet.

### Creating a numeric attribute

Create a numeric attribute for calculation purposes.

A numeric attribute can be set on members at the leaf and consolidated levels. The values at the leaf level can be used for calculations at the consolidated level for a calculation or generic type dimension. Text strings cannot be typed into numeric attributes. You can use numeric attributes for calculation purposes in a calculation type dimension or generic dimension.

**Procedure**

1. Open the dimension.
2. Right-click a member under the **Name** column and select **Add a new attribute**.
3. Type the name of the attribute in the **Enter name for new attribute** field.
4. Click **Numeric** from **Attribute Type**.
5. Click **OK** to confirm.
   - A column with the same name is displayed.
6. You can now enter values for the attribute for each member at the leaf level.
7. Save the dimension.

### Creating a text attribute

You can add text attributes to make textual selections on the members of the dimension. Text attributes are for string values. Text attribute can be used to differentiate the members. For example, you could use a text attribute to mark members that are discontinued, but still need to be included in consolidations.

**Procedure**

1. Open the dimension.
2. Right-click a member under the **Name** column and select **Add a new attribute**.
3. Type the name for the attribute in the **Enter name for new attribute** field.
4. Click **Text** from **Attribute Type**.
5. Click **OK** to confirm.
6. Click the cell for the member under the new attribute you have just created, type a string and press the return key to confirm.
7. Save the dimension.

### Creating an alias attribute in a dimension

Aliases can be used in expressions and links in place of the member name.

An alias is an alternate name for objects in a model. Both the alias name and the caption name can be used in the expressions editor, and when used, the expression editor refers back to the member name. If
a mistake is made with the use of the alias name, then the expression editor shows the text in red with a red underline. You can create a new alias name in the properties of the dimension.

**Procedure**

1. Open the dimension.  
2. Right-click a member under the name column and select **Add a new attribute**.  
3. Type the name **Alias** in the **Enter name for new attribute** field.  
4. Click **Alias** from **Attribute Type**.  
5. Click **OK** to confirm.  
   A column called **Alias** is displayed.  
6. Click the cells for the members under the new attribute you created, type the alias of your choice for each member and press enter to confirm.  
7. Save the dimension.

**Example**

If the invariant member name is **Q1 sales**, the caption for that member is **First quarter sales** and the alias name is **Q1**, all three names can be used in the expressions editor. Therefore the following expressions are the same.

<table>
<thead>
<tr>
<th>Member name</th>
<th>Caption</th>
<th>Alias</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q1 sales</td>
<td>First quarter sales</td>
<td>Q1</td>
</tr>
<tr>
<td>='Q1 sales' * Price</td>
<td>='First quarter sales' * Price</td>
<td>=Q1 * Price</td>
</tr>
</tbody>
</table>

When you place the cursor over the caption or alias name in the expression editor, the member name shows.

**Editing the dimension display options**

The dimension has display options that can be changed to suit how you want the attributes to be seen in the dimension editor.

A valid dimension must exist. The attributes can be changed in the attributes dialog box.

**Procedure**

1. Open a dimension.  
2. Right-click the title **Name** and click **All display options**.  
3. In the **Dimensions** dialog box, select the attributes that you want to display.  
4. Click **OK**.  
5. Save the dimension.

**Adding a single member to a dimension**

You can add single members to a dimension by editing the dimension. You can add a new member, a text member, or a child member to the dimension.

**Procedure**

1. Open the dimension.  
2. Double-click the **<Add new member>** field in the **Name** column.  
3. Type the name for the new member.
4. Drag and drop the new member to the correct place in the list of members.
5. Use the **Demote Selected Members** and **Promote Selected Members** to put the new member in the correct place in the hierarchy.
6. Save the dimension.

**Adding multiple members to a dimension**

If you have a list of members in a spreadsheet, you can add these members using a paste action.

**Procedure**

1. Open a dimension.
2. Copy the members from an open spreadsheet.
3. Right-click the member where you want to paste the members.
4. You can select the following options: **Paste Above**, **Paste Child** **Paste Below**.
5. Save the dimension.

**Removing a member from a consolidation**

If you have two instances of a member in the same consolidation, you can remove one of the instances to keep the consolidation correct.

When a member appears in two different hierarchies in the same consolidation, one instance needs to be removed to keep the consolidation totals correct. When you remove a member that has multiple parents from a consolidation the selected members are removed. If the member has only one parent, the member is moved to the top level and the children of the member keep their position in relation to the member.

**Procedure**

1. Open the dimension.
2. Right-click the member and click **Remove Members From Consolidation**.
   
   More than one member can be selected.
3. Click OK to remove the member.

**Searching in large dimensions**

When you edit large dimensions, navigation can be difficult. To make it easier, you can search through existing elements of the dimension that is open in the dimension editor.

When an element appears in more than one hierarchy, you can get multiple results when you search for that element. The search results show all the hierarchies that contain matching elements. For highly nested elements, these search results can be difficult to navigate. When you search for subtotals, you can see the top level of the nested search results and expand them to reveal their children.

**Procedure**

1. Open the dimension or measure that you want to edit in the content pane.
2. In the search field, enter the search criteria of the elements that you want to find and click the search icon.
   
   The search returns the elements that match the criteria currently. You can expand the children to explore further.
3. To clear the search and see all elements in the dimension, click the clear search button.
**Formatting members**

Format is a user defined property for members. You can define number style, date, time, and text using the format editor.

The format property is available in the versions and calculation dimensions. The format property has a Format for dialog box where you can select a desired format and set format parameters.

**Formatting a member**

You can format members in the versions and calculation dimensions. If you set a format on a member that has an existing picklist set, the operation removes the picklist.

**Procedure**

1. Open the dimension.
2. Double-click the member cell for the member from the Format attribute.
3. Click the desired Format Type.
4. Set the required properties for the format you selected.
5. Click Apply.
6. Save the dimension.

**Custom formats**

In IBM Cognos TM1 Performance Modeler, you can specify custom display formats in versions and calculation dimensions.

**Attention:** Custom formatting patterns are saved with the data. When other users see this data, their user preferences are overridden by this pattern. Use custom formatting patterns only when the format you need is not available from the Format type list.

There are two different types of custom format syntax that you can use: ICU-based formatting, and MDX-based custom formatting.

In versions of Cognos TM1 before version 10.2, MDX-based custom formatting was exclusively used. In version 10.2 and later, in Cognos TM1 Performance Modeler, and Cognos Insight, both ICU and MDX formatting can be used.

ICU syntax is used by default in Cognos Performance Modeler and Cognos Insight. To use the MDX syntax, the following flag must be set in the config.ini file for Cognos Performance Modeler, and for IBM Cognos Insight. The location of config.ini depends on your installation, for example: C:\Program Files\IBM\cognos\tm1_64\perfmodeler\configurations\config_version_number\config.ini.

```
MDX_FORMAT_EDITOR=true
```

If this flag is not set, or not included, ICU syntax must be used.

**Setting custom formats**

To format a member in a dimension, do the following steps:

1. Open the dimension and double-click in the Format cell of the member.
2. Select a Format Type of Custom.
3. Select either Number or Date.
4. Enter the format expression to be used in the field and click Apply.

You can see a preview of the custom format that you have entered, under Samples.
ICU syntax for custom formats

Format expressions that use ICU syntax consist of a pattern and a set of symbols (characters). You can specify how both positive and negative numbers are formatted. If you do not specify a negative subpattern, negative numbers use the positive formatting that is prefixed by the localized minus sign.

For example, if you type the following pattern in the custom formatting field: '#,##0.00; (#,##0.00)

- Positive numbers are formatted as: 123,456,789.00
- Negative numbers are formatted as: (123,456,789.00)

The semicolon (;) separates positive and negative subpatterns.

Another example shows how you can change where the grouping separator that is used to make large numbers more legible appears.

Type the following pattern in the custom formatting field: '#,##,##0

This pattern formats numbers as:

- Positive: 12,34,56,789
- Negative: -12,34,56,789

For more information, go to the following web site: http://icu-project.org/apiref/icu4c/classDecimalFormat.html, and search for "Special Pattern Characters".

For custom date formats, you use a date pattern. In a date pattern, strings of characters are replaced with date and time data.

For example:

- hh:mm a formats time as:
  - 12:00 AM
  - 06:00 PM

- EEE, MMM d, 'yy formats the date like this:
  - Mon, Oct 30, '15

For more information and examples, go the following web site: http://userguide.icu-project.org/formatparse/datetime, and look for "Date/Time Format Syntax".

MDX syntax for custom formats

For examples of expressions that use MDX syntax, see the "Numeric Values" topic in IBM Cognos TM1 Perspectives, TM1 Architect, and TM1 Web documentation.

Creating subsets

Subsets are a limited set of items from a dimension. Some examples of how you can use subsets are described below:

- Create a subset for use with a pick list in a calculation dimension to limit the number of items in the pick list.
- Create a subset from a time dimension to limit the number of months a user sees in a view.
- Create a subset to hide a total from a list of products.

A subset is a selection from the parent dimension. Subsets can be static or dynamic. If dynamic subsets from other IBM Cognos TM1 interfaces, such as Cognos TM1 Architect and Cognos TM1 Perspectives are opened with IBM Cognos TM1 Performance Modeler, the MDX expression is shown in the properties and the user is warned. If you edit a dynamic subset, the subset is saved as a static subset.

You can use filters in subsets. For example, if you have a postcode attribute, you could search for all properties with a postcode that begins with "SW". You can use filters to add and remove members from an existing subset.
Procedure

1. Right-click the dimension name in the Model Design pane and click **New > Subset**
2. Type the name for the subset and click **OK**.
3. Select the members that you want to include in the subset.
   There are different methods of doing this:
   • Hide the members that you do not want in the subset, or
   • Use the filter to select which elements that you want in the subset. For more information, see “Using a filter in a subset” on page 33.
   To hide the members:
   a) Right-click a representative member for the level that you want to apply to the subset.
      For example, if you have Year, Months, Weeks as time periods, and you want to use months only, right-click any month member.
   b) Select the appropriate Hide command from the selection box.
   **Note:** When you hide a member in a subset, the member is not deleted.
4. Choose how the members in the subset appear.
   For example, you can do the following operations:
   • Sort the members in a subset by right-clicking on a member and choosing one of the sort options.
   • Expand all or collapse all members in a dimension.
   • Move members up and down.
5. Save the subset.

Example

Take a dimension that is named Country and region and create a subset that is named Europe.

The Country and region dimension contains the following members:

• All Subsidiaries
  – Americas
  – Asia Pacific
  – Europe
    – Central Europe
    – Northern Europe
    – Southern Europe

To create the Europe subset, perform the following steps:

1. Right-click the dimension that is named Country and region and select **New > Subset**. Name the subset Europe.
2. Right-click the Europe member and select **Hide others**.
3. Expand the Europe member so that the leaf members are displayed and save the subset.

The Europe subset contains the following items:

• Europe
  – Central Europe
  – Northern Europe
  – Southern Europe
Creating dynamic subsets

Members of a dynamic subset change when members are added or removed from the dimension.

A dynamic subset uses an expression to select the members for the subset. When new members are added to the dimension and the member falls into the category the expression defines, the new members are added to the subset without further editing. The expressions are edited in an MDX editor.

You can change a subset from a static to a dynamic subset and back again by checking the Dynamic subset checkbox. A dynamic subset must contain an expression. A static subset can also be defined with the expression editor, and then saved as a static list.

You can edit the expression directly and you can cut and paste MDX expressions from other sources.

Procedure

1. Right-click the dimension and then select New > Subset.
2. Type a name for the new subset and click OK.
3. Click on the name of the new subset in the Model Design pane to display the Properties page for the subset.
4. Click the edit button in the Expression Property. The MDX expression editor opens.
5. Select the Dynamic check box. If the Dynamic check box is not selected, the subset will be a static subset and will not reflect subsequent changes made to the members lists.
6. You can type, or copy and paste an MDX expression directly into the Expression box. Or you can select an option from the Subset Basis selection as a starting point for the expression:
   - Level(n) The levels that are available for members.
   - All Members All members of the dimension.
   - Current Members The current members of the subset.
   - Selected Members The selection from the list of members in the Name column.
7. Select the sort type from the Sort selection, Ascending, Descending or Hierarchy.
8. Click OK to apply the changes and close the editor, click Apply to apply the changes and keep the editor open.

Using a filter in a subset

With filters, you can produce a list of selected members for a static subset based on the attributes or column values.

The filter can be applied to either a static or dynamic subset. If the filter is applied to a dynamic subset, the subset becomes static when saved.

The filter is applied to all of the members in the dimension, and not just in the subset.

Some examples of how you can use filters are listed below:

Filter example

Discontinued items have a text attribute Discontinued. Generate a subset of all current items available for sale by filtering out members with the attribute Discontinued.

Filter with sort

Find all properties with fewer than 100 Office Based Staff and Contractors, and sort them in descending order of staff number. In this example, search a numeric attribute named "Total Office Based Staff and Contractors" for a number value of 100, selecting the Less than and the Sort Descending options. Then, click Select All, and Replace.
Filter by using sort, remove
Find all properties with a construction date before 1900, sort them in descending order of Energy Consumption, and then remove all of those members with fewer than 100 Workstations.

CAUTION:
On large dimensions, the Remove option can be slow. This does not apply to Add and Replace. The filter sorts members by invariant name or attribute, however the two attributes Index and Weight cannot be used.

Procedure
1. Open the subset.
2. If you are filtering on an attribute, click a member in the attribute column that you want to filter on. Otherwise, the invariant name is filtered.
3. Click Filter by column.
4. Select the condition, Show the following or Do NOT show the following.
5. In the Keywords or Number field (if filtering on a numeric attribute), type the key word or number.
6. Select the filter type, Starts with, Ends with, or Contains for a text value, or Greater than, Less than, or Equals for a numeric value.
7. Select the filter order, Sort ascending, Sort descending, Don't sort.
8. Click Search.
The result of the first filter shows in the Values field.
9. Click the values that you want in the subset. You can use Ctrl and click, and Shift and click to select multiple values, or Select All.
10. Click > to move the values into Selected values, and then click one of the following options:
    • Replace replaces the current members in the subset with the selected members.
    • Add adds the selected members to the bottom of the existing subset.
    • Remove removes the selected members from the subset.
    • Cancel
11. Save the subset.

Creating pick lists
A pick list contains values that a user can select in a cell. A pick list contains values corresponding to all members of a dimension or subset of a dimension. If the members of the dimension or the subset change, the values available in the pick list also change. A pick list can also be composed of a static list of values that are specified when you create the pick list.

The Pick List attribute is available in calculation dimensions. The benefit of using a pick list is that it provides a structured user interface, the user has better understanding about the input required. For example, when staff managers do performance planning; they might be required to assign to their staff a performance grade by using pick lists to select from a fixed list of Low, Medium, High, and Excellent, instead of typing a freeform text string. If you set a pick list on a member with an existing format, the operation removes the format.

Procedure
1. In a calculation dimension, double-click the Pick List column for the member for which you want to define a pick list.
2. To create a static pick list, select Static list, then enter the values in the Static list box. Enter each value on a separate line in the box.
3. To create a dynamic pick list that uses members from either a subset or dimension as list values, select Dimension or Subset.
a) Click **More** to open the **Select a dimension or subset** dialog box.
b) Navigate to either the dimension or subset that contains the elements you want to appear in your pick list, then click **OK**.

4. Select either **Text** or **Numeric** to determine the element type that is applied to pick list values.
   If you are creating a dynamic pick list to be used in a link, select **Text**. If you do not select **Text**, the link validates correctly, but no data is put into the target cube.

5. Click **OK**.
6. Save the dimension.
Chapter 4. Creating cubes

A cube is a store of data within a model. It is multidimensional and contains rows, columns, and any number of pages. You use one or more cubes to create an application.

To create a cube by importing data, see “Importing data using Guided Import” on page 10. To create a cube by using dimensions, see “Creating a cube using dimensions” on page 39.

Dimension order determined by dimension type

When you create a cube, dimensions are sorted according to their type. Basic dimensions are listed first, and calculation dimensions are listed last. By default, dimensions are listed in the following order:

1. Basic dimensions
2. Hierarchy dimensions
3. Generic dimensions
4. Time dimensions
5. Versions dimensions
6. Calculation dimensions

Any string members that are in a cube must appear in the last dimension. Because calculation and versions dimension types are listed last, the dimension with a string member is often placed last.

If your cube contains both a versions dimension and a calculation dimension, the calculation dimension is placed last. If you must add a string member to a dimension that is not placed last in a cube, you can reorder the dimensions.

Order of calculations determined by dimension type

When your cube contains dimension calculations, the calculations are performed according to the dimension type. Versions dimensions are calculated first, and calculation dimensions are calculated last. By default, calculations are performed in the following order:

1. Versions dimension calculations
2. Time dimension calculations
3. Hierarchy dimension calculations
4. Generic dimension calculations
5. Basic dimension calculations
6. Calculation dimension calculations

Example of the rationale for calculation order

This example shows why versions dimension calculations are performed before calculation dimension calculations.

You have a calculation dimension that is calculated as follows:

Revenue(=Units*Price)

And you have a versions dimension that is calculated as follows:

Variance(=Actual-Budget)

And you have the following data:

<table>
<thead>
<tr>
<th>Units</th>
<th>Budget</th>
<th>Actual</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>100</td>
<td>110</td>
</tr>
<tr>
<td></td>
<td>Budget</td>
<td>Actual</td>
</tr>
<tr>
<td>--------</td>
<td>--------</td>
<td>--------</td>
</tr>
<tr>
<td>Price</td>
<td>5</td>
<td>4</td>
</tr>
</tbody>
</table>

Scenario 1

If the rules for the calculation dimension came before the rules for the versions dimension, the calculations would be performed as follows:

<table>
<thead>
<tr>
<th></th>
<th>Budget</th>
<th>Actual</th>
<th>Variance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Units</td>
<td>100</td>
<td>110</td>
<td>10</td>
</tr>
<tr>
<td>Price</td>
<td>5</td>
<td>4</td>
<td>-1</td>
</tr>
<tr>
<td>Revenue</td>
<td>500</td>
<td>440</td>
<td>-10</td>
</tr>
</tbody>
</table>

So \( \{ \text{Revenue, Variance} \} \) is calculated as \( 10 \times -1 = -10 = \) which is incorrect.

Scenario 2

If the rules for the calculation dimension came after the rules for the versions dimension, the calculations would be performed as follows:

<table>
<thead>
<tr>
<th></th>
<th>Budget</th>
<th>Actual</th>
<th>Variance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Units</td>
<td>100</td>
<td>110</td>
<td>10</td>
</tr>
<tr>
<td>Price</td>
<td>5</td>
<td>4</td>
<td>-1</td>
</tr>
<tr>
<td>Revenue</td>
<td>500</td>
<td>440</td>
<td>-60</td>
</tr>
</tbody>
</table>

Now, \( \{ \text{Revenue, Variance} \} = \{ \text{Revenue, Actual} \} - \{ \text{Revenue, Budget} \} = 440 - 500 = -60 \), which is correct.

Size limitations on cubes

There is no software limitation on the number of cells that are contained in a cube. There is a hardware limitation that depends on the memory on a computer. To determine the size limitation, calculate the number of cells by multiplying the number of rows by the number of columns by the number of pages. The number of cells is the product of the number of items that are contained in each dimension. The general formula for measuring cube size is the following:

\[
\text{Size} = (\text{number of items in dimension 1}) \times (\text{number of items in dimension 2}) \times (\text{number of items in dimension 3}) \times \ldots \times (\text{number of items in dimension n})
\]

Size limitations vary greatly depending on memory available on a computer. Cubes containing long dimensions of 500 items use more memory than similarly sized cubes containing dimensions of 100 items. In general, size limitations become apparent in cubes of four or more dimensions. If you have a three-dimensional cube of 400 pages, adding another dimension of 20 items increases the memory usage twenty times. That is, you increase the data held from 400 pages to 8000 pages. Adding a fifth dimension of 20 items increases the memory usage twenty times again to 160,000 pages of data. Overcome this memory limitation by creating a series of well-populated cubes of three or four dimensions rather than one sparsely populated cube of five dimensions.

Treatment of views during cube restructuring

If a cube has any private views, the private views are destroyed when the cube is restructured in Cognos Performance Modeler. Actions that change the structure of a cube include:

- Adding a dimension to a cube
- Removing a dimension from a cube
- Changing the order of dimensions in a cube
If a cube is restructured, any worksheet functions (such as DBRW) that reference the cube in Microsoft Excel or in Websheets must be updated to reflect the revised dimensionality of the cube.

**Restructuring cubes used in TM1 Applications**

If you need to restructure a cube that is used in a TM1 Application, the application should first be deactivated in the TM1 Applications portal.

If the cube is accessed by Cognos Insight in Distributed Mode, the application should be redeployed after cube restructuring. This is to ensure that the data reservations used to enforce node ownership can be correctly removed and then updated after the structure of the cube has changed.

The application can be reactivated after cube restructuring is complete.

---

**Creating a cube using dimensions**

Use dimensions to create a cube. Dimensions perform calculations, control labels, and format data entry.

If more than one time dimension is used in a cube, the rules generated from the dimension calculations in the cube will refer to the attributes of the first time dimension for time-related behavior, such as time averages. Additional time dimensions used in the cube (after the first time dimension) will behave as hierarchical dimensions at the consolidated level.

**Procedure**

1. In the Model Design pane, hold CTRL and click the dimensions to go in the cube.
2. Click the **New** icon.
3. Click **Cube**.
4. In the **New cube** field, enter a name for the new cube. Click **OK**.

   **Tip:** In the cube view, you can enable Automatic Recalculation by clicking the **Recalculation** icon. If this option is not selected, when you make any changes to the cube, or reopen it, you must manually click **Recalculate** to see the data in the cube.

**Dropping dimensions on a new cube**

You can drag and drop dimensions from the Dimensions folder to add them to your new cube.

**Procedure**

1. Click a dimension and drag it to the **Rows** area.
   The dimension values are listed as row headers on the cube viewer.
2. Click another dimension and drag it to the **Columns** area.
   The dimension values are listed as column headers on the cube viewer.
3. Click additional dimensions and drag them to the **Context** area.

   **Note:** It does not matter which order you arrange the dimensions. Dimensions are sequenced by their type. You can change the default order in which the dimension types are listed.

**Using the keyboard to add dimensions**

You can use the keyboard to add dimensions to your new cube.

**Procedure**

1. In the Model Design pane, in the **Cubes** folder, double-click the empty cube that you created. The cube viewer for the new cube appears as a new tab.
2. In the Model Design pane, expand the **Dimensions folder**.
3. Right-click a dimension, and select **Add Dimension to Cube, cube_name**. The dimension members are listed as row headers on the cube viewer.

4. Right-click another dimension and select **Add Dimension to Cube, cube_name**. The dimension members are listed as column headers on the cube viewer.

5. Right-click additional dimensions and select **Add Dimension to Cube, cube_name**. The dimensions are added as context filters in the cube viewer.

   **Note:** It does not matter in what order you arrange the dimensions. The dimensions are sequenced by their type. You can change the default order in which the dimension types are listed.

### Adding dimensions to an existing cube

Add a dimension to a cube so that data relationships in the cube can be examined in greater detail. You do not need to create all of a cube's dimensions at the same time. You can add a dimension later, for example, if no data had existed for the dimension when the cube was created.

**Procedure**

1. Decide which dimension you want to add to the cube.
   
   **Note:** View the **Properties** pane to see a list of dimensions that are already part of the cube.

2. In the Model Design pane, expand the **Dimensions** folder.

3. Click and drag a dimension to the **Rows**, **Columns**, or **Context** area of the cube viewer.

4. If there is data in the cells that is not calculated by rules, specify how you want the existing data distributed between the members of the new dimension.

5. Click the **Actions menu** icon , and click **Save** or **Save As**. The cube is saved and the new dimension is displayed in the **Properties** pane and in the cube viewer.

   **Note:** The initial order of the dimensions is determined by the dimension type.

### Removing dimensions from the cube

Remove a dimension from a cube if you do not need to know how the dimension relates to the cube data. For example, the cube you are designing is intended for high-level planning only. You remove a dimension from the cube because users will not need to know the details about that dimension.

**Procedure**

1. Decide which dimension you want to remove from the cube.

   **Note:** View the **Properties** pane to see a list of dimensions that are part of the cube.

2. If you want to sum all the leaf-level data in the cube when the dimension is removed, add a consolidated member to the dimension that you plan to remove.

3. In the **Rows**, **Columns**, or **Context** area of the cube viewer, right-click the dimension, and select **Remove**.

4. If there is data in the cells not calculated by rules, specify how much data from the removed members you want to keep in the cube.

   a) Select **Retain only one slice**, then click `[dimension_name].[member_name]` to keep the data from only the selected member.

      **Note:** If you added a consolidated member to sum all the leaf-level data in the cube, select this option and click the consolidated member.

   b) Select **Clear all the data** to keep none of the data from the removed members.

5. Click the **Actions menu** icon , and click **Save** or **Save As**.
The cube is saved and the dimension is removed from the Properties pane and the cube viewer.

Changing the order of dimensions

Change the order of dimensions in a cube to modify the logical structure of the cube.

When you create a cube, by default, dimensions are sequenced according to their type, in the following order:
1. Basic
2. Hierarchy
3. Generic
4. Time
5. Versions
6. Calculation

You can change the dimension order in a cube to make the order consistent with other cubes. Or you may want to move a dimension to the end of the list because it contains text strings that cannot be displayed unless it is the leaf member.

**Note:** Changing the dimension order with the Reorder dimensions icon is not the same as optimizing the memory used by the dimensions icon.

**Before you begin**

A cube with two or more dimensions must appear in the object viewer.

**Procedure**

1. Click the **Re-order dimensions** icon.
2. Click a dimension and then use the buttons to move the dimension up or down the list.
3. Click **OK**.
4. Click the **Actions menu** icon, and click **Save** or **Save As**.
   The cube is saved and the dimension is no longer displayed in the Properties pane or the cube viewer.

Viewing the rules of a cube

View the rules of a cube to see how certain data values are calculated based on other data values.

Rules and feeders are created from dimension calculations and links. The rules are placed in discrete rule blocks. These rule blocks cannot be edited by users. However, they can be re-ordered. Users can create their own rules to supplement the auto-generated rules.

Feeders are automatically generated when you create a calculation to ensure that all rule-derived values consolidate correctly

**Note:** Some users, such as business analysts, may not need to know that rules are used to perform their calculations.

The most common calculations in OLAP applications involve aggregating data along a dimension. In TM1, you create these calculations by using consolidation hierarchies. For example, in a Month dimension, you can define a quarterly total that sums the January, February, and March values.
In many applications, you need to perform calculations that do not involve aggregating, such as cost allocations and exchange translations. With cube rules, you can create formulas to perform these calculations.

With cube rules, you can perform the following tasks:

• Multiply prices by units to yield the sales amounts.
• Override consolidations when necessary. For example, you can prevent a quarterly price from displaying a tally of individual monthly prices.
• Use data in one cube to perform calculations in another cube, or share data between cubes. For example, you can pull sales data into a cube that contains Profit and Loss information.
• Assign the same values to multiple cells.

**Procedure**

1. In the Model Design pane, expand the **Cubes** folder.

2. Expand the cube whose rules you want to view.

3. Double-click the rules object. The rules editor appears in the object viewer. The rules editor contains two types of sections: rules sections and feeder sections.

**What to do next**

You can create a rules object or continue with other modeling tasks.

For detailed information about rules, see Chapter 6, “Managing rules and feeders,” on page 67 or the *IBM Cognos TM1 Rules* documentation. The documentation contains a tutorial that steps you through developing rules in a business environment.

**Creating a rules object**

Create a rules object to manually add a cube rule to other rules that are generated automatically.

**Procedure**

1. Double-click the rules object for a cube to open the rules editor in the object viewer.

2. In the rules editor, type one or more rule statements.

   The general format of a rules statement is: [Area]=Formula;

<table>
<thead>
<tr>
<th>Variable</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Area</td>
<td>Specifies the portion of a cube affected by the rule.</td>
</tr>
<tr>
<td>Formula</td>
<td>Describes how TM1 calculates the cells in the cube area.</td>
</tr>
</tbody>
</table>

Here is an example of four rule statements:

['Gross Margin%']=['Gross Margin']/['Sales']*100;
['Price']=N:DB('PriceCube',lactvsbud!region!model!month);
C:['Sales']=['Units']*1000;
['Sales']=N:['Price']*['Units']\1000;
For detailed information about creating rules, see Chapter 6, “Managing rules and feeders,” on page 67 or the IBM Cognos TM1 Rules documentation.

3. Click the Actions menu icon, then click Save Data. The rule you added is saved with the cube.

**Defining a cube view**

You can define how data is displayed to a reviewer or contributor. First, you define a cube view in the Model Design pane, and then you add a reviewer or contributor view to an application in the Application Design pane.

To add a view to an application, see “Adding contributor and reviewer views to applications” on page 78.

You can modify a view in the following ways:

- Expanding and collapsing consolidations
- Pivoting dimensions
- Hiding members
- Filtering view data
- Editing subsets

**Designing views for reviewers or contributors**

You can design different views to be used for Review or Contributor users.

For example, a Reviewer can see higher-level summaries while the Contributor can see more detail-rich views.

In the IBM Cognos TM1 Performance Modeler Application Design tab, you can specify which views are designed as Contributor or Reviewer views.

Targeted views also facilitate the deployment of reporting cubes. Reporting cubes can deliver improved performance when large numbers of nodes need to be reviewed. To improve performance, a TurboIntegrator process based on a cube with many rules can report into a cube with only a few rules for review.

If there are no Reviewer views specified, then all users with Review access at the consolidated level also have access to the views specified for contributors at the leaf level.

To identify a view as either a Reviewer or Contributor view, drag the view from the TM1 Objects pane into the Reviewer or Contributor location.
Creating a new cube view

Create a new cube view for a reviewer or contributor.

Before you begin
The cube must already exist in the Model Design pane.

About this task
Be aware that you can change the structure of a cube only from the cube editor, and not from the cube view.

Procedure
1. In the Model Design pane, expand the Cubes folder.
2. Right-click a cube from which you want to create a view and click New > View.
3. Enter a name for the cube view and click OK.

   The new cube view appears in the Model Design pane under the original cube.

What to do next
Modify the cube view using the methods described in this section.

Expanding and collapsing consolidations
You can click the control next to a member name to expand or collapse a consolidation in the cube viewer.

Expand
A plus sign next to a member name identifies the member as a consolidation. To drill down on consolidations in a dimension and view the underlying detail, click the plus sign. The plus sign changes to a minus sign.

Collapse
A minus sign next to a member name indicates an expanded consolidation. To roll up the leaf members in a dimension, click the minus sign. The minus sign changes to a plus sign.
Pivoting dimensions

To change the presentation of cube data, pivot the dimensions in the cube viewer by dragging and dropping dimensions into new locations.

- Drag a dimension to the column position.
- Drag a dimension to the row position.
- Drag a dimension to the title position.
- When you drag Dimension1 and position your cursor in the center of Dimension2, dropping the dimension will swap the positions of the two dimensions.
- When you drag Dimension1 and position your cursor on the left side of Dimension2, Dimension1 is dropped immediately to the left side of Dimension2.
- When you drag Dimension1 and position your cursor on the right side of Dimension2, Dimension1 is dropped immediately to the right side of Dimension2.

If you drag a dimension and drop it immediately to the left or right of an existing column or row dimension, you can see more detail along the columns or rows of a view. For instance, you could drag the plan_time dimension to before the plan_department dimension in the columns of a view to see the detail for time and departments in the columns.

Hiding members

To save screen space, hide rows and columns in the cube viewer. Hidden members still apply to the data displayed in the view, but do not occupy screen space.

Procedure

1. Click a column header or row header.
   The row or column is selected.
2. Right-click the same column header or row header and select Hide Selected.

Defining a view based on subsets and selected members

Define a cube view based on subsets or members of subsets that are already created.

If you or a colleague previously defined a subset, you can add it to your cube view without having to redefine the subset.

Procedure

1. Open an existing cube view or create a new cube view. The cube view appears in the object viewer.
2. Click a subset and drag it to the object viewer onto an existing dimension or view.
   Note: You can drop the subset only onto its parent dimension or another subset of its parent.
   If you drag the subset onto a row or column, all the members of the subset are displayed. If you drag it onto a context area, the first member of the subset is displayed.
3. If you want to keep only selected members of the subset that you added to your cube view, do the following actions:
   a) In the object viewer, drag the imported subset to the rows area or the columns area, if it is not there already.
   b) Ctrl+click the row headers or column headers that you want to keep in your cube view.
      The selected rows or columns are highlighted.
   c) Right-click the highlighted area and select Keep Selected.
      The rows or columns that you did not select disappear.
4. Click the Actions menu icon, then click Save As.
5. Enter a name for the view and click **OK**.

The new cube view ☐ appears in the Model Design pane, in the **Cubes** folder under *cube_name*.

**Editing a working subset from a view**

Edit a view by editing the working subset of the dimension from which the view is based.

**About this task**

You can edit a defined subset from the cube view without having to redefine the subset.

**Procedure**

1. Open an existing cube view ☐

   The cube view appears in the object viewer.

2. Click the drop down menu of the **Working Subset** and click **Edit Subset**.

   The **Working Subset Editor** opens. All filtering capabilities are available for editing the subset.

3. Edit the subset for your needs.

   a) To invoke the subset in the view, click **OK**.

   b) To save the subset for further reuse, click **Save As**, and type a new name for the subset.

      A new subset is created in the **Dimensions** folder.

**Results**

The **Working Subset Editor** closes, and the view shows the data based on the edited subset.

**Changing the working subset of a view**

Edit a view by changing the working subset of the dimension from which the view is based.

**About this task**

You can change a defined subset from the cube view without having to redefine the subset.

**Procedure**

1. Open an existing cube view ☐

   The cube view appears in the object viewer.

2. Click the drop down menu of the name of the working subset and click **Edit Subset**.

   The **Working Subset Editor** opens. All filtering capabilities are available for editing the subset.

3. Click the **Subset** field and click the subset you want to use from the list of available subsets.

4. Edit the subset for your needs.

   a) To invoke the subset in the view, click **OK**.

   b) To save the subset for further reuse, click **Save As**, and type a new name for the subset.

      A new subset is created in the **Dimensions** folder.

**Results**

The **Working Subset Editor** closes, and the view shows the data based on the changed subset.
Spreading data in a cube view

You can use spread data options to distribute numeric data in cells in a cube view. For example, you can evenly distribute a value across a range of cells, or you can increment all values in a range of cells by a specified percentage.

Some data spreading options can only be used in consolidated cells to spread data across child cells: relative proportional, equal leaves, repeat leaves.

Procedure

1. Right-click the cell from which you want to initiate data spreading, and click Spread Data. Or in a consolidated cell, enter a value.
2. Choose the appropriate option:

Relative proportional

Spreads values to the leaves of a consolidation proportional to the leaves of a reference cell. The reference cell must share the same consolidations as the cell from which you initiate spreading.

For example, the following table shows a consolidated value of 100 for Brazil in Quarter 1, 10 in January, 20 in February, and 70 in March.

The values for Canada are currently 0.

<table>
<thead>
<tr>
<th>Country or region</th>
<th>Quarter 1</th>
<th>Jan</th>
<th>Feb</th>
<th>Mar</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brazil</td>
<td>100</td>
<td>10</td>
<td>20</td>
<td>70</td>
</tr>
<tr>
<td>Canada</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

If you initiate relative proportional spreading for Canada in Quarter 1, specifying an update action of replace, spreading the value 400, using Brazil, Quarter 1 as the reference cell, you will get the following values for Canada:

<table>
<thead>
<tr>
<th>Country or region</th>
<th>Quarter 1</th>
<th>Jan</th>
<th>Feb</th>
<th>Mar</th>
</tr>
</thead>
<tbody>
<tr>
<td>Canada</td>
<td>400</td>
<td>40</td>
<td>80</td>
<td>280</td>
</tr>
</tbody>
</table>

Equal leaves

Distributes a specified value equally across the lowest child members of a consolidated cell. You can choose whether this applies to all leaf cells, or populated leaf cells, and you can specify the update action: replace, add, or subtract.

Equal spread

Distributes a specified value equally across all leaves of a consolidated cell.

Repeat leaves

Repeats a specified value across the leaf cells. You can choose whether this applies to all leaf cells, or populated leaf cells, and you can specify the update action: replace, add, or subtract.

Repeat

Replaces the selected cells with a value, adds a value to the selected cells, or subtracts a value from the selected cells.

Straight line

Populates cells by linear interpolation between two specified endpoints. You specify a start and end value, choose the direction of the spread, and the update action.

For example, the following table shows the effect of straight line spreading across a range of six cells with the start value of 100 and the end value of 200.

<table>
<thead>
<tr>
<th>Country or region</th>
<th>Jan</th>
<th>Feb</th>
<th>Mar</th>
<th>Apr</th>
<th>May</th>
<th>Jun</th>
</tr>
</thead>
<tbody>
<tr>
<td>Argentina</td>
<td>100</td>
<td>120</td>
<td>140</td>
<td>160</td>
<td>180</td>
<td>200</td>
</tr>
</tbody>
</table>
Growth %
Sequentially increments the values in a range by a growth percentage. Specify a value that applies to the current cell, then a growth percentage is applied to the cells in the direction chosen, with the specified update action.

Cube calculations
Cube calculations simplify the creation of rules to complete common modeling operations, such as managing and maintaining the model. You can add a calculation to make your model meaningful by deriving more information from the data source.

If you want to create calculations that do not involve aggregating, such as calculating exchange rates or revenue, you can build formula expressions in the Cubes Calculation editor. You can use functions that apply to both dimensions and cubes.

By using the calculation editor, you can view what calculations are applied to a selected cell and modify the precedence of the calculations or rules on the cube. You can use the Rule editor to change the order of the rule block that is associated with the cube calculation.

Following are some of the benefits of building cube calculations:

- Obtain data from other cubes to build the calculation expression.
  For example, you can use attributes that exist in a dimension other than the one where the calculation is defined.
- Apply calculations to the leaf of consolidated levels.
- Apply calculations to string elements.
- Reference element attributes.
- Use standard TM1 functions for leaf level and consolidated level.
  For information about TM1 functions, see the IBM Cognos TM1 Reference Guide.

Note the following considerations when you write calculations:

- If you are using a number that is greater than zero but less than one, prefix the number with a leading zero. For example, 0.10.
- Use single quotation marks and square brackets around attribute names. For example, ['item_name'].
- You can use both uppercase and lowercase letters. The syntax is not case-sensitive.
- The expression string must begin with the equal sign (=).
- Rules are automatically generated when you create a cube calculation. Feeders will also be generated if the server property Generate feeders automatically is set to All Rules or to Only Automatically Generated Rules.

Scope of calculation
The following is the scope or the extent to which a calculation is applied:

- For a specific cell
- For a specific dimension member
- For references to a cell or cells from another cube
- For a specific n-dimensional slice

The scope of the calculation is inferred from the selection in the cube or cube view. When you create a calculation, only the row and column dimensions are included. The calculation applies to all members on any context dimensions. If all the members of either the row or column dimension are selected, the calculation applies to all the members of the dimension. The dimension is not included in the default calculation name or the context.
The modeler can change the scope of the selection by adding, removing, and changing member selections for a dimension in one of the following ways:

- Use the dimension context area in the calculation editor
- Add or remove the dimensions by dragging them to or from the context area of the parent cube.

**Retention of cube calculations**

Data and cube calculations maintain their integrity even when you add or remove a dimension from the cube in which you are creating calculations. However, you must ensure that you adjust links to the new dimension, if one was added. This retention is useful when you are prototyping and restructuring your cubes to adjust to the new business requirements.

**Creating a cube calculation**

To create a cube calculation, you combine operators, functions, attributes, and values, such as text strings and numbers, into an expression that evaluates to a single value.

**About this task**

Formulas for calculated data items can be simple or complex. Simple formulas consist of a combination of other dimension members, numeric constants, and arithmetic operators. Complex formulas can include these elements and functions and links to other cube data. When you add a calculated data item to the cube, it becomes an element of the dimension.

Feeders are automatically generated when you create a calculation to ensure that all rule-derived values consolidate correctly. To automatically generate feeders, you must set the `Generate feeders automatically` property to `yes` for your TM1 server.

If the dimension you select as a constant includes user-defined attributes, you can use the attributes, such as Product Type, as elements in your expression. System-defined attributes, such as leaf-level calculation or consolidated-level calculation attributes for a calculation dimension, are not displayed. A dimension attribute that is referenced in a cube calculation means it is a reference to the values of that attribute for all members of the dimension. You can also reference members from different dimensions of the cube.

**Procedure**

1. In the Model Design pane, expand the **Cubes** folder, and open the cube or view in which you want to add a calculation.
2. Right-click the cell or range of cells where you want to calculate a value, and click **Create Cube Calculation**.

   An example of a range is revenue for Actuals and Budget across four fiscal quarters.

   When you select a column, the calculation editor assumes that the calculation applies to every dimension. However, you can create calculations that apply to a dimension filtered on a specific attribute.

3. In the **Enter a name for the cube calculation** field, enter a meaningful name for your calculation so that you can identify it when you click cells in the cube view, and click **OK**.

   The default name is the name of the cube, dimension on row, row member, dimension on column, and column member. The selection of dimension members in the context area is excluded.

4. In the calculation editor, ensure that the selected members are displayed in the context area, and choose the type of expression that you want to create:
   - To apply the expression at leaf level, under **Expression**, click the **Leaf-level expression** tab.
   - To apply the expression at a consolidated level, under **Expression**, click the **Consolidated-level expression** tab. Any calculation on a consolidated cell means that the result of the calculation appears in the cell, instead of the consolidated values of its children appearing in the cell.
• To use the same expression for both leaf- and consolidated-level expressions, select the **Combine leaf and consolidated** check box. If an expression is applied at leaf level only, at the consolidated level, the consolidated values of its children appear in the cell. In some cases, you do not want this to happen. For example, if the values are percentages, you do not want all the percentage values to be consolidated in the consolidated field; instead you want the average value. By selecting the **Combine leaf and consolidated** option, the same expression is applied at both the leaf and the consolidated level, and the values are not consolidated in the consolidated cell.

**Note:** To undo this option, clear the **Combine leaf and consolidated** check box. Then delete the expression from either the **Leaf-level expression** or **Consolidated-level expression** tab as required.

• To return a string value, under **Expression**, click the **String expression** tab.

**Note:** If the target area of the calculation includes both numeric and string elements, the string expression applies only to the cells included in the scope of the calculation that are formatted as strings. To return a string value, the context area must contain some string-formatted cells.

5. In the **Expression** box, type the formula that defines the calculated item. To create the formula, you can use a combination of the following elements:

<table>
<thead>
<tr>
<th>Goal</th>
<th>Action</th>
</tr>
</thead>
</table>
| **Insert a dimension element** | Click the **Terms** tab.  
All the dimensions of the cube are displayed in a tree. If a hierarchy exists, dimensions in the cube or view are displayed hierarchically in the tree.  
Drag a dimension member to the **Expression** box to include it in the formula expression.  
The members are displayed as fully qualified members. If the name includes a character space, it is enclosed in brackets.  
**Note:** You cannot drag a dimension and all its members to the **Expression** box. You must manually enter the dimension by enclosing it in square brackets. For example, to include a dimension named Region, you must enter `[Region]`. |
| **Add, subtract, multiply, or divide values** | Click the **Simple** tab.  
Under **Operation type**, select **Arithmetic**.  
IBM Cognos TM1 evaluates arithmetic operators in the following order:  
a. Exponentiation  
b. Multiplication  
c. Division  
d. Addition  
e. Subtraction  
You must use parentheses to force a different order of evaluation. The expression 2*3+4 produces the same result as (2*3)+4 because multiplication takes precedence. |
| **Insert Time or Weighted average** | Click the **Simple** tab.  
Under **Operation type**, select **Average**. |
| **Insert a built-in TM1 function** | Click the **Functions** tab.  
Drag the function to the **Expression** box to include it in the formula expression.  
A short description of each function is displayed on the **Tips** tab in the **Power editing support** pane. |
**Goal**

Insert a data item from another cube

**Action**

Click the **Terms** tab.

You can select a link or create a link to import the value.

- To choose a link, expand the **Imported values** folder.
- To create a link, click **Import terms**.

6. To use string or numeric attributes in a conditional expression, such as IF-THEN-ELSE, on the **Terms** tab, expand the **Attributes** folder under the dimension, and drag the attribute member to the **Expression** box.

7. When you are finished, you can choose to view the results or save the calculation.

- To apply the changes and view the results of the calculation, click **Apply**.
- To save the calculation and close the calculation editor, click **OK**.

**Results**

**Note:** To delete a calculation, right-click the cell or range of cells, and click **Delete Cube Calculation** > Delete calculation: *calculation_name*.

**Related tasks**

“Modifying the context of a cube calculation” on page 54

You can change one or more dimensions to quickly focus your cube calculation to a particular area of the data. Filter the context to control the scope of the cube calculation within the cube.

“Creating a cube calculation that references data from other cubes” on page 51

To define your cube calculation, you can reference data that exists in another cube by creating a link to the target cube.

**Creating a cube calculation that references data from other cubes**

To define your cube calculation, you can reference data that exists in another cube by creating a link to the target cube.

**About this task**

Similar to cube rules, you can use data in one cube to create calculations in another cube. For example, you can pull sales data into a cube that contains Profit and Loss information.

Suppose you want to calculate revenue that uses the formula that is based on price by number of units. The data for prices is in a cube other than the one in which you are creating the calculation; rather, the data is in the target cube that contains price information. To reference the external data, you must import it by creating a link to the Price cube.

When you create a link in the calculation editor, it is implemented as a rule. When a link is implemented as a rule, the calculation is stored solely in the source cube, but is used and displayed in the target cube as required. If data referenced in the calculation changes in the source cube, the changes are automatically reflected in the target cube. However, because the data is stored only in the source cube, all edits to data values must occur in the source cube. You cannot edit data values that are displayed in target cubes through rule links.

**Procedure**

1. In the Model Design pane, expand the **Cubes** folder, and open the cube view in which you want to add a calculation.
2. Right-click the cell or range of cells where you want to calculate a value, and click **Create Cube Calculation**.

   An example of a range is revenue for Actuals and Budget across four fiscal quarters.

3. In the **Enter a name for the cube calculation** field, enter a meaningful name for your calculation so that you can identify later, and click **OK**.

   The default name is the name of the cube, dimension on row, row member, dimension on column, and column member. The selection of dimension members in the context area is excluded.

4. In the calculation editor, choose the type of expression you want to create:
   
   - To evaluate the expression at the leaf level, under **Expression**, click the **Leaf-level expression** tab.
   
   - To evaluate the expression on aggregated results, under **Expression**, click the **Consolidated-level expression** tab.

   **Note:** To use the same expression for both leaf- and consolidated-level expressions, select the **Use the same expression for leaf and consolidated** check box.

   - To return a string value, under **Expression**, click the **String expression** tab.

   **Note:** To return a string value, the context area must contain string-formatted cells.

5. On the **Terms** tab, click **Import Terms**.

6. In the **Enter a name for the calculation** field, enter a descriptive name for the calculation link so that it can be easily identified.

   In the Link editor, you specify where you want to use the data from the link by mapping the external data to the dimension member in the cube that contains the calculation.

7. In the **Model Design** pane, click the cube that contains the data that you want to reference in the calculation and drop it in the **Add Source Cube** field.

   The cube in which the calculation is defined is automatically displayed as the target cube.

   If a dimension is used in both cubes, the two dimensions are mapped with automatic mappings between all their dimension members. For all other dimensions, you must either establish correspondence between the source and target cube or slice on selected dimension members.

8. Optional: If necessary, establish correspondence between the source and target cube or slice on selected dimension members.

9. When you are satisfied with the mapping, click **OK** to save the calculation link.

   The link is validated to ensure that the source of the link is consistent with the scope of the calculation that is used in the target cube. This validation also ensures that the expression returns valid results.

   The link that contains the data from the external cube is displayed in the **Imported values** folder in the Terms tree.

10. Drag the link to the **Expression** box to add it as an element in your formula.

11. When you are finished, you can choose to view the results or save the calculation.

   - To apply the changes and view the results of the calculation, click **Apply**.

   - To save the calculation and close the calculation editor, click **OK**.

**Results**

The referenced data in the external cube is displayed in the cell or cells of the cube where the cube calculation is defined.

**Note:** You can delete, and rename import terms that are used in a cube calculation. The cube calculation dynamically updates to match the term and checks to ensure that the calculation is valid.

**Related tasks**

“Establishing correspondence and mapping dimensions” on page 57
Creating a cube calculation in a security control cube

You can create cube calculations against cells, elements, dimensions, and in the underlying security control cube using the security editor.

About this task

The editor displays only the String expression tab because the cells in the security cube can accept only string values. A valid expression is evaluated to a string value in the cell. For example, you can create an expression that evaluates to the value None so that, for example, the cell-level security prevents group members from viewing the contents of the cell.

Cell-level security applies to leaf members and generally does not apply to consolidations. However, None and Read security rights might exist to control the display or editing of consolidations.

Procedure

1. In the Model Design pane, expand Model Security, and expand the CubeSecurity.
2. Right-click the cube to which you want to apply cell-level security, click Configure Security > Set Access Permissions for > Cube cells.
3. In the Create cell security cube box, select a subset of dimensions to control the dimensionality of cell security, and click OK.

   The cell security cube is displayed as a tab in the object viewer.
4. In the Security editor, right-click a cell or a range of cells to which you want to apply access privileges, and click Create Cube Calculation.
5. In the Enter a name for the cube calculation field, enter a meaningful name for your calculation so that you can identify it later, and click OK.

   The default name is the name of the cube, dimension on row, row member, dimension on column, and column member. The selection of dimension members in the context area is excluded.
6. In the calculation editor, ensure that the members selected are displayed in the context area.
7. In the Expression box, type the formula that defines the calculated item. To create the formula, you can use a combination of the following elements:

<table>
<thead>
<tr>
<th>Goal</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enter a dimension element</td>
<td>Click the Terms tab.</td>
</tr>
<tr>
<td></td>
<td>All the dimensions of the cube are displayed in a tree. If a hierarchy</td>
</tr>
<tr>
<td></td>
<td>exists, dimensions in the cube or view are displayed hierarchically in</td>
</tr>
<tr>
<td></td>
<td>the tree.</td>
</tr>
<tr>
<td></td>
<td>Drag a dimension member to the Expression box to include it in the formula</td>
</tr>
<tr>
<td></td>
<td>expression.</td>
</tr>
<tr>
<td></td>
<td>The members are displayed as fully qualified members. If the name</td>
</tr>
<tr>
<td></td>
<td>includes a character space, it is enclosed in brackets.</td>
</tr>
<tr>
<td></td>
<td><strong>Note:</strong> You cannot drag a dimension and all its members to the</td>
</tr>
<tr>
<td></td>
<td>Expression box. You must manually enter the dimension by enclosing it</td>
</tr>
<tr>
<td></td>
<td>in square brackets. For example, to include a dimension named Region,</td>
</tr>
<tr>
<td></td>
<td>you must enter [Region].</td>
</tr>
<tr>
<td>Insert a built-in function</td>
<td>Click the Functions tab.</td>
</tr>
<tr>
<td></td>
<td>For a list of text-based functions, expand the Text folder.</td>
</tr>
<tr>
<td></td>
<td>Drag the function to the Expression box to include it in the formula</td>
</tr>
<tr>
<td></td>
<td>expression. Use Text or Logical functions to build the conditional</td>
</tr>
<tr>
<td></td>
<td>expression.</td>
</tr>
<tr>
<td></td>
<td>For more information about text-based functions, see the IBM Cognos TM1</td>
</tr>
<tr>
<td></td>
<td>Reference Guide.</td>
</tr>
</tbody>
</table>

8. When you are finished, choose whether you want to view the results or save the calculation.

   - To apply the changes and view the results of the calculation, click Apply.
• To save the calculation and close the calculation editor, click **OK**.

**Results**

Group members can access the cells according to the cell security that you assigned as a result of the cube calculation.

**Related concepts**

“Data access and security” on page 114

You can enhance or restrict the access for a user group to individual cubes, dimensions, processes, chores, and members.

**Modifying the context of a cube calculation**

You can change one or more dimensions to quickly focus your cube calculation to a particular area of the data. Filter the context to control the scope of the cube calculation within the cube.

**About this task**

You can change the context for a calculation in one or more of the following ways:

- Add dimensions to the Context area of the cube viewer.
- Change the members of the dimension in the context filters of the Cube Calculation editor.

**Procedure**

1. To change the scope of the calculation, complete the following steps:
   a) In the context area of the Cube Calculation editor, click the down arrow for the selected dimension, and click **Edit Member** selection.
   b) In the **Select Scope for dimension member** dialog box, choose to remove or add a dimension member or subset by clearing or selecting its check box.
   c) To remove the scope, right-click the dimension context filter, and click **Remove**.

   **Note:** If you remove all the dimensions in the Context area of the Cube Calculation editor, the calculation applies to all the cells of the cube.

2. To add dimension members to your scope, complete one of the following steps:
   - Drag the dimension from the **Model Design** pane to the context area of the Cube Calculation editor, and select the members that you require.
   - None of the dimension members is selected in the **Select Scope for dimension member** dialog box because you added a dimension that is not in the cube view. You must manually add the members by selecting their check boxes.
   - Drag the dimension from the cube or view context area to the context area of the Cube Calculation editor.

   A new context dimension is added to the Context area of the editor.

**Modifying cube calculations**

You can change the formula of a cube calculation at any time from the cube viewer.

**Procedure**

1. In the Model Design pane, expand the **Cube** folder, and open the cube or view that contains the calculation that you want to change.

2. Right-click the cell or range of cells, and click **Open Cube Calculation > Open calculation: calculation_name**.

   **Tip:** Hover the cursor over the cells to determine whether the cell is calculated.

   The formula expression is displayed in the Cube Calculation editor.
3. Make the necessary changes.
4. When you are finished, choose whether you want to view the results or save the calculation.
   • To apply the changes and view the results of the calculation, click Apply.
   • To save the calculation and close the calculation editor, click OK.

**Related tasks**
“Creating a cube calculation” on page 49
To create a cube calculation, you combine operators, functions, attributes, and values, such as text strings and numbers, into an expression that evaluates to a single value.

“Creating a cube calculation that references data from other cubes” on page 51
To define your cube calculation, you can reference data that exists in another cube by creating a link to the target cube.

“Modifying the context of a cube calculation” on page 54
You can change one or more dimensions to quickly focus your cube calculation to a particular area of the data. Filter the context to control the scope of the cube calculation within the cube.
Chapter 5. Creating links

Links establish a relationship that moves data from one cube to another. When you create a link, you define the source cube from which data originates, and the target cube, which receives the data values.

Links can be implemented as either rules or processes. When a link is implemented as a rule, data is stored solely in the source cube, but is used and displayed in the target cube as required. If data changes in the source cube, the changes are automatically reflected in the target cube. However, because the data is stored only in the source cube, all edits to data values must occur in the source cube; you cannot edit data values that are displayed in target cubes through rule links.

When a link is implemented as a process, data from the source cube is copied to the target cube. After you copy data from the source cube to the target cube by running the process, there is no longer a connection between the two cubes. You can freely edit data in either the source cube or target cube.

Specifying source and target cubes

To create a link, you must specify both the source cube from which data originates, and the target cube which is the destination for the data.

Procedure

1. In the Model Design pane, right-click the Links folder and click New > Link
2. Enter a name for the new link, and then click OK.
   It is a good idea to assign a descriptive name to the link. For example, if the link moves data from a source cube named Price to a target cube named Sales, name the link Price to Sales.
   The main pane displays two controls: Add Source Cube and Add Target Cube.
3. Set the source cube by doing one of the following actions:
   • In the Model Design pane, click the source cube and drop it on to the Add Source Cube label.
   • Right-click the source cube and click Add Cube to Link Source, <link_name>.
4. Set the target cube by doing one of the following actions:
   • In the Model Design pane, click the target cube and drop it on to the Add Target Cube label.
   • Right-click the target cube and click Add Cube to Link Target, <link_name>
5. Click Save to save the link definition to this point.
   The link definition does not need to be complete to save it, but it must be valid. If the link definition is not valid, the link icon displays as red.

Establishing correspondence and mapping dimensions

When you initially create a link and define a source cube and target cube, the cubes are examined for common dimensionality.

If a dimension is used in both cubes, the two dimensions are mapped with automatic mappings between all their dimension members. For all other dimensions, you must either establish correspondence between the source and target cube or slice on selected dimension members.
Procedure

1. Review both the source and target cube and decide which dimensions correspond to each other. Also determine which dimensions should not have a correspondence, but should rather be sliced on one or more members.

2. For the dimensions for which you want to establish correspondence:
   a) Click a dimension in the source cube.
   b) Ctrl+click the corresponding dimension in the target cube.

3. Select the type of mapping to apply to the dimension correspondence, either Automatic or Manual.
   - If you choose Automatic, mappings are automatically created between identically named members, which are displayed in the Mappings pane of the Links tab. Dimensions that are automatically mapped are indicated by a solid line ending in a triangle point in the Link tab.
   - If you choose Manual, you must create mappings between members in the source dimension and the target dimension. Dimensions that are manually mapped are indicated by a green line ending in a diamond point in the Link tab.
   - If you do not choose a mapping type, a Generic mapping is applied to the correspondence. A Generic mapping is a placeholder; it lets you match a source dimension with a corresponding target dimension while you are working on your link definition. However, until either Automatic or Manual mapping is defined for the correspondence, the correspondence is considered incomplete and the link is invalid.

   It is possible to initially identify a mapping as Automatic to simplify the creation of correspondences, then convert the mapping to Manual. By doing this, you can quickly identify all correspondences with Automatic mapping, then convert the mapping to Manual and retain only the correspondences you require. To convert an automatic mapping to a manual mapping, right-click the mapping, then click Convert to Manual Mapping.

   Generally, Automatic mapping should be used for correspondences with many members, as it is more efficient. Using Manual mapping for correspondences with many members can result in

4. To manually map members between source and target dimensions, complete the following actions:
   a) Click a member in the Members list under the source cube.
   b) Ctrl+click the member to which you want to map in the Members list under the target cube.

   You can also click a member from the Members list under the source cube and drop it to the wanted member in the Members list under the target cube.

   You can map as many or as few members between the source and target dimensions as you desire, if at least one member in the source dimension is mapped to a member in the target dimension. You can also map a single member in the source dimension to multiple members in the target dimension. The Mappings pane of the Links tab displays all mappings that you create.

   It is also possible to paste existing paired mappings from a spreadsheet or text file directly into the Mappings pane. For example, if you have a spreadsheet with mappings set up in adjacent columns, you can copy the mappings from the spreadsheet and paste them directly in the Mappings pane. Similarly, you can copy mappings from a tab delimited file and paste them into the Mappings pane. You must paste paired mappings into the Mappings pane; you cannot paste a single column of members into the pane.

   c) If you make a mistake and want to delete a mapping, select the mapping in the Mappings pane and click Remove selected member mapping.

   When the manual mapping is complete, dimension correspondences with manual mappings are indicated by a solid green line ending in a diamond point in the Link tab.

5. For each dimension that does not have a correspondence and mapping, you must specify the member or members to slice on:
   a) Click the dimension name in the Dimensions list.
   b) Click the member or members that you want to slice on in the Members list.
If you slice on multiple members in a source dimension, the data for those members is summed before it is moved to the target cube. You can click Select All at the top of the Members list to select all leaf nodes in the source dimension. However, if your source dimension includes a single top-level consolidation, it is more efficient to slice on that single consolidation rather than to sum all the leaf nodes in the dimension.

If you slice on multiple members in a target dimension, each selected member receives the data that is moved from the source cube. You can click Select All at the top of the Members list to select all leaf nodes in the target dimension, but when multiple leaf nodes are selected in a target dimension, no summing of nodes is applied because you cannot write data to a consolidation.

6. Click Save to save your progress.

Results

If you create a link that uses many manual mappings or has target dimensions that are unmapped but sliced on many members, Performance Modeler may generate lengthy feeders. In an extreme case, the TM1 Server may not be able to process the volume of feeders that are generated by Performance Modeler. To avoid a situation that would prevent the server from processing feeders, when Performance Modeler compiles a feeder that would run to more than 1000 lines, it instead places the following comment in the rule string: WARNING: Unable to create feeder it would produce too many lines.

When you encounter a situation where a link generates an exceptionally large volume of feeders, you should either reconfigure their link or set the Generate feeders? property for the Link to No.

Slicing on dimension members

When a correspondence is established between a source and target dimensions, then some or all members of those dimensions must be mapped to one another. However, if a dimension in one cube does not correspond to any dimension in the other cube, it must be sliced by selecting one or more members.

For example, consider a cube with a Versions dimension that includes the members Actual and Budget. There are two sets of values in the cube, one for Actual revenue, one for Budgeted revenue. Slicing will have a different effect depending on whether the Versions dimension is in the source cube or target cube.

For a target cube dimension, selecting all members for slicing causes the data values in the source to be moved to all sliced members. Using the previous example, if the Versions dimension is in the target cube, both Actual and Budget would receive the same set of values. If the source cube contains just budget numbers, you might want to slice just the Budget member in the target cube.

For a dimension on the source cube, selecting all members as slices causes them to be summed before being made available to the target cube. Using the Versions dimension example, selecting both Actual and Budget would sum their values, which is probably not what is desired. On the other hand, if there were a Product dimensions on the source cube with no corresponding dimension on the target, it might be very logical to select all Product members as slices.

Breaking a correspondence

You can break an existing dimension correspondence. When a correspondence is broken, both the dimension in the source cube and the dimension in the target cube become available for new correspondence definitions.

Procedure

1. In the Link Editor, right-click the line that establishes the correspondence between a dimension in the source cube and a dimension in the target cube.
2. Click Break Connection.
   The correspondence between the two dimensions is broken. You can now use either dimension in a different correspondence.
Changing the mapping type

You can modify an existing mapping type for a correspondence.

About this task

The options available when modifying the mapping type for a correspondence vary according to the current mapping type.

- If the current mapping is Automatic, you can change the mapping to either Manual or Generic.
- If the current mapping is Manual, you can change the mapping to either Automatic or Generic.
- If the current mapping is Generic, you can change the mapping to either Automatic or Manual.

Procedure

1. In the Link Editor, right-click the line that establishes the correspondence between a dimension in the source cube and a dimension in the target cube.
2. Click **Switch to <new_mapping_type>**.
   - If you change the mapping type to either Automatic or Generic, no further action is required.
3. If you change the mapping type to Manual, complete the manual mapping procedure as described in “Establishing correspondence and mapping dimensions” on page 57.

Setting the link implementation type

When you create a link, you must specify whether the link should be implemented as a rule or a process.

About this task

When a link is implemented as a rule, data is stored solely in the source cube, but is used and displayed in the target cube as required.

When a link is implemented as a process, data from the source cube is copied to the target cube after the process is generated and run.

Procedure

1. If necessary, open the link.
2. In the Properties tab, click the label next to the **Link Implementation Type** field.
   - This label displays the current implementation type for the link. When you initially create a link, the default type is rules.
3. Select one of the following actions:
   - Click **Rules** to implement the link as a rule.
   - Click **Process** to implement the link as a process.
4. Click **Save** to save the link.

Results

If you implement the link as a rule and the link is valid when it is saved, the rule is immediately created and applied to the target cube.

If you choose to implement the link as a process, you must generate and run the process to move data from the source cube to the target cube.
Generating and running link processes
When you implement a link as a process, you must generate the process and then run it to move data from the source cube to the target cube.

Procedure
1. Right-click the link in the Model Design pane and click Generate Process.
   A new TurboIntegrator process is generated and saved on your server. The new process is visible in the Processes folder on the Model Design pane.
   Additionally, new views required by the process are created in both the source cube and target cube. The view in the source cube is assigned the same name as the link from which the process is generated, with (source view) appended to the name. The view in the target cube is assigned the same name as the link from which the process is generated, with (target view) appended. The view in the target cube accepts the data provided by the view in the source cube.
2. Right-click the process and click Execute Process.

Modifying a link implemented as a process
If you modify a link that is already implemented as a process, you must regenerate the process to incorporate your edits.

Procedure
1. Right-click the modified link in the Model Design pane, then click Generate Process.
2. Click OK when prompted to overwrite the existing process.
3. Optionally, right-click the newly overwritten process, then click Execute Process if you want to immediately execute the process with your edits.

Using pick lists as virtual dimensions in links
You can use pick lists as virtual dimensions in links. In this manner, you can set up a correspondence between an actual dimension in either the source or target cube and a pick list virtual dimension in the opposite cube.

When a pick list virtual dimension is used in the source cube for a link, the link is referred to as an accumulation link. When a pick list virtual dimension is used in the target cube for a link, the link is referred to as a lookup link.

Pick list virtual dimensions can be used in either the source cube or target cube for a link, and if required you can use multiple virtual dimensions in either the source cube or target cube. You cannot, however, simultaneously use virtual dimensions in both the source cube and target cube.

Before you begin
The pick list that you select as a virtual dimension must have an element type of text. If the pick list does not have an element type of text, the link validates correctly, but no data is put into the target cube.

Procedure
1. Define the source and target cube for the link as described in Specifying source and target cubes.
2. In the Dimensions list for either the source cube or target cube, click the dimension that contains the pick list that you want to use as a virtual dimension.
   The Members list for the selected dimension displays the members of the dimension. If any member has a pick list that is associated with it, the Pick List icon appears next to the member name.
3. In the Members list for the selected dimension, double-click the Pick List icon for the pick list that you want to use as a virtual dimension.
   The new virtual dimension appears in the Dimensions list.
4. Complete mappings by using the pick list virtual dimension.

Using dimension attributes as virtual dimensions in links

You can use pick lists as virtual dimensions in the target cube for links. In this manner, you can set up a correspondence between an actual dimension in the source cube and an attribute virtual dimension in the target cube. When an attribute virtual dimension is used in the target cube for a link, the link is referred to as a lookup link.

About this task

You can use any user-defined text dimension attribute as a virtual dimension in your link. You cannot use any of the following types of attributes as virtual dimensions:

- system-generated attributes
- numeric attributes
- alias attributes

When an attribute is used as a virtual dimension in a link, Performance Modeler uses an ATTRS reference in the feeder generated for the link. Therefore, the feeder will not be re-evaluated if the attribute values changes. To re-evaluate the feeders that are generated for attributes, you must either edit and re-save the link, or use the CubeProcessFeeders function in a TurboIntegrator process to reprocess the rules in the target cube of the link.

If you choose to display a virtual dimension in a link, but the virtual dimension is not used in any mappings, it will be removed from the link when the link is saved.

Procedure

1. Define the source and target cube for the link as described in Specifying source and target cubes.
2. In the Dimensions list for the target cube, click the dimension containing the attribute that you want to use as a virtual dimension.
   The Members list for the selected dimension displays the members of the dimension.
3. In the Members list for the selected dimension, right-click the heading region where the labels Name and Slice appear.
   A list of the user-defined text attributes for the dimension appears.
4. Click the attribute that you want to use as a virtual dimension in your link.
   The new virtual dimension appears in the Dimensions list, using the naming convention `dimension_name [attribute_name]`.
5. Complete mappings using the attribute virtual dimension. Any mapping between a source dimension and a virtual attribute target dimension must be implemented as an automatic mapping.

Creating internal links

An internal link moves data between members in a single cube. In an internal link, the source cube and the target cube are the same cube.

About this task

Internal links are useful for moving data from one time period to another. For example, you might want to move a closing balance for one time period to the opening balance for the following time period.

Procedure

1. Set both the source and target cubes to the one cube within which you want to move data, as described in “Specifying source and target cubes” on page 57.
Because the source and target cubes are the same, automatic mappings are created for all dimension correspondences.

2. For the dimension in which you want to move data between members, break the correspondence.

3. Manually map the members between which you want to move data.

Creating drill-through objects in links

You can enable drill-through capabilities from a link that lets users click a cell in a cube view and drill-through to related data, providing more information or context for the cell.

Drill-through capabilities rely upon processes and rules to define and display the related data. Performance Modeler can automatically generate these required drill-through objects.

For a full description of drill-through concepts, see the IBM Cognos TM1 Developer documentation.

**Procedure**

1. In the Properties pane for the link, set the Generate drill through objects property to Yes.

2. Click the More next to the Drill through options property. The Drill options dialog box opens.

3. Enter a Drill process name. This name is visible to users when they use the Drill option in Cognos Insight or TM1 Application Web.

4. Configure the view that will open when a drill-through is executed by moving dimensions to the wanted orientation. To move a dimension, click the dimension then click either Move up or Move down.

5. Click OK.

Adding a drill-through process to an application

You must add a drill-through process to an application before users can use the process to drill to related data.

**Procedure**

1. Open the Application Design tab.

2. Click the Actions button and enable Show control objects.

3. In the TM1 Objects pane, click Control Objects, then Processes.

4. Click the drill-through process, then drag the process to the Drill Process folder in the Design pane.

5. Assign rights for the drill-through process.

6. Save and redeploy the application.

**Results**

Users viewing data in Cognos Insight or TM1 Application Web can use the Drill option from an associated cell to drill-through to a detailed view.

Link validation

Links are continually validated. While you are creating a link, validity is checked as you progress through the steps required to define the link. Similarly, any modifications to objects upon which a link is dependent will trigger a validation check on the link.

When a link is identified as being not valid, the link icon in the Model Design pane is updated to reflect the state of the link.

Additionally, any validation warnings or errors are reported in the Validation Errors property for the link.
You must correct all warnings and errors before the link can be used.

**Repairing links**
If a link becomes not valid due to the deletion or modification of any object upon which the link is dependent, you can use this method to automatically repair the link.

**Procedure**
1. Right-click the link in the Model Design pane.
2. Click **Repair Link**.

**Results**
The link is repaired to the greatest extent possible. Any references to deleted objects are removed from the link, but you may have to manually remap some dimensions or otherwise modify the link to restore its validity.

**Link properties**
The Properties pane displays the properties for a link.
Most link properties are read-only. That is, they report property values, but cannot be directly edited in the Properties pane.

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<thead>
<tr>
<th>Property</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
<td>The name of the link.</td>
</tr>
<tr>
<td>Link Type</td>
<td>The type of link. There are three possible Link Type values.</td>
</tr>
<tr>
<td></td>
<td>• Default - A link with regular dimension correspondences and mappings.</td>
</tr>
<tr>
<td></td>
<td>• Lookup - A link that uses virtual dimensions based on either pick lists or</td>
</tr>
<tr>
<td></td>
<td>attributes in the target cube.</td>
</tr>
<tr>
<td></td>
<td>• Accumulation - A link that uses virtual dimensions based on pick lists in</td>
</tr>
<tr>
<td></td>
<td>the source cube.</td>
</tr>
<tr>
<td>Security Owner</td>
<td>The owner is the one who is currently editing the dimension or link.</td>
</tr>
<tr>
<td>Source Cube</td>
<td>The cube that provides the data for the link. This is a clickable property;</td>
</tr>
<tr>
<td></td>
<td>click the source cube name to open the cube.</td>
</tr>
<tr>
<td>Target Cube</td>
<td>The cube that receives the data from the link. This is a clickable property;</td>
</tr>
<tr>
<td></td>
<td>click the target cube name to open the cube.</td>
</tr>
<tr>
<td>Correspondences</td>
<td>Indicates the number of correspondences defined for the link. Each</td>
</tr>
<tr>
<td></td>
<td>correspondence is listed sequentially.</td>
</tr>
<tr>
<td>Link Implementation Type</td>
<td>Set this property to determine if your link is implemented as a rule or as</td>
</tr>
<tr>
<td></td>
<td>a process, as described in “Setting the link implementation type” on page</td>
</tr>
</tbody>
</table>
**Table 4: Link Properties (continued)**

<table>
<thead>
<tr>
<th>Property</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Generate feeders?</td>
<td>Indicates if feeders should be generated for a link implemented as a rule. Select <strong>Yes</strong> to generate feeders, <strong>No</strong> to create the link without feeders. This property is only valid if the <strong>Link Implementation Type</strong> is set to <strong>Rules</strong>.</td>
</tr>
<tr>
<td>Generate drill through objects?</td>
<td>Indicates if drill through rules and processes should be generated for the link.</td>
</tr>
<tr>
<td>Validation Errors</td>
<td>Indicates the number of validation warnings and errors present in the link, with each warning and error listed sequentially.</td>
</tr>
<tr>
<td></td>
<td>Warnings indicate problems that can be addressed by performing actions directly in the link definition. For example, a warning might indicate that you have not yet mapped or sliced a particular dimension. To resolve this warning, you can map or slice the dimension in the link editor.</td>
</tr>
<tr>
<td></td>
<td>Errors indicate problems that cannot be addressed in the link editor. To resolve errors, you should repair the link.</td>
</tr>
</tbody>
</table>
Chapter 6. Managing rules and feeders

With the Rules Editor, you can create and manage IBM Cognos TM1 rules.

Cognos TM1 rules provide a way to perform complex cube value calculations beyond the normal aggregation that is performed on dimension hierarchy consolidations. For example, you can use rules to calculate a revenue value by multiplying units sold by unit price. You can also use rules to derive values in one cube by referencing values in a separate cube.

Rules are stored in the Cubes folder, associated with each cube, in the Model Design pane. For example, the plan_BudgetPlan cube has a rule called plan_BudgetPlan. This is at the bottom of each cube folder. Double-click the rule to open it.

Feeders provide a way to limit the number of calculations that can be created by rules. This method can be a way to improve performance when performing consolidated calculations.

A rule is associated with a single cube and calculates values only for that cube. A rule always uses the same name as the cube with which it is associated and displays beneath the associated cube in the Model Design pane, below any views that exist for the cube. The figure shows a cube with the associated view and rule, as displayed in the Model Design pane.

Figure 2: Cube with view and rule

For a general introduction to rules concepts, refer to “Advanced Calculations for Business Data” in the IBM Cognos TM1 Developer Guide. This publication provides an overview of Cognos TM1 rule, and address topics such as:

- Rules syntax
- Arranging rules statements
- Order of calculation for rules

For a more comprehensive review of Cognos TM1 rules, refer to the IBM Cognos TM1 Rules Guide, which guides you through the creation of a complex business application based on rules.

Automatically generated rules and feeders

IBM Cognos TM1 Performance Modeler simplifies application development by automatically generating some of the IBM Cognos TM1 rules required to perform calculations on your business data.

Rules and feeders are automatically generated when you complete one of the following actions:

- Create a cube calculation, as described in “Creating a cube calculation” on page 49.
- Create a dimension member calculation, as described in “Creating calculation dimensions” on page 20.
- Create a link and implement it as a rule, as described in Chapter 5, “Creating links,” on page 57.

Automatically generated rules appear with a shaded background in the Rules Editor.

You can disable the automatic generation of feeders. For more information, see “Server level feeder generation” on page 68.

Automatically generated rules cannot be directly edited, but you can selectively enable and disable automatically generated rules. For more information, see Enabling and disabling rules and feeders. You can also change the ordering of automatically generated rules. For more information, see Reordering rule blocks and statements.
Attention: You should not edit any automatically generated rules outside Cognos TM1 Performance Modeler. Automatic generated rules that are edited in another tool will be overwritten the next time the automatically generated rules are loaded.

Server level feeder generation
IBM Cognos TM1 Performance Modeler can automatically generate a proposed set of feeders for all cubes on a server. This applies whether the rules were defined manually by the modeler or generated automatically from calculations and links. You can also export a feeder analysis report to see the feeders that are suggested for your model before you commit to the creation of feeders.

About feeder generation
When feeders are generated at the server level, either automatically or on demand, Performance Modeler examines rules across all cubes and attempts to generate optimal feeders for the entire TM1 server. Feeders are generated for all rules regardless of origin, whether from dimension calculations, cube calculations, links, or manually created rules.

When automatic feeders are generated, they are added in a single block to the rule string of a cube. Existing feeders that are manually created are not altered by automatic feeder generation.

After automatic feeders are generated, you cannot delete them, but you can optionally enable or disable generated feeders.

Enabling or disabling automatic feeder generation
Performance Modeler can attempt to generate Feeders for all the cubes on a TM1 Server. By default, when Performance Modeler is connected to an existing TM1 Server, it does not generate feeders automatically. Rather, you can generate feeders on demand. This ensures that when you connect to an existing TM1 server, model behavior is not unexpectedly changed by automatically generated feeders.

When you build new models, are prototyping, or when you otherwise want Performance Modeler to generate feeders, you can enable automatic feeder generation. Any modeling action (such as building a link, creating a calculation, or manually creating a rule) results in the feeders being generated, ensuring that all rule-derived values consolidate correctly.

You control the automatic generation of feeders by setting the Generate feeders automatically property for your TM1 server.

1. On the Model Design pane, click the TM1 server at the top of the Model Design tree.
2. On the Properties pane, click one of the following Generate feeders automatically property values:
   - Select All rules to automatically generate feeders for all rules on the server.
   - Select No to disable automatic feeder generation on the server.
   - Select Only automatically generated rules to automatically generate feeders for rules that are related to dimension calculations, cube calculations, and links. Feeders are not generated for manually entered rules. This is the default.

Generating feeders on demand
When automatic feeder generation is disabled on a TM1 server, you can generate feeders on demand.

1. On the Model Design pane, right-click the TM1 server at the top of the Model Design tree.
2. Click Generate Feeders.

Creating a feeder analysis report
You can generate a report that analyzes the rules in your model and displays the proposed feeders for each rule. Generating a report does not commit any proposed feeders to your model or otherwise alter your model. By using the report, you can review the proposed generated feeders before you either enable automatic feeder generation on your server or generate feeders on demand.
To generate a feeder analysis report:

1. On the Model Design pane, right-click the TM1 server at the top of the Model Design tree.
2. Click **Generate Report**.
3. Select **Rule/Feeder Analysis**.
4. Specify the folder where you want to save the analysis report.
5. Click **OK**.

To review the proposed feeders, go to the folder where you saved the analysis report and open index.html.

The Feeder Generation Report contains the following tabs.

**Problem Rules**
- All the rules for which feeders could not be generated. Rules are referenced by a link, which you can click to view the rule in context.

**Problem Feeders**
- The **Inefficient feeders** section shows feeders that were generated, but are not very efficient.
- The **Feeders that are not dynamic** section shows feeders that were generated, but which may not work in a dynamic way.

**Suggested Feeders**
- All the cubes for which rules exist on your server. Click a cube name to view the suggested feeders. If you choose to generate feeders in Performance Modeler, the feeders listed in this tab are the feeders that are written to the model.

**Rules Analysis**
- The rules for each cube, and provides an icon and hyperlink to show the suggested feeder that relates to that rule.

**Help**
- Provides detailed information on feeder generation.

### Dimension calculation rules

Dimension calculation rules are automatically generated when a leaf-level calculation or consolidated-level calculation is present in a dimension.

### Numeric calculation rules

A numeric calculation rule block is automatically generated whenever one or more leaf-level calculations are defined for any dimension in a given cube. For example, if you have a cube that includes the account1 dimension, and leaf-level calculations are defined for the Units and Price members in that dimension, a rule block similar to the following is generated.

```plaintext
1 #Region Calculation rules: account1
2 #Autogenerated CALC NUMERIC 6163636F756E7431
3     #Region Calculation rules: Units
4     #Autogenerated MEMBERCALC NUMERIC 5B6163636F756E74315D2E5B556E6974735D
5         #Region{account1 : Units}
6             ['account1':{'Units'}]=N:100;
7     #EndRegion
8 #EndRegion
9 #Region Calculation rules: Price
10    #Autogenerated MEMBERCALC NUMERIC 5B6163636F756E74315D2E5B50726963655D
11        #Region{account1 : Price}
12            ['account1':{'Price'}]=N:200;
13        #EndRegion
14     #EndRegion
15     #EndRegion
```
Note that all lines in this rule block are commented with the number sign (#), with the exception of lines 6 and 12, which are the actual rules statements that perform the calculation. The commented lines help you identify the areas of the cube to which this rule block applies.

- Line 1 identifies the dimension to which the entire calculation rule block applies, in this case the account1 dimension.
- Line 2 identifies all rules within the block as being CALC NUMERIC, or leaf-level calculation, rules. This line includes a unique system-generated identifier for the entire rules block.
- Line 3 identifies the first rule in the block as applying to the Units member.
- Line 4 displays the unique system-generated identifier for the first rule in the block.
- Line 5 displays the fully-qualified area to which the first rule applies, in this case account1 : Units.
- Line 6 is the first rule statement in the block. It calculates the value for Units.
- Line 9 identifies the second rule in the block as applying to the Price member.
- Line 10 displays the unique system-generated identifier for the second rule in the block.
- Line 11 displays the fully-qualified area to which the second rule applies, in this case account1 : Price.
- Line 12 is the second rule statement in the block. It calculates the value for Price.

**Consolidated calculation rules**

A consolidated calculation rule block is automatically generated whenever one or more consolidated-level calculations are defined for any dimension in a given cube. For example, if you have a cube that includes the account1 dimension, and a consolidated-level calculation is defined for the Gross Margin member in that dimension, a rule block similar to the following is generated. (Some line breaks are added here for publishing purposes.)

```
1 #Region Calculation rules: account1
2 #Autogenerated CALC CONSOLIDATED 6163636F756E7431
3    #Region Calculation rules: Gross Margin
4    #Autogenerated MEMBERCALC CONSOLIDATED
5       5B6163636F756E74315D2E5B47726F7373204D617267696E5D
6       #Region{account1 : Gross Margin}
7       ['account1':{'Gross Margin'}]=C:['account1':'Sales']-
8       ['account1':'Variable Costs']);
9       #EndRegion
10      #EndRegion
11      #EndRegion
```

Note that all lines in this rule block are commented with the # symbol, with the exception of line 6, which is the actual rules statements that performs the calculation. The commented lines help you identify the areas of the cube to which this rule block applies.

- Line 1 identifies the dimension to which the entire calculation rule block applies, in this case the account1 dimension.
- Line 2 identifies all rules within the block as being CALC CONSOLIDATED, or consolidated-level calculation, rules. This line includes a unique system-generated identifier for the entire rules block.
- Line 3 identifies the first and only rule in the block as applying to the Gross Margin member.
- Line 4 displays the unique system-generated identifier for the first rule in the block.
- Line 5 displays the fully-qualified area to which the first rule applies, in this case account1 : Gross Margin.
- Line 6 is the only rule statement in the block. It calculates the value for Gross Margin.
**Link rules**

Link rule blocks are automatically generated when a link that is implemented as a rule exists in your application.

For the target cube, a rule block is generated that calculates a value based on the dimension correspondence and mapping defined in the link. For the source cube, a rule block is generated that contains the feeders statement required to ensure optimal performance of your application.

**Link rules for the target cube**

The automatically generated rules for the target cube always calculate a value for a numeric member, as you cannot define a link that calculates values for a consolidation.

For example, if your application includes a link named Price to Sales that is implemented as a rule, and the link moves price data from the source PriceCube to the target SalesCube, the generated rule for SalesCube would look similar to the following:

```plaintext
1 #Region Link rule: Price to Sales - Numeric
2 #Source cube: PriceCube
3 #Target cube: SalesCube
4 #Autogenerated LINK NUMERIC 7D4C696E6B5F507269636520746F2053616C6573
5 ['account1': 'Price'] = N:DB('PriceCube', !actvsbud, !region, !model, !month);
6 #EndRegion
```

- Line 1 indicates that this rule block is generated from the link named Price to Sales.
- Line 2 shows that the source cube for this link is named PriceCube.
- Line 3 shows that the target cube for this link is named SalesCube.
- Line 4 displays the system-generated unique identifier for the rule.
- Line 5 is the rule statement that calculates the value for Price by retrieving the corresponding value from the PriceCube.

**Link rules for the source cube**

The automatically generated rules for the source cube always include feeders that feed the location in the target cube to which the link rule applies.

Feeders are the mechanism that IBM Cognos TM1 uses to ensure optimum performance in applications that use rules. The concept of feeders and their implementation is described in “Improving performance with feeders” in the IBM Cognos TM1 Rules documentation.

If your application includes a link named Price to Sales that is implemented as a rule, and the link moves price data from the source PriceCube to the target SalesCube, the generated feeders in the rules for PriceCube would look similar to the following:

```plaintext
1 #Region Link rule: Price to Sales - Numeric
2 #Source cube: PriceCube
3 #Target cube: SalesCube
4 #Autogenerated LINK FEEDER 7D4C696E6B5F507269636520746F2053616C6573
5 [] => DB('SalesCube', !actvsbud, !region, !model, 'Price', !month);
6 #EndRegion
```

- Line 1 indicates that this rule block is generated from the link named Price to Sales.
- Line 2 shows that the source cube for this link is named PriceCube.
- Line 3 shows that the target cube for this link is named SalesCube.
- Line 4 displays the system-generated unique identifier for the rule statement, indicating that it is a feeder statement.
- Line 5 is the feeder statement that feeds all locations in the SalesCube identified by the Price member.
**Manually generated rules and feeders**

You can manually create rules that address the unique requirements of your business application. The Rules Editor allows you to type rules statements directly in the editor, using any of the functions available to IBM Cognos TM1 rules. Manually generated rules appear without a shaded background in the Rules Editor and can be freely edited; they are not protected as are automatically generated rules.

Cognos TM1 rules functions allow you to reference values in external cubes, retrieve member information, determine time values, and apply conditional logic. These functions, which are fully described in the *IBM Cognos TM1 Reference* documentation, fall into the following general categories.

- Cube data
- Date and time
- Dimension information
- Member information
- Financial
- Logical
- Mathematical
- Text

**Editing rules and feeders**

Use the Rules Editor to edit your rules and feeders.

To open a rule and feeder for editing, double-click the rule in the Design Pane.

Rules are stored in the Cubes folder, associated with each cube, in the Model Design pane. For example, the plan_BudgetPlan cube has a rule called plan_BudgetPlan. This is at the bottom of each cube folder. Double-click the rule to open it.

The Rules Editor opens in a new tab. You can edit or create manual rules and feeders by typing directly in the editor and by using the Content Assist feature. You can also manage automatically generated rules using several Rules Editor features that allow you to enable, disable, and change the order of rules and feeders.

**Expanding and collapsing rule and feeder blocks**

By default, automatically generated rule and feeder blocks appear in collapsed form in the Rules Editor. You can expand and collapse blocks individually or simultaneously expand/collapse all blocks.

**About this task**

Some rule blocks may contain multiple regions, and all which appear collapsed in the Rules Editor by default. You can expand/collapse regions within a rule block just as you can expand or collapse the rule block itself.

**Procedure**

1. To expand an individual rule block, or an individual region within a rule block, click the **Expand** icon.
2. To collapse an individual rule block, or an individual region within a rule block, click the **Collapse** icon.
3. To fully expand all rule blocks and regions, right-click the vertical bar, then click **Expand All**.
4. To fully collapse all rule blocks and regions, right-click the vertical bar, then click **Collapse All**.
Reordering rule blocks and statements

You can change the order of automatically generated rule blocks and manually created statements in the Rules Editor.

About this task

The order in which rules blocks or statements are evaluated has a direct impact on the calculations performed on your data. The first statement that applies to a given area of a cube takes precedence over any later statements that are applicable to the same area. You should be very familiar with your data and the expected results of rule calculations before you attempt to reorder your rules.

For further details on the order of precedence for rules calculations, see the IBM Cognos TM1 Rules documentation.

You can move rule blocks or statements within the SKIPCHECK region of the rules editor, but you cannot move them into the FEEDERS region. Similarly, you can move feeder blocks or statements within the FEEDERS region, but cannot move them into the SKIPCHECK region.

You can reorder feeder blocks, but there is no benefit gained.

Procedure

1. Select the block or statement that you want to move by clicking immediately in front of the first character and then drag across the entire block or statement.
2. Click the selected block or statement.
3. Drag and drop the block or statement to a new location in the Rules Editor. The destination must be an empty line. You cannot drop a block or statement on an existing block or statement. When the new location for the block or statement is valid, the destination appears with a gray background.

Commenting and uncommenting lines of code

You can use the Comment/Uncomment feature of the Rules Editor to comment or uncomment manually entered lines of code or commentary.

About this task

The Comment feature inserts a # character at the beginning of a line, indicating that the line is ignored during rule processing. You can similarly uncomment a commented line, so that the line is included in processing. Commentary that describes rules should always be commented in the Rules Editor. If any text in the Rules Editor other than calculation statements appear uncommented, validation will fail.

You cannot use the Comment/Uncomment feature on automatically generated rules. You can, however, selectively enable or disable automatically generated rules.

Procedure

1. To comment one or more lines, click and drag across the lines to select, then click the Comment/Uncomment icon.
2. To uncomment one or more lines that are currently commented, click and drag across the lines to select, then click the Comment/Uncomment icon.
Enabling and disabling rules and feeders
You can selectively enable and disable automatically generated rules and feeders in the Rules Editor.

About this task
You cannot comment or delete automatically generated rules. If you attempt to delete an automatically generated rule, it does initially appear to be deleted from the Rules Editor, but the rule will be automatically regenerated the next time the rule is loaded.

You can, however, selectively enable and disable automatically generated rules and feeders. When you disable an automatically generated rule, any values defined by the automatically generated rule are not calculated.

Procedure
1. To disable an automatically generated rule or feeder, right-click the rule, then click Disable.
2. To enable an automatically generated rule or feeder that is currently disabled, right-click the rule, then click Enable.

Copying content from an automatically generated rule and feeder
Though you cannot directly edit an automatically generated statement, you can copy any portion of the statement. The copied portion can then be pasted into the Rules Editor for use in a manually created rule statement.

Procedure
1. Hover the pointer over the Expand icon of a collapsed rule statement. The entire statement displays in a dialog box.
2. Select the desired portion of the statement in the dialog box.
3. Click the Copy icon to copy the selected text.
4. Click at the desired insertion point in the Rules Editor, then click the Paste icon to paste the copied selection.

Using Content Assist
The Content Assist feature helps you create statements by letting you select items from lists of dimension members and rules functions while manually creating or editing rules and feeders.

About this task
Content Assist presents lists of rules elements that are appropriate for a given context within a rules statement. For example, when you are defining an area to which a calculation statement or feeder applies, or otherwise referencing dimension members, Content Assist presents a list of available dimension members on your server. When you are inserting functions to perform rules calculations, Content Assist presents a list of all available rules functions. When you are creating a DB function, Content Assist presents a list of cubes available on your server.

Content Assist automatically recognizes when you are typing a dimension member reference. As soon as you type [’ (a left square brace followed by an apostrophe), Content Assist displays a list of available dimension members on your server. You can click any member to insert it into the cursor location in the Rules Editor.

Content Assist also recognizes when you are typing a database reference (DB) function. As soon as you type db(’ Content Assist displays a list of cubes available on your server. You can click any cube name to insert a valid DB function referencing the selected cube.

Procedure
To use Content Assist:
1. Click the Content Assist icon or press **Ctrl+Space**
2. Click the desired item from the Content Assist list.

**Clearing rules and feeders**

Rules cannot be deleted, but the contents can be cleared.

**Procedure**

1. Right-click the rule and click **Clear**.
2. Confirm the clear rule in the **Confirm Clear Rules** window.

**Validating rules and feeders**

Rules and feeders are validated upon save. If a portion is not valid, a message appears indicating the location of the first statement that is not valid, along with a brief description of the nature of the error.

To ensure proper rule calculations, you should correct any errors that are reported in your rule.

You can choose to save a rule that is not valid. This allows you to continue developing your model or applications, while letting you address rule errors as time allows. However, even a single error in the SKIPCHECK section of your rule will prevent all rules-derived values from being calculated. If an error exists in the FEEDERS section of a rule, the calculation statements in the SKIPCHECK area will be executed, but the feeder statements will not.

**Rule properties**

The Properties pane displays the properties for a rule.

Most rule properties are read-only. That is, they report property values, but cannot be directly edited in the Properties pane. The exception is the **Require feeding of rule derived cells** property, which can be set directly in the Properties pane.

<table>
<thead>
<tr>
<th>Table 5: Rule properties</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Property</strong></td>
</tr>
<tr>
<td>Name</td>
</tr>
<tr>
<td>Type</td>
</tr>
<tr>
<td>Manual Sections</td>
</tr>
<tr>
<td>Rule Sections</td>
</tr>
<tr>
<td>Property</td>
</tr>
<tr>
<td>----------------------------------------------</td>
</tr>
<tr>
<td>Feeder Sections</td>
</tr>
<tr>
<td>Require feeding of rule derived cells?</td>
</tr>
</tbody>
</table>

**Regenerate rules**

You can regenerate manually all the rules in a project at the same time.

**Procedure**

In the Model Design pane, right-click the server name and select *Generate Rules*. 
Chapter 7. Designing and deploying applications and managing rights

In IBM Cognos TM1 Performance Modeler, define the data, groups, and roles that each member of the planning workflow needs to contribute to their financial objectives.

Before an application can be used, you must define user groups and rights for the user groups depending on the reporting structure and the application type. For more information, see “Managing rights for the application” on page 90.

For a user to work with the deployed application, further steps are required in the IBM Cognos TM1 Applications portal. For more information, see “Managing Cognos TM1 applications in the portal” on page 93.

There are three available clients: Cognos Insight - Connected, and Cognos Insight - Distributed, and TM1 Application Web.

IBM Cognos Insight offers a flexible and interactive experience with a choice of distributed or connected modes. In its distributed mode, Cognos Insight uses an interactive canvas layout for planning and analysis applications that provides responsive, rapid discovery and navigation. Because calculation and query processing in a distributed architecture occurs locally only after the slice of data downloads, administrators can deploy Cognos Insight applications to more distributed users from the same central server hardware.

IBM Cognos TM1 Application Web is a good choice when users need to apply a high degree of formatting or when users do not want to install the IBM Cognos Insight component on their local computer.

Design and deploy an application

You can create and edit more than one application at a time, and you can create more than one type of application.

To build an application, you must have a valid cube.

In the Application Design pane, define the application type and views to be included in your application. You can also view and set properties for your application, views, and application type. The major steps in creating an application are described in the following list:

- Defining the application type
- Defining the views and websheets
- Defining the approval hierarchy
- Defining the rights

You can create the following application types:

**Approval**

A representation of the approval or reporting structure of your business, department, or enterprise.

The hierarchical approval type aids the user with the workflow.

**Central**

No approval hierarchy; used by a small group of users who equally share the task of performing central planning or analysis. Taking ownership is an option, not enforced as in the other application types. Modelers can also prevent the option to take ownership from being offered.

**Responsibility**

Based on approval hierarchy, but the user cannot submit a node to lock it. For use by customers that use rolling forecasts or continuous planning processes where there is no defined end date.
Creating a new application
A new application of all types can be created using the IBM Cognos TM1 Performance Modeler.

Procedure
1. In the Application Design pane, right-click the Application folder and click New > Application.
2. Type a name for the application.
3. From the drop-down menu, select the application type.

<table>
<thead>
<tr>
<th>Application type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Approval</td>
<td>Based on a reporting structure. After a change has been submitted, the report is locked for any new changes until the approving person has rejected the change.</td>
</tr>
<tr>
<td>Central</td>
<td>No reporting structure. All users have equal rights and the changes cannot be locked.</td>
</tr>
<tr>
<td>Responsibility</td>
<td>Based on a reporting structure. Changes can be made without having to be submitted and approved.</td>
</tr>
</tbody>
</table>
4. Click OK.

What to do next
You can add views or websheets to the application, and set application properties.

Adding contributor and reviewer views to applications
After you have created the TM1 application, you can define which views are used in the application. You can design different views to be used for reviewer or contributor users. For example, a reviewer can see higher-level summaries while the contributor can see more detail-rich views.

A view must already exist before it can be defined as a contributor or reviewer view. For more information, see “Defining a cube view” on page 43.

Procedure
1. In the Application Design pane, click either the Contributor Views folder, or the Reviewer Views folder.
   For a central application, you can only define contributor views.
2. In the TM1 Objects pane, expand the Cubes folder and the cube containing the view that you want to add to your application.
3. Click the view you want to add to your application. You can use Ctrl+click to select multiple non adjacent views, or Shift+click to select multiple adjacent views.
4. Drop the views into either the Contributor Views folder, or the Reviewer Views folder of the application.
   You can now set the properties for the views. For more information, see “Set application properties in TM1 Performance Modeler” on page 83.
5. To rename the view, right-click the view in the Contributor Views folder, or the Reviewer Views folder, and select Rename. Type the new name of the view.
6. Save the application.

Websheets in Cognos TM1 Applications
You can use Websheets as an object available to IBM Cognos TM1 Applications.

The Planning Sample contains a number of Websheets.

To make a websheet available to a Cognos TM1 Application, add it to the list of objects in Cognos TM1 Performance Modeler. Websheets provide additional formatting flexibility and offer Action buttons to run different views or launch TurboIntegrator processes.
Once the websheet is listed in the TM1 Objects pane, drag it into the Contributor views or Reviewer views panes of the application shown in the Application design tab.

When you have identified the websheet to use, validate and redeploy the application so that it uses the websheet.

Cognos Insight cannot use websheets. If you try to validate or deploy to Cognos Insight, the application will not deploy.

Once a websheet is added, it shows up in the application as a new tab with its assigned name.

Until you take ownership, any action button from the websheet is grayed out as unavailable.

IBM Cognos TM1 TurboIntegrator processes can be run using action buttons on websheets. Be sure you have considered the effects of running a TurboIntegrator process before including it as part of a websheet.

The security defined by the approval hierarchy is followed for a websheet deployed as part of a Cognos TM1 Application.

Defining application websheets
After you have created the application, you can define the websheets to be used in the application.

About this task
When a websheet is included in the scope of an application, more steps are required to enable data reservation of the nodes and views. The websheets used in your application must exist in the TM1 Objects pane before you can include the views in your application. Please refer to the IBM Cognos TM1 Developer documentation. Each websheet has two properties to help the user:

Important: Applications containing websheets are only deployed to the IBM Cognos TM1 Applications thin client.

Procedure
1. Double-click the application in the Application Design pane, and select Enable advanced modeling in the settings.
2. In the TM1 Objects pane, expand the Websheets folder and the folder containing the websheet you want to add to your application views.
3. Click the websheet you want to add to your application. You can use Ctrl+click to select multiple non adjacent websheets, or Shift+click to select multiple adjacent websheets.
4. Drop the websheet on either the Contributor views pane, or Reviewer views pane.
5. Set the properties as required. For more information, see “Set application properties in TM1 Performance Modeler” on page 83.
6. Save the application.
7. In the TM1 Objects pane, expand the Cubes folder.
8. Click the cubes that are referenced by the websheet. You can use Ctrl+click to select multiple non adjacent cubes, or Shift+click to select multiple adjacent cubes.
9. Drop the cubes to the Manual Dependencies folder of the application.
10. Save the application.

The approval hierarchy
The approval hierarchy determines the workflow of your application.

For Approval and Responsibility applications, specify a dimension subset to use as an approval hierarchy. Other types of applications do not need an approval hierarchy specified.

A consolidated member in an approval hierarchy must use all of the children in the approval hierarchy subset as well. For example, consider an approval hierarchy like this:

- Total Regions
– North
– East
– South
– West

This approval hierarchy with Total Regions as the root must use all four of the leaf-level regions. If you want to deploy a TM1 Application that only includes North and East, but not South or West, you must define a new consolidation above North and East, then use that new consolidation as the approval hierarchy. For example:

• Total Regions
  – North and East
    - North
    - East
  – South
  – West

Defining an approval hierarchy

The Approval and Responsibility application types must have an approval hierarchy defined. An approval hierarchy is a dimension subset on your IBM Cognos TM1 server.

Each member in a subset is referred to as a "node" in the approval hierarchy. An approval hierarchy has these limitations:

• At least one view in your application must include the dimension that contains your approval hierarchy subset.
• The approval hierarchy subset must only contain one top level member. If the subset contains multiple top-level members, you will receive an error.
• The approval hierarchy subset cannot contain any string members.
• When a subset is designated as an approval hierarchy, all security for the parent dimension of the subset is controlled by IBM Cognos TM1 Performance Modeler.

Note: If the subset that is used as an approval hierarchy is modified in any way after an application is deployed and no other aspect of the application has been changed, the Rights must be re-saved. This ensures that security and other application artifacts are updated to reflect the new approval hierarchy structure. Re-saving the Rights will also propagate the change to any newly-added leaf nodes. You must re-save the Rights after a change even if the currently defined Rights are defined at the Reviewer level. Failure to redeploy the application will prevent users from taking ownership of nodes.

Procedure

1. In the TM1 Objects pane, expand the Dimensions folder and the subsets.
2. Click the dimension containing the subset that you want to use as your approval hierarchy.
3. Right-click the subset that you want to use as your approval hierarchy, and click Add to application > Approval Hierarchy and select the application that the approval hierarchy will be added to.
4. Save the application.

What to do next

Administrators can set application properties, define a control dimension, and validate and deploy applications.

Administrators can work with the approval hierarchy in the portal when the application has been deployed.

• In the TM1 Applications portal, click the Manage Rights icon and click the Approval Hierarchy tab.
Defining a control dimension
By using a control dimension in IBM Cognos TM1 Performance Modeler, you can share an approval hierarchy across applications. The control dimension determines the maximum access allowed by any user of the application.

Before you begin
A control dimension is typically a dimension that contains versions or months. The control dimension must already exist before you can define it. For more information, see “Using the same approval hierarchy in different applications” on page 81.

Procedure
1. In the TM1 Objects pane, expand the Dimensions folder and the subsets.
2. Click the dimension that contains the subset that you want to use as your control dimension.
3. Right-click the subset that you want to use as your control dimension, click Add to application > Control Dimension, and select the application that the control dimension will be added to.
4. Save the application.
5. In the Application Design tab, click Configure Rights, and the Control Dimension tab.
6. Set the access for each element. At least one element must be writable.
   Note: The control dimension rights do not overwrite the Cognos TM1 security. The control dimension sets the maximum access that is allowed to a particular slice in the application.

What to do next
Administrators can work with the control dimension in the portal when the application has been deployed. You can change the access for the elements:
1. In the TM1 Applications portal, click the Manage Rights icon , and click the Control Dimension tab.
2. Click in the Access field for the element, and select the level of access for the element.
3. Click Apply.

Using the same approval hierarchy in different applications
An approval hierarchy can be used in different applications by defining a control dimension to ensure that the writing of data is done to different slices of a cube.

You can reuse approval hierarchies across applications or sections of applications if the data does not overlap.

For example, you can create a budget application and a forecast application that use data from the same cube but operate on different schedules or that use different rollups. Different kinds of rollups include geographic rollups versus market maturity rollups. Similarly, the same approval hierarchy can be used when the forecast application writes to the forecast slice and the budget application writes to a budget slice. You can also share hierarchies when, for example, the application uses the Europe portion of the hierarchy while the other uses the North American hierarchy.

To share an approval hierarchy define a control dimension and subset in the application to control the scope within the context of another dimension such as plan_version. The control dimension determines the maximum access allowed by any user of the application. For any writeable member of the control dimension, the user’s access is determined by their Approval Hierarchy Rights

Note: The control dimension creates a subset that defines the visible slices of the control dimension. Do not alter or delete the control subset. If an application is already deployed with a control dimension, the control dimension cannot be removed during the subsequent re-deployments.
You can work with the **Approval Hierarchy** and the **Control Dimension** tab either in IBM Cognos TM1 Performance Modeler, or in the Application Portal. The application must first be deployed. For more information, see “Validating and deploying the application” on page 90.

- In Performance Modeler, in the Application Design pane, expand the application that you want to work with and click **Rights**.

  In the portal, click the Manage Rights icon to work with the Approval Hierarchy and Control Dimension tabs.

The Approval Hierarchy tab shows the Node, Group, Right, Review Depth, and View Depth for the approval hierarchy. This example shows an approval hierarchy for the 2004 Forecast application which uses the Total Business Unit approval hierarchy to assign Review rights to the 1000 user group. The Total Business Unit contains the Europe, North America, PacRim and ROW hierarchies.

![Figure 3: Manage rights screen](image)

1. Application name
2. Rights assigned
3. Approval hierarchy name
4. Approval hierarchy content

The Control Dimension tab sets the access rights for any slice in the application. In this example, the Control Dimension tab shows that users accessing the 2004 Budget application may write to the FY 2004 Budget slice. Other slices use read access so they can see the data in those applications but cannot write to them. The FY 2004 Forecast by Maturity application has no rights which means none of that data is accessible to users.

![Figure 4: Budget North America control dimension](image)

**Note:** The control dimension rights are not overriding the Cognos TM1 security. The Control Dimension is setting the maximum access that allowed to a particular slice in this application.
With this scenario in place, when a member of the European user group takes ownership and adds data to the application, only the FY 2004 Budget application is available for writing. Other slices are shown because read access is set on the other slices. As defined in the rights, this user cannot write to the Forecast slice.

**Set application properties in TM1 Performance Modeler**

To see an overview of an application and to set various properties on it, click the Application Design pane, and double-click the application name to open the Application Design tab in Cognos TM1 Performance Modeler.

You can perform the following actions for an application:

**View, delete, and reorder the Contributor views and Reviewer views**

See “Designing views for reviewers or contributors” on page 43.

**View approval hierarchies and control dimensions**

Right-click the approval hierarchy or control dimension to reorder or delete them. See “Defining an approval hierarchy” on page 80, and “Using the same approval hierarchy in different applications” on page 81.

**Configure rights**

See “Managing rights for the application” on page 90.

**Define the method of security that is used to enforce rights**

To share an approval hierarchy dimension across TM1 Applications, you must use cell security to enforce rights. You cannot use a control dimension if element security is used to enforce the rights. This setting does not apply to central applications because central applications do not have an approval hierarchy. See “How to enforce security rights in an application” on page 122.

**Define what happens when the owner of a node changes**

Select an item from the On ownership change list. See “Configure ownership properties” on page 89.

**Specify which clients are available for the application, and define the default client**

See “Selecting the default client systems for use with the application” on page 84.

**Set help text for the application**

Help text shows when a user clicks the View > Help option in a view in IBM Cognos Applications. This property displays instructions or information to help users to enter data in the view. The help text is also available in the workflow page.

**Define available commentary attachment types.**

See “Configure ownership properties” on page 89.

**Configure the maximum attachment size for commentary**

The default is 500 KB.

You can enable some settings for the application. The following table describes the application settings:

<table>
<thead>
<tr>
<th>Setting</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enable charting</td>
<td>Enables the Chart Type icon in TM1 Application web.</td>
</tr>
<tr>
<td>Enable multiple sandboxing</td>
<td>Enables users to create multiple sandboxes. Sandboxes allow users to work with data in different versions, so that they can add or modify data to see the results in the budget. Changes that are made in a sandbox are not made public until the data is committed. Users who are working with multiple sandboxes must submit from IBM Cognos TM1 Application Web, they cannot submit from the Cognos TM1 Workflow page.</td>
</tr>
</tbody>
</table>
Table 6: Application settings (continued)

<table>
<thead>
<tr>
<th>Setting</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hard lock all widgets</td>
<td>Widgets in an application can be hard-locked in Cognos TM1 Performance Modeler to prevent a non-administrator user from unlocking the widgets in IBM Cognos Insight.</td>
</tr>
<tr>
<td>Spread on rule derived consolidated cells</td>
<td>Allows users to type into cells that contain rule derived consolidations, and to select the data spread type from a dialog box.</td>
</tr>
<tr>
<td>Enable slicing export</td>
<td>Enables the export options in Cognos TM1 Application Web:</td>
</tr>
<tr>
<td></td>
<td>• Export to Excel. Exports data and formulas (SUBNM and DBRW functions) to a new Excel spreadsheet. The spreadsheet maintains a connection with the server. Users must have Microsoft Excel installed.</td>
</tr>
<tr>
<td></td>
<td>• Snapshot to Excel. Exports data to a new Excel spreadsheet, excluding the formulas (SUBNM and DBRW functions). The spreadsheet does not maintain a connection with the server.</td>
</tr>
<tr>
<td></td>
<td>• Export to PDF. Exports data to a PDF file. You must install a PostScript printer for the Export to PDF option to work.</td>
</tr>
<tr>
<td>Enable subset editor</td>
<td>Enables the advanced subset editor in Cognos TM1 Application Web.</td>
</tr>
<tr>
<td>Enable cube import</td>
<td>Enables users to add an action button in Cognos Insight that runs an Import script (this option does not apply to IBM Cognos Insight Personal Edition).</td>
</tr>
<tr>
<td>Enable recalculation on enter</td>
<td>Updates and recalculates data in the view when Enter is pressed, in Cognos TM1 Application Web. Data changes are not committed back to the server until the data is committed or submitted.</td>
</tr>
<tr>
<td>Enable saving CDD</td>
<td>Enables IBM Cognos Insight users to save the Cognos Insight workspace as a CDD file. The CDD file contains the model and data in the workspace, and the layout of the workspace. Users can send the CDD file to other users, or share the file in Cognos Connection. For more information, see the IBM Cognos Insight documentation.</td>
</tr>
<tr>
<td>Enable advanced modeling</td>
<td>You can manually add to an application objects that are not automatically included in the application. This option must be selected for websheets to be added. For more information, see “Advanced modeling” on page 85.</td>
</tr>
</tbody>
</table>

Selecting the default client systems for use with the application

You can define which clients are available for an application made in IBM Cognos TM1 Performance Modeler. The client can be set in the Application Design tab, or in the Properties window of the application highlighted in the Application Design pane. The clients that are available are:

• IBM Cognos TM1 Application Web, the default client. Processing is in real time with the server.
• IBM Cognos Insight - Connected, for use with IBM Cognos Insight. Processing is in real time with the server.
• IBM Cognos Insight - Distributed. Processing of data is local and only with commit data does the server get updated.

When considering which client is best for an application, consider these points:

• Both Cognos Insight, in either distributed or connected mode, and Cognos TM1 Applications can be used interchangeably if the application uses cube views alone and has multiple sandboxes disabled. The user can select which client they want to use on these applications.
• Applications that use a canvas layout show a simple multi-tabbed view when used with Cognos TM1 Applications.
• Applications that contain a websheet can only be opened by Cognos TM1 Applications Web.
**Procedure**

1. In the Application Design pane, double-click the application name to display the Application Design tab.
2. Select the **Clients** to be made available.
3. Select the default client to use with the application.
4. Save the application.

**What to do next**
Before you can edit the user rights for the application, you must first validate and deploy the application.

**Advanced modeling**
Advanced modeling lets the application designer manually add objects to an application design.

Advanced modeling enables the application designer to include items that are not automatically included in the application. This can help the application designer in understanding the application views, dimensions, and approval hierarchy. Some modeling techniques that use dependencies, for example conditional rules, are not parsed and detected automatically. In this situation, the application designer can ensure that those objects are included within the scope of the application when it is deployed to the distributed client. When the application is deployed, the dependency analysis is done on the objects included in application, but excludes those in the **Manual Dependencies** folder. A complete list of the objects in the **Views**, the **Approval Hierarchy**, and those manually added to the **Manual Dependencies** folder are compiled and included in a section in the application definition.

Advanced modeling must be enabled for websheets to be added to an application.

**Enabling advanced modeling**
You must enable advanced modeling before you can add dependencies to the manual dependencies folder.

**Procedure**

1. In the Application Design pane, double-click the application name to display the Application Design tab.
2. In **Settings**, select **Enable advanced modeling**.
3. Save the application.

**Adding dependencies manually**
The dependencies can be manually added to the application for deployment.

**Before you begin**
**Enable advanced modeling** must be selected in the Application Design tab.

**About this task**
The **Manual Dependencies** folder can be used to add IBM Cognos TM1 objects, for example, rule dependencies, chores, and processes.

**Procedure**

1. In the Application Design pane, click the **Manual Dependencies** folder.
2. In the TM1 Objects pane, expand the folder containing the dependency you want to add to your application.
3. Click the dependency you want to add to your application. You can use Ctrl+click to select multiple non adjacent dependencies, or Shift+click to select multiple adjacent dependencies.
4. Drop the dependencies to the **Manual Dependencies** folder of the application.
5. Save the application.
What to do next
You can now validate and deploy the application.

Configuring commentary on applications
The modeler can restrict the file types and size of file attachments in applications.

Procedure
1. Open the Application Design tab.
2. In the Commentary attachment types field, the standard set of file types that are permitted are listed. You can restrict the type of file. For example you can prevent executable files from being uploaded by removing those file types from the file of allowed files. Click the ellipsis (...) to add a new file type or to remove an existing file type.
3. To control the volume of files that can be uploaded to the TM1 Server, in the Max attachment size (KB), enter the maximum file size permitted for this application.
   
   **Note:** This file size must be 500 KB or less.

Purging Commentary
You can identify commentary to be purged using a variety of criteria. You can purge commentary for more than one application at a time. You must be an administrator to purge commentary.

Procedure
1. In the Cognos TM1 Applications portal, click the selection box of the applications for which you want to remove their commentary.
   
   If you select more than one application, the only criterion available is the "Created before" date. Only current users are available in the field. To purge commentary by obsolete users, use the Created by or node-based filter.
2. Click the Commentary Maintenance icon .
3. Specify the commentary to delete by using the Created before, For node, and Created by selections.
   
   You can also elect to delete comments and attachments or just the attachments. The nodes and users for this application are available on the pull-down menu.

![Commentary Maintenance for - My Applications](image)

**Figure 5: Commentary Maintenance**

Adding more than one criteria is treated as an add operation. So in the example in the figure, only commentary that was created before 2/18/2014 and was in the Europe node and was created by the Admin is purged.

4. When you have the correct commentary identified, click OK.
   
   **Note:** You cannot purge commentary using the command line interface.
Email notifications in Cognos TM1
You can add email notifications to applications by using either the Human Task and Annotation Services or your standard mail delivery service.

Workflow-driven notifications are only available for IBM Cognos TM1 servers that are CAM authenticated by using Mode 5 authentication.

Notifications can be processed by the Human Task and Annotation Services from the Cognos platform, or you can set notifications to use only your standard email delivery service. The Human Task and Annotation Services is installed either as part of the Cognos Business Intelligence (BI) Server install, which BI version 10 customers have, or as part of the Cognos BI Runtime install, which Cognos TM1 customers with no Cognos BI license are entitled to. The platform services must be at version 10.1.1 or newer.

If you are a Cognos TM1 customer and you install the Cognos BI Runtime to support workflow notifications, you must provide a supported RDBMS instance, such as DB2®, SQL Server, or Oracle, to use as a Content Store. Alternatively, for a test or demo environment, you can use the Cognos Content Store that is based on Apache Derby. However, this is not provided with the Cognos BI Runtime that Cognos TM1 customers can access, and should not be used for production systems.

Using your standard mail delivery system (DLS notification)
You can use your standard mail delivery system for Cognos TM1 Applications workflow actions.

Procedure
In IBM Cognos Configuration, click TM1 Application Server and enter DLS, in the Notifications provider field.

Configuring the Human Task and Annotation Services
You can configure your Cognos TM1 Applications to use the Human Task and Annotation Services to notify users of actions taken. The human task service creates and manages human tasks used in IBM® Cognos® Event Studio and IBM Cognos Workspace. A human task is either a notification of information or an action to be performed by a person, such as a report approval request.

Before you begin
You must have the following software on your system:

- An installed Cognos BI Server or Cognos BI Runtime with the Human Task and Annotation Services configured. See the IBM Cognos Business Intelligence Administration and Security Guide, and the IBM Cognos Business Intelligence Installation Guide for more information.

- The Cognos TM1 Application Server installed and configured against Cognos Access Management (CAM)-authenticated Cognos TM1 servers.

- The relevant TM1 Applications gateway components must be installed on the Cognos BI Server, and configured correctly. For example, the planning.html file in the BI_install_location \webcontent directory must be edited to point to the location of the Cognos TM1 Application Server, for example, http://machinename.com:9510).

- A Cognos TM1 Application that is deployed from Cognos TM1 Performance Modeler and has Rights assigned.

Procedure
1. Ensure that the Cognos TM1 instance of Cognos Configuration is set to point to a valid Cognos BI server.
2. If you want to have workflow notifications sent by email in addition to the notifications that are sent to the user Inbox in Cognos Connection, ensure that a mail server is configured in the Cognos BI instance of Cognos Configuration.
3. Modify the `<notifications emailProvider tag>` in the `pmpsvc_config.xml` file for the Cognos TM1 Application Server:

```
<service>
  <notifications emailProvider="HTS"/>
</service>
```

4. Re-start the Cognos TM1 Application Server service.

### Changing notifications
You can change the email notification settings in the IBM Cognos TM1 Applications portal.

#### Procedure
1. In the IBM Cognos TM1 Applications portal, for example, `http://server_name:9510/pmpsvc`, click the selection box of the application, and click the **Set properties** icon.
2. Click the **Notifications** tab.

   The Notifications page lists the actions and the current values for each kind of notification.
3. To enable or disable notifications on particular actions, enter either True or False in the **Enable Notification** column.
4. To change the notification recipients, or to alter the content of the notifications, click in the relevant row for the **Advanced Notification Settings** column:
5. You can change the recipients and construct different Subject and Body text, and use preset parameters in the notification content.
6. Redeploy the Application for changes to the notification settings to take effect.

**Note:**

Authentication sources such as Active Directory or LDAP can have the email address field populated automatically. It is possible to use an authentication source such as NTLM that has no native email field, and to add the email address from the user’s preferences in Cognos Connection.

Users without email addresses still receive notifications via the Inbox.

### Changing the language for notifications
You can change the language that is used for the notification by identifying the language and the translated text in the Applications Properties page.

#### Procedure
1. In the Cognos TM1 Applications page, select the Application to use.
2. Click the **Properties** icon.
3. Click the workflow action that you want to use. Only the actions that can use notifications are available.
4. On the **Notifications** tab, you can change the language setting, the subject, and the text of the notification so that the notification uses translated text.

   **Important:** Do not alter or remove the metadata tags such as `<Current Owner>` or `<Application Link>`. Do not translate those tags.

### Reading notifications
You can read the notifications through the Inbox that can be accessed from both Cognos Connection and the Cognos TM1 Applications portal.

#### Procedure
- From the Cognos TM1 Applications portal toolbar, click the **My inbox** icon
- From Cognos Connection, the Inbox is found on the **My Area Options** drop-down menu.
Managing user rights for widgets
Widgets in an application can be hard-locked in Cognos TM1 Performance Modeler to prevent a non-administrator user from unlocking the widgets in IBM Cognos Insight.

In Cognos Insight, any user can unlock widgets using the context-sensitive menus. After the widgets are hard-locked, users of Cognos Insight are prevented from unlocking them. After the property has been set to true, when the application is opened by a non-administrator, using Cognos Insight, the context menu actions of both the workspace and widget are disabled.

Managing hard-lock rights for widgets
To prevent a non-administrator user from unlocking the widgets in IBM Cognos Insight.

About this task
In TM1 Performance Modeler, you can set the Hard lock all widgets option to prevent them being unlocked by a non-authorized user.

Procedure
1. In TM1 Performance Modeler, open the Application Design pane and double-click the application name to display the Application Design tab.
2. Select the Hard lock all widgets option and save.
3. Deploy the application.

Managing data spread options in consolidated cells
This feature allows users to type a rule derived consolidation into a cell, and to launch the spread dialog box to spread data values and be prompted for the spread type.

The options Proportional Spread, Equal Spread, and Repeat Leaves Spread are available in the Data Spread dialog box in IBM Cognos Insight. The options are enabled in IBM Cognos TM1 Performance Modeler.

Managing the data spread options
The steps to activate data spread options in consolidated cells are described.

Procedure
1. In Cognos TM1 Performance Modeler, open the Application Design pane and double-click the application name to display the Application Design tab.
2. Select the Spread on Rule Derived Consolidated Cells setting and save.
3. Deploy the application.

Configure ownership properties
If users attempt to take ownership of a node that is owned by another user, the system can provide a warning message and offer the opportunity to cancel, or can prevent the taking of ownership. Ownership properties are configured by the administrator.

An administrator can see who has ownership and determine which owner is released. "Bouncing" behavior can be controlled per application.

You can configure warning messages by double-clicking the application name in the Application Design tab and selecting an option from the On ownership change list. You can also configure warning messages by setting the Ownership Change Behavior property.

The options are as follows:

Never warn
Users can take ownership from one another freely, and no warnings are raised.

Warn on active user
Display a warning if the current owner has the node open in a client, but allow the change of ownership ("bouncing") to proceed if the warning is ignored.
**Prevent bouncing of active user**
Display a warning if the current owner has the node open in a client, and block the change of ownership. Do not allow the “bounce” to occur.

**Always warn**
Display a warning if the node for which the user is attempting to take ownership is already owned by another user, regardless of whether the current owner is in the system or not. Allow the change of ownership to take place if the user continues.

**Always prevent ownership change**
Display a warning if the node for which the user is attempting to take ownership is already owned by another user, regardless of whether the current owner is in the system or not. Never allow the change of ownership to proceed. In this situation, the current owner must release his or her ownership before another user may attempt to take ownership.

These settings are available regardless of the client used. When users have ownership, an administrator can click the **Release Ownership** icon on the workflow page to display a window that lists the current owners of nodes. The administrator can then choose which user to release.

**Validating and deploying the application**
The validation process ensures that all conditions required to deploy the application are met.

Before an application can be used, the application must pass validation and deployment. This process ensures that the following conditions are met:

- The correct structure is used for approval hierarchy.
- All objects in the application definition are available on the IBM Cognos TM1 server.
- The correct client is used for the application.
- For the application types, **Approval** and **Responsibility**, the **Approval Hierarchy** folder includes the dimension that contains the approval hierarchy.

**Procedure**
1. Right-click the application in the Application Design pane and click **Validate Application**.
   ![Validation icon]
   If the validation fails, an error message is displayed detailing the changes that must be made to the application.
2. Right-click the application and click **Deploy Application**.
   ![Deployment icon]
3. Click **OK**.

**What to do next**
The user groups and rights must be configured for Approval and Responsibility applications before the application is available for use.

**Managing rights for the application**
After an IBM Cognos TM1 application is deployed, you must define rights for all user groups for which you want to provide access to the application.

For an application with an approval hierarchy, each node in your approval hierarchy has rights assigned to the user groups that exist on the server that hosts your application. The rights that you assign determine the actions that can be performed by members of the user groups.
For applications without an approval hierarchy, you can assign a group to have full access to the application. Central applications can be designed to either allow users to take ownership or only to edit nodes.

Assigning rights for an approver

In a typical application, an approver is assigned either Review or Submit access rights at consolidation nodes in the approval hierarchy. As an application designer, consider the following extra questions:

- Is the approver required to see all levels following the designated consolidation?
  If yes, you can control how many hierarchy levels the user sees by using the Review Depth and View Depth options in the Add Rights window.
- Is the approver required to edit leaf nodes or just submit or reject them?
  If yes, you can allow an approver to edit leaf nodes by enabling the Allow Reviewer Edit option in the Rights window.

When you assign rights for a consolidated node, those rights are applied to all the descendant nodes of that consolidated node. Descendant nodes include consolidated and leaf nodes under the consolidated node. Cascading rights assignments have the following behavior that depends on which access right you apply to the initial consolidated node:

- Review rights that are assigned at a consolidated node are also assigned to all descendant nodes.
- Review rights assigned at a consolidated node sets View rights to consolidation and Submit rights to all descendants.
- Submit rights assigned at a consolidated node sets Submit rights to that consolidation and Submit rights to all descendants.

The Allow Reviewer Edit option and the Review Depth and View Depth options in the Add Rights window override the cascading of Review and Submit rights on a consolidated node:

- When the Allow Reviewer Edit check box is not selected, the application assigns View access rights only where Submit or Edit rights would exist.
- When you set a number (n) for the Review Depth and View Depth options, the application only display n-levels from the initial node. You can use these options to keep lower-level nodes from appearing for higher level managers who must focus on higher consolidation levels.

Assigning rights for a non-approver

To provide a non-approver user or contributor the ability to perform multi-node editing, you must assign at least View rights to the consolidated node. This minimum rights assignment makes the consolidated node the starting point from which the user can access, edit, and submit all descendant nodes to which they have the rights. Users must take ownership at the consolidated node to use the Multi-Node Edit ability to gain access to all the related leaf nodes. As an application designer, you must consider the following additional questions:

1. Does the non-approver require the ability to update more than one node at a time with the Multi-Node Edit?
   If yes, consider question 2.
   If no, you can either assign Edit or Submit rights to individual leaf nodes for the non-approver.
2. Does the non-approving user need Submit rights to all nodes reporting to a parent consolidated node?
   If yes, consider question 3.
   If no, assign Submit rights to the designated child nodes.

   **Note:** When you assign Submit rights to a leaf node, the underlying TM1 security cube also allows Write access to the consolidated parent of the leaf node. This ensures that values can be spread from the consolidated parent to the leaf nodes for which the user has Submit rights.

3. Is the non-approving user responsible for submitting the consolidated node?
If yes, assign **Submit** rights to the non-approver at the consolidation node.

If no, consider question 4.

4. Is another user responsible for submitting the consolidated node?

If yes, assign **Review** rights to the non-approver at the consolidation node.

### Managing user groups and rights for an application with an approval hierarchy

After an IBM Cognos TM1 application is deployed, you can assign user groups and access rights to the approval hierarchy.

**About this task**

For application types **Approval** and **Responsibility**, you can define the user groups and access rights for each node in the approval hierarchy. The rights that you assign determine the actions that can be performed by members of the user groups.

The user groups must exist on the IBM Cognos TM1 server that hosts your application. If you reset an application, data changes are not discarded.

**Procedure**

1. Double-click the **Rights** object in the Application Design pane.
   - **Tip:** You can also click **Configure Rights** in the Application Design tab.
2. In the **Add Rights** pane, click the node in the hierarchy from the **Select Node** column.
3. Select the user group from the **Select Group** column.
   - For each set of rights defined, click **Add**.
5. Repeat steps 3 and 4 for every user group required for the application.
   - A user group can have more than one user right.
6. In the **Rights** window, click **Apply**.

### Managing user groups for a central type application

After a central type application is deployed, you can assign user groups to the application.

**About this task**

For the **Central** application type, you can define the user group and identify if the user group can take ownership or only edit the node.

**Procedure**

1. Double-click the **Rights** object in the Application Design pane.
   - **Tip:** You can also click **Configure Rights** in the Application Design tab.
2. In the column **Select Group**, select the user group.
3. To allow the user to take ownership, select **Own** in the **Define Security** field. To prevent the user from taking ownership, select **Edit**.
   - In both cases, the user can write to cells where the model security gives them Right access without taking ownership. However, when you have Edit rights, the **Take Ownership** button is always unavailable. When you have Own rights, the **Take Ownership** button is active for a user in a group where Own rights are assigned.
Managing Cognos TM1 applications in the portal

To be able to work with the deployed IBM Cognos TM1 Performance Modeler application, you must activate the application in the portal.

All applications are visible to administrators in the applications portal. The application must be activated before it can be used. After activation, the application is available for use. The application and properties can also be edited.

Activating an application in a portal

The IBM Cognos TM1 Performance Modeler application must be activated before users can use it from the Applications portal.

Procedure
1. Open the portal. The applications are listed in the Name column.
2. To activate the application, under the Actions column, click the Activate Application icon.

Exporting an application from the portal

You can export an IBM Cognos TM1 Performance Modeler application for use as a template for a new application, or as a backup for an existing application. An application should be exported only to a server that does not have that application or uses a different dimension for the approval hierarchy of the exported application. An archive is created and contains the XML files that describe the structure and security of your application.

Procedure
1. Open the Cognos Applications portal.
2. Click the Export Application icon under the Actions column.
3. Click Save File to download the file to your computer.

Importing an exported application to the portal

You can import an exported application back into the IBM Cognos TM1 Applications portal and use it as the basis for a new application.

Procedure
1. Open the Cognos TM1 Applications portal.
2. Click the Import Application icon.
3. Select the server onto which you want to import the application.
4. Click Choose file.
5. Navigate to the application (.zip) file, and then click Open.
6. If you want to import security settings with the application, select the Import application security option.
7. If you want to import commentary with the application, select the Restore application commentary option.
8. Click Import.

Resetting an application in the portal

You can reset all nodes in the approval hierarchy to their original state after the application is deployed to the IBM Cognos TM1 Applications portal. Resetting an application discards all progress made in the planning process so that you can restart the planning process. It also removes sandboxes. Resetting an application does not reset or discard any data changes.
**Procedure**

1. Open the Applications portal.
2. Next to your application name, select the check box.
3. Click the **Reset Application** button.
4. Click **OK** to confirm the reset.

**Setting workflow, translation, and text properties in the Applications Portal**

You can set properties in the IBM Cognos TM1 Applications Portal.

**Procedure**

1. Open the Applications portal.
2. To open the **Set Properties** window, click the **Set Properties** button.
3. Set properties as described here:
   - **Workflow Settings: Workflow page refresh rate**
     The interval, in minutes, at which the workflow page is refreshed.
   - **Application Text: Language**
     The language in which your application runs.
     Select any of the available languages from the menu.
   - **Application Text: Name**
     The name of your application. This is the name that identifies the application in the Applications portal and other locations.
     There is a 200 character limit for application names.
   - **Application Text: Help**
     This property sets the User Instructions text that appears when users access the application through the Applications Portal.
     Enter text that will instruct users on using your Application.
   - **Views: Name**
     This property sets the name that is displayed on the View tab in the Applications client.
   - **Views Text: Help**
     This property sets the text that appears when a user clicks the Help button when working with a view in the Applications client.
     Enter instructions or information that assists users in entering data in the view.
4. Click **OK**.

**Setting Cognos TM1 Applications configuration options**

You can configure options that determine which server hosts your applications and which clients can be run against your applications.

**Procedure**

1. Click the **Administer Application** icon on the IBM Cognos TM1 Applications portal.
2. To add a new server that hosts additional applications, click **Add** in the **Server Names** section.
   a) Specify the name of the Admin Host for the new server.
   b) Select the server name from the list of available servers.
     If the **Server Name** list is empty, click the Refresh button.
c) Click OK. You can also select Disabled to disable this server.

3. To edit or remove a server, select the server, and click Edit or Remove.

4. To add a new client application, click Add in the Clients section.
   a) Enter a unique ID for the client.
   b) Select a client Type. A client can either open in the Current Window, open in a New Window, or be Provisioned to open in a new application.
   c) Enter the Universal Resource Locator (URL) for the new client.
   d) Select the Language to use as the default.
      The language setting defines which locale strings are used for the client. The client name is visible in the context menu of the workflow page and is translated based on the content locale setting from the user.
   e) Enter a Name for the client.

5. To edit or remove an existing client, select the client from the Clients list and click Edit or Remove.

Setting Cognos TM1 Applications Maintenance options
You can configure maintenance options for a server, such as editing custom error settings and fixing applications that are stuck in a running job state.

You can define a number of error codes and associate them with text strings for specific user locales. You can also define an error condition which stops workflow execution immediately.

If something exceptional occurs while an application maintenance job is running, the application can get stuck in running job state. This can happen if one of the TM1 Server or TM1 Applications Service processes is terminated unexpectedly. You can correct this by selecting the Clear the "Running Jobs" flag for the selected server option.

Procedure
1. Click the Administer Application icon on the IBM Cognos TM1 Applications portal.
2. Click Maintenance.
3. Select the server.
4. To define an error code, click Edit custom error settings for the selected server, and select and modify the error code.
   For example, for an error code that is named CheckPrices, CheckPrices is the code that is used for the parameter PErrorcode in a custom process. The strings that you see for English and French can be identified by their system locale. To display the correct strings, the Cognos TM1 server must be correctly configured with caption support, so that the relevant cultures (en, en-GB, en-US, fr, fr-FR, and so on) are linked to the relevant captions in the Cognos TM1 server.
5. To correct a running jobs issue, click Clear the "Running Jobs" flag for the selected server
   This option updates the IsRunningMaintenance attribute in the tp_applications dimension. It sets the value to N. It also updates the TM1 Server global ApplicationMaintenanceRunning attribute of the tp_config dimension, setting the value to N.

Managing jobs in TM1 Applications
You can monitor the deployment, the initial saving of rights, and the import of an application that may be taking a long time in the TM1 Applications portal and have those jobs processed in the background.

This feature also blocks administrators from triggering any of these actions if they are already running for any application built from the same underlying TM1 server. Anyone who attempts to connect to an application while these processes are completing are blocked and the application displays a busy icon. Also other activity icons are not available during this kind of process. The wait time and the maximum...
number of threads can be configured using the deployment MaxThreads and the deployment MaxWaitTime parameters in the pmpsVC_config.xml file.

Procedure

1. In the TM1 Applications portal, click the Manage Jobs icon.
   The Manage Jobs window is displayed with any jobs that are currently being processed.

2. Click the Refresh icon to ensure that all currently running jobs are shown.

3. To reduce the jobs shown, click the Filter icon.
   Click the Define Filter icon to identify the criteria to use when reducing the display.
   Use the pull-down at each field to identify the kind of job you want to see.

4. Use the plus sign to add another set of criteria.

5. If a job is currently running, you can select it and use the delete icon to delete the job.

Configuring a TurboIntegrator process to execute on a workflow action

You can configure the execution of a TurboIntegrator process from a Cognos TM1 Application Server workflow action.

Procedure

1. Create the custom TurboIntegrator process that you want to execute.
   For more information, see “Considerations for creating a TurboIntegrator process that can be executed from a workflow action” on page 97.

2. Determine the error messages to return to the user.
   In the TM1 Applications portal, click the Administer icon and click Maintenance.
   You can define a number of Error Codes in the Cognos TM1 Application Portal and associate them with text strings for specific user locales. You can also define an Error condition which stops workflow execution immediately.
   For example, for an Error Code called CheckPrices, CheckPrices is the code used for the parameter pErrorCode in the custom Process. The strings that you see for English and French can be identified by their system locale. To display the correct strings, the Cognos TM1 server must be correctly configured with Caption support, so that the relevant Cultures (en, en-GB, en-US, fr, fr-FR, and so on) are linked to the relevant Captions in the Cognos TM1 server.

3. To set the custom action, open the application in the Application Design tab of Cognos TM1 Performance Modeler.

4. Select the application and display the Properties tab in the pane.

5. Click the ellipses (...) at the Custom Processes label to display the window. You can set the Pre and Post Process names and whether the process is enabled.
   See the following example:

<p>| | | | |</p>
<table>
<thead>
<tr>
<th></th>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
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</tr>
</tbody>
</table>

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In this example, the Process Other Revenue Validation is configured to run as a Pre-workflow action process in the event of Submit, Reject, or Annotate. However, it is enabled only for the Submit workflow action.

You can configure the same action for Pre- and Post-workflow actions. However, you can configure only one Process to run in each case. For example, you cannot name three Processes to run as Post Process actions for the Submit operation. Only one process is allowed.

The application must be deployed for these settings to take effect.

Test the custom Process execution in a Development environment before deploying to a Production system. If any problems occur with the custom Process execution, use the Enabled flag to selectively isolate the custom Processes to determine whether the workflow actions proceed normally when the custom Process is not running.

6. Click OK.

Considerations for creating a TurboIntegrator process that can be executed from a workflow action

When you create a TurboIntegrator process that can be executed from a workflow action, there are a number of considerations that must be taken into account.

You can create a TurboIntegrator process in IBM Cognos Performance Modeler. Right-click in the Model Design pane and select New > Process.

The Cognos TM1 Application Server needs the context of the workflow action, the approval hierarchy node that is used, and the Application from which the workflow action was performed. The TurboIntegrator process must have the following parameters in this order on the Advanced tab in the process editor.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>pExecutionId</td>
<td>Represents the GUID unique identifier for the application. The GUID identifies the application that triggered the action. You can deploy more than one application from the same cube, so you need to identify exactly which application triggered the action.</td>
</tr>
<tr>
<td>pAppId</td>
<td>Represents the node from which the workflow action was performed. pNodeid is always a single value; in the case of a multi-node edit, pNodeid represents the consolidated node from which the action was performed.</td>
</tr>
<tr>
<td>pWorkflowAction</td>
<td>Returns one of the following values:</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Value of pWorkflow Action</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>OWN</td>
<td>Take Ownership of a node.</td>
</tr>
<tr>
<td>SAVE</td>
<td>Commit data for a node.</td>
</tr>
</tbody>
</table>
Table 7: pWorkflowAction values (continued)

<table>
<thead>
<tr>
<th>Value of pWorkflow Action</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>SUBMIT</td>
<td>Submit a node.</td>
</tr>
<tr>
<td>REJECT</td>
<td>Reject a node.</td>
</tr>
<tr>
<td>ANNOTATE</td>
<td>Annotate a node.</td>
</tr>
<tr>
<td>RELEASE</td>
<td>Release ownership of a node.</td>
</tr>
<tr>
<td>OFFLINE</td>
<td>Take the approval hierarchy node Offline when the Cognos Insight client is used in Distributed mode.</td>
</tr>
<tr>
<td>ONLINE</td>
<td>Return the approval hierarchy node to Online when the Cognos Insight client is used in Distributed mode.</td>
</tr>
</tbody>
</table>

All workflow actions are not available in all application types. For example, the Submit and Reject actions cannot occur in a Responsibility application.

You cannot set a Pre-Workflow TurboIntegrator process for the Commit action.

To return specific messages in the correct locale to the user of the Application, the Process must call a specific system-generated TurboIntegrator process that generates a ProcessError; call:

```java

ProcessError;
```

Update only the pErrorCode and pErrorDetails fields in this ExecuteProcess() statement. Do not edit the other fields.

**pProcess**
- The name of the current process.

**pErrorCode**
- A code that represents the error condition that is used to warn the user about (OtherRevWarning in this example). A more descriptive string that can be translated corresponding to this Error Code can be configured in the Cognos TM1 Applications Portal. For more information, see “Configuring a TurboIntegrator process to execute on a workflow action” on page 96 “Configuring a TurboIntegrator process to execute on a workflow action” on page 96.

**pErrorDetails**
- Can be any string that returns supplementary information that you want returned to the user when the user takes the workflow action. In this case, a variable vErrorDetails was used, but a specific text string can also be used. This value cannot be translated. The custom Process must display a ProcessError; statement in order for the Cognos TM1 Application Server to present an error or warning to the user. The actions that cause the custom Process to return a warning or error are also logged in the tp_process_errors cube. This cube is maintained by the Cognos TM1 Application Server and is not edited.
Automating tasks with the Cognos TM1 Application Maintenance utility

The Cognos TM1 Application Maintenance utility is a command-line utility that helps administrators take actions that were previously only possible from the Cognos TM1 portal.

The utility can be used to deploy a version of the automation for use on a computer other than the Cognos TM1 application server. You can also run the utility from inside a TurboIntegrator Process as part of a wider-ranging chore.

The utility is installed as part of the Cognos TM1 application in `install_dir/webapps/pmpsvc/WEB-INF/tools/app_maintenance.bat`

To display a list of the actions that can be automated along with the required parameters, use the `-h` argument. For a formatted version, pipe the output to a temporary text file, for example

```bash
app_maintenance.bat -h > automate.txt
```

The help file contains all the parameters and syntax that is needed for each action.

The utility can automate the following actions:

- Activate/deactivate an application
- Deploy an application
- Import/Export/refresh rights
- Logon with a CAM logon
- Logon with an encrypted password
- Logon with an encrypted password created with TM1crypt.exe
- Log to a file
- Set logging level to ERROR, DEBUG, INFO, or OFF
- Execute a sequence of commands from a command file
- Package the app_maintenance tool so that it can be installed and run on another computer
- Enable/disable a server
- Reset the application (not included in the -h flag listing). This removes all existing sandboxes for cubes in the application. When you use Reset from the TM1 Applications portal, you are prompted to verify that you want sandboxes removed.

The tool requires a Java™ runtime environment. By default the tool uses the JRE in the usual TM1 installation location. It uses the JAVA_HOME or JRE_HOME environment variables.

To deploy the tool to another machine, a JRE must be available on the other machine. The javahome variable must be set so that the tool can find it.

You can also deploy a version of the tool and all the required executables it needs into one location. Then you can easily import them to another computer.

For example, you can create a folder that is called `D:\AppAutomation\utility` on the machine where you want the utility to run. On the original computer, use the following command to package up the tool and its required objects:

```bash
app_maintenance.bat - package "D:\AppAutomation\utility"
```

This action creates a compressed file called `application_maintenance.zip` which can be moved to the other machine where you want to run the automation. The compressed file includes the tool and the objects it needs. Ensure that there is a Java runtime environment available on the secondary computer and that it is identified in the javahome or jrehome environment variable.

The following sample syntax is used to deactivate an application called StorePlan (breaks in syntax are for formatting purposes only. Do not break these lines in your commands):
The service URL is the URL used to browse to the TM1 Applications portal. Your browser may encode the "{}" in the URL. Ensure that your GUID is using the convention you need for your browser.

This command uses TM1 authentication. In a production environment, it is not secure enough to pass the username and password in clear text. Use the TM1Crypt utility to encrypt the necessary admin credentials and then pass in an encrypted password file to this utility.

The GUID can be identified by the aid parameter in the browser link when you open the application in the TM1 Applications portal.

http://localhost:9510/pmpsvc/pmpjs/workflow/workflow.jsp?portal=1&aid=7cc2f875-281f-4e97-b51c-daf7b772a777

Using the automation tool as part of a TurboIntegrator process

You can use this utility as part of a TurboIntegrator process.

For example, suppose that you have a model with the following approval hierarchy:

![Store Plan Workflow model](image)

Figure 6: Store Plan Workflow model

For this example, you want to add a new leaf node called "Western Europe" that rolls up into Europe. You can create a set of TurboIntegrator processes combined into a chore. Ensure that the Chore process is set to use Multiple Commit mode, so that the TurboIntegrator process is committed and relevant locks released before the next TurboIntegrator process is run. Then use the automation tool to refresh and update the application in an overnight batch process.

The TurboIntegrator processes take the following actions:

**Deactivate**
- Makes the application unavailable to users while the update is taking place.

**Update Country and Region**
- Updates the approval hierarchy dimension for this application. The command adds Western Europe as a node beneath Europe.

**Update Approval Hierarchy Subset**
- Updates the approval hierarchy subset with the new information.

**Deploy Store Plan app**
- Redeploys the application. In a production environment, data would be added first.

**Refresh rights for Store Plan app**
- Updates the rights for users with review rights to Europe. Those users would inherit the rights to the new node.

**Activate Store Plan app**
- Makes the application available to users again after making those changes.

Here is sample code for the deactivate process:

```sql
ExecuteCommand('D:\AppAutomation\StorePlanDeactivate.bat', 1);
```
The “1” in the command indicates that the command completes before the next command is executed. When the chore is complete, it can be executed immediately or scheduled to run as an overnight process.

**Show Data Flow in Cognos TM1 Performance Modeler**

You can see a graphic representation of your application using the Show Data Flow option in Cognos TM1 Performance Modeler.

You can also see a graphic representative of data flow for cubes that shows which cubes are connected.

To see a graphic representation of your application:

1. Perform one of the following options:
   - Right-click the name of the application.
   - Right-click the cube.
   - Right-click a folder containing cubes.
   - Right-click the root of the server to include everything in the server.

2. Click **Show Data Flow**.

   A diagram of the application's cubes and rules displays:

   ![Figure 7: Cubes and rules example](image)

3. You can take the following actions on the flow diagram:
   - Select or unselect the Rule Links, Process Links, Rules, or Feeders to control the display of those elements in the current application.
• Control the zoom with + and -
• Use Reset Layout to organize the diagram in the most logical fashion.
• Drag the elements to new locations. Or, when one or more diagrams are open in the pane and a clicked objected is the kind of object that can be added, use the Add Data Flow Diagram option.
• Double-click the elements to display their values in the Properties pane.
• Double-click the Rule or Link icons within the model to display the Link and Rule editing windows.
• Double-click the object name to open the dimension for editing. Close the new tab to return to the flow diagram.
• Drag an Object from the TM1 Objects pane into the diagram to add it to the model and display the relationships between the new and existing objects.
• Right-click the diagram and select Export to file to save the dataflow as a .png file.
• Group items by pressing CTRL and right-clicking and then selecting Group. To ungroup items, right-click the group and select Ungroup. You can also create a new diagram from grouped data.
• To remove an item from the diagram, right-click an item and select Remove.
• To remove an item from a group, right-click a group and select Remove from group, and then select the item to remove.

The Show Data Flow feature cannot be used to change any structure of your model. It is used simply to provide a visual representation of the existing structure.

**Analyzing object dependencies**

Analyze an object's dependencies to see which other objects would be affected if you delete it.

**About this task**

Objects have relationships with other objects. For example, a cube can be linked to another cube. Or a dimension can be part of a cube's structure. If one object's deletion would affect a second object's properties, the second object is called a dependent object.

When one cube links to a second cube, both cubes are dependent objects of the link between them. This is because deleting the first cube would result in the second cube not having all of its data. Both cubes are dependent objects of the link between them because if either were deleted the link would be broken. When a dimension is part of a cube, the cube is the dependent object because deleting the dimension would affect the structure of the cube.

You can view all the dependent objects of selected objects. This can help you decide which objects not to delete. If you try to delete an object that has dependent objects, you will be prompted to remove the dependencies first.

**Procedure**

1. In the Model Design pane, expand a folder.
2. Select one or more objects.
   - **Note:** Ctrl-click to select multiple objects.
3. Right-click on the selection and click Show Dependencies.

   A Dependencies tab lists all the dependent objects for each selected object.
4. If you want to open a dependent object in the viewer, click its link.
5. If you want to sort multiple dependencies, do the following actions:
   a) Click the Object column header to sort selected objects.
   b) Click the Is needed by column header to sort the dependent objects.
Chapter 8. Transfer of model objects and applications

You can transfer model elements to update, for example, an existing cube or application. You can also transfer dimensions from IBM Cognos Business Viewpoint to an IBM Cognos TM1 environment and vice versa.

Use the Transfer Specification Editor to copy model objects from one IBM Cognos TM1 environment to another and manage any changes to the applications or model elements. For instance, you might want to transfer the objects of a model when you have a staging environment, which is used for performance testing, and you want to move the objects from that environment to a production environment. Alternatively, you might want to create different versions of your model to distribute to business users or analysts.

Creation of transfer specifications

Understanding relationships among objects and determining which objects to move from the source environment can be difficult for users who are not modelers. When you start the transfer operation, the selection of objects that you make can be saved to a transfer specification to repeat the transfer operation later. Users other than modelers can run this specification and avoid repeating the task of selecting the same model objects.

Impact analysis of a transfer

If the target environment was previously populated with model objects, when you move a model object from the source environment to the target environment, the difference in the structure of the model is indicated in the Action column in the Transfer Specification Editor preview. This preview provides a summary of how the model objects fit in to the target IBM Cognos TM1 environment. For example, you can quickly identify which objects are being added to a dimension or a cube and which objects are being updated or removed from the initial selection.

Transfer of cube data

When you transfer from an IBM Cognos TM1 environment, you can choose to transfer only the objects of your models or transfer both the objects and related cube data. Even though you can move the data, do not use the transfer process to move volumes of data, such as sales transactions, across environments. Rather, use a TI Process or the Import wizard to import source data in to the target system. Transferring data is best used when you want to move metadata, such as currency rates, that are used to derive other data in the cube.

Automation of the transfer process

When your selection of objects for transfer is saved to a transfer specification, you can create a batch file to run this specification at a scheduled time and without intervention.

Transfer of model objects between IBM Cognos TM1 environments

Use the Transfer Out command to copy the model elements by selecting objects from a source IBM Cognos TM1 environment and copying them to a target IBM Cognos TM1 environment. You can control the type and number of model objects that are transferred to the target environment.

The transfer specification includes the selected objects and those objects that are required by them.

If you use a development environment to modify and test an application, you can transfer the changes that you made to a target directory. Content in the target directory is ready to be transferred to a production environment when the changes are complete.

A selective transfer provides the following benefits:
• The server is not interrupted.
• You can select only the objects that you know were changed. Understanding the business logic for the application reduces any errors that might be generated during the transfer process.

Transferring model objects from an IBM Cognos TM1 environment
Use the Transfer Out command to copy selected objects from an IBM Cognos TM1 development environment to a target production environment. You can copy changes that you made to an application or model elements in a source environment to a target directory before those changes are transferred to a target environment.

You can transfer the following model objects:
• cubes
• views
• dimensions
• subsets
• links
• processes
• chores
• scorecards

While you can transfer cube calculations, they are not primary model objects that you can select from the TM1 source. The calculation is considered the metadata that is transferred along with the cube or view.

You can select Include dependent objects when adding to include objects that are related to other objects. For example, a dimension is part of the structure of a cube. If a dimension is added, it affects the structure of the cube. If you are not familiar with the objects, use this command to ensure that all required objects are copied to the target environment. Adding dependencies increases the likelihood of a successful update.

Procedure
1. In the Model Design pane, select all the objects that you want to transfer.
   Tip: Press Ctrl and click or press Shift and click to select multiple items.
2. Right-click the selection and click Transfer Out.
3. If prompted, in Transfer Target, click Files, and click OK.
4. In the Select Folder window, go to the directory where you want to save your transfer specification, and click OK.
   The default directory is target_drive:\Users\your_user_name\AppData\Roaming\IBM \Cognos Performance Modeler\Transfer.
   A preview of the transfer is displayed in the Transfer Specification Editor. The Transfer Out operation analyzes the dependents of the selected objects that are required and displays them in the Target pane. The Source pane displays model objects that you can add to the initial selection of objects.
   The tree in the Target pane includes a merge of the new, updated, and existing content. If the target environment contains existing content, the Action column provides details on how the changes affect the target environment. By default, a concise view of the changes is displayed. To show all the model objects, click Expand All.
5. To include dependent objects, click Include dependent objects when adding.
6. To add more elements from the source system, in the Source pane, click the object in the tree and click Add.
   The object and its dependents are added to the Target tree.
7. To transfer cell data for views or cubes, click the Configure data icon in the toolbar, and select one of the options.

**Tip:** If you want to transfer selected data for views or cubes, first highlight the views or cubes, and then click the Configure data icon, and click the appropriate option.

8. To execute the transfer, click Transfer.

**What to do next**

You can either transfer these objects into a target environment from the target directory, or you can create a transfer specification to automate the transfer process.

“Transferring model objects to an IBM Cognos TM1 environment” on page 105

“Creating a transfer specification” on page 110

Save your selection of model objects to a transfer specification so that other administrators can be involved in the transfer process.

**Transferring model objects to an IBM Cognos TM1 environment**

After model objects are transferred from a source environment to a holding directory, you can transfer the objects from the directory to a target environment. Objects are transferred across environments to update existing cubes and applications.

When you transfer a transfer specification from the transfer archive, the effects that the transfer will have on the target environment are indicated in the Actions column of the Target pane. For example, if the object already exists on the target environment, the object is updated. If the object does not exist on the target environment, the object is added.

**Procedure**

1. To connect to the target server, click the Actions menu icon and click Connect.
2. In the Select a TM1 Server window, click the target environment.
3. In the Model Design pane, right-click the top-level admin_host:server_name object and click Transfer In.
4. If prompted, in Transfer Source, click Files, and click OK.
5. In the Select Folder window, go to the folder that contains the transfer specification, and click OK.

   **Tip:** The default directory is target_drive:\Users\your_user_name\AppData\Roaming\IBM \Cognos Performance Modeler\Transfer.

   A preview of the transfer is displayed in the Transfer Specification Editor. The Transfer In operation analyzes the dependents of the selected objects that are required and displays them in the Target pane. The Source pane displays model objects that you can add to the initial selection of objects.

   The tree in the Target pane includes a merge of the new, updated, and existing content. If the target environment contains existing content, the Action column provides details on how the changes affect the target environment. By default, a concise view of the changes is displayed. To show all the model objects, click Expand All.

6. To change the model objects, complete one or more of the following tasks:

   - To add more elements from the source TM1 environment, in the Source pane, select the element and click Add.
   - To remove an element from the selection that is ready for transfer, in the Target pane, select the element and click Remove.

   **Important:** If you changed the cell data in the target environment, the changes that you made are overwritten with the cell data that is included in the current transfer operation.

7. When you are satisfied with your changes, click Transfer.

   The imported objects and related updates are displayed in the Model Design pane.
Transfer of applications between IBM Cognos TM1 environments

Transfer an application to move it from one environment to another environment.

When you transfer an application, the following items are moved:

- IBM Cognos TM1 server objects
- IBM Cognos TM1 Application definition

Transferring an application from IBM Cognos TM1 Performance Modeler is different from exporting and importing an application from the Cognos TM1 Applications portal. When you export an application from the portal, only the application definition is moved; Cognos TM1 server objects are not exported.

When you transfer an application the cube views needed by the application are included in the transfer. If you want to include the data for views, click the Configure data icon in the toolbar, and select either Include data for default views, Include data for views, or Include data for highlighted views.

Transferring applications from an IBM Cognos TM1 environment

Transfer an application from an IBM Cognos TM1 environment to another environment.

Before you begin

Before you can transfer an application, you must design and deploy the application by completing the following tasks:

- Create an application.
- Define the application views.
- Define an approval hierarchy, if applicable.
- Select the default client systems to be used with the application.
- Validate and deploy the application.
- Assign user group rights to the application.

Procedure

1. In the Application Design pane, right-click the application and select Transfer Application.
2. In the Select Folder window, choose the target directory where you want to save the application definition and click OK.

   The Transfer Specification Editor displays a preview of the application definition that is ready for transfer. You can continue to refine the definition.
3. To change the application definition, complete one or more of the following tasks:
   - To add an object from the source TM1 environment, in the Source pane, select the object and click Add.
   - To remove an object from the selection that is ready for transfer, in the Target pane, select the object and click Remove.
   - To include cube data in your transfer archive, click the Configure data icon in the toolbar, and select one of the following options: Include data for default views, Include data for views, Include data for highlighted views, or Include data for cubes.
4. To execute the transfer, click Transfer.
5. Copy the contents of the target folder on your computer to the target IBM Cognos TM1 environment.

**Results**

Application rights are not transferred, however if you are transferring into a system where the application already exists, existing application rights are not removed. This is because you might not have the same user groups in your source system as in the target system. Control dimension settings are universal and so these are transferred.

Required object security is not set in the target environment by transferring in an application, although existing object security is not overwritten. For example, if you transfer in an application with a view of cube A and cube A does not exist already in the target environment, you must give the application users rights to the cube after the transfer.

To do give application users rights, right-click the cube to which you want to apply cell-level security, click **Configure Security > Set Access Permissions for > Cube.**

**Transferring applications to an IBM Cognos TM1 environment**

Transfer an application to promote modeling changes from another IBM Cognos TM1 environment.

**Before you begin**

You must first design, deploy, and finally transfer an application from your IBM Cognos TM1 environment. When you transfer an application from a source TM1 environment, you are importing modeling changes to your environment without having to shut down your server. However, you must deactivate any applications in the target environment before you begin.

**Procedure**

1. In the Model Design pane, right-click the top-level `admin_host:server_name` object and click **Transfer In.**

2. If prompted, in **Transfer Source**, click **Files**, and click **OK.**

3. In the **Select Folder** window, browse for the transfer archive folder and click **OK.**

   The Transfer editor displays a preview of the application definition that is ready for transfer. You can continue to refine the definition.

4. To change the application definition, complete one or more of the following tasks:
   - To add an object from the source TM1 environment, in the **Source** pane, select the object and click **Add.**
   - To remove an object from the selection that is ready for transfer, in the **Target** pane, select the object and click **Remove.**
   - To transfer cube data, click the **Configure data** icon in the toolbar, and select **Include data for cubes.**

   **Important:** If you changed the cell data in the target system, the changes that you made are overwritten with the cell data that is included in the current transfer.

5. When you finish your changes, click **Transfer.**

   The imported objects and related updates are displayed in the **Model Design** pane.

**What to do next**

When the transfer is complete, activate the application so that users can begin to use it.
Transfer of hierarchies to and from IBM Cognos Business Viewpoint

For dimensions that are updated regularly in IBM Cognos Business Viewpoint, you might want to manage some of the changes in an external system, such as an IBM Cognos TM1 system. Use the transfer functionality in IBM Cognos Performance Modeler to move objects of the dimension, such as the hierarchies, to and from IBM Cognos Business Viewpoint.

Configuring Cognos TM1 Application Service for Cognos Business Viewpoint

To transfer data from IBM Cognos Business Viewpoint, you must edit the configuration file for the IBM Cognos TM1 Application Service. When you specify the use and location of Cognos Business Viewpoint, it is available as a transfer source and target.

**Before you begin**
Depending on the version of Windows operating system, you must be an admin user or a user with administrator privileges to modify the configuration file.

**Procedure**
1. In a text editor, open the `fpmsvc_config.xml` configuration file in the `TM1_install_location\webapps\pmpsvc\WEB-INF\configuration` directory.
2. Set the `businessViewpoint enabled` parameter to `true`.
3. Specify the URL to IBM Cognos Business Viewpoint in the `uri="http://localhost:9410/bv"` parameter where `localhost` is the name of the server where IBM Cognos Business Viewpoint is installed.
4. Save the configuration file.
5. Restart the TM1 Applications service.

**Results**
When you use the **Transfer In** or **Transfer Out** command, IBM Cognos Business Viewpoint is available as a source or target system.

Transferring hierarchies from IBM Cognos Business Viewpoint

When you transfer hierarchies from IBM Cognos Business Viewpoint, the hierarchies are imported into existing dimensions in IBM Cognos TM1 Performance Modeler.

**Before you begin**
You must use IBM Cognos Business Viewpoint version 10.1.1 or later.
Cognos TM1 Performance Modeler must be able to connect to the IBM Cognos Business Viewpoint server. The URL to Cognos Business Viewpoint is set in the `fpmsvc_config.xml` configuration file.

**Procedure**
1. In the **Model Design** pane, right-click the highest level folder and click **Transfer In**.
2. In **Transfer Source**, click **IBM Cognos Business Viewpoint** and click **OK**.
   The **IBM Cognos Business Viewpoint** option is available only if the URL to the system was specified.
3. If prompted, enter your security credentials to access IBM Cognos Business Viewpoint.
   A preview of the transfer is displayed in the Transfer Specification Editor. The **Source** pane displays hierarchies that you can add to the target selection.
4. To change the selection of hierarchies, complete one or more of the following tasks:
• To add more versions of the hierarchies from the source IBM Cognos Business Viewpoint, in the **Source** pane, select one version of a hierarchy, including any child subsets, and click **Add**.

  You can select multiple hierarchies, but you can select only one hierarchy per dimension.

• To remove a version from the selection that is ready for transfer, in the **Target** pane, select the version and click **Remove**.

  5. Review the selection that you made, and click **Transfer** to move the hierarchies from IBM Cognos Business Viewpoint to an IBM Cognos TM1 target environment.

---

**Transferring hierarchies to IBM Cognos Business Viewpoint**

You can transfer dimensions to IBM Cognos Business Viewpoint as hierarchies.

**Before you begin**

You must use IBM Cognos Business Viewpoint version 10.1.1 or later.

Cognos TM1 Performance Modeler must be able to connect to the IBM Cognos Business Viewpoint server. The URL to Cognos Business Viewpoint is set in the **fpmsvc_config.xml** configuration file.

**Procedure**

1. In the **Model Design** pane, right-click the top-level folder and click **Transfer Out**.
2. In the **Transfer Target** window, click **IBM Cognos Business Viewpoint** and click **OK**.
   
   The **IBM Cognos Business Viewpoint** option is available only if the URL to the system was specified.
3. If prompted, enter your security credentials to access IBM Cognos Business Viewpoint.
   
   A preview of the transfer is displayed in the Transfer Specification Editor. The **Source** pane displays hierarchies that you can add to the initial selection.
4. To change the selection of hierarchies, complete one or more of the following tasks:
   
   • To add more versions of the hierarchies from the source TM1 environment, in the **Source** pane, select one version of a hierarchy, including any child subsets, and click **Add**.
     
     You can select multiple hierarchies, but you can select only one hierarchy per dimension.
   
   • To remove a version from the selection that is ready for transfer, in the **Target** pane, select the version and click **Remove**.
5. Review the selection that you made, and click **Transfer** to transfer the hierarchies from the IBM Cognos TM1 system to IBM Cognos Business Viewpoint.

**What to do next**

You can import the hierarchies into a new dimension in IBM Cognos Business Viewpoint.

---

**Transfer specifications**

The transfer specification is a selection of model objects, such as model elements and application definitions, that can be used to transfer content across IBM Cognos TM1 systems or IBM Cognos Business Viewpoint. The transfer specifications are saved for future use so that other TM1 administrators can run the specification to update cubes or applications in the target environment.

Users who are not administrators or modelers but are authorized to run a transfer, can use the transfer specification to move model objects or dimensions. Users who run the specification are not required to know the business logic of the application or the dependent relationships between objects. For this reason, the use of the archived transfer specification facilitates the transfer process.

When you create a transfer specification, you can complete the following tasks:

• Modify the transfer specification so that it reflects any updates to the model objects or application definitions.
• Create a batch file to automate the transfer that is based on the transfer specification.

**Creating a transfer specification**

Save your selection of model objects to a transfer specification so that other administrators can be involved in the transfer process.

**About this task**

Administrators can run the transfer specification so that they do not have to repeatedly select the model objects or applications to transfer the structure. By using this specification, users are not required to fully understand the business logic of the model to successfully transfer content from one system to another.

**Procedure**

1. In the *Model Design* pane, select all the objects that you want to transfer, right-click the selected items, and then click *Transfer Out*.
2. If prompted, in the *Transfer Target* window, click *Files*.
3. In the *Select Folder* window, select the directory where you want to save your transfer specification and click OK.
   The default directory is \Users\your_user_name\AppData\Roaming\IBM\Cognos Performance Modeler\Transfer.
   The Transfer Out process analyzes the dependents of the selected objects that are required by the cube. It creates a preview and displays the results in a new tab that is labeled *Unnamed Transfer*. In the transfer preview, the *Source* pane displays model objects that you can add to your previously selected objects.
   The *Target* pane displays objects and their dependents that are ready for transfer. The target tree includes a merge of the new, updated, and existing content. The *Action* column shows how the changes affect the target environment. By default, a concise view of the changes is displayed. To show all the model objects, click *Show All*.
4. To save your transfer specification, click *Save*.
5. In the *Save Transfer to Folder* window, enter a name for the transfer specification.

The transfer specification is displayed in the *Transfer Design* pane.

**What to do next**

Other administrators or modelers can use this file to run the transfer process at any time without having to repeat the selection of objects. Administrators can also schedule the transfer process to run at defined intervals by creating a batch file that runs the transfer specification.

**Modifying a transfer specification**

After you save a transfer specification for your transfer, you can change it to reflect updates in the design of model elements and applications.

**Procedure**

1. In the *Transfer Design* pane, right-click the transfer specification that you want to modify and click *Open*.
   A preview of the model objects that are ready for transfer is displayed in the Transfer Specification Editor.
2. Make one or more of the following changes:
   a) To add all the dependent objects that are related to a model object, first click *Include dependent objects when adding* above the *Source* pane.
   b) To add more elements from the source environment, in the *Source* pane, click the object in the tree and click *Add*.
Tip: Click **Add** only if you are familiar with the structure of the model and know exactly which objects that you want to transfer. For example, if you changed a subset definition on a large dimension, you can transfer that specific change without transferring the entire dimension.

c) To transfer cell data for views, click the **Configure data** icon in the toolbar, and select either **Include data for default views**, **Include data for views**, or **Include data for highlighted views**.

3. When you are satisfied with your changes, click **Save**.

### Automating the transfer by using the transfer specification

Use the command line to automate the transfer of model objects between IBM Cognos TM1 environments. The predefined transfer specification is used to guide the automated transfer operation.

To run the transfer process by using the command line, you must first create the transfer specification.

**About this task**

To run the batch file, the Performance Modeler components require a 32-bit `java.exe` file that is in the `installation_directory\tm1_64\bin\jre\version_number\bin` directory.

The `.jar` file that is required to run the batch file is in the `installation_directory\tm1_64\webapps\pmpsvc\rcp_updates\plugins` directory.

When you use the Generate batch file command, a command file is created so that you can run it through the command line. You can automate the transfer process by using a scheduling utility to run the batch file at a specified date or time.

**Procedure**

1. To create the batch file, complete the following steps:

   a) Click the **Actions menu** icon and click **Transfer Design**.

   b) In the **Transfer Design** pane, right-click the transfer specification and click **Generate batch file**.

      A command file is generated and saved to the `target_drive:\Users\your_user_name\AppData\Roaming\IBM\Cognos Performance Modeler\Transfer\transfer specification folder\scripts\` directory.

2. To override source or target parameters, use the `-S` for the source environment and `-T` for the target environment.

   For example, in the following line, the source IBM Cognos TM1 server details are overridden:

   ```
   java.exe -jar com.ibm.mdt.transfer.app_version.jar -SUser=user_ID -Spwd=password -Sserver="source_server_name" -file "transfer_specification.json"
   ```

   If you are using CAM security, you must also specify several CAM-specific parameters, as in this example:

   ```
   java.exe -jar com.ibm.mdt.transfer.app_version.jar -SUser=user_ID -Spwd=password -Smode="CAM" -ScamNameSpace="SYD" -ScamUrl="http://machinename.domain.com:9300/p2pd/servlet/dispatch" -SadminHost=adminhost -Sserver="source_server_name" -file "transfer_specification.json"
   ```

   **Note:** The ScamNameSpace parameter is case sensitive. Check the case of the namespace in BI Cognos Configuration.

3. To run the batch file, double-click the command file.

   The target IBM Cognos TM1 environment is updated based on the objects included in the transfer specification.

   **“Creating a transfer specification” on page 110**

   Save your selection of model objects to a transfer specification so that other administrators can be involved in the transfer process.

---

**Transfer of model objects and applications 111**
Chapter 9. Setting up security and control access for user groups

Before an application can be deployed, the user groups, the capabilities of the user group, and the members of the user group must be defined for security access.

The work flow for security is as follows:
- Define the new user group.
- Assign the capabilities the user group.
- Define the users of the user group.
- Define user group privileges for data access and security.

Capabilities and security for user groups

Each user group must have the security capability and the security access defined before the user group can access IBM Cognos TM1 Performance Modeler.

The security capability and security access are described by:
- Capability assignments
- Data access and security

Capability assignments

Certain capabilities for each user group can be set with the Capability Assignment menu.

Each capability can be set to either grant or deny for each user group. The capabilities are:
- **RunServerExplorer**, enables the user group to use the Server Explorer. The choice to grant this capability enables access to the Server Explorer.
- **UsePersonalWorkspaceWritebackMode**, defines how data changes are handled in the user group.
  - Users can privately adjust data values before making them available to the rest of the community. The sandbox makes it easy to try out different data changes without the complexity of named sandboxes.
  - New data displays in a different color to data that is part of the base data. After the data change in a Personal Workspace is committed, the cell coloring reverts to black to identify it as part of the base data.
  - Users must manually commit their data changes to make them available to other users.
  - Personal Workspace mode can improve performance over working in direct writeback. Changes to the base data occur less frequently than when every data change must be merged to the base.

When denied, users have to work directly in the base data. This is the default behavior for this capability. The advantage to this capability setting is that data changes happen immediately.
- **UseSandbox**, the user group can create named sandboxes that can be used to build what-if scenarios.
- **ManageDataReservation**, a server-related feature that allows you configure an exclusive write access to regions of a cube for individual users. Once reserved, the data in that region can only be modified by that specific user until the reservation is released.
- **DataReservationOverride**, a server-related feature that allows members of a user group to override data reservation for themselves and other users.
• **Consolidation TypeIn Spreading** enables users in clients to perform spreading actions from a consolidated cell that is the target of a rule. If this capability is set to Deny, users are prevented from typing in a consolidated cell that is the target of a rule. You might want to set this capability to Deny if there is a risk that typing in a consolidated cell might cause a large spreading action, which could potentially cause performance issues. However, the user can still manually select a data spreading action from the context menu (right-click in a consolidated cell and select Data Spread). The admin user cannot be set to Deny.

• **Allow Spreading**, gives users access to spreading functions. This can be set to Deny or Grant for the admin user.

The capabilities for **UsePersonalWorkspaceWritebackMode** and **UseSandbox** work together as follows:

<table>
<thead>
<tr>
<th>To let the user group</th>
<th>Use Personal Workspace Writeback Mode</th>
<th>Use Sandbox Mode</th>
</tr>
</thead>
<tbody>
<tr>
<td>Work directly in the base data with the ability to create more than one sandbox.</td>
<td>Deny</td>
<td>Grant</td>
</tr>
<tr>
<td>Work in a single, private work area without named sandboxes.</td>
<td>Grant</td>
<td>Deny</td>
</tr>
<tr>
<td>Work with a private work area and a named sandbox.</td>
<td>Grant</td>
<td>Grant</td>
</tr>
<tr>
<td>Work in Direct writeback with no sandbox. This prevents the use of sandboxes and puts all users into direct writeback mode.</td>
<td>Deny</td>
<td>Deny</td>
</tr>
</tbody>
</table>

**Related tasks**

Assigning capabilities to user groups

Capabilities can be assigned to a user group, after the user group is defined. By default, all assignments are blank.

**Data access and security**

You can enhance or restrict the access for a user group to individual cubes, dimensions, processes, chores, and members.

When you enhance or restrict access for a user group. The privileges you can set for securing these objects are:

- **READ**, The group can view a cube, element, dimension, process, or chore, but cannot perform operations on the object.
- **WRITE** - The group can view and update a cube, element, dimension, process, or chore.
- **LOCK** - The group can view and edit a cube, element, dimension, or other object and can permanently lock objects to prevent other users from updating them.
- **NONE** - The group cannot see a cube, element, dimension, process, or chore, and cannot perform operations on the object.
- **RESERVE** - The group can view and edit a cube, element, dimension, or other object, and can temporarily reserve objects to prevent other users from updating them.
- **ADMIN** - The group has complete access to a cube, element, dimension, or other object.

When you create a new cube, other groups initially have no access to the new cube. You must assign security rights for other groups to view the cube.

When you create a new dimension, the access rights are as follows:

- Only members of the ADMIN and DataAdmin groups can create and delete dimensions.
• Groups with Read access to a dimension can view dimension and member attributes, but cannot edit attribute values.
• Other groups initially have no access to new dimensions.
• When no security has been assigned to a member in a dimension, groups have Write access to new members in that dimension.
• When you assign security rights to at least one member in a dimension, groups have None access to new members in that dimension. Existing members keep their original access (Write), unless you change that access.

The security rights you assign to the processes and chores determine the ability of a group to execute a process from a chore. If the user has no access to a process, but read access to the chore, the group can execute the process from the chore.

You can assign rights for multiple members or to multiple groups by selecting a range of members. You can set different levels of security for a consolidated member and the leaf members that belong to the consolidation.

The following table describes all the security rights and privileges that you can assign to groups.

<table>
<thead>
<tr>
<th>Table 8: Privilege descriptions for member objects</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Privilege</strong></td>
</tr>
<tr>
<td>READ</td>
</tr>
<tr>
<td>WRITE</td>
</tr>
<tr>
<td>LOCK</td>
</tr>
<tr>
<td>NONE</td>
</tr>
<tr>
<td>RESERVE</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Table 9: Privilege descriptions for dimension objects</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Header</strong></td>
</tr>
<tr>
<td>READ</td>
</tr>
</tbody>
</table>
### Table 9: Privilege descriptions for dimension objects (continued)

<table>
<thead>
<tr>
<th>Privilege</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>WRITE</td>
<td>Members of the user group can edit member attributes, edit member formats, and create private subsets for the dimension. Members can also edit attributes for the dimension itself.</td>
</tr>
<tr>
<td>LOCK</td>
<td>Members of the group have all privileges implied by Write permission, and can also lock the dimension. When a dimension is locked, nobody can edit the dimension structure. The lock can be removed only by users who have Admin rights for the dimension. Locks stays in place after the remote server shuts down.</td>
</tr>
<tr>
<td>NONE</td>
<td>Members of the group cannot see the dimension in the Server Explorer, and cannot browse a cube that contains the dimension.</td>
</tr>
<tr>
<td>RESERVE</td>
<td>Members of the group have all privileges implied by Write permission, and can also reserve the dimension to prevent other users from redefining the dimension. The reservation can be removed either by the user who reserved the dimension or by users who have Admin rights for the dimension. A reservation expires automatically when the reserving user disconnects from the remote server or when the server shuts down.</td>
</tr>
</tbody>
</table>

### Table 10: Privilege descriptions for cube objects

<table>
<thead>
<tr>
<th>Privilege</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>READ</td>
<td>Members of the user group can see the cells in the cube, but cannot change their data.</td>
</tr>
<tr>
<td>WRITE</td>
<td>Members of the user group can read and update cells. They can save private cube views. The Write access privilege does not apply to cells identified by consolidated members or to cells derived from rules.</td>
</tr>
<tr>
<td>LOCK</td>
<td>Members of the user group have all privileges implied by Write permission, and can also lock the cube. When a cube is locked, nobody can update its data. The lock can be removed only by users who have Admin rights for the cube. Locks stays in place after the remote server shuts down.</td>
</tr>
<tr>
<td>NONE</td>
<td>Members of the group cannot see the cube in the Server Explorer, and thus cannot browse the cube.</td>
</tr>
<tr>
<td>RESERVE</td>
<td>Members of the group have all privileges implied by Write permission, and can also reserve the cube to prevent other users from applying edits. The reservation can be removed either by the user who reserved the cube or by users who have Admin rights for the cube. A reservation expires automatically when the reserving user disconnects from the remote server or when the server shuts down.</td>
</tr>
</tbody>
</table>
Table 11: Privilege descriptions for process objects

<table>
<thead>
<tr>
<th>Header</th>
<th>Header</th>
</tr>
</thead>
<tbody>
<tr>
<td>READ</td>
<td>Members of the user group can see the process, and can manually execute the process, but cannot edit the process. Privileges assigned to processes are ignored when a process is executed from within a chore.</td>
</tr>
<tr>
<td>NONE</td>
<td>Members of the group cannot see the process in the Server Explorer, and thus cannot execute the process. Privileges assigned to processes are ignored when a process is executed from within a chore.</td>
</tr>
</tbody>
</table>

Table 12: Privilege descriptions for chores objects

<table>
<thead>
<tr>
<th>Header</th>
<th>Header</th>
</tr>
</thead>
<tbody>
<tr>
<td>READ</td>
<td>Members of the user group can see the chore, and can manually execute the chore, but cannot edit the chore.</td>
</tr>
<tr>
<td>NONE</td>
<td>Members of the group cannot see the chore in the Server Explorer, and thus cannot execute the chore.</td>
</tr>
</tbody>
</table>

Related tasks
Defining security and access settings
Creating a cell security cube

Defining a new user group
To add a new user, the user group must first be defined for IBM Cognos TM1 Performance Modeler.

Procedure
1. In the Model Design pane, select the model tree.
2. Right-click the model tree and click **Configure Security > Define Users and Groups > Users and Groups**.
   
   The ClientGroups table opens.
3. Right-click the ClientGroups table and click **New Group**, or click **New Group**.
4. Type the name of the new group. Click **OK**.
   
   The new user group shows as a column in the ClientGroups table.
5. Close the table.
6. To use the changes made to security, right-click in the Model Design pane, and click **Refresh Security**.

What to do next
You can add capability assignments to the new user group.

Assigning capabilities to user groups
Capabilities can be assigned to a user group, after the user group is defined. By default, all assignments are blank.

Procedure
1. In the Model Design pane, select the model tree.
2. Right-click the tree and select **Configure Security > Define Users and Groups > Assign Capabilities**. The Capabilities table opens.
3. In the **Context** field, select the user group that you want to assign capabilities to.
4. In the **EXECUTE** column for each capability, double-click the cell and select **GRANT** or **DENY**.
5. Changes made to these assignments take effect after you log out of IBM Cognos TM1 then log back in.
6. Close the table.
7. To use the changes made to security, right-click in the Model Design pane, and click **Refresh Security**.

**What to do next**
You can add users to the user groups.

**Related concepts**
- Capability assignments
- Certain capabilities for each user group can be set with the **Capability Assignment** menu.

---

**Defining a new user for a user group**

A single user can be added to the security users and groups.

**Procedure**
1. In the Model Design pane, select the model tree.
2. Right-click the tree and select **Configure Security > Define Users and Groups > Users and Groups**. The **ClientGroups** table opens.
3. Click **New User**.
4. Type the name of the new user, the password for the new user, and confirm the password. Click **OK**.
5. Scroll to the new user entry in the **ClientGroups** table. Select each user group that the new user is to have access.
6. Close the table.
7. To use the changes made to security, right-click in the Model Design pane, and click **Refresh Security**.

**Results**
New users have the access rights for the user groups of which they are a member.

---

**Defining security and access settings**

You can define the privileges for a user group for objects defined in IBM Cognos TM1 Performance Modeler.

**Procedure**
1. In the Model Design pane, select the model tree.
2. Right-click the model tree and click **Configure Security > Set Access Permissions for** and select one of following objects: **Dimensions**, **Cubes**, **Processes**, **Chores**, or **Elements**.
3. For the object type that you want to apply the security, double-click the cell for the intersection of the data type and user group.
4. From the drop-down menu, select one of the following:
   - **READ**
   - **WRITE**
   - **LOCK**
   - **NONE**
- RESERVE
- ADMIN

For more information, see “Data access and security” on page 114.

5. Close the table.
6. To use the changes made to security, right-click in the Model Design pane, and click Refresh Security.

Related concepts
Data access and security
You can enhance or restrict the access for a user group to individual cubes, dimensions, processes, chores, and members.

Creating a cell security cube

Create a cell security cube to define user group privileges for accessing specific cells in a cube.

About this task
A cell security cube is a type of control cube. Control cubes are generated by IBM Cognos TM1 server to perform special tasks.

You assign cell-level security by doing the following:
1. Create a cell security control cube that contains the dimensions of the cube whose cell-level security you configure. Only the dimensions needed to define security are added to the control cube.
2. Set security for the appropriate cells in the security control cube by assigning security rights for TM1 security groups.

Use the cell security cube to assign the access privileges that each user group has to specific cells. These access privileges can be one of the following:
- READ - group members can only view the cell
- WRITE - group members can read and write to the cell
- LOCK - group members can view and edit the cell and can permanently lock the cell to prevent other users from updating it
- NONE - group members cannot see the cell
- RESERVE - group members can view and edit the cell, and can temporarily reserve it to prevent other users from updating it
- ADMIN - group members have complete access to the cell

Cell-level security applies to leaf members and generally does not apply to consolidations, although you can use the None and Read security rights to control the display or editing of consolidations.

Procedure
1. If the control cubes are not already visible, click the Actions menu icon, then click Show Control Objects.
   The Control Objects folder is displayed.
2. In the Model Design pane, expand the Cubes folder.
3. Right-click the cube to which you want to apply cell-level security, and then click Configure Security > Set Access Permissions for > Cube cells.
   The cell security cube appears as a tab in the object viewer.
4. To change the dimensions, click the Change Dimensionality icon and select the dimension.
5. Double-click a cell and then select the access privilege you want to assign.
6. Repeat the previous two steps to assign security to additional cells.
Results
Group members can access the cells according to the cell security that you assigned.

Related concepts
Data access and security
You can enhance or restrict the access for a user group to individual cubes, dimensions, processes, chores, and members.

Creating a pick list cube

Create a pick list cube to define pick lists that appear in cube cells.

About this task
A pick list cube is a type of control cube. Control cubes are generated by IBM Cognos TM1 server to perform special tasks.

You can create pick lists with control cubes. This gives you greater control over which cube cells should contain pick lists and allows greater flexibility in defining pick lists for individual cells. You can also create rules for the pick list control cube, which allows you to define pick lists for any section of a cube, from a single cell to the entire cube.

A pick list control cube is composed of the same dimensions as the regular cube it is associated with, along with an additional dimension named }Picklist. The }Picklist dimension contains a single string member, named Value.

Follow these steps to define pick lists for individual cells in a control cube. The pick lists defined in the control cube are used to display pick list values in the associated regular cube.

Procedure

1. If the control cubes are not already visible, click the Actions menu icon, then click Show Control Objects.
   The Control Objects folder is displayed.
2. In the Model Design pane, expand the Cubes folder.
3. Right-click a cube and click Set Cube PickList.
4. In the Create picklist cube box, click Yes.
   The picklist cube appears as a tab in the object viewer.
   Note: The pick list cube view looks similar to the view of the related cube, except for these differences:
   • Object viewer differences
     – a pick list cube icon appears next to PicklistCube for <cube name>.
     – the Re-order dimensions button does not appear in the toolbar
     – the Optimize cube dimensions button does not appear in the toolbar
   • Property pane difference
     – the value of the Name property is }PickList_cubename
     – a new dimension, }PickList, appears in the dimension list
5. Configure the view of the control cube as necessary to view the cells for which you want to define pick lists.
6. In each cell for which you want to create a pick list, enter a pick list definition. You can enter any of the pick list types in the control cube: static, subset, or dimension.
7. Click the **Actions menu** icon 📌, then click **Save Data**.

**Results**
The cell in the associated regular cube displays the pick list values that you created.

## The interaction rights and access control in TM1 Applications

The TM1 Application Server enforces various business rules that determine whether or not a user is permitted to view or edit data. These rules determine the Rights set on the Application; whether or not a given user has Ownership of the node or Application; and whether or not a node has been Submitted.

There are three basic "layers" of control that are used by the TM1 Application Server for restricting the data or cubes that a specific user can access: TM1 Security, Data Reservation, and the TM1 Application Server Overlay.

### TM1 Security
The most fundamental layer.

### Data Reservation
Controls who can write to a particular range of cells but applies only to specific users (not Groups) and is used to enforce the Ownership concept. See [Using Data Reservations](#) for details on using Data Reservations.

### Security Overlay
This layer also controls who can write to a particular range of cells. Security Overlay, however, applies to all users in the TM1 server, not just the users with rights to the TM1 Application. The Security Overlay is used to enforce the Submission concept to lock data.

**Remember:** Data Reservation or Security Overlay can never grant more permissive rights than TM1 security permits: they can only further constrain a user’s access.

The following table describes some right enforcement scenarios.

<table>
<thead>
<tr>
<th>Concept</th>
<th>TM1 Server</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rights</td>
<td>Element and/or Cell Security</td>
<td>When the administrator sets Rights for an Approval or Responsibility Application along the Approval Hierarchy and Control Dimension, these Rights are translated into either Element or Cell Security. Element or Cell Security is determined by the Application's configuration.</td>
</tr>
<tr>
<td>Concept</td>
<td>TM1 Server</td>
<td>Explanation</td>
</tr>
<tr>
<td>-------------</td>
<td>----------------</td>
<td>-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
</tbody>
</table>
| Ownership   | Data Reservation | When a cube is used in an Approval or Responsibility application, the **REQUIREDSHARED** mode of Data Reservation is applied to the cube. This mode of Data Reservation requires that a user must have a Data Reservation before they can write to the cube. The TM1 Application Server grants a Data Reservation to a user who takes Ownership of an Approval Hierarchy node or set of Nodes. A Data Reservation is specific to a particular User, not a Group. Only one user can have Ownership of a leaf node at any time. The Data Reservation granted by the TM1 Application Server is scoped to the relevant Approval Hierarchy nodes. If a Control Dimension is used, the Data Reservation is scoped to the writeable Control Dimension slices for the Application.  
**Remember:** The Data Reservation method is set by the TM1 Application Server with an entry in the `{CubeProperties}` control cube that applies to the whole cube. Because the Data Reservation mode applies to the entire cube, even if a TM1 Application is scoped to only one slice of a cube with the Control Dimension, a Data Reservation is required in order to write to any region of the cube. For Central applications, the **ALLOWED** mode of Data Reservation is used. This mode permits you to **optionally** take Ownership if you want to have exclusive write access to all the cells in the scope of the Application. Users in a Central application are able to write by default without taking Ownership subject to normal TM1 security. |
| Submit     | Security Overlay | The action of Submitting a node applies only to Approval applications. When a node is submitted, the slice of data that is identified by the Approval Hierarchy node and Control Dimension, if used, is locked, preventing any further data entry. This locking is done with a Security Overlay cube. |

### How to enforce security rights in an application

You can set the method that is used to determine how rights to a cube or cell are enforced by an application.

In earlier versions of TM1, an approval hierarchy could not be shared across an application. Rights to view or edit a particular piece of data were enforced with element security on the approval hierarchy. The architecture was changed so that rights are enforced with cell security. This change meant the approval hierarchy dimension could be used in multiple applications. It also enabled multiple applications to be
deployed from the same cube. You can now choose to use either element security or cell security to enforce security rights in an application.

Element security is the default method of enforcing security when you create an application, but you can use the **Method to enforce rights** setting in the Application Design tab to specify the method that is used to enforce rights (either element or cell). For more information, see Set application properties in TM1 Performance Modeler.

To share an Approval Hierarchy dimension across TM1 Applications, you need to use cell security to enforce rights. With cell security, a Control Dimension is used to delineate the Applications. When Cell Security is used, the TM1 Application Server creates Cell Security cubes for all data cubes in the Application that contains the Approval Hierarchy dimension. If Cell Security cubes already exist, the TM1 Application Server extends their dimensionality to ensure that they include the Approval Hierarchy dimension and the Control Dimension if a control dimension is used.

When rights are enforced with element security, the element security is populated on the Approval Hierarchy dimension using a TurboIntegrator process. In that case, a change to the rights does not generate a Security Refresh.

You cannot use a Control Dimension if Element Security is used to enforce the rights.

You can use the **Enforce Element Security on Approval Hierarchies** parameter to turn Element Security on for approval hierarchies. This parameter is a property of all the Approval or Responsibility Applications for a given TM1 server.

**Remember:** This parameter does not apply to Central applications because Central applications do not have an Approval Hierarchy. TM1 does not enforce any additional TM1 security for Central applications.

**Enforce Element Security on Approval Hierarchies** defaults to **No** for both new and upgraded environments. You set this parameter in the Properties pane of the Applications folder.

To be sure that any user in any non-TM1 Application interface, for example TM1 Web, Architect, or Cognos Business Intelligence, sees only approval hierarchy dimension elements for which they have access, set this parameter to **Yes**. Remember that the user can have access to more than one Application. The **Yes** setting applies Element security to any dimension used as an approval hierarchy.

In earlier releases, element security was not applied to the approval hierarchy dimension. In that case, if you use Architect, for example, you can see all the *elements* of the Approval Hierarchy in the subset editor, even though you can see the data for only the elements for which you have rights in the TM1 Application.

If rights are enforced using Cell security, then Element Security is applied to the Approval Hierarchy dimension only if the **Enforce Element Security on Approval Hierarchies** option is set to **Yes**. When **Enforce Element Security on Approval Hierarchies** is **yes**, element security is applied using a rule that refers to a control cube maintained by the TM1 Application Server. This cube contains logic that computes the aggregate security across all Groups and all Applications that use the same Approval Hierarchy dimension. In this case, because Element Security is driven using Rules, the TM1 Application Server must do a Security Refresh when the Rights are updated. This Security Refresh can take some time for a large TM1 Server. If this time is prohibitive, you can revert to using Element Security to enforce Rights, or switch the **Enforce Element Security on Approval Hierarchies** option to **No** using a Control Dimension is not possible if Element Security is used to enforce the rights.

When Cell Security is used as the **Method to enforce Rights**, then you can additionally set a parameter called **CELLSECURITYMOSTRESTRICTIVE** in the **jCubeSecurityProperties** cube, for the data cubes in the scope of the Application.

When **CELLSECURITYMOSTRESTRICTIVE** is **yes**, Element and Cell Security behave such that the most restrictive applies. For instance, if Element Security for a specific element is set to READ for a given Group and Cell Security for a cell referencing that dimension element is set to WRITE, then security will resolve to READ. If the **CELLSECURITYMOSTRESTRICTIVE** parameter is set to any value other than **YES**, then the server behaves as it did in the prior releases.

Choosing how to set this parameter depends on whether you wish to take advantage of the new behavior when **CELLSECURITYMOSTRESTRICTIVE** is set to **yes**, or whether you wish to maintain the existing TM1 Server behavior. If you have existing TM1 Applications built using TM1 10.1.1 or earlier that use Cell
Security, you are likely to want to retain the old behavior, so the `CELLSECURITYMOSTRESTRICTIVE` parameter need not be altered. If you are building new Applications, you wish to use the ability to share Approval Hierarchy dimensions, and you want to make use of READ-level Element Security on some dimensions, then you can set `CELLSECURITYMOSTRESTRICTIVE` to `yes` to have your Element Security respected.

If you already have Applications deployed in TM1 10.2, you may have used the techniques described in the IBM Technote ‘Element Security and TM1 Applications in TM1 10.2’ http://www-01.ibm.com/support/docview.wss?uid=swg21659499. The use of the `CELLSECURITYMOSTRESTRICTIVE` parameter will allow you to model some of the scenarios described in that Technote more easily.

The TM1 Application Server does not access `CELLSECURITYMOSTRESTRICTIVE` and it is blank by default. This behavior means that in the TM1 Server, Cell Security set to WRITE overrides READ-level Element Security, which is the behavior used in earlier releases. If you wish to enforce rights using Cell Security, for example, to share Approval Hierarchies, and you also wish to use Element Security set to READ, then set this parameter to `YES` for the relevant cubes.
Chapter 10. Cognos TM1 Scorecarding

IBM Cognos TM1 Scorecarding integrates scorecarding dashboards and strategy management into Cognos TM1. Use IBM Cognos TM1 Performance Modeler to define the key performance indicators (KPIs) to monitor. Use them to build your scorecarding diagrams. The scorecard objects and diagrams you create are stored in your Cognos TM1 server and made accessible to users as interactive dashboards. This collection of scorecarding features creates a close integration of scorecarding and strategy with planning, analysis, and dashboarding.

You can use Scorecarding cubes and diagrams in IBM Cognos Insight, IBM Cognos Workspace, and IBM Cognos TM1 Web.

This section includes detailed information about scorecard objects and diagrams and explains how to build and deploy a scorecarding solution.

Scorecarding sample server

IBM Cognos TM1 provides a sample scorecarding database called GO_Scorecards.

This sample includes a collection of scorecarding objects that are ready to use, including metrics cubes, impact diagrams, strategy maps, and custom diagrams.

Understand Cognos TM1 Scorecarding

IBM Cognos TM1 Scorecarding integrates scorecarding and strategy management capabilities into IBM Cognos TM1 to provide better integration of performance management with planning. Use IBM Cognos TM1 Performance Modeler to define and build scorecarding solutions. You can then make them available for interaction and monitoring in IBM Cognos Insight, IBM Cognos Workspace, and IBM Cognos TM1 Web.

Using Cognos TM1 Scorecarding, you can complete the following tasks:

- Visually capture and monitor organizational strategy and goals
- Define and monitor your key performance indicators (KPIs) with traffic light and trend icons
- Compare your KPIs to corporate strategic goals
- Create interactive scorecard diagrams and data visualizations

What is a scorecard?

A scorecard is a collection of performance metrics that are designed to reflect the strategic goals of a business unit or organization. The information about a scorecard identifies how well the objectives are being met by comparing planned to actual results. Scorecards can also show information for the different organizations in your business. By using visual status indicators such as traffic light and trend icons, scorecards can help users to quickly evaluate performance.

What is a Cognos TM1 Scorecarding solution?

A Cognos TM1 Scorecarding solution combines your TM1 data and dimensions into interactive diagrams and data visualizations that you can share with other users.

The key terminology for Cognos TM1 Scorecarding includes the following objects:

Scorecard solution
A collection of TM1 objects that includes a metric dimension, a metrics cube, and one or more interactive scorecard diagrams. A scorecard solution is built in Cognos TM1 Performance Modeler and used in Cognos Insight.
**Metric**  
A measure or key performance indicator (KPI) that conveys the performance of an important area of the business. Examples include Profit, Revenue, and Expenses.

**Metric indicator**  
A measure of performance, status, or trend for a key area (metric) of a business. A metric indicator compares current results to target values. For example, Score, Status, and Trend.

You can create scorecards for different audiences to cover different levels of detail. To best manage your scorecard solution, create separate scorecards for each unit in your organization.

**Scorecarding data**  
You build scorecarding solutions that are based on new or existing data from your Cognos TM1 system.

**Scorecarding diagrams**  
Using Cognos TM1 Scorecarding, you can build the following interactive diagrams and data visualizations that are based on the dimensions in your metrics cube.

- Impact diagram
- Strategy map
- Custom diagram
- History chart

**Scorecarding tools**  
Cognos TM1 Scorecarding uses the following user interfaces to create, manage, and view your scorecard solutions.

**IBM Cognos TM1 Performance Modeler**  
Use Cognos TM1 Performance Modeler to build and deploy your scorecarding solutions.

- Use the **Scorecards** Welcome page in Cognos TM1 Performance Modeler to start all the necessary tasks to build your scorecards.
  
  To open the **Scorecards** Welcome page, click **Create Scorecards** on the **Model Design** Welcome page in Cognos TM1 Performance Modeler.

- Use the dedicated scorecard edit tools in Cognos TM1 Performance Modeler to define and build your scorecarding dimensions, cubes, and diagrams.

- Deploy a scorecarding solution to a Cognos TM1 server to make it available to users of IBM Cognos Insight.

**IBM Cognos Insight**  
Use the dashboard features in Cognos Insight to display your strategy maps and impact diagrams as interactive visualization diagrams. Using Cognos Insight, you can select values for different time periods, metrics, and dimensions and analyze data directly in your scorecarding diagrams.

**IBM Cognos Workspace**  
View and interact with metrics cubes and scorecarding diagrams.

**IBM Cognos TM1 Web**  
View and interact with metrics cubes, impact diagrams, and strategy maps.

**Scorecarding objects**  
Cognos TM1 Scorecarding uses the following specialized TM1 objects to organize and store your scorecarding solution:

- Metric dimension
- Metric Indicator dimension
- Metrics cube
Scorecarding solution

An IBM Cognos TM1 scorecarding solution includes a collection of scorecard objects (dimensions, cube view, and diagrams). Use these objects to visually and interactively share the performance metrics and strategic goals of a business unit or organization.

Users can interact with the information in the scorecard cube view and diagrams. They can see how well objectives are met by comparing the planned to actual results. You can create scorecards for different audiences to cover different levels of detail. To best manage your scorecard solution, create separate scorecards for each unit in your organization.

A Cognos TM1 Scorecarding solution is based on a single TM1 metrics cube. You use the dimensions in a metrics cube to build the scorecard diagrams that you want in your scorecarding solution.

**Scorecarding Solution**

<table>
<thead>
<tr>
<th>Metrics Cube</th>
<th>Scorecarding Diagrams</th>
</tr>
</thead>
<tbody>
<tr>
<td>Metrics dimension</td>
<td>Impact diagram</td>
</tr>
<tr>
<td>Metric Indicators dimension</td>
<td>Strategy Map diagram(s)</td>
</tr>
<tr>
<td>Time dimension</td>
<td>Custom diagram(s)</td>
</tr>
<tr>
<td>Additional dimensions (geography, product ...)</td>
<td></td>
</tr>
</tbody>
</table>

*Figure 8: Cognos TM1 Scorecarding solution*

You use IBM Cognos TM1 Performance Modeler to create the scorecard structure. You can use your existing IBM Cognos TM1 data to represent part of the scorecard structure.

**Scorecarding solution requirements**

You must create and publish at least one scorecard in TM1 Performance Modeler before you can use them in Cognos Insight.

The main requirement for a Cognos TM1 scorecarding solution is a metrics cube. By default, any scorecarding diagram that is related to that cube is also added to the scorecarding solution. You are not required to create more diagrams to publish a scorecarding solution, however, the scorecarding solution always includes the impact diagram that is automatically created when a metrics cube is created.

The scorecarding solution contains:

- Metrics Cube
  - Metric dimension
  - Metric indicator dimension
  - Time dimension
  - Optional - more dimensions for geography, product, or customer.
- Impact diagram (automatically created for the scorecard cube)
- History chart (automatically created for the scorecard cube)
- Optional scorecarding diagrams:
  - Strategy map
  - Custom diagrams
**Metrics cube**

A metrics cube is a special type of cube in IBM Cognos TM1 Performance Modeler that provides the basis for scorecard solutions and scorecard diagrams. You create a metrics cube to include all of the dimensions that you want to use for viewing and analyzing your scorecard information.

You can use a metrics cube to monitor multiple metrics and metric indicators. The primary feature of a metrics cube is that it shows the current relative status of many rows in a table. It displays the current trend of many measures simultaneously.

The following list describes a standard scorecard layout for a metrics cube:

- Row title dimension: metric dimension
- Column title dimension: metric indicator dimension
- Context dimensions: time, geography, and other data context dimensions

![Figure 9: Metrics cube example](image)

A metrics cube combines your metric dimension and metric indicator dimension with your other regular TM dimensions. These cubes have the same properties of other TM1 cubes. You can import dimensions into them from other existing dimensions.

A metrics cube requires a minimum of the following dimensions:

- One metric dimension
- One metric indicator dimension
- One time dimension

Optionally, you can also add other existing dimensions such as geography or products.

**Note:** When you create a metrics cube, an impact diagram is automatically created. A metrics cube can have only one impact diagram.

**Metric dimension**

The metric dimension contains your collection of important measures or key performance indicators (KPI) that you want to monitor in your business or organization.

These measures are called **metrics** and each identifies one aspect of performance, such as *Gross profit*, *Revenue*, or *Product cost*. You can monitor the actual performance of a metric and compare it to expected...
or target values by combining it with metric indicators to provide the additional details about status, score, and trend. Metrics are shown in the row title in a cube view.

**Figure 10: Metric dimension in a metrics cube**

**Designing your metric dimension**

As metric dimension definitions might not be stored in your existing TM1 data, you need to create the metric dimension and related metric members. You use the metric dimension editor in Cognos TM1 Performance Modeler to build the metric dimension.

The users of your scorecarding solution need an understanding of the expected performance patterns for each metric. For example, Revenue above a set target is a positive indicator that a business is exceeding its forecast, however, Product cost above a set target is a negative indicator and needs attention.

**Metric dimension properties**

A metric dimension has the following properties that you configure in the dimension editor.

**Format property**

- Specifies the numerical or date/time display format.

**Performance Pattern**

- How the metric is applied. Choose from:
  - Above target is favorable
  - On target is favorable
  - Below target is favorable

Choose a Performance Pattern for the specific metric you want to monitor. For example, revenue above target is favorable, while Product cost below target is favorable.

**Tolerance Type**

- Tolerance type indicates how to interpret the value in the tolerance indicator.
  - **Absolute**, the value in the tolerance indicator is the tolerance and is used as-is.
- **Percent**, the value in the tolerance indicator is used to calculate the tolerance as a percentage of target.

**Metric dimension calculations**

You use standard TM1 functions to define metric dimensions. For example:

\[
\text{Profit} = \text{Revenue} - \text{Expenses}
\]

You can set separate calculations for leaf and consolidated level cells.

**Leaf-level expression**

A simple calculation that is computed at the leaf level.

**Consolidated-level expression**

A calculation that is computed on aggregated results.

For more information, see “Creating calculations for metric and metric indicator dimensions” on page 146.

**Metric indicator dimension**

In IBM Cognos TM1 Scorecarding, a metric indicator dimension provides more information about your key performance indicators (KPI) or metrics. Examples of metric indicators include *Score, Status*, and *Trend*.

The metric indicators in a scorecard solution measure the performance, status, and trends in key areas of a business by comparing current results to target values. For example, the *Actual, Target, and Tolerance* indicators for a metric are typically used to calculate the related *Score, Status*, and *Trend* indicators.

Cognos TM1 Scorecarding provides a set of built-in, predefined metric indicators. You can use the predefined metric indicators or create your own. You can also use standard TM1 functions and special scorecarding functions to calculate your metric indicators.

Metric indicators can be shown as numeric values or visually as traffic light and trend icons. The metric indicator dimension is typically shown in the column dimension title of a standard scorecard or cube view.

![Metric indicator dimension in a metric cube](image)

**Figure 11: Metric indicator dimension in a metric cube**

**Renderer property for metric indicator icons**

The Renderer property specifies the type of indicator icon to use as a visual reference to show the performance of a metric indicator. These icons display in metrics cubes and scorecard diagrams. You can set a different Renderer for each metric indicator.
The valid options for the Renderer property are provided in the following list:

- Traffic light icon - Enter trafficLight in the Renderer property.
- Metric trend icon - Enter metricTrend in the Renderer property.
- Numeric - Leave the cell blank to display a numeric value instead of an indicator icon.

**Traffic light status indicator**
A traffic light or status indicator is an icon that shows the status of a metric indicator. The status is indicated by the color and the shape of the icon as described in the following table.

<table>
<thead>
<tr>
<th>Traffic light icon</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Green circle</td>
<td>A green circle icon indicates a satisfactory status for the associated metric indicator.</td>
</tr>
<tr>
<td>Yellow diamond</td>
<td>A yellow diamond icon indicates caution about the status for the associated metric indicator.</td>
</tr>
<tr>
<td>Red square</td>
<td>A red square icon indicates a warning about the status for the associated metric indicator.</td>
</tr>
<tr>
<td></td>
<td>This image represents an incomplete status, for when there is no data for the Actual or Target metric indicators. A score or status cannot be calculated when one of these values is missing.</td>
</tr>
</tbody>
</table>

**Trend indicator**
A trend indicator shows how the value of one column compares to the value of another column. For example, a trend indicator shows the trend from the previous period to the current period by comparing values between periods. The trend indicator shows if the value is greater than, unchanged, or less than the value from the previous period.

<table>
<thead>
<tr>
<th>Trend icon</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Green up</td>
<td>A green upward facing triangle icon indicates that the trend value is greater than the previous period. For example, the value is greater than the previous month or quarter.</td>
</tr>
<tr>
<td>Gray dash</td>
<td>A gray dash icon indicates that the trend value is unchanged.</td>
</tr>
<tr>
<td>Red down</td>
<td>A red downward facing triangle indicates that the trend value is less than the previous period. For example, the value is less than the previous month or quarter.</td>
</tr>
<tr>
<td>Blank cell</td>
<td>Indicates that the trend is incomplete for that period. A trend cannot be displayed when there is an incomplete status. For example, a trend cannot be displayed for the first time period, such as Q1 (quarter one). Previous data does not exist, even if the metric has a value for Actual, Target, Score, and Status.</td>
</tr>
</tbody>
</table>

**Default metric indicators**
Cognos TM1 Scorecarding provides a collection of built-in metric indicators that are ready to use. When you create a metric indicator dimension, these members are automatically created and populated with suggested indicator names and calculations.

**CAUTION:** You can use the built-in metric indicators only as-is. Do not edit or delete them because they are required for scorecarding. If you need your own metric indicators, add them in addition to the built-in ones.
Cognos TM1 Scorecarding includes the following built-in metric indicators:

<table>
<thead>
<tr>
<th>Metric indicator name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Status</strong></td>
<td>A calculated value that represents the performance of the score for a metric. The returned numeric value is displayed as a traffic light indicator icon to visually show status in grid views and diagrams.</td>
</tr>
</tbody>
</table>
|                       | • 1 - excellent (on target or above)  
|                       | • 0 - average (within 1 tolerance of target)  
|                       | • 1 - poor (more than 1 tolerance from target)  
|                       | Uses the SCORESTATUS metric indicator function:  
|                       | =SCORESTATUS('Score') |
| **Trend**             | A calculated value that represents how a metric’s performance has changed since the previous period. Evaluates a metric’s score and returns a value to indicate the current performance of the metric. The result reflects only a positive or negative trend if the score changes more than 5% of tolerance. By default, this indicator is configured to display as a metric trend indicator icon to visually show the trend in grid views and diagrams. |
|                       | • ▲ 1 - trend is getting better  
|                       | • ▼ 0 - no change in trend  
|                       | • ▼ 1 - trend is getting worse  
|                       | Uses the SCORETREND metric indicator function:  
|                       | =SCORETREND('Score') |
| **Actual**            | A value for the Actual indicator is derived from operational data. Populate this value from your existing Cognos TM1 data. |
| **Target**            | A target value defines a level of expected performance. Populate this value from your existing Cognos TM1 data. |
| **Tolerance**         | A tolerance value defines an acceptable range for a result that deviates from a set target. Enter this value or populate it from your existing Cognos TM1 data. |
| **Variance**          | Calculates the difference between the Actual and Target indicators. Uses the calculation: = 'Actual' - 'Target' |
| **Variance Percent**  | Calculates the percent of difference between the Actual and Target indicators. Uses the calculation: = ('Actual' - 'Target') / 'Target' |
### Table 16: List of default Metric Indicators (continued)

<table>
<thead>
<tr>
<th>Metric indicator name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Score</strong></td>
<td>Calculates a metric’s score, which is based on the actual, target, and tolerance indicators. This value indicates whether a metric is on target, higher than the target, or less than the target, and by how much. It reflects the distance from the target as measured in units of tolerance. Values are reported in the range of -10 to 10 where a value of 0 indicates that the metric is on target. A positive score indicates that the metric is performing well. A negative score indicates that the metric is not performing well. Uses the SCORE metric indicator function: ( \text{SCORE(Actual, Target, Tolerance)} )</td>
</tr>
<tr>
<td><strong>Score Change</strong></td>
<td>Calculates the change in score by comparing the current value to the value from the previous time period. Uses the Cognos TM1 LAG function as follows: ( =\text{Score} - \text{LAG}(0, \text{Score}) )</td>
</tr>
<tr>
<td><strong>Actual Trend</strong></td>
<td>Not currently used.</td>
</tr>
<tr>
<td><strong>Actual Change Percent</strong></td>
<td>Calculates the change in percent for the actual indicator by comparing the current value to the value from the previous time period. Uses the Cognos TM1 LAG function as follows: ( =\left(\frac{\text{Actual} - \text{LAG}(0, \text{Actual})}{\text{LAG}(0, \text{Actual})}\right) )</td>
</tr>
<tr>
<td><strong>Status_1_Count</strong></td>
<td>Internal use only.</td>
</tr>
<tr>
<td><strong>Status_0_Count</strong></td>
<td>Internal use only.</td>
</tr>
<tr>
<td><strong>Status_-1_Count</strong></td>
<td>Internal use only.</td>
</tr>
</tbody>
</table>

### User-defined metric indicators

Create your own user-defined metric indicators to measure the performance of a metric against a comparable metric, such as an industry-wide standard measurement.

For example, you might want to define metric indicators to monitor the performance of a forecast metric. In this scenario, you create a collection of derived and calculated metric indicators.

Create the following derived metric indicators and populate the indicators with existing forecast data.

- **Forecast Actual**
- **Forecast Target**
- **Forecast Tolerance**

Create the following calculated metric indicators and use metric indicator functions to populate them.

- **Forecast Score** - Use the \( \text{SCORE} \) function to calculate this value. For example: \( =\text{SCORE(\text{Forecast Actual}, \text{Forecast Target}, \text{Forecast Tolerance})} \)
- **Forecast Status** - Use the \( \text{SCORESTATUS} \) function to calculate this value. For example: \( =\text{SCORESTATUS(\text{Forecast Score})} \)
- **Forecast Trend** - Use the \( \text{SCORETREND} \) function to calculate this value.

For the Renderer property, enter \( \text{trafficLight} \) to display a traffic light icon for this metric indicator.
For example: =SCORETREND('Forecast Score')

For the Renderer property, enter metricTrend to display a trend icon for this metric indicator.

For more information about creating and calculating metric indicators, see the following topics.

- “Creating a metric indicator dimension” on page 145.
- “Metric indicator functions” on page 142.

**Metric indicator calculations and functions**

You can use standard TM1 functions and a special set of metric indicator functions to define calculations for your metric indicators. A calculation for a metric indicator can provide a status, score, or trend value that is based on the other indicators for that same metric.

For example, you can use the metric indicator SCORE function to calculate a score for a metric depending on the Actual, Target, Tolerance indicators for the metric.

=SCORE('Actual','Target','Tolerance')

For more information about using calculations with your metric indicators, see the following topics:

- “Metric indicator functions” on page 142
- *IBM Cognos TM1 Reference* documentation, “Rules Functions” topic.
- Dimension calculations

**Derived metrics**

A derived metric is a metric based on your key performance indicators or measurements from your metric dimension. Examples of a derived metric are: Employee Satisfaction based on employee survey results, employee turnover, and cost of hiring, or Customer Satisfaction based on product survey, returns, and customer count. These two derived metrics can also be the basis of a further derived metric, Overall Company Satisfaction rating.

You define a derived metric by creating a hierarchy in the metric dimension. The parent metric is the derived metric and is calculated from its child metrics. In the example image, the metrics Employee turnover, Bonus, Salary, and Training cost are child members of the derived metric Employee satisfaction. The metric dimension gometric shows the derived metric Employee satisfaction with its child metrics, Employee turnover, Bonus, Salary, Training cost.

The calculation for the status of the derived metric is derived from the status of the child metrics. The status is determined based on one of these derived calculations:

- **Most Positive Status.** Reports the status of the most positive child metric.
- **Least Positive Status.** Reports the status of the least positive child metric.
- **Most Frequent Status.** Reports the most frequent status of all child metrics.
- **Average Status.** Reports the average status of all child metrics.

**Note:** Metrics that are not derived show as Not derived. This is to differentiate between calculated metrics and derived metrics in the same hierarchy.

**Note:** A derived metric is based on a consolidation of the direct child metrics that can have differing units and measures. Therefore the metric indicators Target and Actual do not produce credible values and so
show as zero. For example, **Employee satisfaction** is based on: **Employee turnover** as a % of headcount, **Bonus** as a % of salary, **Salary** as a monetary value and **Training cost** as a monetary value. The consolidation of these values do not give a credible result therefore none is given.

The status indicators of the child metrics are as follows:

- Excellent performance 🟢 - the actual value is equal to, or exceeds, the target value.
- Average performance ⬇️ - the actual value is below the target value, but is within the accepted tolerance.
- Poor performance 🟡 - the actual value is below the target value, and it is below the accepted tolerance.
- Incomplete status 🕓 - there is no enough data from which a status can be calculated.

**Most Positive Status**

The derived metric reports the status of the most positive of the direct child metrics.

![Most Positive Status](image)

The illustration shows that the derived metric **Overall company rating** reports the most positive of the child metrics which in this case is Employee satisfaction.

**Least Positive Status**

The derived metric reports the status of the least positive of the direct child metrics.

![Least Positive Status](image)

The illustration shows that the derived metric **Overall company rating** reports the least positive of the child metrics which in this case is Prod Satis.

**Most Frequent Status**

The derived metric reports the most reported status of the direct child metrics.

![Most Frequent Status](image)

The illustration shows that the derived metric **Overall company rating** reports the most frequently reported status of the child metrics which in this case are Employee satisfaction and Expense profile.

**Note:** If there is more than one most frequent status, for example two green and two yellow, the status is reported with the status with the highest precedence. Green or excellent performance has highest precedent, gray or incomplete has the lowest.

**Average Status**

The derived metric reports the average of the reported status of the direct child metrics.

![Average Status](image)

The illustration shows that the derived metric **Overall company rating** reports the average of the reported status of the child metrics.
Scorecarding diagrams
Using Cognos TM1 Scorecarding, you build interactive diagrams and data visualizations based on the dimensions in your metrics cube. These diagrams are used to assemble the dashboard in Cognos Insight.

Impact diagram
Impact diagrams visualize the positive and negative relationships between the metrics in your metrics cube. This type of diagram shows how the business actually works by displaying how one metric influences another.

An example for an impact diagram might show how Revenue and Expenses influence Profit, which then affects Bonuses and Research Funding.

Impact diagrams display traffic light and trend indicators that show the status and the trend of each metric in the diagram. When a user interacts with an impact diagram, they can filter for different contexts. The traffic light and trend indicators update with new values for the selected dimension.

Designing impact diagrams
Impact diagrams organize your metrics into three categories; Impacting Metrics, Focused Metrics, and Impacted Metrics.

- Impacting metrics - examples include Expenses and Revenue
- Focused metrics - examples include Profit
- Impacted metrics - examples include Research Funding and Employee Bonuses

Nature of Impact property
The Nature of Impact property configures the line type to show either positive or negative impact relationships between the metrics in the diagram.

- Positive - Displays a solid line in the diagram to show a positive influence from one metric to another metric.
- Negative - Displays as a dashed line in the diagram to show a negative influence from one metric to another metric.

This property can be set for each metric in the Impacting Metrics and Impacted Metrics lists.
**Strategy map**
A strategy map is an industry standard visualization that tracks business performance by *perspectives*, *objectives*, and *metrics*.

You can use IBM Cognos TM1 Scorecarding to create strategy maps by defining your perspectives and objectives and then mapping your metrics to them. A strategy map shows the status of metrics with traffic lights and trend indicator icons. A strategy map organizes perspectives, objectives, and metrics into the following hierarchy:

- A strategy map can have multiple perspectives.
- Each perspective can have multiple objectives.
- Each objective can have multiple metrics.

The standard perspectives for a strategy map include the following items:

- Financial performance
- Customer knowledge
- Internal business processes
- Learning and growth

When you hover your mouse over the metric indicator icons for an objective a list of the related metric indicators shows.

When you hover your mouse over the indicator icons for a perspective shows the name of the diagram and perspective.

**Strategy map connections**
Connections in a strategy map display as directional arrows to show a visual relationship or flow between the objectives in the diagram. A strategy map does not require connections, but you can add them if you want.
Default values for strategy maps
When you create a strategy map, the following perspectives and objectives are automatically created for it. You can use these perspectives and objectives as a starting point, edit them, or create your own combinations.

- Financial
  - Grow Revenue
  - Reduce Expenses
- Customer
  - Reduce Complaints
- Internal Processes
- Learning and Innovation

Status and status calculations for strategy maps
The perspectives and objectives in a strategy map display a summary of the status of the underlying metrics in the diagram. You can set the status calculation to control how the underlying metrics are summarized or "rolled-up" for each perspective and objective in the diagram.

The status for a metric is a calculated value that represents the performance of for the metric. The returned numeric value is displayed as a traffic light indicator icon to visually show the status in the diagram. The status values are Excellent, Average, Poor, and Incomplete.

Table 17: Status for summarizing metrics in strategy maps

<table>
<thead>
<tr>
<th>Status</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Excellent</td>
<td>A green circle icon indicates a satisfactory status. The metric is on or above target.</td>
</tr>
<tr>
<td>Average</td>
<td>A yellow diamond icon indicates cautionary status. The metric is within one tolerance of target.</td>
</tr>
<tr>
<td>Poor</td>
<td>A red square icon indicates a warning status. The metric is more than one tolerance from target.</td>
</tr>
<tr>
<td>Incomplete</td>
<td>An incomplete status indicates there is no data for the actual or target metric indicators. A score or status cannot be calculated.</td>
</tr>
</tbody>
</table>

The status calculations that you can use to control how metrics are summarized in the strategy map are described in the following table.

Table 18: Status calculations for summarizing metrics in strategy maps

<table>
<thead>
<tr>
<th>Status Calculation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>No status</td>
<td>Does not show any status for the metrics that are associated with this perspective or objective.</td>
</tr>
<tr>
<td>Status Calculation</td>
<td>Description</td>
</tr>
<tr>
<td>-------------------------</td>
<td>-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Most frequent status</td>
<td>Shows the status icon for the most frequently occurring status of all the metrics that are associated with this perspective or objective. For example, if the associated metrics are Excellent (2), Average (4), Poor (1), and Incomplete (0), a status of Average is displayed.</td>
</tr>
<tr>
<td>Most positive status</td>
<td>Shows the status icon for the most positive status of all the metrics that are associated with this perspective or objective. The status is selected in the following order of priority: Excellent, Incomplete, Average, Poor. For example, if the associated metrics are Excellent (1), Average (1), Poor (3), and Incomplete (1), a status of Excellent would be displayed.</td>
</tr>
<tr>
<td>Least positive status</td>
<td>Shows the status icon for the least positive status of all the metrics that are associated with this perspective or objective. The status is selected in the following order of priority: Poor, Incomplete, Average, Excellent. For example: If the associated metrics are Excellent (1), Average (1), Poor (1), and Incomplete (1), the least positive status is Poor. If the associated metrics are Excellent (1), Average (1), Poor (0), and Incomplete (2), the least positive status is Incomplete. If the associated metrics are Excellent (1), Average (1), Poor (0), and Incomplete (0), the least positive status is Average.</td>
</tr>
</tbody>
</table>

**Custom diagram**
A custom diagram is a strategy map where you import a custom image and show metrics with dimensional context onto the image as data points.

These examples of a custom diagrams are available:

**Geographical maps**
To show a regional focus of your organization.

**Process diagrams**
Show metrics in context of a process flow.

A custom diagram displays the metric and context dimension names with traffic light and trend indicator icons as an overlay or layer on the selected image.
Dimensions for a custom diagram

To create a custom diagram, first select an image and then choose the dimensions and dimension context that you want to use in the diagram.

- Primary dimension (required)
- Secondary dimension (optional)
- Secondary dimension context (optional)

Sample images

These images are available in the custom diagram editor:

- World map for use with a geographic dimension.
- Process flow chart.
- Organization chart.

Image file types

You can use any of the following image file types in a custom diagram:

- PNG
- GIF
- BMP
- JPEG
**Image properties**
You can edit the properties for the image size and opacity.

**History chart**
A history chart shows a column chart of data for a metric.

By default, it compares the actual value against the target value for each time period, and indicates whether the result is within an accepted tolerance. You can change the visible range of time periods, to increase or reduce the level of detail, by sliding the focus bar.

When you hover over a column, more detail is shown about the underlying values, including traffic lights and trend indicators. Traffic lights show the status according to the performance pattern defined for a metric. For example, if the performance pattern is set to **Above target is favorable**, the status can be one of the following:

- Excellent performance - the actual value is equal to, or exceeds, the target value.
- Average performance - the actual value is below the target value, but is within the accepted tolerance.
- Poor performance - the actual value is below the target value, and it is below the accepted tolerance.

For more information about performance patterns, see “Metric indicator dimension” on page 130.

The trend indicators show whether performance improved (▲), declined (▼) or remained the same (≡) when compared to the previous time period. Where no previous time period is available, such as the initial bar in a history chart, no trend information is shown.

The following example shows a history chart that focuses on eight months of revenue data. For every month except February 2013, total revenue performance is average. With the focus on February 2013, you can see that the performance is poor, and the trend is declining when compared to January 2013.

![Example of a history chart](image-url)

*Figure 12: Example of a history chart*
Metric indicator functions
IBM Cognos TM1 Scorecarding includes a collection of dedicated functions that are specific to metric indicator calculations. Examples of these functions in the default metric indicators are Score, Status, and Trend. You can use these with your own metric indicators.

These functions are available in the expression editor when you work with metric indicators.

**SCORE**

**Purpose**
The SCORE function calculates a metric’s score for a specified context of actual, target, and tolerance indicators.

This function returns a value that indicates whether a metric is on target, higher than the target, or less than the target, and by how much. It reflects the distance from the target as measured in units of tolerance. It returns values in the range of -10 to 10 where a value of 0 indicates that the metric is on target. A positive score indicates that the metric is on target. A negative score indicates that the metric is not on target.

This function is valid only in a cube that has a metric dimension and can determine the performance pattern of the metric and the tolerance type.

```plaintext
=SCORE('<Actual>', '<Target>', '<Tolerance>')</n
```

**Parameters**

- **Actual**
  The name of the metric indicator that represents the Actual indicator.

- **Target**
  The name of the metric indicator that represents the Target indicator.

- **Tolerance**
  The name of the metric indicator that represents the Tolerance indicator.

**Sample**
For example, this function is used by the default metric indicator named Score.

```plaintext
=SCORE('Actual', 'Target', 'Tolerance')
```

**SCORESTATUS**

**Purpose**
The SCORESTATUS function calculates a value that represents the performance of the score for a metric. This function takes a member that contains the metric score for the current context.

It returns one of the following numeric values to indicate how the metric is performing:

- 1 - excellent (on target or above)
- 0 - average (within one tolerance of target)
- -1 - poorly (more than 1 tolerance away from target)

```plaintext
=SCORESTATUS('Score')
```

**Parameters**

- **Score**
  The Score parameter is the name of the metric indicator that represents the Score indicator for a metric.
Sample
For example, this function is used by the default metric indicator named Status.

=SCORESTATUS('Score')

SCORETREND

Purpose
The SCORETREND function calculates a value that represents how a metric's performance has changed since the previous period.
The function takes a member that contains the metric score and returns one of the following values to indicate the current performance of the metric:

• 1 - getting better
• 0 - no change
• -1 - getting worse

The result reflects a positive or negative trend only if the score changes more than 5% of tolerance.
This function works only in a cube with a Time dimension that defines the previous period for each member.

=SCORETREND(Score)

Parameters
The Score parameter is the name of the metric indicator that represents the Score indicator.

Sample
For example, this function is used by the default metric indicator named Trend.

=SCORETREND('Score')

Interaction with scorecarding diagrams and visualizations
Scorecarding diagrams have interactive features for both modelers and users when viewing the diagrams in the different supportive IBM Cognos applications.
The interactive features in scorecarding diagrams include the ability to zoom, expand, collapse, and filter the displayed data. These features are available in these applications:

• Cognos TM1 Performance Modeler (available on the diagram editor Preview tab)
• Cognos Insight
• Cognos TM1 Web

Zoom in and out of scorecarding diagrams
All the scorecarding diagrams include controls to zoom in and out of the diagram.

Expand and collapse impact diagrams
Impact diagrams provide controls for interactively expanding and collapsing individual metrics or all metrics in the diagram.

Expand and Collapse all metrics
The Expand All and Collapse All controls expand and collapse all of the metrics in the entire impact diagram.
Expand and Collapse individual metrics
The Expand and Collapse icons are displayed directly within the diagram for each metric that is a parent of other metrics. You can selectively expand or collapse these individual metrics throughout the diagram.

Filter scorecarding dashboard by selecting metrics in a strategy map
Cognos Insight users can filter and update the scorecarding widgets in a workspace dashboard by selecting metrics in a strategy map. When you hover the mouse cursor over an objective in a strategy map, a popup window displays a list of the related metrics. To learn more about a particular metric, click it in the popup window. The other scorecarding widgets in the dashboard update to display the information about the selected metric.

For example, your workspace includes a cross-tab (data grid), a strategy map, an impact diagram, and a custom diagram. All four scorecarding widgets are synchronized with each other. To change the data that is displayed in each widget, you can select one of the metrics that appear when you hover over an objective in the strategy map.

Creating a Cognos TM1 Scorecarding solution
A series of steps are required to create a Scorecarding solution in IBM Cognos TM1 Performance Modeler.

To build and publish a scorecarding solution, you first define and assemble the required scorecard objects. Use the Scorecards Welcome page in Cognos TM1 Performance Modeler to start all the necessary tasks to build your scorecarding solution. After you assemble the required objects for a scorecarding solution, you publish the solution to make it available for interaction and monitoring in other IBM Cognos applications.

Use IBM Cognos Insight to create a dashboard from the objects for your scorecarding solution.

Creating a metric dimension
You must first create a metric dimension when creating an IBM Cognos TM1 Scorecarding solution in IBM Cognos TM1 Performance Modeler.

About this task
A metric dimension contains the list of metrics that you use to monitor business performance.

For more information about metric dimensions, see “Metric dimension” on page 128.

Procedure
1. In Cognos TM1 Performance Modeler, on the Model Design Welcome page, click Create Scorecards.
2. On the Scorecards Welcome page, in the first task, click Metrics Dimensions.
3. Enter a name for the metric dimension.
   
   **Note:** The Dimension Type is set to Metric and cannot be changed.

   A new tab opens to edit the metric dimension.

4. In the Name column, click <Enter new member> and enter a name for the new member.

5. In the Leaf-level Expression column, click the More icon to create a calculation for leaf level data.

6. In the Format column, click the More icon to set a date/time or numeric format. The format properties are displayed at the bottom of the screen.

7. In the Consolidated-level Expression column, click the More icon to create a calculation for aggregated results.

8. In the Performance Pattern column, select how you want the metric to be applied.
   - Above target is favorable
   - On target is favorable
   - Below target is favorable

9. In the Tolerance Type column, select how the metric is to be evaluated.
   - Choose Absolute to evaluate based on the actual value provided.
   - Choose Percent to evaluate based on a percentage of the target value.

10. Repeat the previous steps to add more members to the metric dimension.

11. Click Save.

**What to do next**

After you create a metric dimension, you can then create a metric indicator dimension.

### Creating a metric indicator dimension

Create a metric indicator dimension in IBM Cognos TM1 Performance Modeler.

**About this task**

When you create a new metric indicator dimension, it is pre-populated with members that are required to build a metrics cube. You can add more as necessary.

⚠️ **CAUTION:** Do not edit or delete built-in metric indicators. They are required objects for scorecarding. If you need your own metric indicators, add them in addition to the built-in ones.

For more information about metric indicator dimensions, see “Metric indicator dimension” on page 130.

**Procedure**

1. On the Scorecards Welcome page, in the task Create Metrics Dimensions, click Metric indicator Dimensions.

2. Type the name for the new metric indicator dimension and click OK.
   
   **Note:** The Dimension Type is set to Metric indicators and cannot be changed.

   In the new tab, you can add and edit members of the new dimension. Members are automatically populated, such as Status, Score, and Trend.

3. In the Name column, click <Enter new member> and enter a name for the new member.

4. In the Format column, click the More icon to set a date/time or numeric format. The format properties are displayed at the bottom of the screen.

5. In the Leaf-level Expression column, click the More icon to create a calculation for leaf level data.

6. In the Consolidated-level Expression column, click the More icon to create a calculation for aggregated results.

7. In the Render column set the indicator icon to use for the status or trend to either trafficLight or metricTrend. Leave the cell blank to display a numeric value instead of an indicator icon.
8. Repeat these steps to add more members to the metric indicator dimension.
9. Click **Save**.

**What to do next**
You can now create the metrics cube.

**Creating custom metric indicators for scorecarding diagrams**
You can create a custom subset of metric indicators that display in the tooltip when you hover over objects in a scorecarding diagram. You can create multiple custom subsets and specify which one to use for each of your scorecarding diagrams.

**About this task**
Use the Metric Indicator Subset wizard to build a custom subset based on new or existing metric indicators. You can set the order for these metric indicators in the tooltip when you hover over objects in a scorecarding diagram.

After creating a custom subset of metric indicators, you can assign the subset to a scorecarding diagram using the **Traffic Light Subsets** property in the diagram editor.

**Procedure**
1. Open a metric indicator dimension.
2. In the toolbar of the metric indicator editor, click the **Subset** icon.
3. Follow the steps in the wizard to create your subset of custom metric indicators.
4. Type the name for the new subset.
5. Select and organize the order of up to five metric indicators to display in the tooltip pop-up window of the diagram.
6. Click **Example** to see a sample tooltip window.
7. View a summary of the custom metric indicators.
8. Click **OK** to complete the process.

Your custom indicators are added as a subset in the current metric indicators dimension.

9. To assign the custom metric indicator subset to a diagram do these steps:
   a) Open a scorecarding diagram.
   b) In the **Properties** panel, use the **Traffic Light Subsets** property to select a custom metric indicator subset.
   c) To see the custom metric indicators in a tooltip, click the **Preview** tab and hover the mouse over a metric.

**Creating calculations for metric and metric indicator dimensions**
You can use standard TM1 functions when you define metric dimensions and metric indicator dimensions. For metric indicators, you can also use a set of functions that are specific to scorecarding.

**About this task**
For metric dimensions and metric indicator dimensions, use Simple (Arithmetic), Dimension and , TM1 functions for leaf level and consolidated level expressions. Aggregation functions are used for consolidated-level expressions only.

For more information about standard TM1 functions, see the following topics:

- **IBM Cognos TM1 Reference** documentation, "Rules Functions"
- “Creating calculation dimensions” on page 20

For more information, see “Metric indicator functions” on page 142.
Procedure

1. To use standard TM1 calculations and functions with your metric and metric indicator dimensions, use the expression editor in Cognos TM1 Performance Modeler.
2. In the dimension editor, click the icon in the Leaf-level Expression or Consolidated-level Expression cell where you want to enter the calculation.
3. Use the expression editor to build the expression.
4. To use metric indicator functions with the members in your metric indicator dimension, in the expression editor, click Functions, and then expand Metric Functions.

Creating a metrics cube from existing dimensions

After you create your metric and metric indicator dimensions, you can then create a new metrics cube in IBM Cognos TM1 Performance Modeler.

About this task

A metrics cube requires a metric, metric indicator, and a time dimension. You can also add other existing dimensions such as geography or product.

Procedure

1. On the Scorecards Welcome page, click Create Metrics Cube.
2. Enter a name for the new metrics cube and then click OK.
3. Click and drag a metric dimension to the row area of the cube.
4. Click and drag a metric indicator dimension to the columns area of the cube.
5. Click and drag a time dimension to the context area of the cube.
6. Click Save.

What to do next

You can create a scorecard diagram that is based on this metrics cube.

Creating a metrics cube based on an existing standard cube

You can create a new metrics cube based on an existing standard cube. When you use this method to create a metrics cube, the existing standard cube remains unchanged on your TM1 server and a new metrics cube of near identical dimensionality is created.

About this task

A metrics cube requires a metric, metric indicator, and a time dimension. You can also add other existing dimensions such as geography or product.

For more information about these different types of dimensions, see “Creating new dimensions” on page 19.

Procedure

1. On the Model Design pane of Performance Modeler, right-click the standard cube that you want to use as the basis of a metrics cube, then click New > Metrics Cube.
2. In the New Metrics Cube dialog box, enter a name for the new metrics cube.
3. Select the calculation dimension in the existing cube to be used as a metric dimension in the new metrics cube, then click OK.
4. Click OK on the Metrics cube creation information message.
Results
When you generate the new metrics cube, a new link is created that maps dimensions and data from the existing standard cube to the new metrics cube. The link uses the same name you assigned to the new metrics cube.

- The calculation dimension you selected in Step 3 is converted to a metric dimension.
- The version dimension in the standard cube is mapped to a new metric indicator dimension. This new metric indicator dimension uses the same name you assigned to the new metrics cube.

You can modify the link as required for your analysis needs. See Chapter 5, “Creating links,” on page 57 for more information on links in Performance Modeler.

What to do next
After you have created a metrics cube, you can then create a scorecard diagram that is based on that cube.

Editing the impact diagram
By default, an impact diagram is automatically created whenever you create a metrics cube.

A metrics cube can have only this one impact diagram. You can modify the impact diagram for a metrics cube by organizing the metrics to use in the diagram into three categories: Impacting metrics, Focused metrics, and Impacted metrics.

About this task
Impact diagrams visualize the relationships among members of the dimensions in your metrics cube. These diagrams portray how the business actually works by displaying how one metric impacts another metric.

For more information about impact diagrams, see “Impact diagram” on page 136.

The following figure shows an example of how metrics can be organized for an impact diagram.

Procedure
2. Select the metrics cube that you want to use with the diagram and then click OK.
3. Drag the required metric to the Focused Metrics list.
4. Drag the required metric to the Impacting Metrics list.

![Diagram showing the process of editing an impact diagram.](image-url)
5. Drag the required metric to the **Impacted Metrics** list.

6. Set the **Nature of Impact** for each impacting and impacted metric.
   
   In the **Impacting Metrics** or **Impacted Metrics** list, click the **Nature of Impact** cell next to a metric and select a value:
   
   - **Positive** Displays a connection between the metrics as a solid line in the diagram.
   - **Negative** Displays a connection between the metrics as a dashed line in the diagram.

7. Click **Save**.

8. Click the **Preview** tab to see an interactive preview of the diagram.

**What to do next**

You can create additional scorecard diagrams or deploy the scorecarding solution to use in IBM Cognos applications.

**Discovering effects between relationships from metrics in an impact diagram**

You can use the Discover feature to discover and generate impact relationships from the metrics in your impact diagram. The generated relationships are determined by analyzing the cube rules in your metrics dimension. You can also review the results, make any necessary changes, and use them in your impact diagram.

**Before you begin**

⚠️ **Attention:** The discovery process can alter or remove existing automatically generated impacts. When you run the discovery process, a message displays with a warning and you are prompted to continue or cancel.

**About this task**

The results from the discovery process are displayed in the Impact Diagram editor.

**Important:** The impacts that were discovered based on the cube rules do not take into account the context of the rule. For example, if the cube rule states that the net profit for North America is equal to the Revenue of the United States of America minus the Expenses for Canada, the impact relationship that is discovered is that Profit is impacted by the Revenue and Expenses metrics.

The discovery process sets the nature of impact as undefined for each generated relationship. You should review the results and manually set the undefined values to either positive or negative.

**Procedure**

1. Open an Impact diagram.
2. On the **Outline** tab, click **Discover**.
   
   **Remember:** A warning message displays that previous auto-generated relationships might be altered or removed.

3. Click **Yes** to continue.

   The impact relationships are automatically determined and updated in the impact lists on the **Outline** tab.

4. In the **Focused Metrics** list, click the **Defined Impacts** dropdown list and select a metric.

5. Review the metrics in the **Impacting Metrics** and **Impacted Metrics** lists.

6. Review the **Nature of Impact** for each metric.

7. Review the impact relationships that were discovered:
   
   - If you know the nature of impact for any relationships that are set to **Undefined**, set the impact to either **Positive** or **Negative**.

8. Save the diagram.
9. Click the **Preview** tab to see an interactive preview of the diagram.

**Creating a strategy map**

You can build strategy maps to track business performance by defining your *perspectives* and *objectives* and then mapping metrics to them.

**About this task**

When you create a strategy map, a sample of perspectives and objectives are automatically created. You can use the samples as a starting point, edit them, or create your own combinations.

For more information about strategy maps, see “Strategy map” on page 137.

**Procedure**

1. On the **Scorecards** Welcome page, under **Create Strategies**, click **Create Strategy Map**.

2. Select a metrics cube to use with the strategy map.

3. Enter a name for the strategy map.

4. In the **Strategy Type** list select **Strategy Map**. Click **OK**.

   The Strategy Map editor opens.

5. Create a perspective:

   Under the **Perspectives** column, click **<Enter name of new Perspective>** and type the name for the new perspective. Press Enter.

6. Create an objective:

   Under the **Objectives** column, click **<Enter name of new Objective>** in the cell next to an existing Perspective, type the name for the new objective. Press Enter.

   The new objective is now associated with that perspective.

7. Repeat the previous steps to create more perspectives and objectives.

8. Add a metric to an objective:

   a) Click an objective in the **Objectives** column.

   b) Drag a metric from the **Source Cube** list to the **Metrics for selected Objective** list.

   The selected metric is now associated with that objective.

   c) Repeat for more objectives and metrics.

9. Review the status calculation for each perspective and objective in the diagram.

   The default status calculation for each item is set to **Most frequent status**. For more information about status calculation, see “Strategy map” on page 137.

   a) In the **Strategy Map** table, click the perspective or objective for which you want to set the status calculation.

   b) In the **Properties** tab, click the **Value** field for the **Status Calculation** property and select a calculation type.

      • **No status** - Does not show any status for the metrics that are associated with this perspective or objective.

      • **Most frequent status** - Shows the status icon for the most frequent occurring status of all the metrics that are associated with this perspective or objective.

      • **Most positive status** - Shows the status icon for the most positive status of all the metrics that are associated with this perspective or objective.

      • **Least positive status** - Shows the status icon for the least positive status of all the metrics that are associated with this perspective or objective.

   c) Repeat these steps if you want to change the status calculation for other perspectives or objectives.

10. Add connections to the diagram:
Connections display as an arrow in the diagram between two objectives.

a) In the Strategy Map editor, click the **Connections** tab.

Your list of perspectives and objectives are shown in the **Strategy Map** table. The list of connections for the diagram are shown in the **Connections** table on the right.

b) To create a connection, drag an objective from the **Strategy Map** table to the **From** column in the **Connections** table.

c) Drag a different objective to the **To** column.

d) Repeat these steps to create more connections between pairs of objectives.

11. Click **Save** to save the strategy map.
12. Click the **Preview** tab to see an interactive preview of the strategy map.

**What to do next**
After you create a strategy map, you can create more scorecard diagrams or deploy the scorecarding solution to use in IBM Cognos applications.

**Creating a custom diagram for scorecarding**
You can create a custom diagram by importing an image file and overlaying metric dimension data points onto it.

**About this task**
The custom diagram editor pane in Cognos TM1 Performance Modeler includes an **Outline** and **Preview** tab. These tabs provide separate areas for designing your custom diagram and previewing an interactive sample.

For more information about custom diagrams, see “Custom diagram” on page 139.

**Procedure**
1. On the **Scorecards** Welcome page, under **Work with your Diagrams**, click **Create Custom Diagram**.
2. Select a metrics cube to use with the diagram.
3. Enter a name for the diagram and then click **OK**.
   
   The Custom Diagram editor opens.
4. Choose a background image for your diagram, click the **Background Image** list and select an sample image or browse for your own.
5. Click the **Primary Dimension** list and select the main dimension to use in your diagram (usually the metric dimension).
6. **Optional step**: Select the secondary dimension and context that you want to use:
   
a) Click the **Secondary Dimension** list to select a second dimension for the diagram.
   
b) Click the **Secondary Dimension Context** list to choose a dimension member from the secondary dimension.
7. Click and drag a dimension member from the **Source Cube** list and place it on the image. The member is displayed with a gray status icon.
8. Edit the image properties and resize options.
9. Click **Save**.
10. Click the **Preview** tab to see an interactive preview of the diagram.

   To test and review the diagram:
   
   • Hover the mouse pointer over the data points to display more information.
   • Click the **Zoom In** and **Zoom Out** icons to view the diagram at different zoom levels.
   • Change the dimension context for the diagram.
Customizing a history chart

A history chart is automatically created whenever you create a metrics cube. A metrics cube can have only one history chart.

To include a history chart in a metrics cube, each leaf member in the time dimension must have a start date and end date defined. For more information, see “Creating time dimensions” on page 23.

For more information about history charts, see “History chart” on page 141.

By default, a history chart compares actual values against the target values. You can customize a history chart to compare the performance of different sets of data. For example, you might want to compare actual values with budget values. To do this, in the Properties panel, use the Metric Indicators Subsets property to select a custom metric indicator subset.

For information about creating custom metric indicator subsets, see “Creating custom metric indicators for scorecarding diagrams” on page 146.

Controlling the display and format of Tolerance values

There are limitations for how values are displayed in different formats within the same dimension in a cube view. Because of this, you cannot display a mix of formatting types, such as an absolute value and a percent value, in the Tolerance column of a metrics cube. However, you can create a specialized Tolerance Value column in your metrics cube to show values that are formatted to match each metric in the cube.

Before you begin

You have already created a metrics cube for your scorecarding solution.

About this task

The steps to create a specialized Tolerance Value column include creating a new member in the metric indicator dimension and adding a cube calculation for that member.

The figure shows an example of a metrics cube with a Tolerance Value column that displays values in the same format as the related metric for each row.

![Figure 14: Example of a metrics cube with a Tolerance Value column](image-url)
This example uses a metrics cube Scorecards, a metric dimension Metrics, and a metric indicator dimension Metric Indicators.

**Procedure**

1. Create a new Tolerance Value member in the metric indicator dimension.
   a) Open the metric indicator dimension for your metrics cube.
   b) Add a new member to the dimension. For example, add a new member named Tolerance Value.

   For information about adding members to the metric indicator dimension, see “Creating a metric indicator dimension” on page 145.

   **Important:** Do not apply any formatting to this new member.
   c) Click **Save** to save the dimension.

2. Add a cube calculation to your metrics cube.

   This example assumes that the metric indicator dimension is set as the column title for your metrics cube.
   a) Open the metrics cube.
   b) Right-click the **Tolerance Value** column heading and select **Create Cube Calculation**.
   c) Accept the default name for the new calculation or enter your own.
   d) Click **OK**.

   The Expression Editor tab opens for the new calculation.
   e) In the Expression Editor, click to select the **Combine leaf and consolidated** check box.

   This option applies the calculation to all cells in the Tolerance Value column.
   f) Add the following expression into the **Leaf and consolidated expression** tab:

   ```
   =ABS(IF [Metrics].tolerancetype = 1
   then [Metric Indicators]:Tolerance
   else [Metric Indicators]:Tolerance * [Metric Indicators]:Target )
   ```

   **Tip:** You can use the object tree on the **Terms** tab to drag attribute and object names into the expression. For example, drag the **Tolerance Type** attribute from the Metrics dimension and then drag the **Target** and **Tolerance** members from the metric indicators dimension into the expression.
   g) Click **OK** to save the expression and apply it to the metrics cube.

**Results**

The values in the **Tolerance Value** column of the metrics cube now display in a format that matches the related metric on each row.

**Adding data to a metrics cube**

After you create your scorecard objects, you can use different approaches to add data to your metrics cube.

**About this task**

Use the metrics cube as the primary way to get your TM1 data into your scorecarding solution. You do this by adding your data to the Actual, Target, and Tolerance cells for each metric in the cube.

For example, to calculate the metric indicator values for the Revenue metric:

1. You populate the Actual and Target metric indicator cells with the respective values for Revenue.
2. You enter a Tolerance value to define an acceptable range for comparing actual revenue to target revenue.
3. The values in the Actual, Target, and Tolerance cells then provide the basis for calculating the other metric indicator values, such as Status, Trend, and Variance.

You can use any of the standard approaches for entering data into TM1 to populate the Actual, Target, and Tolerance cells in your metrics cube.

**Procedure**

- **Manually enter data:**
  Enter values directly into the cells of your metrics cube. Manual data entry is described in the *IBM TM1 Perspectives, TM1 Architect, and TM1 Web* documentation, *TM1 Applications* documentation, and the *Cognos Insight* documentation.

- **Use data spreading:**
  Spread values across a range of cells in a view or spread values to the children of a consolidation. For more information, see “Spreading data in a cube view” on page 47.

- **Import data with TM1 TurboIntegrator:**
  Create a TurboIntegrator process to import data from any supported data source into a cube, as described in the *TM1 TurboIntegrator* documentation.

- **Use rules-based calculations:**
  Manually create rules that define data for a cube, as described in the *TM1 Rules* documentation. You can also define cube calculations or dimension calculations to generate rules that define data at the cube or dimension level. For example, you can enter a global value or expression for Tolerance in the Metrics Indicator editor that will apply the same tolerance level to all the metrics in your metrics cube.

  For details about cube calculations, see *Cube Calculations*.

  For details on dimension calculations, see *Dimension Calculations*.

**Creating a derived metric**

**About this task**
A derived metric is a conceptual metric used to indicate performance using child metrics of differing unit types. Derived metrics are custom metrics that a modeler defines based on their own requirements.

**Procedure**

1. In Cognos TM1 Performance Modeler, click Model Design and open the metric dimension.
2. In the Name column, click <Enter new member> and enter a name for the new derived metric.
3. Paste the metrics for the derived metric into the new metric.  
   For example: a derived metric called **Produce effectiveness** can comprise of **Quantity sold, Sales revenue**, and **Product survey**.

4. In the **Derived calculation** column, click the **More** icon to create a derived calculation based on the status of the child metrics.
   - **Most Positive Status** to report the status of the most positive child metric.
   - **Least Positive Status** to report the status of the least positive child metric.
   - **Most Frequent Status** to report the status of the most frequent status of the child metrics.
   - **Average Status** to report the average status of all child metrics.

5. Repeat the previous steps to add more members to the metric dimension.

6. Click **Save**.

**What to do next**

After you create a derived metric you can see the results of the derived metric in the scorecard cube.

**Related concepts**

**Derived metrics**

A derived metric is a metric based on your key performance indicators or measurements from your metric dimension. Examples of a derived metric are: Employee Satisfaction based on employee survey results, employee turnover, and cost of hiring, or Customer Satisfaction based on product survey, returns, and customer count. These two derived metrics can also be the basis of a further derived metric, Overall Company Satisfaction rating.

**Deploying a scorecarding solution to a TM1 Server**

After you finish creating a scorecarding solution in IBM Cognos TM1 Performance Modeler, you can then deploy it to a TM1 server to share with other users. Users can then view and interact with the scorecard diagrams from within IBM Cognos applications to monitor business performance.

**Procedure**

1. In the **Application Design** pane, right-click the **Applications** folder and click **New > Application**.
   
   **Note:** If you connected directly to the TM1 Server when you logged in to TM1 Performance Modeler, the Applications pane does not display. See “Connecting directly to a TM1 server” on page 3.

2. Type a name for the application.

3. From the **Application Type** menu, select **Central**.

4. Click **OK**.

5. Drag the cube view object from the metrics cube that you want to use into the **Contributor views** area for the new application.
   
   **Note:** You can add metrics cube view objects only to an application. You cannot add individual impact diagrams or strategy maps to an application. By default, all of the diagrams that are related to the views that you select for the application are deployed.

6. Under the **Clients** section for the new application:
   
   a) Select either the **Cognos Insight - Connected** or **Cognos Insight - Distributed** option and then click the **Default** option to set it as the default.
   
   b) Ensure that the **TM1 Application Web** option is not selected.

7. Save the application.

8. Right-click the application and select **Deploy Application**.

9. Use IBM Cognos TM1 Applications to activate and open the application.
   
   a) Open IBM Cognos TM1 Applications and go to the portal page.
   
   b) Click the **Refresh** icon on the toolbar.
      
      The available applications are listed in the **Name** column of the **My Applications** table.
c) To activate the application, under the **Actions** column, click the **Activate Application** icon.
d) To open the application, click the name of the application.

   After the page updates, you might need to click the name of the application a second time.

   The scorecarding solution opens in Cognos Insight.

**What to do next**

After Cognos Insight opens, you can view and interact with the scorecard objects and diagrams that are contained in the scorecarding solution.

**Deploying a scorecard solution with a distributed application**

Deploying a scorecard solution as a distributed application for IBM Cognos Insight requires a specific set of steps.

**About this task**

These steps involve working with IBM Cognos TM1 Performance Modeler, IBM Cognos TM1 Applications, and IBM Cognos Insight.

**Procedure**

1. Set up a special directory to handle the local copy of TM1 objects:

   Specify a directory location using the `DistributedPlanningOutputDir` parameter in the Cognos TM1 server configuration file, `Tm1s.cfg`.

   This parameter defines the directory to which TUnits are written when a Cognos Insight distributed application is deployed.

   For example: `DistributedPlanningOutputDir=<location of the tunit directory>`

2. Create an application in IBM Cognos TM1 Performance Modeler. For example, create an approval type application.

   a) Use the Geography dimension as the basis for the approval hierarchy in the approval application.

   b) Make sure the approval hierarchy dimension has a parent node for the dimension. For example, add `World` so that North America, Europe, and other elements all roll up to the parent element.

   c) From this dimension, create a new subset that is not dynamic and use it as the subset for the approval hierarchy.

3. Configure the application to be deployed in distributed mode.

   a) Select **Cognos Insight - Distributed** under the **Clients** section.

   b) Select **Enable advanced modeling** under the **Settings** section.

      This option enables you to define manual dependencies for control cubes.

   c) Click **Actions > Show Control Objects** to display TM1 control objects.

   d) Click **Save** and then click **Refresh**.

      A **Manual Dependencies** folder is automatically created under the application. Once you see the Manual Dependencies folder in the Design tree under the application, you can add the required control cubes to the folder.

4. Drag and drop the control cubes for the related scorecarding diagrams to the **Manual Dependencies** folder:

   You can find the control cubes for scorecarding diagrams by looking for the following naming conventions:

   - Impact diagram - `MI_metrics_cube_name`
• Strategy map - a control cube with exactly the same name as the strategy map. For example, *
  Strategy_map_name*.
• Custom diagram - a control cube with exactly the same name as the custom diagram. For example, *
  Custom_diagram_name*.

5. Save, validate, and deploy the application:
   a) Right-click the application and click **Save Application**.
   b) Right-click the application and click **Validate Application**.
   c) Right-click the application and click **Deploy Application**.

6. In the Cognos TM1 Applications portal, locate your application in the list and click the **Activate** icon to
   activate it.

7. Open Cognos Insight to create and publish your dashboard:
   a) Open Cognos Insight from the toolbar of the Cognos TM1 Applications portal.
   b) In Cognos Insight, connect to the TM1 server and select the application that you deployed.
      Click **Actions > Connect to IBM Cognos TM1**, log in, select the Planning Server where your
      application is located, and then click **Connect**.
   c) Create your dashboard using your scorecarding objects, including the scorecarding diagrams that
      you added to the Manual Dependencies folder.
   d) Publish the dashboard, but do not select the **Publish and Distribute** option.
      Click **Actions > Publish**, and then click the **Publish** option.
      This will update your application on the TM1 server.

8. In the Cognos TM1 Applications portal, open your application for one of the nodes in distributed mode.
   You should see the dashboard you created, but in distributed mode.

**Scorecarding and security**

You can use standard IBM Cognos TM1 security steps to configure different types of object-level security
for scorecarding users. You can configure object-level security for objects that are based on different use
cases.

Review and apply the necessary security for your scorecarding objects before you publish them in a
scorecarding solution. You can apply security to your scorecarding objects as you create them or after
they are complete.

Depending on the security that you apply, users see messages when they do not have sufficient security
rights when they try to interact with scorecarding objects. In some cases, users might not be able to see
the scorecarding objects at all.

To configure these security assignments, you must be a member of either the TM1 ADMIN or
SecurityAdmin groups.

Use IBM Cognos TM1 Performance Modeler to apply the security settings.

**Use cases for scorecarding security**

You can use the following examples to determine which level of security to apply to your scorecarding
objects. The examples range in order from the minimum amount of security that is required to an
increased amount of security for individual scorecarding objects and dimension members.

**Granting minimum access to scorecarding objects for non-administrator users**

Use the following information to determine and configure minimum security access for non-administrator
users to open all scorecarding objects in a client. Clients include IBM Cognos Insight or IBM Cognos TM1
Web. These steps apply to all scorecarding objects; metrics cube, impact diagram, strategy map, and
custom diagrams.

About this task

In IBM Cognos TM1, the objects to which you can apply security are either regular (user-defined) objects
or control (system-defined) objects. These objects include cubes, dimensions, and dimension members.
When you apply security to scorecarding objects, you might be required to apply security to regular and
control objects for cubes, dimensions, and dimension members.

There are four objects that we are concerned with; the metrics cube, the impact diagram, the strategy
map, and the custom diagram. The scorecard cube is a regular, user-defined TM1 object, but the impact
diagram, strategy map, and custom diagram are represented by system-defined control objects.

The user needs READ rights to all of these scorecard objects to view and interact with the objects in
Cognos Insight or Cognos TM1 Web.

Note: To view information about the regular and control objects for scorecarding, open the Model pane in
IBM Cognos TM1 Performance Modeler and click an object. Information about the object and its related
objects is displayed in the Properties tab.

Metrics cube

The metrics cube, or scorecard grid, consists of regular objects. For example, a typical metrics cube
named Scorecard is made up of four dimensions named Metrics, Indicators, Geography, and Time.

Impact diagram

The impact diagram consists of a combination of regular and control objects. The names of the objects
are based on the name of the related metrics cube for the diagram. For example, a typical impact
diagram, for a metrics cube named Scorecard, consists of one control cube named MI_Scorecard and
three dimensions named Metrics, MI_Scorecard_I, and MI_Scorecard_D.

Strategy map

The strategy map consists of a combination of regular and control objects. For example, a strategy
map named Balanced Scorecard is defined by a control cube with the same name, Balanced
Scorecard. It consists of four dimensions—three regular dimensions named Geography, Time,
Indicators, and one control dimension named Balanced Scorecard.

Custom diagram

The custom diagram consists of a combination of regular and control objects. For example, a custom
diagram named Custom consists of one control cube also named Custom and three dimensions. The
dimensions include one regular dimension, named Metrics, and two control dimensions,
named MD_Scorecard_Custom_I and MD_Scorecard_Custom_D.

Procedure

1. Create the initial setup for this scenario.
   In Cognos TM1 Performance Modeler, log in as the administrator user and complete the following
   steps:
   a) Create a metrics cube named Scorecard that includes the Metrics, Metric Indicators, Geography,
      and Time dimensions.
   b) Configure an impact diagram with at least one impact.
   c) Create a strategy map by using the defaults.
   d) Create a custom diagram and add a point to the US.
   e) Create a central-type application and deploy it to the Cognos TM1 Applications portal.

2. Create a workspace in Cognos Insight:
   a) From the Cognos TM1 Applications portal, log in as administrator and open the application/
      workspace in Cognos Insight.
b) In Cognos Insight, add the following four objects to the canvas: metrics cube, strategy map, custom diagram, and impact diagram.

c) Save the workspace.

3. In Cognos TM1 Performance Modeler, create a user named nonadmin and assign it to the nonadmingroup group. This user can open and view all the scorecarding objects from Cognos TM1 Applications and Cognos Insight.


The nonadmingroup group needs access to specific cubes as follows:

a) To see the metrics cube, grant READ access to the nonadmingroup group for the Scorecard cube.

b) To see all the scorecard diagrams, grant READ access to the nonadmingroup group for the following control cubes:

   - \{MD_Scorecard\}_Custom
   - \{MI_Scorecard\}
   - \{MS_Scorecard\}_Balanced Strategy

   **Note:** When working in the CubeSecurity control cube, the full names of the control cubes for the strategy map and custom diagram are displayed with a prefix of \{MS_metrics_cube_name\}_ and \{MD_metrics_cube_name\}_ respectively.

5. Set dimension security using the DimensionSecurity control cube.

The nonadmingroup group needs access to specific dimensions as follows:

a) When you granted READ access to the Scorecards cube in the previous steps, TM1 automatically granted the user READ access to the dimensions in the Scorecards cube. The rights are cascaded down.

b) When you granted READ access to the \{MD_Scorecard\}_Custom, \{MI_Scorecard\} and \{MS_Scorecard\}_Balanced Strategy control cubes in the previous steps, TM1 automatically granted the user READ access to the dimensions in the \{MD_Scorecard\}_Custom, \{MI_Scorecard\} and \{MS_Scorecard\}_Balanced Strategy control cubes.

c) Grant the nonadmingroup group READ access to the \{Cubes\} dimension.

6. Optionally, you might want to configure member-level security for all of the dimensions that make up the metrics cube.

   After you configure the security as described in the previous steps, the nonadmingroup group has READ access to all of the members in all of the dimensions that make up the metrics cube. To see a slice of the cube, users must have READ access to the dimensions that make up the cube. If you want to refine these settings, manually set the member security rights or create rules to set them.

**Blocking access to scorecard objects**

In this use case we want to block the user access to different scorecarding objects. These objects include the metrics cube, the strategy map, the custom diagram, and the impact diagram.

**About this task**

For this use case, the administrator user creates a workspace in IBM Cognos Insight with the four scorecarding objects. You then create four new users and configure security so that each user is restricted from viewing one of the scorecarding objects.

**Procedure**

1. To block access to the strategy map:
   a) Create a user NA_no_balanced and assign them to the NA_No_Balance_Group.
b) Grant the NA_No_Balance_Group group the minimum rights needed to see all of the scorecarding objects.

For more information, see “Granting minimum access to scorecarding objects for non-administrator users” on page 157.

c) Remove the READ right for the NA_No_Balance_Group group to the }MS_Scorecard{ Balanced Scorecard cube.

d) Log in to the IBM Cognos TM1 Applications portal as the NA_no_balanced user and open the application in Cognos Insight.

The user can see, interact, and drag new objects of only the following types; metrics cube, custom diagram, and impact diagram.

The user can see the strategy map widget, but it should be empty except for an error message that tells the user they do not have access to view the contents of the widget.

The user cannot see the strategy map icon in the object tree.

2. To block access to the custom diagram:

a) Create a user NA_no_custom and assign them to the NA_No_Custom_Group.

b) Grant the NA_No_Custom_Group group the minimum rights needed to see all of the scorecarding objects.

c) Remove the READ right for the NA_No_Custom_Group group to the }MD_Scorecard{ Custom cube.

d) Log in to the Cognos TM1 Applications portal as the NA_no_custom user and open the application in Cognos Insight.

The user can see, interact, and drag new objects of only the following types; metrics cube, strategy map, and impact diagram.

The user can see the custom diagram widget, but it should be empty except for an error message that tells the user they do not have access to view the contents of the widget.

The user cannot see the custom diagram icon in the object tree.

3. To block access to the impact diagram:

a) Create a user NA_no_impact and assign them to the NA_No_Impact_Group.

b) Grant the NA_No_Impact_Group group the minimum rights needed to see all of the scorecarding objects.

c) Remove the READ right for the NA_No_Impact_Group group to the }MI_Scorecard{ cube.

d) Log in to the Cognos TM1 Applications portal using the NA_no_impact user and open the application in Cognos Insight.

The user can see, interact, and drag new objects of only the following types; metrics cube, strategy map, and custom diagram.

The user can see the impact diagram widget, but it should be empty except for an error message that explains that this user does not have access to view the contents of the widget.

The user cannot see the impact diagram icon in the objects tree.

4. To block access to the Scorecard metrics cube:

a) Create a user NA_no_scorecard and assign them to the NA_No_Scorecard_Group.

b) Grant the NA_No_Scorecard_Group group the minimum rights needed to see all of the scorecarding objects.

c) Remove the READ right for the NA_No_Impact_Group group to the Scorecard cube.

d) Ensure that the user still has rights to the dimensions that make up the Scorecard cube: Geography, Indicators, Metrics, and Time.

e) Log in to the Cognos TM1 Applications portal using the NA_no_scorecard user and open the application in Cognos Insight.
Limiting access to individual metrics in a metric dimension

In this use case, we block the user access to the Sales metric in the metric dimension. This example shows how restricting access to an individual metric affects the four main scorecarding objects: metrics cube, strategy map, custom diagram, and impact diagram.

About this task

For this use case, the administrator user creates a workspace in IBM Cognos Insight with the four scorecarding objects already on the canvas.

This example uses the following configuration of scorecarding objects:

- The metric dimension contains four metrics, including Revenue, Expenses, Headcount, and Sales.
- The impact diagram contains Sales as the impacting metric for Revenue.
- The strategy map contains Sales as the selected metric for Grow Revenue.
- The custom diagram uses the provided world map sample image and contains a point that includes Sales for Canada.

Procedure

Blocking the Sales metric:

1. Create a user `NA_no_metric` and assign them to the `NA_No_Metric_Group`.
2. Grant the `NA_No_Metric_Group` group the minimum rights that are required to see all of the scorecarding objects.
   
   For information, see “Granting minimum access to scorecarding objects for non-administrator users” on page 157.

3. Remove the `READ` right for the `NA_No_Metric_Group` group to the Sales member in the metric dimension.

4. A reference to the Sales metric is also held in the control dimension for the strategy map. Remove the `READ` right for the `NA_No_Metric_Group` group to the Sales member in the `{MS_Scorecard}_Balanced Scorecard` dimension.

5. Log in to the IBM Cognos TM1 Applications portal as the `NA_no_metric` user and open the application in Cognos Insight.

   The user is able to see, interact, and drag new scorecarding objects: metrics cube, strategy map, custom diagram, and impact diagram.

   The user sees all four of the scorecarding widgets, but does not see any references to the Sales metric in these objects as follows:

   - Metrics cube - The Sales metric does not show in the grid.
   - Strategy map - The Sales metric does not show in the tooltip. It also does not contribute to the status count in Grow Revenue.
   - Custom diagram - The Sales point does not show in the custom diagram.
   - Impact diagram - When revenue is the focused metric, nothing is displayed adjacent to the focused metric.
Limiting access to Scorecarding perspectives and objectives

This example shows what happens if a user's access is set to NONE for one of the objectives in a strategy map.

About this task

To configure this scenario, you grant NONE access for the Grow Revenue objective in a strategy map named Balanced Strategy.

A control dimension holds the perspectives and objectives for a strategy map. For example, a strategy map that is named Balanced Strategy is defined by a control cube with the same name, Balanced Strategy. The perspectives and objectives for the strategy map are defined in a control dimension that also has the same name, Balanced Strategy.

Procedure

1. In IBM Cognos TM1 Performance Modeler, click Actions menu > Show Control Objects.
2. In the Model Design pane of Cognos TM1 Performance Modeler, right-click the Balanced Strategy control dimension and select Configure Security > Set Access Permissions for > Elements.
3. Select a group, such as a group named No_Objective, and assign WRITE access to all the perspectives and objectives except for the Financial, Grow Revenue objective.
4. For that one objective, assign NONE access for the No_Objective group.
5. Open Cognos Insight as a user in the No_Objective group.
6. Drag the strategy map onto the canvas.

   The strategy map is blank and an error is displayed.

   Error - You do not have security rights to this perspective or objective.

Transfer of scorecarding objects

You can use the transfer feature in IBM Cognos TM1 Performance Modeler to transfer scorecarding objects from one IBM Cognos TM1 environment to another.

The following information outlines the requirements and behavior of transferring out the different types of scorecarding objects. The types include metrics cubes, impact diagrams, strategy maps, and custom diagrams.

For more information about the Transfer feature, see Chapter 8, “Transfer of model objects and applications,” on page 103.

General steps for transferring out a scorecarding object

When you select a scorecarding object to transfer, TM1 automatically determines the necessary related objects that must be transferred out along with it.

To transfer out a scorecarding object:

1. In the tree of the Model Design pane in Cognos TM1 Performance Modeler, locate the Scorecarding object that you want to transfer.
2. Right-click the object and select Transfer Out.
3. Select the folder for the output location and click OK.
4. If you want to include cube data with the transfer process, in the Target: Files toolbar, click the Configure Data icon and select the Include data for cubes option.
   This option mostly applies to the metrics cube and other TM1 cubes that contain actual data values.
By default, the transfer out process is set to **Add without cell data** for most cubes and does not include data values in the transfer. Choosing whether to include the cube data depends on what is stored in the target environment. When you transfer in, you can also clear objects.

5. Click **Transfer** to complete the transfer out process.

**Transfer of metrics cubes**

A metrics cube is a standard TM1 cube, except that it is designated as a metrics cube by using a cube attribute. This designation is discovered during the transfer analysis process and all of the related objects for the cube are automatically selected for inclusion in the transfer. This includes all related scorecarding diagrams for the selected metrics cube. Examples include the impact diagram and any strategy map or custom diagrams that are based on the cube.

If you select to transfer cube data, the transfer behaves the same as other TM1 cubes and includes the actual data values from the metrics cube.

**Transfer of impact diagrams**

When you select an impact diagram for transfer, the related metrics cube is automatically included as a dependent object. Other objects that are automatically selected with the transfer include the control cube. It defines the diagram, the metric dimension from the metrics cube, and other control dimensions that contain metadata about the diagram. The data in the diagram's cube is also set to automatically transfer.

**Remember:** A metrics cube can have only one impact diagram associated with it.

**Transfer of strategy maps**

Transferring out a strategy map automatically includes the related metrics cube as a dependent object. A strategy map is defined by a control cube and has the same dimensionality as the related metrics cube. There is no data in the diagram's cube to transfer because it is essentially a calculated cube.

**Remember:** A metrics cube can include one or more strategy maps.

**Transfer of custom diagrams**

Transferring out a custom diagram automatically includes the related metrics cube as a dependent object. All of the related regular and control dimensions and cubes are also automatically selected, including the user-defined background image for the diagram.

**Remember:** A metrics cube can include one or more custom diagrams.

### Scorecarding message logging

You can configure IBM Cognos TM1 Performance Modeler and IBM Cognos Insight to record Scorecarding messages to the log files for each application. You can use these messages to monitor or troubleshoot Scorecarding activity.

Scorecarding messages are recorded using the log4j logging framework in Cognos TM1 Performance Modeler and Cognos Insight.

You can configure loggers in the logging properties file to log messages about the following areas of Scorecarding:

**General messages about Scorecarding activity**

```
log4j.logger.Metrics=DEBUG
```

**Messages about Scorecarding performance**

```
log4j.logger.com.ibm.cognos.perf.Metrics=DEBUG
```
Messages about Scorecarding diagrams and visualizations
This logger applies only to the impact diagram and strategy map.

log4j.logger.RAVEMetrics=DEBUG

By default, logging is configured to log the necessary messages for day-to-day purposes and typically does not need to be adjusted. In some cases you might need to work with IBM Customer Support to change the logging configuration to record more specific messages about Scorecarding activity.
Chapter 11. Administering and maintaining IBM Cognos TM1 Performance Modeler

Perform administration and maintenance tasks in IBM Cognos TM1 Performance Modeler such as optimizing settings, managing processes, and transferring applications.

Optimizing the memory consumption of a cube

Optimize the memory consumed by a cube to improve its performance.

About this task
You should optimize the memory consumption of a cube only while working in a development environment for the following reasons:

- Significant memory resources are required to optimize the memory consumed by a cube. During the optimization process, the temporary RAM on the IBM Cognos TM1 server increases by a factor of two for the cube that you are optimizing. For example, a 50 MB cube requires 100 MB of RAM to optimize.
- The server locks all user requests while the optimization is performed.

Note: Optimizing the memory consumption of a cube is not the same as changing the dimension order.

Procedure

1. Open the cube and click the Optimize Cube Dimensions icon.
2. Click a dimension in the New Order box.
3. Click the Up or Down button to move the dimension's order in the list.
4. Note the Percentage changed value.
   - If this value is negative, the new order of dimensions consumes less memory and is therefore more efficient.
5. Repeat steps 2 through 4 until you achieve the most efficient ordering of dimensions.
6. Click OK.
7. Click the Actions menu icon, and click Save or Save As.
   - The cube is configured for optimal memory consumption.

Managing processes

Manage processes to create, modify, and schedule how data is imported and used in IBM Cognos TM1 Performance Modeler.

Related tasks
Importing data using Guided Import
When the source data includes many columns, examine the source data and identify which columns should be defined as dimensions, levels, attributes, or measures. You can choose to import dimensions only or to import both dimensions and measures in a cube. The source data can be a file, a list report, a cube view, a dimension subset, or a relational data source.

Importing data from a relational data source
Before you import data from a relational data source, ensure that you understand your relational data source and how to build SQL queries. Ensure that the ODBC connections have been defined. When you are working in connected mode, you can use the ODBC relational data sources that are defined on the server.

Creating a process

Create a process that defines a data source to be imported, data mappings, and advanced procedures. You can run a process at any time or schedule a process to run at defined intervals.

Procedure

1. In the Model Design pane, right-click the folder where you want the process to be stored, and click New > Process.
2. Enter a name for the process and click OK. The folder expands, showing the new process in the Model Design pane. A process viewer allows you to define the process.
3. Follow the steps for either “Importing data using Guided Import” on page 10 or “Importing data from a relational data source” on page 16.

Example: Prototyping a new requirement

In certain situations, such as when prototyping a new requirement, you could use the Guided Import to create a single process that performs three distinct functions:

- creates or updates dimensions
- creates or updates cubes
- loads data

In a typical production environment, however, you would separate these functions as three different processes. This would give you more flexibility to make changes or perform maintenance. In addition, you may create a chore that contains the three processes. This would allow you to schedule regular data refreshes. For example, you could schedule the chore to run every night at midnight.

For more information about chores, see “Scheduling processes” on page 169.

What to do next

You can modify the process by editing its procedures or you can schedule the process as part of a chore. You can run the process at any time by right-clicking the chore in the Model Design pane and clicking Execute Process.

Using the process editor

The process editor allows you to modify procedures that were defined when a process was created.

When to use the process editor

Use the process editor when you want to do the following actions:

- refine the process that is generated when you run a Guided Import
- create a script only process
- bypass the Guided Import
- create a process without executing it right away
Comparing the process editor with the TurboIntegrator editor

The process editor has a toolbar that allows you to perform many useful editing tasks. For example, click the comment/uncomment icon to comment out selected text. Or you can click the content assist icon to see a list of valid functions.

In IBM Cognos TM1 Performance Modeler, process editor scripts contain both a generated header and generated statements. TurboIntegrator scripts contain generated statements, but not a generated header.

Some process editor commands do not exist in TurboIntegrator. For example, in the process editor you can create collapsible content by enclosing text between the following two lines:

```
#region region_name
#endregion
```

The following data types are supported in IBM Cognos TM1 Architect, but not supported in Cognos TM1 Performance Modeler:

- ODBO
- SAP
- IBM Cognos packages

Moving scripts between Cognos TM1 Performance Modeler and Cognos TM1 Architect

Process editor scripts and TurboIntegrator scripts have similar formats, but are not completely interchangeable. You can share scripts between both editors as long as you don't change the mappings. The following table lists three scenarios where scripts are moved between Cognos TM1 Performance Modeler and IBM Cognos TM1 Architect. The script remains valid in the first two scenarios. But in the third scenario, the mappings are modified, which makes the script invalid.

<table>
<thead>
<tr>
<th>Scenario</th>
<th>Validity of script</th>
</tr>
</thead>
<tbody>
<tr>
<td>Script created in Cognos TM1 Architect and opened in Cognos TM1 Performance Modeler.</td>
<td>Valid</td>
</tr>
<tr>
<td>Script created in Cognos TM1 Performance Modeler and opened in Cognos TM1 Architect.</td>
<td>Valid</td>
</tr>
<tr>
<td>Script created in Cognos TM1 Performance Modeler, modified in Cognos TM1 Architect, and opened in Cognos TM1 Performance Modeler.</td>
<td>Not valid.</td>
</tr>
</tbody>
</table>

Example: the ViewZeroOut function

The ViewZeroOut function sets all data points in a view to zero. Syntax:

```
ViewZeroOut(Cube, ViewName);
```

<table>
<thead>
<tr>
<th>Argument</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cube</td>
<td>The parent cube of the view you want to zero out.</td>
</tr>
<tr>
<td>ViewName</td>
<td>The view you want to zero out.</td>
</tr>
</tbody>
</table>

```
ViewZeroOut('99sales', '1st Quarter Actuals');
```

This example sets all data points in the 1st Quarter Actuals view to zero.
**Editing procedures**
Edit procedures to include process editor functions and IBM Cognos TM1 rules functions that extend the capabilities of a process.

For example, you can edit the Data procedure to include statements that instruct the process to skip records containing zero values, or to write imported records to an external file.

**Before you begin**
A process exists because you ran a guided import, created a process, or generated a process from a link.

**About this task**
A process contains four procedures that are based on the options you selected when you specified the data source and mapped the data. These procedures are listed in the following table.

<table>
<thead>
<tr>
<th>Procedure</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prolog</td>
<td>A series of statements to be executed before the data source is processed.</td>
</tr>
<tr>
<td>Metadata</td>
<td>A series of statements that update or create cube, dimensions, and other metadata structures during processing.</td>
</tr>
<tr>
<td>Data</td>
<td>A series of statements that manipulate values for each record in the data source.</td>
</tr>
<tr>
<td>Epilog</td>
<td>A series of statements to be executed after the data source is processed.</td>
</tr>
</tbody>
</table>

For a complete list of all available TurboIntegrator and Cognos TM1 rules functions, see the *IBM Cognos TM1 Reference* documentation.

When editing procedures, keep in mind that each procedure is intended to execute certain types of actions at specific times in a process. Accordingly, you should create actions or statements that are appropriate for a given procedure.

**Note:** When the source type for a process is script-only, the Data and Metadata sub-tabs are not available.

**Procedure**
1. Click the **Advanced** tab.
2. Specify parameter values:
   a) Set param_destroy = 1, if you want the process to overwrite an existing cube and dimensions.
   b) Set param_createIfNotExist = 1, if you want the process to create a cube and dimensions if they don't exist.
3. Click the sub-tab for the procedure you want to edit.
4. Enter your statements in the text box either **before** or **after** these lines:
   1. #****GENERATED STATEMENTS START****
   2. #****GENERATED HEADER START****
   or **after** these lines:
   1. #****GENERATED STATEMENTS FINISH****
   2. #****GENERATED HEADER FINISH****
5. Save the process.
What to do next
You can do the following actions:
• schedule the process
• run the process at any time by right-clicking the chore in the Model Design pane and clicking **Execute Process**

Scheduling processes
Create a chore to schedule processes to run at defined intervals.

About this task
A chore is the IBM Cognos TM1 object that executes one or more processes at a user-defined frequency. A chore is comprised of:
• a list of processes to be executed
• a start date and time for the initial execution of the chore
• a frequency at which the chore is subsequently executed

Procedure
1. In the Model Design pane, right-click the folder where you want the chore to be stored, and click **New > Chore**.
2. Enter a name for the chore and click **OK**.
   - The folder expands, showing the new chore in the Model Design pane. A chore viewer appears.
3. In the **Available** box, select the processes you want and click the arrow icon to move them to the **Selected** box.
4. Use the up and down arrows to move the processes into the order that you want the chore to execute them.
5. Specify parameter values by selecting a process in the **Selected** box, and updating the value.
6. Specify whether the chore will be executed as a single transaction or as multiple transactions.
   - **Note:** By default, the entire sequence of processes is executed as a single Commit transaction. Any locks acquired by the first process are kept until the last process is complete. If you choose the multiple transactions option, each process is committed as a transaction. Therefore, locks are held only for the duration of each process, not for the duration of the chore.
7. Click the **Schedule** tab.
8. In the **Start Date and Time** box, specify when the initial execution of the chore will occur.
9. Specify the interval at which the chore is executed
10. Select the **Activate Chore** check box.
    - This checkbox is enabled only if values were entered in the **Run Chore Every** box.
    - **Note:** If you want to stop the chore from running for a period of time, keep the **Activate Chore** check box unselected.
11. Save the chore.

What to do next
You can run the chore at any time by right-clicking the chore in the Model Design pane and clicking **Execute Chore**.
Chapter 12. Translating your model

IBM Cognos TM1 provides a mechanism to display objects on your TM1 server in other languages, so that users can view object names in their language without requiring any configuration.

Translation in Cognos TM1 is accomplished through the Caption attribute, which lets you assign translated names to any cube, dimension, member, or member attribute on the TM1 server. You can assign Caption attribute values for all language locales supported in TM1, which correspond to the members in the Cultures control dimension.

When a user starts any of the TM1 clients that support translation, object names display the Caption attribute value for the language associated with the user’s current locale, without requiring any configuration. If you have added translated values to the cube, translated attribute values are also displayed in the filter dialog box.

The following TM1 clients support translation:

- IBM Cognos TM1 Web
- IBM Cognos TM1 Application Web
- IBM Cognos Insight
- IBM Planning Analytics for Microsoft Excel

TM1 Web and TM1 Application Web use the current browser language setting to determine the language to display.

IBM Planning Analytics for Microsoft Excel uses the Windows Location setting to determine the language to display.

Cognos Insight uses the Windows Location setting to determine the language to display when opened from the Windows Start menu. When Cognos Insight is opened from the TM1 Application Web workflow screen, it uses the Content Language defined in the portal user preferences.

**Note:** IBM Cognos Performance Modeler can optionally display translated names or invariant names for objects on the TM1 server. An invariant name is the name assigned to an object upon original creation. To display translated names, right-click the root on the Model Design pane, then click **Show Captions**. To display invariant names, right-click the root on the Model Design pane, then click **Show Invariant Names**.

The Caption attribute

The Caption attribute can be set up as an Alias type or as a Text type. When the Caption attribute is an Alias type, the attribute values are used to display translated object names. Additionally, TM1 enforces the uniqueness of its Caption attribute values, and you can use the Caption value to search for the associated dimension, cube or member, or to use as arguments to functions that retrieve or send data to the TM1 server.

When the Caption attribute is a Text type, the attribute values are used solely to display translated object names. Uniqueness is not enforced, so you can use the same value for multiple attributes if desired.

**Note:** When defining the Caption attribute for use in TM1 Web, TM1 Application Web or IBM Planning Analytics for Microsoft Excel, define the Caption attribute as an Alias type. In TM1 Web and TM1 Application Web, cube view dimensions can be set to display only an alias. In addition, when defining a SUBNM for display in a web sheet, it can take only an alias as an argument. Similarly, in IBM Planning Analytics for Microsoft Excel, SUBNM takes an alias as an argument.

Language locale codes and behavior of the Caption attribute

TM1 uses international language codes defined by ISO 639-1 to identify major languages and IETF language tags to identify specific locales. For example, “fr” identifies French, while “fr-CA” identifies French (Canada).
You can assign Caption attribute values for major language codes, such as "fr", as well as any associated specific locales, such as "fr-FR" or "fr-CA".

If a Caption attribute value does not exist for a given specific locale, TM1 automatically retrieves the value of the associated major language code. For example, if a Caption attribute value does not exist for "pt-BR", TM1 retrieves the value for "pt".

If no values are found for a Caption attribute, the base default attribute value is returned.

Review the list of elements in the }Cultures control dimension to familiarize yourself with the ISO 639-1/IETF combinations supported in TM1.

**Translating cubes**

You can display cube names in other languages by creating the required control cube and then assigning Caption attribute values for the cubes available on your TM1 server.

**Procedure**

1. In the Model Pane of Performance Modeler, right-click the model root, then click **Create localized cube attributes**.
   
   This action adds the Caption attribute to the }CubeAttributes control dimension and generates the }LocalizedCubeAttributes control cube.

   **Tip:** To view control objects, click the **Actions menu** icon, and click **Show Control Objects**.

2. Assign Caption attribute values for cubes on your TM1 server. You can assign values using either of the following methods.

   • Double-click the }LocalizedCubeAttributes control cube to create a view. In this view, for each cube on your TM1 server, assign a Caption attribute value for the language locales for which you want to display translated text.

   • In TurboIntegrator, create a process that uses the CubeAttrPutS function to assign values to the Caption attribute.

      For example, to assign a Caption attribute for French for the plan_BudgetPlan cube, you could use the following function:

      ```
      CubeAttrPutS( 'Plan Budgetaire', 'plan_BudgetPlan', 'fr' )
      ```

      The CubeAttrPutS TurboIntegrator function is fully described in the *IBM Cognos TM1 Reference* documentation.

**Results**

After the Caption attribute values are assigned for cubes, users will see translated cube names when using any of the TM1 clients that support translation.

**Translating dimensions**

You can display dimension names in other languages by creating the required control cube and then assigning Caption attribute values for the dimensions available on your TM1 server.

**Procedure**

1. In the Model Pane of Performance Modeler, right-click the model root, then click **Create localized dimension attributes**.

   This action adds the Caption attribute to the }DimensionAttributes control dimension and generates the }LocalizedDimensionAttributes control cube.
2. Assign Caption attribute values for dimension names on your TM1 server. You can assign values using either of the following methods.

- Double-click the }LocalizedDimensionAttributes control cube to create a view. In this view, for each dimension on your TM1 server, assign a Caption attribute value for the language locales for which you want to display translated text.
- In TurboIntegrator, create a process that uses the DimensionAttrPutS function to assign values to the Caption attribute.

For example, to assign a Caption attribute for French for the Plan Business Unit dimension, you could use the following function:

```
DimensionAttrPutS( 'Des Entités d'Affaires', 'plan_business_unit', 'fr' )
```

The DimensionAttrPutS TurboIntegrator function is fully described in the *IBM Cognos TM1 Reference documentation*.

**Results**

After the Caption attribute values are assigned for dimensions, users will see translated dimension names when using any of the TM1 clients that support translation.

---

### Translating members

You can display member names in other languages by creating the required control cube and then assigning Caption attribute values for the members available in a given dimension.

**Procedure**

1. In the Model Pane of Performance Modeler, right-click the dimension containing the elements you want to translate, then click **Create localized member attributes**. This action adds the Caption attribute to the }ElementAttributes_<dimname> control dimension and generates the }LocalizedElementAttributes_<dim_name> control cube.
2. Assign Caption attribute values for members in the dimension. You can assign values using either of the following methods.

- Create a view for the }LocalizedElementAttributes_<dim_name> control cube and open the view. For each member in the dimension, assign a Caption attribute value for the language locales for which you want to display translated text.
- In TurboIntegrator, create a process that uses the AttrPutS function to assign values to the Caption attribute for elements.

For example, to assign a Caption attribute for French for the Total Business Unit element, you could use the following function:

```
AttrPutS( 'Entités Totale', 'plan_business_unit', 'Total Business Unit', 'Caption', 'fr' )
```

The AttrPutS TurboIntegrator function is fully described in the *IBM Cognos TM1 Reference Guide*.

**Results**

After the Caption attribute values are assigned for elements, users will see translated element names when using any of the TM1 clients that support translation.
Copying existing alias values to Caption attributes

If your model uses aliases to display translated strings, you can use TurboIntegrator to convert existing aliases to Caption attributes.

**Procedure**

1. On the Model Design pane of Performance Modeler, right click **Processes**, then click **New, Process**.
2. Enter a name for the new process, then click **OK**.
3. Click the **Advanced** tab.
4. Click the **Prolog** tab.
5. In the Prolog tab, create a process that retrieves an alias value and then assigns that value to a Caption attribute.
6. Save and execute the process.

**Example**

Using the Planning Sample sample database that ships with TM1, the following process copies the alias value for BusinessUnit_French for the Total Business Unit element to the fr locale value for BusinessUnit.

```plaintext
vValue = AttrS( 'plan_business_unit', 'Total Business Unit', 'BusinessUnit_French');
AttrPutS( vValue, 'plan_business_unit', 'Total Business Unit', 'Caption', 'fr');
```
Appendix A. Accessibility features

Accessibility features help users who have a physical disability, such as restricted mobility or limited vision, to use information technology products.

Keyboard shortcuts

Standard Microsoft Windows navigation keys are used in addition to application-specific keys.

You can use keyboard shortcuts to navigate through the application and perform tasks. If you are using a screen reader, you might want to maximize your window so the keyboard shortcut table is completely expanded and accessible. You might want to turn high contrast on in your operating system so the lines in diagrams and charts in the application are more visible.

Note: The following keyboard shortcuts are based on U.S. standard keyboards.

<table>
<thead>
<tr>
<th>Action</th>
<th>Keyboard shortcut</th>
</tr>
</thead>
<tbody>
<tr>
<td>Open the Application view</td>
<td>Alt+A</td>
</tr>
<tr>
<td>Open the Model view</td>
<td>Alt+M</td>
</tr>
<tr>
<td>Close the editor</td>
<td>Ctrl+W</td>
</tr>
<tr>
<td>Go to the next editor</td>
<td>Ctrl+F6</td>
</tr>
<tr>
<td>Go to the previous editor</td>
<td>Ctrl+Shift+F6</td>
</tr>
<tr>
<td>Go to the next view</td>
<td>Ctrl+F7</td>
</tr>
<tr>
<td>Go to the previous view</td>
<td>Ctrl+Shift+F7</td>
</tr>
<tr>
<td>Save</td>
<td>Ctrl+S</td>
</tr>
<tr>
<td>Save all</td>
<td>Ctrl+Shift+S</td>
</tr>
<tr>
<td>Show key assistance</td>
<td>Ctrl+Shift+L</td>
</tr>
<tr>
<td>Switch to the editor</td>
<td>Ctrl+Shift+E</td>
</tr>
<tr>
<td>Open a context menu</td>
<td>Shift+F10</td>
</tr>
<tr>
<td>Navigate a menu</td>
<td>Up and Down arrows</td>
</tr>
<tr>
<td>Activate a command on a menu or context menu</td>
<td>Enter</td>
</tr>
<tr>
<td>Move to and select the next enabled menu item or context menu item</td>
<td>Down arrow</td>
</tr>
<tr>
<td>Select the first enabled item in a submenu on a menu or context menu</td>
<td>Right arrow</td>
</tr>
<tr>
<td>Move to and select the previous enabled menu item or context menu item</td>
<td>Up arrow</td>
</tr>
<tr>
<td>Close an opened menu</td>
<td>Esc</td>
</tr>
<tr>
<td>Select or clear a check box</td>
<td>Space bar</td>
</tr>
<tr>
<td>Move to the next item in a dialog box or wizard</td>
<td>Tab</td>
</tr>
<tr>
<td>Action</td>
<td>Keyboard shortcut</td>
</tr>
<tr>
<td>------------------------------------------------------------------------</td>
<td>-------------------</td>
</tr>
<tr>
<td>Move to the previous item in a dialog box or wizard</td>
<td>Shift+Tab</td>
</tr>
<tr>
<td>Move to the next choice in a drop-down list</td>
<td>Down arrow</td>
</tr>
<tr>
<td>Move to the previous choice in a drop-down list</td>
<td>Up arrow</td>
</tr>
<tr>
<td>Move to and select the next option button</td>
<td>Tab+Space bar</td>
</tr>
<tr>
<td>Move to and select the previous option button</td>
<td>Shift+Tab+Space bar</td>
</tr>
<tr>
<td>Open and display a drop-down list or menu</td>
<td>Alt+Down arrow</td>
</tr>
<tr>
<td>Close an open drop-down list or menu</td>
<td>Alt+Up arrow or Esc</td>
</tr>
<tr>
<td>Close a dialog box or wizard</td>
<td>Esc</td>
</tr>
<tr>
<td>Invoke a selected drop-down item</td>
<td>Enter</td>
</tr>
<tr>
<td>Apply the changes you made and close the dialog box or wizard</td>
<td>Tab to <strong>OK</strong> and press Enter</td>
</tr>
<tr>
<td>Close the dialog box or wizard without applying or saving the changes you made</td>
<td>Esc</td>
</tr>
<tr>
<td>Navigate between the tabs</td>
<td>Left and Right arrows or Tab or Shift+Tab</td>
</tr>
<tr>
<td>Move the current tab to the right</td>
<td>Shift+Page Up</td>
</tr>
<tr>
<td>Move the current tab to the left</td>
<td>Shift+Page Down</td>
</tr>
<tr>
<td>Navigate from icon to icon in the toolbar</td>
<td>Left and right arrows</td>
</tr>
<tr>
<td>Display members of a dimension in the cube viewer</td>
<td>Alt+Down arrow</td>
</tr>
<tr>
<td>Select several rows or columns in the cube viewer</td>
<td>Ctrl+Down arrow</td>
</tr>
<tr>
<td>Replace the existing dimension in the rows with the selected dimension</td>
<td>Ctrl+R</td>
</tr>
<tr>
<td>Replace the existing dimension in the columns with the selected dimension</td>
<td>Ctrl+C</td>
</tr>
<tr>
<td>Replace the existing dimension in the context with the selected dimension</td>
<td>Ctrl+T</td>
</tr>
<tr>
<td>Automatically expand the members in the selected dimension</td>
<td>In the context menu for the selected dimension, Down arrow to the <strong>Expand to level</strong> command and select the level that you want to display</td>
</tr>
<tr>
<td>Expand or collapse a parent in a dimension</td>
<td>Enter</td>
</tr>
<tr>
<td>Refresh the model with the data on the server</td>
<td>F5</td>
</tr>
<tr>
<td>Exit the application</td>
<td>Alt+F4</td>
</tr>
</tbody>
</table>
IBM and accessibility

See the IBM Accessibility Center (http://www.ibm.com/able) for more information about the commitment that IBM has to accessibility.
Appendix B. Modeling and analysis tutorial

This tutorial demonstrates simple modeling and analysis techniques in IBM Cognos TM1 Performance Modeler. It takes you through the steps to create an analysis, following a scenario.

Scenario
Your Chief Executive Officer wants an analysis of your company's trading figures (a revenue analysis). He wants to understand the discounts that are given, and he wants to understand which cities and products are associated with the largest discounts. He wants to be able to access the final model via an application on the web, although he does not require any submission process.

Goal
Your task is to produce the following analyzes (views):

Price variance
A variance gives you the difference between two sets of values. In this example, you compare Actual Last Year price values (the values that change) against Actual Last Year-1 price values.

Price trend
Shows you how the prices for each product change across a year.

Revenue variance
Shows the Volumes, Gross Revenue, Net Revenue, Discount % and Discount as a variance, with the variance by city.

Discount percent by city
Shows which city gives the highest discount percentage.

Discount percent by product
Shows which product has the highest discount percentage.

The business model
To produce the views, you must first create a business model. The different types of objects that you will create are described below:

Cubes
A cube contains rows and columns and usually at least one other page, making it multidimensional. Cells in cubes can contain entered data or calculations.

Dimensions
The rows, columns, and pages of a cube are created from dimensions. Dimensions are lists of related items, such as Profit and Loss items, products, customers, cost centers, version and months. Dimensions can also contain calculations. One dimension can be used by many cubes. The items in a dimension are named members.

Subsets
A subset is a selection of a parent dimension. Create a subset to limit the number of items a user sees from a dimension. For example, you can limit the number of months a user sees in a view.

Views
You create a view to define what the user sees. For example, you might want a reviewer to see only high-level (consolidated) items. You can hide members in a dimension.

Tasks
This case study demonstrates the following tasks:
1. Create folders to organize the objects created.
2. Create and populate dimensions and cubes by using Guided import.
3. Modify dimensions.
4. Create cube calculations.
5. Define how data is displayed to a reviewer or contributor by creating views and subsets
6. Create, deploy, and activate an application, and then log on to Cognos Insight to test the application.
7. Use sort in the views in the application to find the product and city with largest Discount percentage.

Sample files
Before you begin, import three sample files into TM1 Performance Modeler to create and populate cubes and dimensions. You can get the sample files from the IBM Support site: (http://www.ibm.com/support/docview.wss?uid=swg27047004).

You will use the following files:
- list prices.csv which holds the list prices for the products by month and version.
- net revenue.csv which holds the information about the actual volume and net revenue by products, cities and months for the last two years.
- cities.csv which holds a list of cities and their hierarchy structure.

Step 1: Create two cubes and organize your objects

In IBM Cognos TM1 Performance Modeler, create some folders to organize the objects that you will create. Then create the List Price cube and populate it with data by using the Guided Import process to import the List Prices.csv file. Guided Import creates the dimensions, the List Price cube, and imports data into the cube. Then create the Net Revenue cube by importing the Net Revenue.csv file. Finally, organize your objects into the folders that you created.

Before you begin

Procedure
1. Start TM1 Performance Modeler from the Windows Start menu, or from the desktop shortcut.
   a) Click Log on as and enter your user name and password.
   b) Select the server that you will be using from the TM1 Server list and click OK.
      You may want to use a new TM1 server so that there are no conflicts with existing objects.
2. Create the folders.
   a) In the Model Design pane, click the name of the server, click the New icon and click Folder.
   b) Name the folder Activities.
   c) Right-click the Activities folder, click New and create two sub folders: Revenue Analysis, and Common Objects.
3. Create the list price cube by importing the list prices.csv file.
   a) Right-click the Common Objects folder, and click Guided Import > Cube.
   b) Browse to the folder containing list prices.csv and select list prices.csv.
      A preview of the data is displayed.
   c) Expand the File Details section. For the Data contains column label option, select Yes.
   d) Click Advanced.
   e) On the Import Data - Data Mapping screen, in the Target Items pane, click the list prices cube.
   f) Click Show Properties in the bottom right of the screen.
      Modify the Import Options as follows:
• Clear **Create a measure dimension.** This prevents a measure dimension from being created. Instead, the values from the file are imported.

• Set the **Data update behavior** to replace the data. This replaces any existing cube values with the import data.

<table>
<thead>
<tr>
<th>Properties</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Import Options</strong></td>
</tr>
<tr>
<td>Target cube name: List Prices</td>
</tr>
<tr>
<td>Create measure dimension</td>
</tr>
<tr>
<td>Data update behavior: Replace the data</td>
</tr>
<tr>
<td>Clear the cube data</td>
</tr>
<tr>
<td>Retain zero values</td>
</tr>
<tr>
<td>Replace empty strings with default values</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Advanced</th>
</tr>
</thead>
<tbody>
<tr>
<td>Use existing dimensions in the import: select dimensions</td>
</tr>
</tbody>
</table>

**g)** Click **Summary.**

The summary shows you that a new cube named list prices is being created, with four new dimensions: Products, Month, Versions and List Price.

A total is created for each dimension; you can change this in the **Advanced** screen, or after the import.

All dimensions are imported as generic dimensions; the dimension types can be changed in the **Advanced** screen, or after the import. We will change them after the import.

**h)** Click **Finish.**

The list prices cube and the dimensions are created, and the data is imported.

**i)** Click **Recalculate** so that you can view the data.

<table>
<thead>
<tr>
<th>Data</th>
<th>Products</th>
<th>Jan</th>
<th>Feb</th>
<th>Mar</th>
<th>Apr</th>
<th>May</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total of Products</td>
<td>85653.57</td>
<td>712.20</td>
<td>740.40</td>
<td>742.20</td>
<td>716.25</td>
<td>723.75</td>
</tr>
<tr>
<td>Star Lite</td>
<td>6616.24</td>
<td>684.54</td>
<td>719.70</td>
<td>719.70</td>
<td>719.70</td>
<td>719.70</td>
</tr>
<tr>
<td>Star Dome</td>
<td>14162.20</td>
<td>1230.19</td>
<td>1230.19</td>
<td>1230.19</td>
<td>1230.19</td>
<td>1230.19</td>
</tr>
<tr>
<td>Star Gazer 2</td>
<td>13209.24</td>
<td>1160.77</td>
<td>1160.77</td>
<td>1160.77</td>
<td>1160.77</td>
<td>1160.77</td>
</tr>
<tr>
<td>Star Gazer 3</td>
<td>16210.20</td>
<td>1343.35</td>
<td>1343.35</td>
<td>1343.35</td>
<td>1343.35</td>
<td>1343.35</td>
</tr>
<tr>
<td>Star Gazer 6</td>
<td>18067.22</td>
<td>1572.26</td>
<td>1572.26</td>
<td>1572.26</td>
<td>1572.26</td>
<td>1572.26</td>
</tr>
<tr>
<td>Hibernator</td>
<td>3330.12</td>
<td>277.51</td>
<td>277.51</td>
<td>277.51</td>
<td>277.51</td>
<td>277.51</td>
</tr>
</tbody>
</table>

**Tip:** You can set the cube to automatically recalculate every time you make a change to the cube by clicking the **Automatic Recalculate** icon.

**j)** Save the list prices cube.

4. Create the Net Revenue cube by using Guided Import to import the Net Revenue .csv file in the same way as you created the List price cube.

**a)** Modify the **Import Options** as follows:

• Do not create a measure dimension.
• Set Data update behavior to replace the data.

b) In the Summary screen, you will see that some of the dimensions already exist as they are shared with the list price cube. Click Finish.

c) Click Recalculate so that you can view the data.

d) Save the net revenue cube.

5. Organize your objects as follows:

a) In the Model Design pane, open the Common Objects folder, press CTRL and click the list prices and net revenue cubes.

Cubes are indicated by the cube icon

b) Drag the cubes into the Revenue Analysis folder.

c) In the Common Objects folder, press CTRL and right-click the two New Process objects that were created, and click Delete.

These processes were created by the Guided Import process. Processes that are generated by the import process can be used to automate imports.

Step 2: Modify dimensions

In IBM Cognos TM1 Performance Modeler, modify the dimensions that were created in the previous step so that they have the correct dimension types and properties.

Modify the dimension properties based on the function that the dimension performs. For example, if a dimension contains months, it is a time dimension, which has specific properties that relate to time.

The dimensions that you created by importing list prices.csv and Net Revenue.csv are available from the Model Design pane, in the Activities, Common Objects folder.

The dimension types are described below:

**Hierarchy dimension**
Contains a representation of the reporting structure of your business, department, or enterprise.

**Calculation dimension**
Contains formulas that perform mathematical and other operations on your data.

**Time dimension**
Contains time members that are meaningful to your users, such as financial accounting periods or the dates of sales transactions.
Versions dimension
Contains data from various iterations of a member in an application.
When you change the dimension type, the icons next to the dimension names change to reflect the types.

Procedure
1. Display a dimension by double-clicking its name in the Common Objects folder. Modify each dimension as described in the following steps.
2. Change Cities to a hierarchy dimension.
   a) Right-click Cities in the Common Objects folder and click Change Dimension Type.
   b) Select the Hierarchy dimension type and click OK.
3. Modify the Cities dimension so that it includes countries as the parents of the cities.
   You can manually modify the dimension in Performance Modeler, or you can import a CSV file, as described below.
   a) Right-click the Cities dimension in the Model Design pane and click Import into dimension "Cities".
   b) In the Import Dimensions - Select Data Source screen, browse for the cities.csv file.
   c) Click Advanced, and then click Show Properties.
   d) In the Mapping, Target Items pane, click the Cities dimension.
   e) In the Properties pane, select the following options:
      • In the Update the dimensions list, select Repopulate dimension
      • Clear the Create total element option as you do not want the members to add up.
      • Parent-Child to indicate that the members have a parent, child relationship.
   f) In the Source Items pane, drag the parent item to the Parent Members item in the Target Items pane.
   g) In the Source Items pane, drag the child item to the Child Members item in the Target Items pane.
   h) Click Summary.
      A warning is displayed. You can safely ignore the warnings because you want dimensions to be repopulated.
   i) Click Finish.
   j) Close the existing Cities dimension and reopen it to refresh the data.
   The Cities dimension is now a hierarchy.
   Central Europe
   • Belgium
     – Heverlee
   • France
     – Lyon
     – Paris
   • Germany
     – Hamburg
     – München
4. Change List Price to a calculation dimension and modify the properties as described in the following steps.
   a) Display the List Price dimension.
   b) Right-click Total of List Price and click Delete Selected Members.
A total is not needed in a calculation dimension.

c) Click Save and close the dimension.

5. Change Month to a time dimension and modify as described in the following steps.

a) Display the Month dimension.

b) Click the Populate Time Dimension icon

c) Select a Start Date.

d) For Select period type for members. Click in the cells in the Period column to select the period type. Select Year for Level 0 and Month for Level 1.

   ![Populate Time Dimension](image)

   e) Click OK and Save and close the dimension.

6. Change Net Revenue to a calculation dimension and modify the properties as described in the following steps.

   a) Display the Net Revenue dimension.

   b) Delete the Total of Net Revenue.

   c) Move the dimension members into the following order: Volume, Net Revenue, Gross Revenue, Discount %, Discount by selecting the member and clicking either Move up or Move down.

   d) Click Save and close the dimension.

7. Change Products to a hierarchy dimension.

8. Change Versions to a versions dimension, and add some new members.

   a) Delete the Total of Versions member.

   b) Add a new member named Variance LY v LY-1 by clicking Enter new member and typing the name.

   c) Add a new member named Comments.

   d) Click Save and close the dimension.

   Notice that the icons for each dimension are different depending on the dimension type.
Step 3: Modify the List Prices cube

In IBM Cognos TM1 Performance Modeler, modify the List Prices cube, and create some views. You will do the following steps:

- Enable text to be entered in the comments field.
- Add a variance calculation.
- Create a Price Variance view to remove the Total of products from the face of the cube.
- Modify the List Price dimension so that the prices do not add up.
- Create a Price Trends view

Step 3a: Edit the comments field

Edit the Comments field in the Versions dimension so that users can enter text.

Procedure

1. In the Model Design pane, expand Activities > Revenue Analysis, open the list prices cube by double-clicking on it, and click Recalculate if the Automatic Recalculate option is not selected.
   
   Data is updated and recalculated in the view.

2. Open the Versions dimension, and in the Format field for Comments, select Text as the format type and click OK.

3. Save the Versions dimension.

4. Switch to the list prices cube, and reorder the Versions dimension so that it is the last dimension in the cube.
   
   If you have a text field in a dimension, that dimension must be the last dimension in the cube to ensure that it is correctly formatted.

   a) In the list prices cube, click the Reorder dimension icon, click the Versions dimension and then click Move to End.

   b) Click OK.

Step 3b: Create a variance calculation

Add a variance calculation to the Versions dimension so that you can see the difference between the Actual Last Year values, and the Actual Last Year -1 values. The Actual Last Year values are the values that change, and Actual Last Year-1 values are the values that you compare Actual Year against.

Procedure

1. In the list prices cube, drag the Versions dimension on top of the Month dimension in the Columns section.
   
   This changes the orientation of the cube so that the Products dimension make up the rows, the Versions dimension makes up the columns, and Month becomes the context.

2. Open the Versions dimension.

3. In the Variance LY v LY-1 row, click the Version Calculation field, and then click the browse button in the field.

4. Click the Functions tab in the Version Calculation for Variance LY v LY-1 pane.

5. Click Dimension Functions, and then double-click VARIANCE.

6. Drag the Actual Last Year and Actual Last Year-1 members into the Expression box and create the following expression: =VARIANCE('Actual Last Year','Actual Last Year-1'). Click OK.
7. Save the dimension.

8. In the list prices cube, verify the value in the Variance LY v LY-1 column: it should be the difference between Actual Last Year and Actual Last Year-1. The correct value is achieved by setting the **Nature of positive variance** value to **Favorable**. Right-click in the Variance LY v LY-1 column, click **Edit member (List Price)**, and change the property value for **Nature of positive variance** to **Favorable**.

   For cost of sales, you would set an unfavorable value for Nature of positive variance. This attribute is only used in conjunction with a versions dimension.

9. Save and close the List Price dimension.

**Results**

You will see that for most products, the Actual last Year value is less than Actual Last Year-1, with the exception of the Star Lite product.

**Step 3c: Create the Price Variance view**

Create a view that removes Total of products from the face of the cube. You use views to define how data is displayed to a reviewer or contributor in a TM1 application.

**Procedure**

1. In the Model Design pane, right-click the list prices cube in the **Activities > Revenue Analysis** folder and select **New > View**. Name the view **Price Variance**.

2. In the Price Variance view, under **Rows**, click the arrow in the All Members, Products list box, and click **Edit Subset**.

   A subset is a selection of items from a dimension.

3. Right-click on a leaf node such as Star Lite, click **Hide by Level > Hide Consolidated Members**. Save and name this subset **Leaf**.

4. Under **Context**, change the Months dimension to Total of months.

   You can see that the prices are adding up, which you do not want. You can change this in the List Price dimension.

5. Save the Price Variance view.
Step 3d: Modify the List Price dimension so that prices do not add up across the year.

Modify the List Price dimension so that prices do not add up across the year. You do this by creating a consolidated-level expression.

Procedure

1. Open the list prices cube and drag the Month dimension on top of Versions in the Columns so that you see Products as rows and Month as columns.
2. Right-click on a cell and click Edit Member (List Price).
3. In the Properties tab, click the Consolidated-level Expression field, and click the browse button in the field.
4. In the Consolidated-level Expression for List Price pane, set the Option as Time Average. The expression displays as: =TimeAverage("Time Average"). Click OK.

In the Price Variance view, you will see that Total of Months is now an average value.

5. Drag the Versions dimension on top of the Month dimension so that you see the variance in the view.
6. Save and close the List Price dimension and save the list prices cube.

Results

The Price Variance view should look like this:

![Figure 15: Price Variance showing Total of Months with an average value](image)

Figure 15: Price Variance showing Total of Months with an average value

5. Drag the Versions dimension on top of the Month dimension so that you see the variance in the view.
6. Save and close the List Price dimension and save the list prices cube.

Results

The Price Variance view should look like this:

![Figure 16: Price Variance view showing Products as rows and Versions with the variance calculation as columns](image)

Figure 16: Price Variance view showing Products as rows and Versions with the variance calculation as columns
Step 3e: Create the Price Trend view

Create a view of the list prices cube named Price Trend. This shows you how the price for products trends over the year.

Procedure

1. In the Model Design pane, right-click the list prices cube in the Activities > Revenue Analysis folder and select New > View. Name the view Price Trend.
2. Drag the Month dimension on top of the Versions dimension in the Columns section. This changes the orientation of the cube so that the Month dimension makes up the columns, Versions becomes the context, and the Products dimension make up the rows.
3. You want to prevent the Total of Products from displaying, and to prevent the prices from adding up in the Products dimension.
   a) In the Price Trend view, click the down arrow in All Members, Products, and click Edit Subset.
   b) In the Subset list, select Leaf (you created this subset previously), and click OK.
   c) Save and close the view.

Results
The Total of Products is removed.

![Price Trend view]

Figure 17: Price Trend view

Step 4: Modify the Net Revenue cube

In IBM Cognos TM1 Performance Modeler, modify the Net Revenue cube so that the orientation makes sense, and so that you can enter text in the Comment LY v LY field. Then modify the Net Revenue dimension so that the correct positive or negative values are shown.

Procedure

1. In the Model Design pane, expand Activities > Revenue Analysis, double-click the net revenue cube to display the cube, and click Recalculate.
   Data is updated and recalculated in the view.
2. Drag the Versions dimension on top of the dimension in the Columns section, and the Net Revenue dimension on top of the dimension in the Rows section.
   This changes the orientation of the cube so that the Net Revenue dimensions makes up the rows, the Versions dimension makes up the columns, and the Products, Cities, and Month dimensions make up the Context.
3. Reorder the dimensions so that the Versions dimension is the last dimension in the Net Revenue cube, so that you can enter text in the Comments field.

   **Tip:** In the Net Revenue cube, click the Reorder dimension icon.

4. Modify the Net Revenue dimension so that the correct positive or negative values are shown.
   a) View the detail level in the Net Revenue cube, instead of the totals, then click Recalculate.
      For example, in the Products dimension, select Star Lite, for the Cities dimension, select Hamburg, and for the Months dimension, select Jan.
   b) Open the Net Revenue dimension.
   c) Move the Gross Revenue item below Volume.
      This is for appearance only, it does not change anything else.
   d) Change the **Nature of positive variance** property for each member as described:
      - Volume, Net Revenue, and Gross Revenue are favorable.
      - Discount % and Discount are unfavorable (you want a negative value for discount).

   e) Save and close the dimension, and save the cube.
**What to do next**
The next step is to calculate Gross Revenue.

---

**Step 5: Calculate Gross Revenue**

In IBM Cognos TM1 Performance Modeler, create a cube calculation to calculate Gross Revenue.

In the cube calculation, you will create a link to bring in some of the data from the list prices cube into the net Revenue cube. This data is multiplied by the Volume to generate the Gross Revenue values.

**Procedure**

1. Open the net revenue cube, and in the Gross Revenue row, press CTRL and click to select both Actual Last Year, and Actual Last Year -1.
2. Right-click in the selection, and click **Create Cube Calculation**, and name the cube calculation **Gross Revenue**
3. In the cube calculation editor, under **Import terms**, expand Net Revenue, and drag Volume into the Expression pane.
4. Click **Import terms** to create a link between the List prices cube and the Net Revenue cube, and name the link, for example, List_price.
   **Tip:** Scroll to the top of the list box to see the **Import terms** link.
5. Drag the list prices cube from the **Model Design** pane into the **Add Source Cube** field. The dimensions in the List Price cube are automatically mapped to the dimensions in the Net Revenue cube.
6. Change the Versions mapping. Right-click one of the Versions dimensions and click **Convert to manual mapping**.
7. In the **Mappings** pane, you only want Actual Last Year and Actual Last Year-1, so delete the other two items (Variance LY v LY-1 and Comments).
8. In the list prices Dimensions pane, click List Price, then in Members, click the List Price check box. In the Net Revenue Dimensions pane, click Cities. You want the link to apply to all cities, so click the check box next to Members.

9. You also want the link to apply to Gross Revenue in the Net Revenue dimension. In the Net Revenue Dimensions pane, click Net Revenue, and then in the Members pane, click the Gross Revenue check box and click OK.

10. In the Cube calculation editor, expand Imported values to see the link that you created.

11. Drag the link that is named List_price to the Expression pane and modify the expression like this: 

   \[ \text{[Net Revenue]} : \text{Volume} \times \text{LINK('List_price')} \]

   Click Apply and then close the calculation.

**Results**

You now have meaningful Gross Revenue numbers.

---

**Figure 18: Net revenue cube with gross revenue numbers**

---

**Step 6: Calculate Discount and Discount %**

In IBM Cognos TM1 Performance Modeler, create two cube calculations to calculate Discount, and the Discount % in the Net Revenue cube. Discount is calculated by taking Gross Revenue and subtracting Net Revenue.

**Procedure**

1. Open the net revenue cube, and in the Discount row, press CTRL and click to select Actual Last Year and Actual Last Year-1 cells.
2. Right-click in the selection, and click **Create Cube Calculation**. Name the cube calculation Actual Discount.

3. In the cube calculation editor, expand Net Revenue, and drag Gross Revenue into the **Expression** pane.

4. Drag Net Revenue into the **Expression** pane.

5. Modify the expression so it looks like this expression: 

   \[\text{Actual Discount} = \text{Net Revenue} - \text{Gross Revenue}\]

6. Click **Apply**, and then close the calculation. You have created the Discount calculation.

7. Create a cube calculation that is named **Actual Discount Percent** in the Discount% row, for the Actual Last Year, and the Actual Last Year-1 cells.

   The expression should look like this: 

   \[\text{Discount%} = \frac{\text{Net Revenue} \cdot \text{Discount}}{\text{Net Revenue} \cdot \text{Gross Revenue}}\]

8. In the cube calculation editor, select **Combine leaf and consolidated**, then click **Apply**. This option means that the formula applies to both the leaf and consolidated levels, so that the values are not added up at the consolidated level.

9. Change the Discount % cells so that they are formatted as percentages.

   a) Right-click in one of the Discount % cells, and click **Edit Member (Discount %)**.

   b) In the Discount % row, double-click the **Format** cell.

   c) In the **Format for Discount %** pane, click **Percentage**, and select 1 for **Decimal place**.

   d) Click **Apply**.

10. Format Volume as a **Number**, and select **Show digit grouping** to have a separator. Click **Apply**.

11. Copy the formatting to the other items, except for Discount %.

   a) In the Volume row, click **Format**, and click **Copy**.

   b) CTRL and click to select the **Format** cell for Gross Revenue, Net Revenue, and Discount, then right-click and select **Paste**, to copy the Number formatting to these items.

   c) Click **Apply**.

   d) Save and close the dimension.

**Results**

The Net Revenue cube with Discount and Discount% calculations added:
Step 7: Create new views for the Net Revenue cube

In IBM Cognos TM1 Performance Modeler, create some new views of the Net Revenue cube. These views show Revenue variance, Discount percent by city, and Discount percent by product. These views will be used in the final application that you will create.

Procedure

1. Create a new view of the Net Revenue cube named Revenue variance.
   a) Change the dimension items in the context bar so that you see Total of products, Central Europe, and Total of Month.
   b) Save and close the view.

2. Create a new view of the Net Revenue cube named Discount percent by city.
   a) Drag the Cities dimension on top of the Net Revenue dimension in rows so that Cities replaces Net Revenue.
   b) In the Net Revenue dimension, select Discount %. Ensure that the Month dimension is showing Total of all month, and the Products dimension is showing Total of products.
   c) Save the view, but do not close it.
3. Create another view named **Discount percent by product**.
   a) With the **Discount percent by city view** open and selected, click **Save as**
      , and name it **Discount percent by product**.
   b) Drag the **Products dimension** into rows, to replace **Cities**.
   c) Click the down arrow in **All Members**, **Products**, and click **Edit Subset**.
   d) In the **Subset** list, select **Leaf** (you created this subset previously), and click **OK**.
   e) Save and close the view.

**Step 8: Create a Net Revenue application**

In IBM Cognos TM1 Performance Modeler, create an application by using the views that you created. Then, log on to IBM Cognos Insight to test the application. Use sort in the views in the application to find the product and city with largest Discount percentage.

**Procedure**

1. In TM1 Performance Modeler, open the **Application Design** pane.
   
   **Tip:** Press Alt+A.

2. Right-click **Applications**, and click **New > Application**.

3. Name the application **Revenue Analysis**.
4. Select the application type. For this exercise, choose **Central**.

   A Central application has no approval hierarchy; it is used by a small group of users who share equally the task of performing central planning of analysis.

   If you want to use an approval hierarchy, select **Approval**, which has a hierarchical approval structure, or **Responsibility**.

   A Responsibility application is similar to an Approval application, but users cannot submit nodes to lock them. A Responsibility application is used for rolling forecasts or continuous planning processes with no defined end date.

   A new tab named Revenue Analysis is created.

5. Add the views that you created in earlier steps to the **Contributor views** pane.

   a) In the TM1 Objects pane, expand **Activities > Revenue Analysis > list prices**, and drag the Price Trend and Price Variance views into the Contributor views pane.

   b) In the TM1 Objects pane, expand **Activities > Revenue Analysis > net revenue**, and drag the Discount percent by city, Discount percent by product, and Revenue Variance views into the Contributor views pane.

   c) Reorder the views by dragging them so that they are in the following order:

      1) Price Variance
      2) Price Trend
      3) Revenue Variance
      4) Discount percent by city
      5) Discount percent by product

      This determines the order in which contributors will see the views.

6. Under **Clients**, select the **Cognos Insight - Connected** client, and make it the default mode.

   **Tip:** You may need to scroll down the window to see this option.

   In connected mode, the calculations take place on the server, and in distributed mode, the calculations take place on the local computer.

7. Save the application.
8. Right-click the Revenue Analysis application in the Application Design pane and click Deploy application.

9. Open the IBM Cognos TM1 applications portal in a Web browser, for example: http://localhost:9510/pmpsvc/applications.jsp.
   The Revenue Analysis application should be listed.

10. Click the Activate icon for Revenue Analysis.

   ![Figure 25: Cognos TM1 applications portal](image)

   Figure 25: Cognos TM1 applications portal

11. Click the Revenue Analysis name to open the application, then click Revenue Analysis again to open the application within Cognos Insight.

    You are logged into the application as an administrator because no security has been set up. This means that you see everything in the application.

    A tab for each view that you added to the application is displayed.
12. Click the **Discount percent by city** tab. You want to sort this view. Expand each country so that the cities are shown. Right-click the Actual Last Year column header, and click **Sort > Sort by Value > Descending**.

13. You want to view the Discount %. In the **Context** area, click Volume (Net Revenue dimension), and select Discount %.

You can see that Hamburg gives the biggest discount.

14. Click the **Discount percent by product** tab. Right-click the Actual Last Year column header, and click **Sort > Sort by Value > Descending**.

You can see that Canyon Mule Cooler has the product with the biggest discount.
Appendix C. Cognos TM1 Performance Modeler for existing Cognos TM1 users

Existing IBM Cognos TM1 users who are moving to IBM Cognos TM1 Performance Modeler should be aware of the following issues and points of interest.

Object creation and model management

Most object creation and model management tasks that Cognos TM1 users are accustomed to performing in the Server Explorer can be accomplished in Cognos TM1 Performance Modeler. You can maintain your Cognos TM1 models in Cognos TM1 Performance Modeler, with the following exceptions.

- Replication and synchronization is not supported in Cognos TM1 Performance Modeler. If your model uses replication and synchronization, you must maintain this part of your model in the Cognos TM1 Server Explorer. For full details on replication and synchronization, see the IBM Cognos TM1 Operation documentation.

- Drill-through process and rules must be created and maintained in Cognos TM1 Architect or Perspectives. For details on creating drill-through processes and rules, see the IBM Cognos TM1 Developer documentation.

- Server administration tasks such as disconnecting individual users, broadcasting messages to users, and shutting down the server with notification to users, must be performed from the Clients Messaging Center, which is accessible from the Server Explorer. See "Managing Client Connections" in the IBM Cognos TM1 Operation documentation for details.

- TurboIntegrator processes with ODBO data sources must be created and maintained in Architect or Perspectives. The Cognos TM1 Performance Modeler TurboIntegrator editor does not support ODBO datasource. All other TurboIntegrator data sources can be maintained in Cognos TM1 Performance Modeler. For details on creating a process with an ODBO source please see the IBM Cognos TM1 TurboIntegrator documentation.

- If you create a TurboIntegrator process through Guided Import in Cognos TM1 Performance Modeler, you should not subsequently edit the process in the native Architect or Perspectives.

Differences in functionality between Cognos TM1 Performance Modeler and Cognos TM1 Architect/Perspectives

Most object creation functionality is similar in IBM Cognos TM1 Performance Modeler and IBM Cognos TM1 Perspectives/Architect. However, there are some differences to be aware of.

- In comparison to Cognos TM1 Architect/Perspectives, cube creation is simplified through a drag and drop interface in Cognos TM1 Performance Modeler. Cognos TM1 Performance Modeler also allows you to re-dimension an existing cube, either adding or deleting dimensions from a cube or changing the order of dimensions in a cube.

- There is limited support for dynamic subsets in Cognos TM1 Performance Modeler.

- Rule creation is greatly simplified in Cognos TM1 Performance Modeler. The Rules Editor includes Content Assist features that present contextually relevant elements or information while creating a rule. Additionally, Cognos TM1 Performance Modeler automatically generates rules and associated feeders when you define a calculation dimension or create a link.

- The TurboIntegrator editor in Cognos TM1 Performance Modeler includes improved editing features in the Advanced scripting tabs (Parameters, Prolog, Metadata, Data, Epilog).

- The Dimension Editor in Cognos TM1 Performance Modeler provides a more intuitive and comprehensive environment for managing all aspects of dimensions. For example, you can create specific dimension types that fulfill unique requirements in your model. Additionally, all dimension management is accomplished in a single window. There is no need to open a separate window to manage attributes or set element properties.
Appendix D. Dimension calculations

The dimension expressions and functions for calculations are described with syntax and examples.
An expression editor is available for leaf-level calculations and consolidated-level calculations. The expression editor has a simple expression editor for the editing and creation of arithmetic and average calculation expressions and a function editor to apply predetermined functions for both leaf-level and consolidated-level calculations. The expression editor also has an aggregation expression editor available for consolidated-level calculations.

Time-related functions in dimension calculations
If you apply a time-related function, such as CUMULATE, in a dimension calculation and the dimension is then used in a cube that contains no Time dimension, invalid rule statements are generated and a comment describing the problem is placed in the rule for the cube that does not use a Time dimension. In circumstances where the calculation dimension is used in many cubes and most, but not all, of the cubes contain a Time dimension, you can disable the invalid rule statements in the rule for the cube that doesn’t contain a Time dimension.

Arithmetic operations
IBM Cognos TM1 Performance Modeler supports the normal arithmetic operations: Sum, Difference, Multiplication, and Division.

Sum
Sum operand for simple calculations.

Purpose
A summation of cell values for either leaf-level and consolidated-level calculations.

= (operand 1) + (operand 2)

Difference
Difference operand for simple calculations.

Purpose
A difference calculation between two cell values for leaf-level and consolidated-level calculations.

= (operand 1) - (operand 2)

Multiplication
Multiplication operand for simple calculations.

Purpose
A multiplication calculation between two cell values for leaf-level and consolidated-level calculations.

= (operand 1) * (operand 2)

Division
Division operand for simple calculations.

Purpose
A division calculation between two cell values for leaf-level and consolidated-level calculations.

= (operand 1) / (operand 2)
Functions

The functions that are available for leaf-level and consolidated-level calculations are described. For information about functions you can use in scorecarding, see “Metric indicator functions” on page 142.

Related tasks
Creating calculation dimensions with N calculations using dimension functions

Consolidated Average (CAVERAGE)

Purpose
This function calculates the average value in a consolidation and returns a single value.
This function is available on the Aggregation tab of the Expression Editor when you are working with a cube calculation or with a C calculation in a dimension.

=CAVERAGE(flag-value)

Parameters
The flag-value parameter can be one of the following values:
- 1 - Do not use consolidation weighting to compute the value. If this flag is turned on, the raw value of the consolidated element is used.
- 2 - Ignore zero values. If this flag is set, zero values are not used as part of computing an average.
- 3 - Combination of the flag value 1 and 2; do not use consolidation weighting to compute the value and ignore zero values.

Sample
For example, this function is used by the default metric indicator named Tolerance.

=CAVERAGE(3)

CUMULATE

Purpose
CUMULATE calculates the cumulative totals in one row based on the original numbers in another row.

=CUMULATE(Input)

Sample
The function =CUMULATE(Profit), calculates the cumulative profit across the Time dimension in the cube where the CUMULATE function is used.

DECUMULATE

Purpose
Starting from the cumulated totals, DECUMULATE calculates the original series.

=DECUMULATE(Input)

Sample
The function =DECUMULATE('Cumulative Sales') breaks down cumulative sales into period sales across the Time dimension in the cube where the DECUMULATE function is used.
DIFFER

Purpose
This function calculates the difference between the current and previous time periods. The difference can be expressed as a percentage (%), proportion (p), or standard arithmetic difference (a).

This function is available on the Functions tab of the Expression Editor when you are working with a cube calculation or with N and C calculations in a dimension.

=DIFFER('Base','<%/a/p>')</p>

Parameters

Base
The <Base> parameter specifies a dimension member.

%/a/p
This parameter specifies how the difference is expressed: as a percentage (%), proportion (p), or standard arithmetic difference (a).

Sample
For example, the member Headcount Change could use the function =DIFFER(Headcount, "a") to calculate the change in Headcount between the current and previous time periods.

Force To Zero

Purpose
Forces the member’s value to zero.

This function is available on the Aggregation tab of the Expression Editor when you are working with C calculations in a dimension.

=ForceToZero()

Sample
For example, the member Product Price could use the function =ForceToZero() as the consolidated level expression. This prevents product prices from being aggregated.

GROW

Purpose
The GROW function increases a base figure by a specified percentage each period. The growth can be compound (C) or linear (L).

This function is available on the Functions tab of the Expression Editor when you are working with a cube calculation or with N and C calculations in a dimension.

=GROW('Base','<%Growth Rate>',"<L/C>")

Parameters

Base
This parameter specifies the member to which the % Growth Rate is applied.

<%Growth Rate>
This parameter specifies a member that contains the growth rates. The member must be in the same dimension as the member specified in the Base parameter. The growth rates
must be whole numbers and not decimal values. For example to apply a growth rate of 20%, use a value of 20, not 0.2.

L/C
This parameter specifies the manner in which the growth rate is applied: Linear (L) or Compounded (C).

Note: If you format a member that uses the GROW function as a percentage and enter 20, it is displayed as 2000%. This is a display issue only. The computation is still working correctly. To correct the display issue, apply a custom format to the member and do not use the percentage format type.

Sample
For example, the member Sales Forecast could use the function =GROW('Base Monthly Sales','Sales Increase %','L') to calculate the sales forecast based on monthly sales and the expected percentage increase in sales.

LAG

Purpose
Calculates a result in one row by lagging an input from another row by 1 period.
=LAG(<Pad>,<Inputs>)

Parameters
Pad
The <Pad> argument specifies the value returned by LAG for the first leaf member in the Time dimension; it may be another member in the dimension or a constant. If it is omitted, the user may key a value for this function into the first leaf member of the Time dimension.

Sample
The member 'Opening Balance' may use a function =LAG('Prime value', 'Closing Balance').

LASTNZ

Purpose
LASTNZ searches back along the series of data in the input row and returns the most recent non-zero or non-null value. LASTNZ can be used to avoid re-keying of data over a long time scale where the input changes rarely over the periods.
=LASTNZ(<Input>)

Parameters
<Input>
Can be either a numeric or string member.

PERIODDAYS

Purpose
The number of days in the period.
=PERIODDAYS()

PERIODEND

Purpose
The date and time at the end of this period.
=PERIODEND()
PERIODMIDDLE

Purpose
The date and time at the middle of this period.
=PERIODMIDDLE()

PERIODSTART

Purpose
The date and time at the start of this period.
=PERIODSTART()

SCORE

Purpose
The SCORE function calculates a metric’s score for a specified context of actual, target, and tolerance indicators.

This function returns a value that indicates whether a metric is on target, higher than the target, or less than the target, and by how much. It reflects the distance from the target as measured in units of tolerance. It returns values in the range of -10 to 10 where a value of 0 indicates that the metric is on target. A positive score indicates that the metric is on target. A negative score indicates that the metric is not on target.

This function is valid only in a cube that has a metric dimension and can determine the performance pattern of the metric and the tolerance type.

=SCORE('<Actual>','<Target>','<Tolerance>')</n

Parameters
Actual
The name of the metric indicator that represents the Actual indicator.

Target
The name of the metric indicator that represents the Target indicator.

Tolerance
The name of the metric indicator that represents the Tolerance indicator.

Sample
For example, this function is used by the default metric indicator named Score.
=SCORE('Actual','Target','Tolerance')

SCORESTATUS

Purpose
The SCORESTATUS function calculates a value that represents the performance of the score for a metric.

This function takes a member that contains the metric score for the current context.

It returns one of the following numeric values to indicate how the metric is performing:

- 1 - excellent (on target or above)
- 0 - average (within one tolerance of target)
- -1 - poorly (more than 1 tolerance away from target)
=SCORESTATUS('Score')

**Parameters**
The Score parameter is the name of the metric indicator that represents the Score indicator for a metric.

**Sample**
For example, this function is used by the default metric indicator named Status.
=SCORESTATUS('Score')

### SCORETREND

**Purpose**
The SCORETREND function calculates a value that represents how a metric's performance has changed since the previous period.

The function takes a member that contains the metric score and returns one of the following values to indicate the current performance of the metric:
- 1 - getting better
- 0 - no change
- -1 - getting worse

The result reflects a positive or negative trend only if the score changes more than 5% of tolerance.
This function works only in a cube with a Time dimension that defines the previous period for each member.

=SCORETREND(Score)

**Parameters**
The Score parameter is the name of the metric indicator that represents the Score indicator.

**Sample**
For example, this function is used by the default metric indicator named Trend.
=SCORETREND('Score')

### Time Average

**Purpose**
This function returns the average value calculated across all time periods, the first period only, or the last period only.

This function is available on the Aggregation tab of the Expression Editor when you are working with a cube calculation or with a C calculation in a dimension.

=Time Average(<'Time Average Type'>)

**Parameters**

**Time Average Type**
- Specifies the type of value to return. The allowed values are:
  - Time Average: calculates the average as sum / number of periods
  - First Period: uses the data from the first period only
  - Last Period: uses the data from the last period only
• Zero: returns zero

For First Period and Last Period, the expression looks to each consolidation member for the attribute "last period" or "first period" and uses that attribute to determine where to get the Time Average value.

Sample
The member Headcount could use a function of =Time Average("Time Average") to calculate the average headcount over time periods.

Or, if you want the Headcount member to use the data from the last time period only, use the function =Time Average("Last Period").

VARIANCE

Purpose
Computes the Variance between two datasets, denoted as <Actual> and <Budget>.

For a dimension member where a positive variance would be favorable, the result is computed as <Actual> minus <Budget>. For a dimension member where a positive variance would be unfavorable, the result is computed as <Budget> minus <Actual>.

This function is available on the Functions tab of the Expression Editor when you are working with a version calculation.

=VARIANCE(<Actual>,<Budget>)

VARIANCEPERCENT

Purpose
Computes the percentage variance between two datasets, denoted as <Actual> and <Budget>.

For a dimension member where a positive variance would be favorable, the result is computed as (<Actual> - <Budget>) / <Budget> * 100. For a dimension member where a positive variance would be unfavorable, the result is computed as (<Budget> - <Actual>) / <Budget> * 100.

This function is available on the Functions tab of the Expression Editor when you are working with a version calculation.

=VARIANCEPERCENT(<Actual>,<Budget>)

Syntax combinations

The combinations of function and logical operand are described.

The expressions editor validates in real time. There are no extra steps to validate an expression. An invalid expression shows in red with a red underline.

The parser that validates dimension calculation expressions uses the Backus–Naur Form to determine a valid expression. The combinations of syntax that can be used in an expression are as follows:

• Expression ::= AndExpression { "OR" AndExpression }
• AndExpression ::= CmpExpression { "AND" CmpExpression }
• CmpExpression ::= AddOrSub [ "=" AddOrSub | "<>" AddOrSub | "<" AddOrSub | "<=" AddOrSub | "!" AddOrSub | "<=>" AddOrSub ]
• AddOrSub ::= MultiplyOrDivide { "+" MultiplyOrDivide | "-" MultiplyOrDivide }
• MultiplyOrDivide ::= Power { "*" Power | "/" Power | "%" Power }
• Power ::= Unary [ "^" power ]
Unary ::= "+" Unary | "-" Unary | "!" Unary | Operand
Operand ::= INTEGER | Variable | "(" Expression ")" | Sum | Multiply | IfExpression | BIFS
IfExpression ::= "IF" Expression "THEN" Expression [ "ELSE" Expression ]
BifExpression ::= BIF "(" Expression { ";" Expression "}")"
SumExpression ::= SUM "(" Expression { "," Expression ")"}
MultiplyExpression ::= MULTIPLY "(" Expression { "," Expression ")""
WeightedAverageExpression ::= WEIGHTEDAVERAGE "(" Expression ")"
TimeAverageExpression ::= TIMEAVERAGE "(" TIMEAVERAGETYPE ")"
ForceToZeroExpression ::= FORCETOZERO "(" ")"
Condition ::= parseExpression [ "AND" parseExpression | "OR" parseExpression | "NOT" parseExpression]
Appendix E. Import Cognos Planning models into Cognos TM1

You can import the Cognos Analyst objects from a Cognos Planning model into Cognos TM1.

The Import Cognos Planning model option helps you build your Cognos Planning model in IBM Cognos TM1 Performance Modeler. The import option uses an .XML application definition file that is generated from your Cognos Planning model. This file is used to get you started with the dimensions, cubes, and links needed to build the model in Cognos TM1 Performance Modeler.

The import option is installed by default in Cognos TM1 10.2 and higher. To make the option available, an updater and a custom menu item are deployed in Cognos Analyst to add the option to your Cognos Planning environment.

The import process has three parts:

- In Cognos Analyst, you add a custom menu item so you can generate a report that identifies potentially problematic objects in the model.
- In Cognos Contributor, you generate an .XML application definition of the model. The import converts the .XML output from Cognos Planning into a folder of .json type files.
- In Cognos TM1 Performance Modeler, you import the .json files into Cognos TM1 Performance Modeler with the Action > Import Cognos Planning model option.

Imported elements

The import option analyzes the Cognos Planning model and provides the most appropriate construct in Cognos TM1. Not all objects can be transferred. Some objects and model features in Cognos Planning have no counterpart in Cognos TM1. In those cases, you must manually adjust certain features in the resulting Cognos TM1 model. The next sections detail what the utility can and cannot transfer.

Data, security, and application rights

Only dimensions, cubes, and links are imported by the import option. It does not take account of data, security settings, or application rights.

Cognos Contributor links

The objects to be transferred are generated from a Cognos Contributor .XML. Therefore, only links that are part of the Cognos Contributor application are included. Links from external sources or links that are not in the update sequence of their target cube are not included.

Illegal characters

The illegal and reserved characters are not identical between Cognos Planning and Cognos TM1. Therefore, object and dimension item names are imported where possible exactly as they are. If it is not possible to import the unacceptable characters, the illegal characters are removed.

<table>
<thead>
<tr>
<th>Table 20: Dimensions that are imported</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dimension</td>
</tr>
<tr>
<td>Dimension types</td>
</tr>
</tbody>
</table>
### Table 20: Dimensions that are imported (continued)

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Calculations</td>
<td>All dimension calculations, including complex nested conditionals, are imported. Where there is an equivalent function for a BiF, the imported dimension uses it. Where there is no direct equivalent, the calculation imports into the new model as a calculation with a broken component so that it can be read for reference. See Table 22 on page 210 for calculations that involve dist formatted or text formatted items.</td>
</tr>
<tr>
<td>Formats</td>
<td>All formats are imported including dates and list formats (“picklists” in Cognos TM1). Default formatting is different in Cognos Planning and Cognos TM1. Unformatted items must be adjusted in the imported model to achieve the same appearance as they had in Cognos Planning.</td>
</tr>
<tr>
<td>Time averages</td>
<td>First period, last period, and time averages are imported.</td>
</tr>
<tr>
<td>Cubes</td>
<td>All dimensions import in the best order that can be determined with calculation type dimensions placed last.</td>
</tr>
</tbody>
</table>

### Table 21: Links that are imported

<table>
<thead>
<tr>
<th>Link</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cube to cube links</td>
<td>Import as Fill mode.</td>
</tr>
<tr>
<td>Accumulation links</td>
<td>Import as Fill mode.</td>
</tr>
<tr>
<td>Look up links</td>
<td>Import as Substitute mode.</td>
</tr>
<tr>
<td>Allocation tables</td>
<td>Import as manual allocations between dimensions if the allocation table is linked to the dimensions on the source and target side.</td>
</tr>
</tbody>
</table>

### Table 22: Objects that are imported but need adjustment

<table>
<thead>
<tr>
<th>Type of Object</th>
<th>Action needed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weighted averages</td>
<td>Reset as c-calcs in Cognos TM1 Performance Modeler dimensions.</td>
</tr>
<tr>
<td>Calculations involving IID of dist-formatted items</td>
<td>Reset to include the item name rather than the IID.</td>
</tr>
<tr>
<td>BiFs which do not exist in Cognos TM1 Performance Modeler</td>
<td>Fix broken calculations.</td>
</tr>
<tr>
<td>Cubes with more than one calculation type dimension</td>
<td>Check to ensure the cubes work as expected. Manually reorder dimensions if necessary.</td>
</tr>
<tr>
<td>Cube to cube and accumulation links in any mode other than fill</td>
<td>Imports as fill mode. Remodel if necessary.</td>
</tr>
<tr>
<td>Look up links in any mode other than substitute</td>
<td>Imports as substitute mode. Remodel if necessary.</td>
</tr>
</tbody>
</table>
Table 22: Objects that are imported but need adjustment (continued)

<table>
<thead>
<tr>
<th>Type of Object</th>
<th>Action needed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Links that use allocation tables or dcube allocation tables or cut subcolumns</td>
<td>Remodel if necessary with manual allocations or dimension attributes.</td>
</tr>
<tr>
<td>Links targeting subtotals or calculated items</td>
<td>Imports but does not generate breakback in target cubes. Requires remodeling.</td>
</tr>
</tbody>
</table>

Table 23: Objects that do not import

<table>
<thead>
<tr>
<th>Object</th>
<th>Action to take</th>
</tr>
</thead>
<tbody>
<tr>
<td>Access Tables</td>
<td>Re-create model security.</td>
</tr>
<tr>
<td>Allocation tables</td>
<td>There is no equivalent object in Cognos TM1 but dimension attributes can be used to achieve a similar result.</td>
</tr>
<tr>
<td>Validations</td>
<td>No equivalent functionality currently exists in Cognos TM1. Re-create in the new Cognos TM1 server. See also the “Configuring a TurboIntegrator process to execute on a workflow action” on page 96.</td>
</tr>
<tr>
<td>Data</td>
<td>Not imported. Add manually.</td>
</tr>
<tr>
<td>Dimension Import Links</td>
<td>Not imported. Add manually.</td>
</tr>
</tbody>
</table>

CAUTION: The import does not validate that a modeling technique used in the Cognos Planning model will work after migration. It also does not optimize the end model to take advantage of Cognos TM1 functionality or features.

Adding the import option

To prepare Cognos Analyst and Cognos TM1 Performance Modeler so you can import models:

1. Before you run Cognos Analyst, copy the .up1 and menu.txt files into your Cognos Analyst install_dir\bin directory.
2. Start Cognos Analyst.
3. Click Help > Updates to ensure that the update is applied. The Updates applied dialog box now displays

<table>
<thead>
<tr>
<th>Update ID</th>
<th>Applied</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>XPJTM101</td>
<td>Yes</td>
<td>Migration to TM1</td>
</tr>
</tbody>
</table>

4. Click Tools > Options > Custom.
5. Browse to the location where you copied menu.txt and select it.
6. Click OK.
7. Restart Cognos Analyst.

After you restart Cognos Analyst, Migration now displays in the menu toolbar.

Investigating the model

Before you perform the import, use the newly added Migration option to investigate objects that require adjustment:

1. You can investigate an individual library or, if the objects you need are spread across multiple libraries, you can investigate a group of objects:
a. To investigate an individual library, click Migration > Investigate Library and select the library to analyze.

b. To investigate a group of objects, click File > Library > objects and select the initial objects from one library. Then, use the Check integrity functionality or you can select the objects manually until your group of objects is complete.

2. Click OK to generate the report.

The report alerts you to features in the Cognos Analyst model that require adjustment after you import. See Table 22 on page 210 for the items and suggested actions that you can take on them.

Generating the .XML in Cognos Contributor

To generate the .XML you need for the import, run the Cognos Administration Console in Cognos Contributor:

1. In the application you want to import, select Development > Application Maintenance > Application XML.
2. Browse to a location to place the .XML file. Take note of this location.
3. Click Save XML to File.

Opening the .XML in Cognos TM1 Performance Modeler

On the Cognos TM1 Performance Modeler computer:

1. Create a folder where you want the import to be on this computer.
2. Copy the .XML file you generated from Cognos Administrator Console onto the Cognos TM1 Performance Modeler computer.
3. Click Actions > Import Cognos Planning Model.
4. Click the ellipses to browse to the location of your .XML file and select it.
5. Click OK.

After the .json files have been generated, a dialog box displays indicating the location:

Import completed - model elements ready to be transferred in from location

Take note of this location.

6. Click OK.
7. In Cognos TM1 Performance Modeler, right-click the Cognos TM1 server in the tree and select Transfer In.
8. Browse to the location indicated by the transfer acknowledgement dialog box.
   Note: The file that is needed is the parent folder that contains a subfolder named json
9. Click OK to start the import.
   A dialog box displays with the list of objects that are being imported.
10. Click Transfer and Discard to import the objects and complete the model import. Use Cognos TM1 Performance Modeler to examine the resulting model. You can now add the data for your model.

The following examples describe three ways to adjust the weighted averages often found in a Cognos Planning model.

Weighted averages Example 1

In this example, revenue is calculated as Units * price. Over the whole year you want Price=Revenue/Units

In Cognos Planning, set Price to be a weighted average by Units sold.
To get the same result in Cognos TM1 Performance Modeler, set a C-calculation for Price.

<table>
<thead>
<tr>
<th>region1</th>
<th>elist</th>
<th>Whole Year</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Units</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Price</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Revenue</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Q1</th>
<th>Q2</th>
<th>Q3</th>
<th>Q4</th>
<th>Whole Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Units</td>
<td>200</td>
<td>100</td>
<td>400</td>
<td>100</td>
<td>800</td>
</tr>
<tr>
<td>Price</td>
<td>10.00</td>
<td>8.00</td>
<td>6.00</td>
<td>20.00</td>
<td>9.00</td>
</tr>
<tr>
<td>Revenue</td>
<td>2,000</td>
<td>800</td>
<td>2,400</td>
<td>2,000</td>
<td>7,200</td>
</tr>
</tbody>
</table>

Weighted averages Example 2
In this example, you know the Gross Margin and can calculate Gross Margin % = Gross margin *100/Revenue

<table>
<thead>
<tr>
<th></th>
<th>Q1</th>
<th>Q2</th>
<th>Q3</th>
<th>Q4</th>
<th>Whole Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Revenue</td>
<td>2,000</td>
<td>800</td>
<td>2,400</td>
<td>2,000</td>
<td>7,200</td>
</tr>
<tr>
<td>Gross Margin</td>
<td>5.00</td>
<td>30.00</td>
<td>41.67%</td>
<td>20.00%</td>
<td></td>
</tr>
<tr>
<td>Gross Margin %</td>
<td>25.00%</td>
<td>37.50%</td>
<td>41.67%</td>
<td>20.00%</td>
<td>30.56%</td>
</tr>
</tbody>
</table>

On an aggregate item such as whole year, use the same calculation 2200*100/7200 = 30.56%

Name | Format | N Calculation | C Calculation
---|--------|---------------|---------------
Revenue | | =Revenue/Units |
Gross margin | | =Gross margin*100/Revenue |
Gross margin % | | =Gross margin*100/Revenue |
<Enter new member> | | =Gross margin*100/Revenue |

Weighted averages Example 3
In Cognos Planning, an implicit product is calculated in this scenario: This input results in the following calculation:
<table>
<thead>
<tr>
<th>Name</th>
<th>N Calculation</th>
<th>C Calculation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Items per box</td>
<td>= 'Dummy product' / 'Number of boxes'</td>
<td></td>
</tr>
<tr>
<td>Number of boxes</td>
<td>= 'Items per box' * 'Number of boxes'</td>
<td></td>
</tr>
<tr>
<td>Dummy Product</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;Enter new member&gt;</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

In Cognos TM1 Performance modeler you will need to create a new item to use in the weighted average calculation. You can then create subsets and cube views to hide this dummy element from the user.

**Modelling techniques which require a redesign**

If your model uses the following techniques, you redesign the model to achieve a successful transfer.

- Links using allocation tables or cut subcolumns
  
  It is usually possible to remodel these by adding an attribute to a dimension. Then match this attribute in a link.

- Links in Add or Subtract mode
  
  Create extra lines in the target cube to be the target of these links and set appropriate calculations in the target dimensions.

- Models which rely on "no data" access tables
  
  You can create a model where the only thing in the model is the source cube of a link for some elist items. In this case the target cube behaves differently for different elist items. Because the concept of "no data" does not exist in Cognos TM1, this scenario must be remodeled using conditionals.

- Multiple copies or similar copies of the same dimension.
  
  An example of this technique in Cognos Planning is when a dimension is used as a dlist format but also as a real dimension in cubes. A copy dlist is used for the dlist format item which might contain only the detail items. This structure can also be necessary because using a dlist as a format prevents the dimension from being reduced in as a "cut-down" process. In Cognos TM1, there is no need for the extra copy of the dimension. The original dimension itself or a suitable subset can be used as a picklist.

**Long elists**

If your model has a very long elist, create a new model with just a short placeholder elist to use for migration. Then update the resulting dimension in Cognos TM1 after you have re-engineered your model.
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