IBM Cognos TM1 Performance Modeler
Version 10.2.0

User Guide

Note
Before using this information and the product it supports, read the information in "Notices" on page 189.

Product Information

This document applies to IBM Cognos TM1 Performance Modeler Version 10.2.0 and may also apply to subsequent releases.

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Introduction

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 IBM Cognos product documentation on the web, including all translated documentation, access one of the IBM Cognos Information Centers (http://pic.dhe.ibm.com/infocenter/cogic/v1r0m0/index.jsp). Release Notes are published directly to Information Centers, and include links to the latest technotes and APARs.

Accessibility features

Accessibility features help users who have a physical disability, such as restricted mobility or limited vision, to use information technology products. Cognos TM1 Performance Modeler has accessibility features. For information about these features, see the Appendix A, "Accessibility features," on page 171 section in this document.

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

Forward-looking statements

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

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Chapter 1. What's new

This section contains a list of new, changed, and removed features for this release.

It will help you plan your upgrade and application deployment strategies and the training requirements for your users.

To locate the most current product documentation, go to the IBM Cognos TM1 information center (http://pic.dhe.ibm.com/infocenter/ctm1/v10r2m0/index.jsp)

New features in version 10.2.0

The following list identifies new features in IBM Cognos TM1 since the last release.

New Cube Calculation

You can now define a calculation that can be scoped across the full dimensionality of a cube in the same way as you define a calculation for dimensions.

Cube calculations are a way of simplifying 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 47.

New Cognos TM1 Scorecarding

Scorecarding with IBM Cognos TM1 integrates scorecarding and strategy management capabilities into Cognos TM1 to provide better integration of performance management with planning.

You can create scorecard solutions that contain interactive impact diagrams, strategy maps, and custom diagrams that monitor your key performance indicators (KPIs). The underlying data is stored in Cognos TM1 and can be published to users in IBM Cognos Insight, IBM Cognos TM1 Web, and IBM Cognos Workspace as interactive dashboards. A metrics dimension and metrics indicator dimension form a metrics cube. The metrics cube is used to store and manage the data used to generate impact diagrams, strategy maps, and scorecarding diagrams.

For more information, see Chapter 12, "Cognos TM1 Scorecarding," on page 129.

New Feeder Optimization

TM1 Performance Modeler can now automatically generate a proposed set of feeders for the cubes in the model. The set is generated whether the rules are defined manually by the modeler or generated automatically from Calculations and Links.

The modeler can also export a Feeder analysis report to see what feeders are proposed, without actually writing feeders to their model.

For more information, see "Automatically generated rules and feeders" on page 67.

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Full picklist capability

IBM Cognos TM1 version 10.2.0 includes new support for static picklists and the ability to set a picklist on a numeric cell.

IBM Cognos TM1 now supports static picklists and the ability to set a picklist on a numeric cell.

For more information, see “Creating pick lists” on page 34.

TurboIntegrator processes triggered from workflow actions

You can now initiate a TurboIntegrator process either immediately before or immediately after a workflow action takes place.

For example, you can trigger a TurboIntegrator process to do a data validation test before a Commit action. Or you can move data for a specific approval hierarchy node to a different application immediately after a Submit action.

You can design the workflow action trigger in the Cognos TM1 Applications server without editing any system-related objects.

For more information, see “Configuring a TurboIntegrator process to execute on a workflow action” on page 111.

Link editing improvements

In Cognos TM1 version 10.2.0 you can select the source and target members of links separately then paste the source/target member pairs.

You can also turn an automatic mapping into a manual mapping while retaining the mapped member pairs.

For more information, see “Establishing correspondence and mapping dimensions” on page 58.

Drill-through

In IBM Cognos TM1 version 10.2.0, you can choose to have a link that is exposed as a drill-through relationship. You can also configure the orientation of the view that results from the drill.

For more information, see “Creating drill-through objects in links” on page 64

Reuse of approval hierarchies

In Cognos TM1 version 10.2.0, you can deploy TM1 Applications to different slices of the same cube.

IBM Cognos TM1 version 10.2.0 includes the ability for TM1 Applications to reuse approval hierarchies or sections of approval hierarchies across applications. This feature means you can create two different views that follow a budget and forecast process that operate on different schedules but still use the same leaf elements. Similarly, you can create views by using the same leaf elements that roll up in different ways. For example, you can have a view that rolls up regionally and another that uses the same elements that roll up by maturity.

A new type of dimension that is called a Control dimension defines the scope of an approval hierarchy by using a control subset.

For more information, see “Deploying multiple applications to different slices of the same cube” on page 15.

Restrict views to reviewers or contributors

You can identify specific views for use by 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.

For more information, see “Designing views for reviewers or contributors” on page 17.

TurboIntegrator processes triggered from workflow actions

You can now initiate a TurboIntegrator process either immediately before or immediately after a workflow action takes place.

For example, you can trigger a TurboIntegrator process to do a data validation test before a Commit action. Or you can move data for a specific approval hierarchy node to a different application immediately after a Submit action.

You can design the workflow action trigger in the Cognos TM1 Applications server without editing any system-related objects.

For more information, see “TurboIntegrator processes triggered from workflow actions”

New TM1 Applications Maintenance utility

New IBM Cognos TM1 Applications maintenance utility can do many activities from the command line.

The Cognos TM1 Application Maintenance utility is a command-line utility that helps administrators complete actions that were previously done from the Cognos TM1 portal.

For more information, see “Automating tasks with the Cognos TM1 Application Maintenance utility” on page 119.

Show Data Flow model diagramming

In Cognos TM1 Performance Modeler version 10.2.0, you can see a graphical flow diagram that maps the flow of data from cube-to-cube in a model.

You can apply an automatic layout for your model diagram or you can set your own layout. Cubes can be grouped for ease of viewing, and you can open cubes and links from the data flow diagram. Use the data flow diagrams to more easily visualize the structure of your Cognos TM1 cubes and dimensions.

For more information, see “Show Data Flow in Cognos TM1 Performance Modeler” on page 8.

Improved transfer of model objects and applications

The new Transfer Specification Editor allows modelers to better manage which objects are copied from a source system to a target system.

The management of the transfer process was improved in the following ways:

- Transfer Specification editor added
- Better handling of model object dependencies
- Creating transfer specifications
- Automating the transfer process
- Transferring cell data
- Transferring large model structures

For more information, see "Transfer of model objects and applications" on page 95.

New way to manage applications in TM1 Performance Modeler

You can manage many aspects of an application by double-clicking the application name in the TM1 Performance Modeler Application Design tab.

For more information, see the "Managing applications in Cognos TM1 Performance Modeler" topic in the *IBM Cognos TM1 Applications Guide*.

New import of Cognos Planning models 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.

For more information, see Appendix D, "Import Cognos Planning models into Cognos TM1," on page 183.

Chapter 2. Getting started with Cognos TM1 Performance Modeler

In IBM Cognos TM1 Performance Modeler you can create applications for use in IBM Cognos TM1 Applications.

Applications are based on models that contain dimensions, cubes, and links. You can also administer those applications, assign security, and establish a workflow using Cognos TM1 Performance Modeler.

Create a model containing dimension, cube, and link objects. This model contains the objects required to create your applications. You can create rules and feeder scripts from the logic in the formulas and links. Rules determine the format and presentation of data and can also manipulate it. In addition to using rules that are generated, you can also manually create rules. Load data into applications by importing data and creating TurboIntegrator processes.

Create applications based on the objects contained in your model for use in Cognos TM1 Applications. Create cubes based on the dimensions that exist in the model. Use links to make connections between the cubes. Include views in an application to define the way it is presented to an end user. Set up a workflow to determine how contributors will interact with the application. 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. Deploy an application before you set up an approval hierarchy.

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 machines from the TM1 Applications portal, this delivery is primarily intended as a means of simplifying deployment for modelers working on a local area network (LAN). It is recommended that 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 machine that is local to the TM1 Server.

Logging on to Cognos TM1 Applications

Before you can start IBM Cognos TM1 Performance Modeler, you must log on to IBM Cognos TM1 Applications. The first time you log on, you must specify several configuration parameters for your specific implementation.

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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.

After this initial provisioning and configuration of Performance Modeler, you can start Performance Modeler directly from the Windows Start Menu or the desktop shortcut.

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.

   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. Click **OK**.
4. 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.
5. Click **OK**.

Starting Cognos TM1 Performance Modeler

You can create and manage IBM Cognos TM1 Applications in IBM Cognos TM1 Performance Modeler.

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 **Model the data** icon to start Cognos TM1 Performance Modeler.

Results

When Cognos TM1 Performance Modeler is opened, it displays a guide to model design.

Note:
If Performance Modeler is opened against a TM1 server that contains one or more corrupted cube views, a warning is issued and none of the views (whether valid or invalid) are shown the for affected cube.

Organizing your content using folders

Use folders to categorize and organize your content.

By default, existing objects on the TM1 server are grouped into folders organized by content type as follows:

- Dimensions

- Cubes
- Links
- Processes
- Chores

You can change how your content 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.

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

View control objects to see security settings and certain object attributes.

About this task

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. 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:

Object type	Icon
Dimension	
Subset	
Cube	
Cube view	
Link	
Process	
Chore	
Rules	

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.

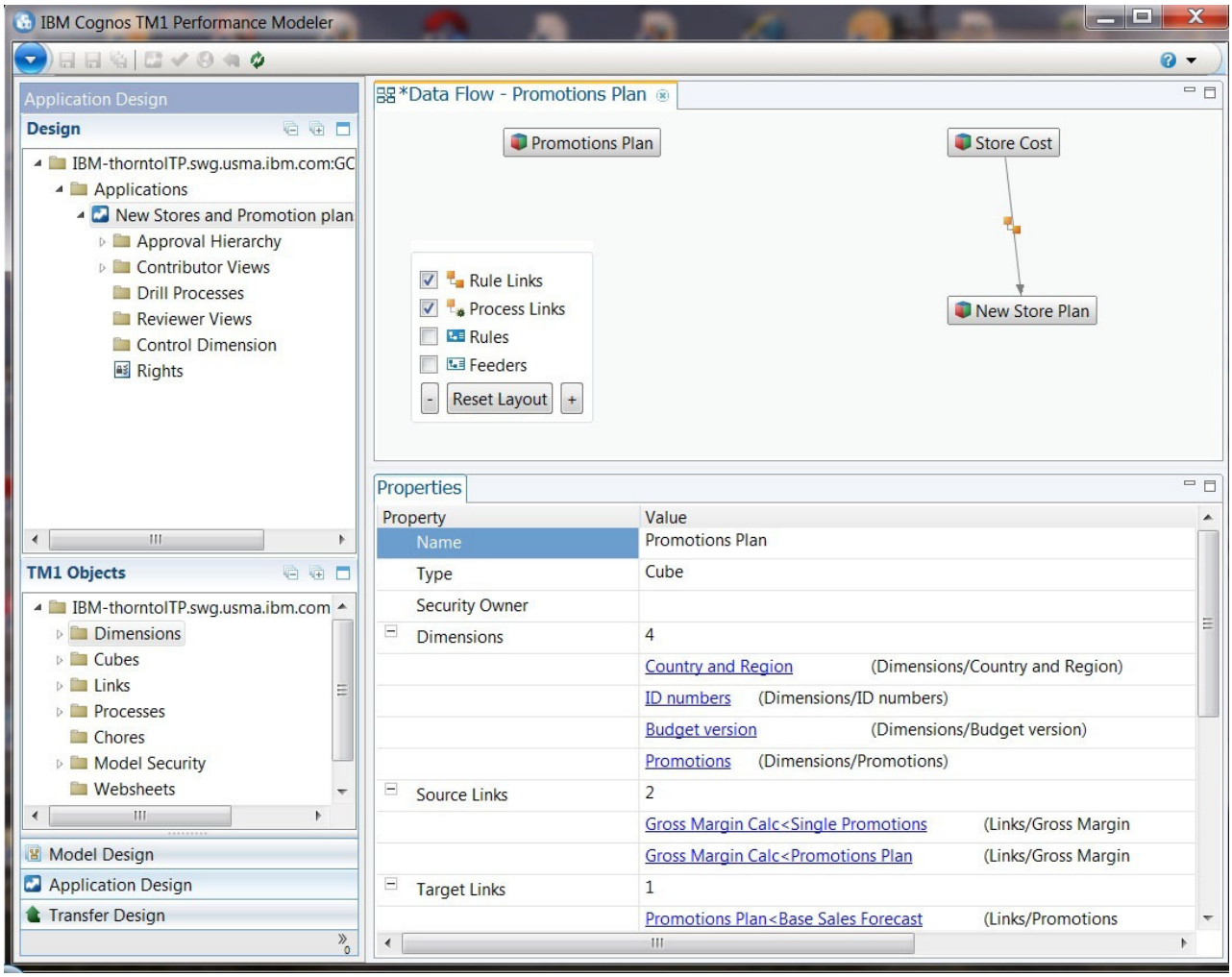
One way you can use the Properties pane is to compare the object in the viewer with an object in the Model Design pane. For example, a cube appears in the object viewer. You click once on a second cube in the Model Design pane. The second cube's dimensions are listed in the Properties pane. You can now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

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.

To see a graphic representation of your application:

1. Import the application into Cognos TM1 Performance Modeler.
2. Right-click the name of the application in the Application Design tab.
3. Select **Show Data Flow**.
   A diagram of the application's cubes and rules displays:



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.

- Export diagram to file
- Group and ungroup. You can also create a new diagram from grouped data
- Remove from diagram
- Remove from group
-

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.

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 is 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.

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*.

Therefore, when one cube links to a second cube, the first cube is the dependent object. This is because deleting the second cube would result in a broken link for the first cube. Similarly, 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 3. Designing models and applications

There are two different design guides: Model Design and Application Design.

Model Design guides you through designing cubes and dimensions that form the basis of your financial analysis models.

Application Design makes it easy to follow the steps needed to create an application that users can review and contribute to, including deployment, validation, and security definition.

Model design

Launched from the IBM Cognos Applications portal, the Model Design pane takes you through the process of creating dimensions, cubes, and links to define the business logic for an application.

Defining dimensions for your model

The dimensions step guides you through creating the dimensions such as Chart of Accounts, Products, Time, and Version used in your application.

This part of the Model Design pane helps you not just define dimensions, but also to populate them and specify other attributes and calculations you need for your model.

Related concepts:

Chapter 4, “Creating and formatting dimensions,” on page 21
To make the data available for input and analysis, you must first structure your data into dimensions.

Building cubes

Another step in modeling your business data is to use the dimensions that you have already defined to build cubes.

Use the Model Design pane to create cubes that serve business requirements, such as Sales Planning or Expense Analysis using relevant dimensions.

Related concepts:

Chapter 5, “Creating cubes,” on page 37
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.

Linking cubes

The Model Design pane gives you the option to create links to move data between cubes.

This capability helps you create links, for example, to reference assumption data in a planning cube.

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Related concepts:

Chapter 6, "Creating links," on page 57
Links establish a relationship that moves data from one cube to another.

Creating rules and processes

Rules and processes can be created from the Model Design pane.

Dimension calculations and links generate rules and feeders automatically. 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.

Related concepts:

Chapter 7, "Managing rules and feeders," on page 67
With the Rules Editor, you can create and manage IBM Cognos TM1 rules.

Application design

After you have modeled your business process, you can create an application so that users can review and contribute to it.

The application identifies the cubes 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.

Defining an approval hierarchy

If an approval hierarchy is needed for this application, the subset used is linked to the application here.

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

Related tasks:

"Defining an approval hierarchy" on page 110
The approval hierarchy determines the workflow of your application.

Deploying multiple applications to different slices of the same cube

An approval hierarchy can be used in different applications if the writing of data is done to different slices.

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

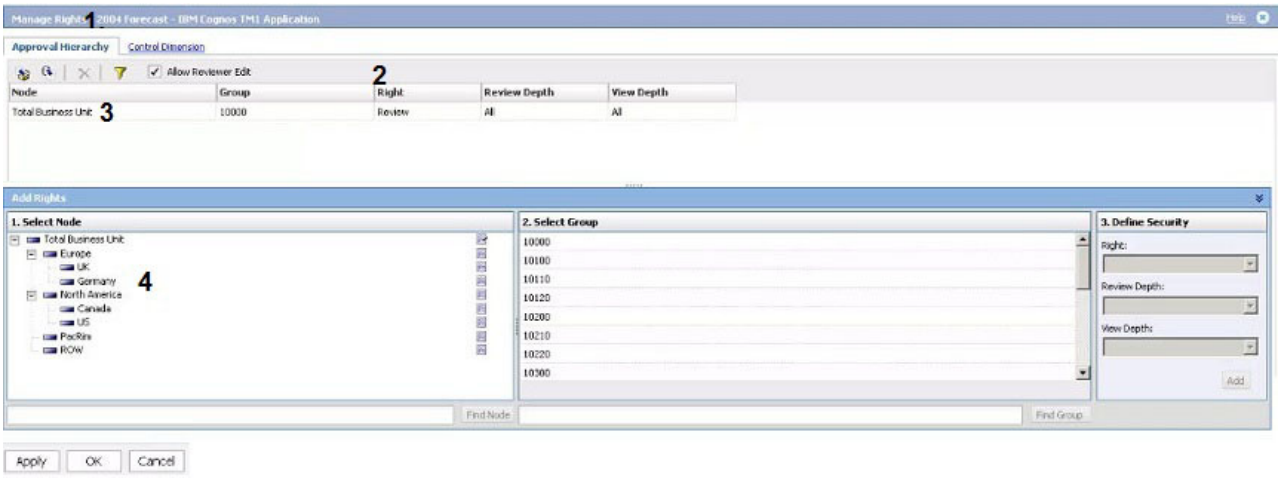
For example, you can create a budget application and a forecast application that use data from the same cube but operate on different schedules or that use different rollups. Different kinds of rollups include geographic rollups versus market maturity rollups. Similarly, the same approval hierarchy can 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.

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, 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.



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.

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.

Defining views and websheets

Views and websheets that are needed for this application are identified in the application design pane.

Drag cube views and websheets from your TM1 server to the application to make them available to reviewers and contributors.

Related tasks:

"Defining application views" on page 108
After you have created the application you can define the views to be used in the application.

"Defining application websheets" on page 109
After you have created the application, you can define the websheets to be used in the application.

Designing views for reviewers or contributors

You can identify specific views for use by Reviewers or Contributors.

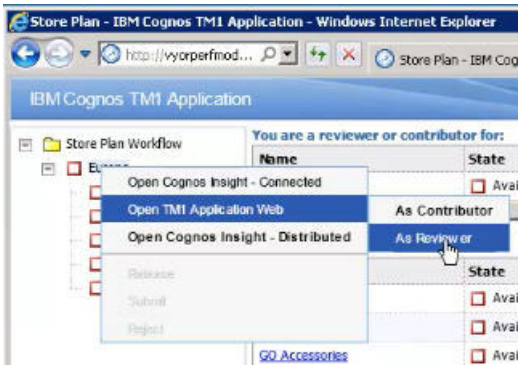
You can design different views to be used for Review or Contributor users. For example, a Reviewer can see higher-level summaries while the Contributor can see more detail-rich views.

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

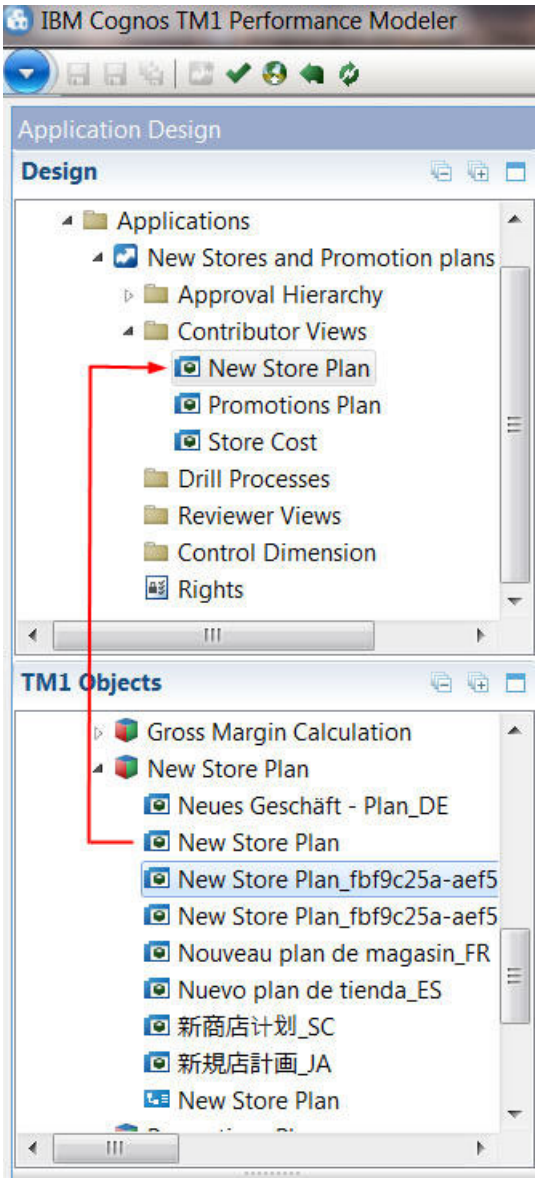
Targeted views also facilitate the deployment of reporting cubes. Reporting cubes can deliver improved performance when large numbers of nodes need to be reviewed. To improve performance, a TurboIntegrator process based on a cube with many rules can report into a cube with only a few rules for review.

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.

If a view is defined as for both Reviewers and Contributors, the user can choose which view to use:



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.



Deploying the application

Before reviewers or contributors can use the application, it is deployed to the IBM Cognos TM1 Application Service.

Deploy the application to the portal to make it available to users from the selected clients.

Related tasks:

"Validating and deploying the application" on page 114
The validation process ensures that all conditions required to deploy the application are in place.

Defining security

The security defined for the application restricts users to only the part of the data they need to accomplish their work.

For hierarchical workflow or continuous planning applications, define security against the approval hierarchy.

Related concepts:

Chapter 8, "Setting up security and control access for user groups," on page 79
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.

Activating an 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.

Related tasks:

"Activating an application in a portal" on page 118
The IBM Cognos TM1 Performance Modeler application must be activated before users can use it from the Applications portal.

Configuring commentary on applications

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

To restrict the size and types of files that can be attached to an application:

Procedure

1. Open the Application Design tab in Cognos TM1 Performance Modeler so that the Properties tab displays.
2. Scroll down to display the Commentary property. The currently set file types display.
3. Click the field to display the ellipsis icon.
4. Click the ellipsis to open the Commentary Setting dialog box.
5. To control the volume of files that can be uploaded to the TM1 Server, enter the maximum file size permitted for this application.

   Note: This file size must be less than 500.
6. By default a standard set of file types are permitted. You can restrict the type of file, for example you can prevent executable files from being uploaded, by removing those file stypes from the file of allowed files. Click the ellipsis to add a new file type or to remove an existing file type.
7.

Chapter 4. Creating and formatting dimensions

To make the data available for input and analysis, you must first structure your data into 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.

Related concepts:

"Defining dimensions for your model" on page 13
The dimensions step guides you through creating the dimensions such as Chart of Accounts, Products, Time, and Version used in your application.

Creating new dimensions

When you create a dimension, you set the dimension to a dimension type. The types are described in the following sections:

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 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 version dimensions should not be aggregated, because multiple data entries for the same item are included in them.

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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.

Creating calculation dimensions

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

About this task

A calculation dimension contains formulae that perform 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 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.
- **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. 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.

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.

Creating arithmetic N and C calculations

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.

About this task

The values of members within a dimension can be used for simple and consolidated calculations using arithmetic operands +(Sum), -(Difference), *(Multipication), and /(Division). A simple calculation is derived from two input values, a consolidated calculation is derived from the results of the simple calculations. For example, Projected Revenue = Quantity * Price for an N calculation, whereas Average Price = Total Revenue / Quantity for a C calculation. The expression editor helps in the selection of commonly used aggregation behaviors for a C calculation; **Force to Zero**, **Weighted Average**, and **Time Average**.

Procedure

1. Open the calculation dimension to be edited.
2. You can either add simple formulae directly to the appropriate members, or you can add formulae with the expression editor. For example, 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. To add a formula 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.
3. To add a formula with the expression editor, click the cell where you want to add the formula.
4. Click the **More** button in that cell. The expression editor opens.
5. Select `Arithmetic` from the **Operation type** field.
6. Select the operation type:`+(Sum)-(Difference)*(Multipication)/(Division)`
7. 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. Members can also be dragged and dropped into the expression editor, either individually or by selecting multiple members at a time.
8. Repeat the previous step for <operand2>.
9. Save the dimension.

Creating 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.

About this task

The expression editor has built-in functions that uses 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. Open the calculation dimension to be edited.
2. To add a function with the expression editor, click the cell where you want to add the function.
3. Click the **More** button in that cell. The expression editor opens.
4. Click the **Functions** tag and expand the **Dimension Functions** tree.
5. Select the function type and drag the function to the expression editor. If you click the Tips tag, the power editing support opens that gives a detailed explanation of the function selected.
6. 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.
7. Save the dimension.

Related concepts:

"Functions" on page 178
The functions that are available for leaf-level and consolidated-level calculations are described.

Creating time dimensions

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

About this task

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 calculation performed to give an aggregated result.
- **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. 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
5. Using the example shown, for the member `Year`, select the **First Period** attribute and type Q1.
6. For the same member select the **Last Period** attribute and type Q4.
7. From the same example, select the member Q1 and select the attribute Start Date. From the drop down calender, select the first date for Q1.
8. Repeat for the attribute End Date and select the last date for Q1.
9. Repeat these steps for Q2, Q3 and Q4.
10. For the member Q1, select the attribute Next Period and type Q2.
11. For the member Q2, select the attribute Previous Period and type Q1.
12. For the same member, select the attribute Next Period and type Q3.
13. Repeat for the members Q3 and Q4.
14. Save the dimension.

Adding members with the add time period and attribute tool

You can use the add time and attribute tool to add multiple levels of members and specify hierarchy of the members. Using the tool simplifies adding members. For example, you can add quarters, months, and days.

Before you begin

Before you can use the **Add time period and attribute** tool, you must create a time dimension object.

Procedure

1. In the Model design pane, double-click a time dimension.
2. In the toolbar in the object viewer, click the **Add time period and attributes** icon . The **Time dimension** tool appears.
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 **Years**. 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. If you want to force the month to end at a calendar end date, click **Yes** in the **Force the month to the calendar end date** option.
9. Click **2. Duration**.
10. In the **First period 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.
11. In the **Last period 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.
12. Click **3. Member names**. You can set formatting options for the member levels that you include in the dimension.
13. In the **Member level type** box, select the member level that you want to apply formatting options to. For example, you may want to apply formatting to years.
14. In the **Member level format** box, select the formatting that you want to apply to the member level.
15. 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 preface to years to indicate fiscal years. The year 2011-2012 would then display as FY 2011-2012.
16. Apply formatting options to other member levels as required. Click **OK**.
17. Save the dimension.

Creating versions dimensions

Create a versions dimension when you need to compare different versions of similar data.

About this task

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 are not usually aggregated, as 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 **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: `FY 2004 Budget, FY 2005 Budget, FY 2004 Forecast, FY 2005 Baseline`.
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 to contain lists of members in a hierarchical structure.

About this task

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 as well as drag and drop function to drag member to a parent member. Multiple parent hierarchies can be created using cop and paste or CTRL drag a member to a parent member or group of members. The **Expand** and **Collapse** context menu commands gives the ability to view and hide members of an 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 when you are not sure of the precise dimension type.

About this task

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. For example `FY 2004 Budget`, `FY 2005 Budget`, `FY 2004 Forecast`, `FY 2005 Baseline`.
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.

About this task

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 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.

About this task

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.

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 shows.
6. You can now enter values for the attribute for each member at the leaf level.
7. Save the dimension.

Results

You can use numeric attributes for calculation purposes in a calculation type dimension or generic dimension.

Creating a text attribute

You can add text attributes to make textual selections on the members of the dimension.

About this task

Text attributes are for string texts. Text attribute can be used to differentiate the members in another way. For example: Text attributes can be used to mark members that are discontinued, but the data still needs to be available at the consolidation level.

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, and type the name of your choice 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.

About this task

An alias is where the name of a caption or term is different to the member or invariant name. 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 shows.
6. Click the cells for the members under the new attribute you have just created, and type the alias name 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 1. Member, caption and alias names in an expression

Member name	Caption	Alias
Q1 sales	First quarter sales	Q1
`='Q1 sales' * Price`	`='First quarter sales' * Price`	`=Q1 * Price`

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.

About this task

A valid dimension need to have been created. The attributes can be changed in the attributes dialog box.

Procedure

1. Open a dimension.
2. Right-click the title **Name** and click **More display options**.
3. In the **Dimensions** dialog box, select the attributes 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. 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 by a paste action.

Procedure

1. Open a dimension.
2. Copy the members from an open spreadsheet.
3. Right click the member to where you want to paste the members.
4. You can paste as, `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.

About this task

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 members 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 from the list of names to be removed and click **Remove Members From Consolidation**. More than one member can be selected.
3. Click OK to remove the member.

Formatting members

Format is a user defined property for members. Users can define number style, date, time, and text from 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

A format is applied to the number style by the user. Format is available for the calculation and version 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.

Creating subsets

A subset is a limited version of the parent dimension. Create a subset for use with a pick list in a calculation dimension.

About this task

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 when opening them. Edits made to a dynamic subset will result in the subset being saved as static. The subset editor has these commands available:

- **Hide**, hides the selected member and keeps all other members.
- **Hide others**, keeps the selected member and hides all other members.
- **Hide by level**, hides according to the sub commands:
  - **Hide This Level**
  - **Hide other levels**
  - **Hide above this level**
  - **Hide below this level**
  - **Hide leaf members**
  - **Hide consolidated members**
- **Expand**, shows all sub levels of the member selected.

- **Collapse**, hides all sub levels of the member selected.
- **Sort by ascending**, sorts the members by ascending alpha numeric name order.
- **Sort by descending**, sorts the members by descending alpha numeric name order.
- **Hierarchy sort.**
- **Sort by index ascending**, sorts ascending on the index number.
- **Sort by index descending**, sorts descending on the index number.

Procedure

1. Right-click the dimension name in the Model Design pane.
2. Click **New** > **Subset**.
3. Type the name for the subset and click **OK**.
4. Select a representative member for the level you want apply to the subset. For example if you have Year, Months, Weeks as time periods, and you want to use months only, select any month member.
5. Right-click the member and select the command from the selection box.
6. Save the dimension.

Creating dynamic subsets

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

About this task

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

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

Note: You can drop an existing subset into the MDX editor to create a starting point for the subset.

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

Procedure

1. Right-click the dimension, select **New** > **Subset**.
2. Type a name for the new subset and click **OK**.
3. Save the new dimension.
4. Click the edit button in the **Expression** Property. The MDX expression editor opens.
5. Check the **Dynamic** check box. If the dynamic check box is empty, the subset will be a static subset and will not reflect subsequent changes made to the members lists.
6. Select the basis for the subset from the Sub Basis selection.

Option	Description
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.

Applying a filter to a subset

The filter gives you the ability to produce a list of selected members for a static subset based on the attributes or column values.

About this task

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.

An example use case for the filter: Discontinued items could have a text attribute `Discontinued` where item members that are no longer available for sale have the text `Discontinued` in the attribute column. A filter on the word discontinued generates a subset of all current items available for sale by filtering out the word `Discontinued`.

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. Right-click an attribute title to apply the filter to, and click **Filter by column**.
3. Select the condition, **Show the following** or **Do NOT show the following**.
4. In the **Keywords** field, type a letter or key word.
5. 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.
6. Select the filter order, **Sort ascending**, **Sort descending**, **Don't sort**.
7. Click **Search**. The result of the first filter shows in the Values field.
8. Click the values you want in the subset. You can use Ctrl - click and Shift - click to select multiple values.
9. Confirm the values by clicking the arrow icon. Click **OK**.
10. 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 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.

About this task

The Pick List attribute is available in calculation dimensions. The benefit of using pick lists 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 containing 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.
5. Click **OK**.
6. Save the dimension.

Chapter 5. 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.

Unlike a spreadsheet, cubes can be sliced so that any pair of dimensions can comprise the rows and columns while additional dimensions comprise the pages. While a cube can contain any number of dimensions, the only practical limitation is the amount of memory on the server. Typically a cube will contain no more than five or six dimensions. A cube must contain at least two dimensions, similar to a flat spreadsheet. Alternatively, a cube can have three dimensions, in which case it resembles a three-dimensional worksheet consisting of several flat sheets stacked behind one another. A four or five-dimensional cube can be considered the same as a cross between a three-dimensional spreadsheet and a set of query reports from a relational database. For example, a typical four-dimensional cube could contain the following dimensions: Profit and Loss, Divisions, Months, and Variance.

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 version 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. Version 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

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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:

	Budget	**Actual**
Units	100	110
Price	5	4

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

	Budget	**Actual**	**Variance**
Units	100	110	10
Price	5	4	-1
Revenue	500	440	-10

So { Revenue , Variance } is calculated as 10 * -1 = -10 = which is incorrect.

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

	Budget	**Actual**	**Variance**
Units	100	110	10
Price	5	4	-1
Revenue	500	440	-60

Now, { Revenue , Variance } = { Revenue, Actual} - {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:

Size = (number of items in dimension 1) * (number of items in dimension 2) * (number of items in dimension 3) * . . . * (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 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 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.

Related concepts:

"Building cubes" on page 13
Another step in modeling your business data is to use the dimensions that you have already defined to build cubes.

Creating a cube using dimensions

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

About this task

Add the dimensions to the cube in any order that you want. The dimension types are checked to try and ensure that the calculation precedence is correct. If the initial order is not correct, you can change the calculation sequence by moving rule blocks in the rule editor.

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 behaviour, 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, click the **New** icon .
2. Click **Cube**.
3. In the **New cube** field, enter a name for the new cube. Click **OK**.

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 which 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 the 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 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 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 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 for the order to be 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 is not the same as optimizing the memory used by the dimensions .

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.

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

About this task

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 the Managing Rules section or the *IBM Cognos TM1 Rules Guide*. The guide 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;

Variable	Description
Area	Specifies the portion of a cube affected by the rule.

Variable	Description
Formula	Describes how TM1 calculates the cells in the cube area.

Here is an example of four rule statements:

['Gross Margin%']=['Gross Margin']\['Sales']*100;

['Price']=N:DB('PriceCube',!actvsbud,!region,!model,!month);

C:['Sales']\['Units']*1000;

['Sales']=N:['Price']*['Units']\1000;

For detailed information about creating rules, see the Managing Rules section or the *IBM Cognos TM1 Rules Guide*.

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 in the cube viewer to meet the requirements of an application designer.

- Expand and collapse consolidations
- Pivot dimensions
- Hide members
- Filter view data
- Edit subsets

Creating a new cube view

Create a new cube view so that you can make modifications to the view to suit your business needs. A cube must appear in the Model Design pane.

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 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**.
3. To make the hidden row or column visible again, right-click the header and select **Show hidden**.

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.

Cube calculations

Unlike dimension calculations, cube calculations are a way of simplifying 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 must 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 evaluate the expression at leaf level, under **Expression**, click the **Leaf-level expression** tab.
   - To evaluate the expression at a consolidated level, 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: 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:

Goal	Action
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: 1. Exponentiation 2. Multiplication 3. Division 4. Addition 5. 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. For a full explanation of the various functions, see the *IBM Cognos TM1 Reference Guide*.
Insert a data item from another cube	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"
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 some 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.

Related tasks:

"Establishing correspondence and mapping dimensions" on page 58
When you initially create a link and define a source cube and target cube, the cubes are examined for common dimensionality.

Creating a cube calculation in a security control cube

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

About this task

The Cube Calculation 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:

Goal	Action
Enter 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]`.
Insert a built-in function	Click the **Functions** tab. For a list of text-based functions, expand the **Text** folder. Drag the function to the **Expression** box to include it in the formula expression. Use Text or Logical functions to build the conditional expression. For more information about text-based functions, see the *IBM Cognos TM1 Reference Guide*.

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 80
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. Optional: 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 48
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 6. 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.

Related concepts:

"Linking cubes" on page 13
The Model Design pane gives you the option to create links to move data between cubes.

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

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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 58.

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.

About this task

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.

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 containing 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 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 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 Guide*.

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-though 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.

Table 2.

Property	Description
Name	The name of the link.
Link Type	The type of link. There are three possible Link Type values. • Default - A link with regular dimension correspondences and mappings. • Lookup - A link that uses virtual dimensions based on either pick lists or attributes in the target cube. • Accumulation - A link that uses virtual dimensions based on pick lists in the source cube.
Security Owner	The owner is the one who is currently editing the dimension or link.
Source Cube	The cube that provides the data for the link. This is a clickable property; click the source cube name to open the cube.
Target Cube	The cube that receives the data from the link. This is a clickable property; click the target cube name to open the cube.
Correspondences	Indicates the number of correspondences defined for the link. Each correspondence is listed sequentially.

Table 2. (continued)

Property	Description
Link Implementation Type	Set this property to determine if your link is implemented as a rule or as a process, as described in "Setting the link implementation type" on page 61.
Generate feeders?	Indicates if feeders should be generated for a link implemented as a rule. Select **Yes** to generate feeders, **No** to create the link without feeders.
Generate drill through objects?	Indicates if drill through rules and processes should be generated for the link.
Validation Errors	Indicates the number of validation warnings and errors present in the link, with each warning and error listed sequentially. 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. Errors indicate problems that cannot be addressed in the link editor. To resolve errors, your should repair the link.

Chapter 7. 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.

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.

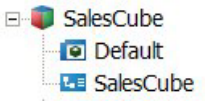

Figure 1. Cube with view and rule

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.

Related concepts:

"Creating rules and processes" on page 14
Rules and processes can be created from the Model Design pane.

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 dimension member calculation, as described in "Creating calculation dimensions" on page 22

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- create a link and implement it as a rule, as described in Chapter 6, "Creating links," on page 57

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

Automatically generated rules cannot be directly edited, but you can selectively enable or disable automatically generated rules. You can also change the ordering of automatically generated rules.

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

Performance Modeler can automatically generate a proposed set of feeders for all cubes on a server, 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 recommended for your model before committing 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 have been manually created are not altered by automatic feeder generation.

After automatic feeders have been generated, you can not delete them, but you can optionally enable or disable generated feeders, as described in "Enabling and disabling rules and feeders".

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 will 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 building new models, performing prototyping, or when you otherwise want Performance Modeler to generate feeders, you can enable automatic feeder generation. Any modelling 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 the desired **Generate feeders automatically** property value.

3. 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 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. The report allows you to 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:

1. Navigate to the folder where you saved the analysis report.
2. Open index.html.

The Feeder Analysis Report contains four tabs.

Problems - This tab displays 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.

Difficult Rules - This tab contains two sections. The Inefficient Feeders sections shows feeders that were generated, but which 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 - This tab lists 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, these are the feeders that will be written to the model.

Rules Analysis - This tab lists the rules for each cube, and provides an icon and hyperlink to show the suggested feeder relating to that rule.

Dimension calculation rules

Dimension calculation rules are automatically generated when an 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.

```
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.

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

```
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 names 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 Guide*.

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:

```
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 names 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 Guide*, 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.

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 mange 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/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 Guide*.

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 3.

Property	Description
Name	The name of the rule. A rule always uses the name of the cube with which it is associated. For example, the rule for a cube named RegionalSales would also be named RegionalSales.
Type	The type of object for which the Properties pane displays values. When viewing a rule, the Type is always Rule.
Manual Sections	Indicates whether a rule contains any manually created sections. The property value is Yes if manually created sections are present in the rule. The property value is No if the rule is composed solely of automatically generated rules.
Rule Sections	Indicates the number of calculation sections in the rule. Each calculation section is listed sequentially, with an indication of whether the section calculates a Numeric or Consolidated value. If a section is associated with a link, the name of the link displays as a clickable item. Click the link name to open the link.

Table 3. (continued)

Property	Description
Feeder Sections	Indicates the number of feeder sections in the rule. Each feeder section is listed sequentially with the label FEEDER. If a feeder is associated with a link, the name of the link displays as a link. Click the link name to open.
Require feeding of rule derived cells?	Set this property to determine if your rule includes a FEEDERS section. If set to NO, the rule does not include a FEEDERS section and you do not have to define feeders for rules-derived cells in your cube. If you set this property to NO for a rule that already contains feeders, the existing feeders are retained in the rule. If set to YES, the rule does include a FEEDERS section and you should define feeders for rules-derived cells in your cube. **Attention:** Any rules for cubes what are associated with a link must have feeders. The feeders are automatically generated and inserted into the rule, regardless of the **Require feeding of rule derived cells** setting.

Chapter 8. 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.

Related concepts:

Chapter 8, "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.

"Defining security" on page 18
The security defined for the application restricts users to only the part of the data they need to accomplish their work.

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.

  When granted, users can hold data changes in a private workspace before manually deciding when to commit the changes to the base data. Users can also create and manage multiple private scenarios called sandboxes (see the Sandbox Capability).

  – 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.

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  - 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.

The capabilities for **UsePersonalWorkspaceWritebackMode** and **UseSandbox** work together as follows:

To let the user group	Use Personal Workspace Writeback Mode	Use Sandbox Mode
Work directly in the base data with the ability to create more than one sandbox.	Deny	Grant
Work in a single, private work area without named sandboxes.	Grant	Deny
Work with a private work area and a named sandbox.	Grant	Grant
Work in Direct writeback with no sandbox. This prevents the use of sandboxes and puts all users into direct writeback mode.	Deny	Deny

Related tasks:

"Assigning capabilities to user groups" on page 84
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 4. Privilege descriptions for member objects

Privilege	Description
READ	Members of the user group can see the cells identified by the member, but cannot change their data.
WRITE	Members of the user group can read and update the cells identified by the member and edit attributes of the member.
LOCK	Members of the user group have all privileges implied by Write permission, and can also lock the member. When a member is locked, nobody can update cube cells identified by the member. The lock can be removed only by users who have Admin rights for the member. Locks stays in place after the remote server shuts down.
NONE	Members of the group cannot see the member in the Subset Editor or Dimension Editor, and cannot see the cells identified by the member when browsing a cube.

Table 4. Privilege descriptions for member objects (continued)

Privilege	Description
RESERVE	Members of the group have all privileges implied by Write permission, and can also reserve the member to prevent other users from updating cube cells identified by the member. The reservation can be removed either by the user who reserved the member or by users who have Admin rights for the member. A reservation expires automatically, when the reserving user disconnects from the remote server or when the server shuts down.

Table 5. Privilege descriptions for dimension objects

Header	Header
READ	Members of the user group can see the members in a dimension, but cannot add, remove, or reorder the members.
WRITE	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.
LOCK	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.
NONE	Members of the group cannot see the dimension in the Server Explorer, and cannot browse a cube that contains the dimension.
RESERVE	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.

Table 6. Privilege descriptions for cube objects

Privilege	Description
READ	Members of the user group can see the cells in the cube, but cannot change their data.

Table 6. Privilege descriptions for cube objects (continued)

Privilege	Description
WRITE	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.
LOCK	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.
NONE	Members of the group cannot see the cube in the Server Explorer, and thus cannot browse the cube.
RESERVE	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.

Table 7. Privilege descriptions for process objects

Header	Header
READ	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.
NONE	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.

Table 8. Privilege descriptions for chores objects

Header	Header
READ	Members of the user group can see the chore, and can manually execute the chore, but cannot edit the chore
NONE	Members of the group cannot see the chore in the Server Explorer, and thus cannot execute the chore.

Related tasks:

"Defining security and access settings" on page 85
You can define the privileges for a user group for objects defined in IBM Cognos TM1 Performance Modeler.

"Creating a cell security cube" on page 86
Create a cell security cube to define user group privileges for accessing specific cells in a 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 **Add 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, do a Refresh Security operation in IBM Cognos TM1.

Results

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, do a Refresh Security operation in IBM Cognos TM1.

Results

You can add users to the user groups.

Related concepts:

"Capability assignments" on page 79
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. Right-click the user column and select **Add 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, do a Refresh Security operation in IBM Cognos TM1.

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 according to the table in *Capability assignments*:
   - READ
   - WRITE
   - LOCK
   - NONE
   - RESERVE
5. Close the table.
6. To use the changes made to security, do a Refresh Security operation in IBM Cognos TM1.

Related concepts:

"Data access and security" on page 80
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:

- Creating a cell security control cube that contains the dimensions of the cube whose cell-level security you configure. As of Cognos TM1 10.2 only the dimensions needed to define security are added to the control cube.
- Setting 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**.
4. In the **Create cell security cube** box, click **Yes**. The cell security cube appears as a tab in the object viewer.

   Note: The security cube view looks similar to the view of the related cube, except for these differences:

   - Object viewer differences
     - a key icon appears next to **CellSecurity for <cube name>** .

- the **Re-order dimensions** icon

  does not appear in the toolbar
- the **Optimize Cube Dimensions** icon does not appear in the toolbar

- Property pane differences
  - the value of the **Name** property is }CellSecurity_*cubename*
  - a new dimension, }Groups, appears in the dimension list

5. Drag the two dimensions that share cells to which you want to assign security into the **Rows** and **Columns** areas.
6. Double-click a cell and then select the access privilege you want to assign.
7. 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" on page 80
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 do 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.

Chapter 9. Importing and transferring data

Data can be imported using either guided import or import data source, and also, data can be transferred to update an existing cube or application.

Importing data

You can import source data, map it to target data, and add the new objects to the Model Design pane immediately. This allows you to begin modelling with the new objects right away.

When you import data, the guided import wizard saves your actions as a 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, will import source data, map it to target data, and add 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 explicitly invoke it. This allows you to further modify the process, using the process editor, before you run it. You can also schedule processes to perform administrative tasks automatically. For more information, see "Managing processes" on page 123.

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

Importing and mapping dimensions or cubes

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.

Before you begin

Before you import, note the following considerations:

- 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.
- Reports must be a simple tabular list report with no unresolved prompts.
- If you are importing a cube that contains a dimension in a deployed application, you must first have ownership of the approval hierarchy or deactivate the application.

Procedure

1. If you are running a guided import, complete one of the following actions:
   - If you are importing dimensions only, click **Guided Import** > **Dimensions**.
   - If you are importing a new cube, click **Guided Import** > **Cube**.

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- If you are creating a process, go to the next step.

2. Complete one of the following actions:

Table 9. Source types

Goal	Action
Import a Microsoft Excel file	Select **File** in the **Source type** field. Browse for the file that you want to import. Expand **Source details**. Specify whether the data is structured as a list or a crosstab. Optional: Specify the worksheet, rows, and columns to use.
Import a delimited text file	Select **File** in the **Source type** field. Browse for the file that you want to import. Expand **Source details**. If you want to use the decimal separator and thousands separator for a specific locale, select that locale from the **Data source locale** field. Specify the delimiter, quote character, and separators. 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	Select **IBM Cognos Report Data** in the **Source type** field. Specify the connection details for the report in the **System gateway URI** field. 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	Select **IBM Cognos TM1 Cube View** in the **Source type** field. Select the cube and view that you want to import.
Import a Cognos TM1 dimension subset This option is available only when you use the **Import Dimensions** command.	Select **IBM Cognos TM1 Dimension Subset** in the **Source type** field. Select the dimension and subset that you want to import.

You can also import from a relational data source. For more information, see "Importing from a relational data source" on page 93.

3. Click **Next**.

By default, the columns with a text data type are added as dimensions, and the columns with a numeric data type are added as measures only when you are importing a cube. You can change the mapping type to dimension, level, attribute, or measure.

A dimension is a broad grouping of related data about a major aspect of your business. For example, you have a dimension called Products.

A level represents related data within a hierarchy. For example, the Products dimension contains levels called Product Line and Product Type.

An attribute is a characteristic of a member that the business wants to quantify. For example, the Products dimension contains attributes called Color and Size.

A measure is a performance indicator that is quantifiable and used to determine how well a business is operating. For example, useful measures may be Quantity Sold or Revenue.

4. To customize the properties of a dimension, select the heading for the item in the **Data Preview** field and complete the following actions:
   a. Expand **Advanced Mapping** to display all properties.
   b. If you are importing a dimension with multiple levels and the member names are not unique, select the **Qualify member names** check box and specify a character for the separator.

      If member names are all unique, clear the **Qualify member names** check box.

      An example of non-unique members 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 members 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.
   c. To create a member that displays a total for the dimension, ensure that the **Create total element** check box is selected.
   d. To move the dimension in the structure, change the **Dimension Index** field.

      You can also drag the dimension to a new location.
   e. Specify how the consolidated members will be sorted.
   f. Specify how the leaf, or child, members will be sorted.
   g. Specify how to update the cube. New values can be added to existing values or new values can replace existing values.
5. If you are importing dimensions only, select the dimension that is structured as a parent-child hierarchy, select the **Parent-Child** check box, and complete the following actions:
   a. Map the columns in the source that will be the parent.
   b. Map the columns in the source that will be the child.
   c. Specify how to update the target. New members can be appended to existing members or new members can replace existing members.
6. To define a level, complete the following actions:
   a. Select the heading for the item in the **Data Preview** field. You can select multiple items and define them all as levels in one step.
   b. Click **Level** under **Mapping Type**.
   c. In the **Owner Dimension** field, select the dimension that this level belongs to.

For example, the source lists Years, Quarters, Months, and Days as separate columns. Each column is defined as a separate dimension. To create a hierarchy with Years at the top and Days at the bottom, define Quarters, Months, and Days as levels with Years as the level at the top.

d. To move the level in the structure, change the **Level Index** field.

7. To add an attribute to a level, complete the following actions:
   a. Select the heading for the item in the **Data Preview** field. You can select multiple items and define them all as attributes in one step.
   b. Click **Member Attribute** under **Mapping Type**.
   c. Specify the data type for the attribute.
   d. Select the dimension and level that this attribute belongs to.
   e. Optional: Define the attribute as an alias. An alias adds data that can be used as an alternate name for a member, such as a name in another language. Each alias must have a unique name.
8. If you are importing a new cube, define measures for the cube by completing the following actions:
   a. Expand **Advanced Mapping** to display all properties.
   b. Select the heading for the item in the **Data Preview** field. You can select multiple items and define them all as measures in one step.
   c. Click **Measure** under **Mapping Type**.
   d. Specify the data type for the measure.
   e. To move the measure in the structure, change the **Measure Index** field.
   f. To rename the measure, type the new name in the **Measure Name** field.
   g. To change the measure to an attribute, click **Member Attribute** under **Mapping Type**. The object is no longer a measure, but becomes an attribute of the dimension.
   h. To change the measure to a dimension, click **Member Attribute** under **Mapping Type**. The object becomes a dimension as part of the cube.
9. If you want to exclude a column from the import, select it in **Data Preview** field and click **Do not map** under **Mapping Type**.

   You can select multiple dimensions and exclude them from the import in one step.
10. If you want to add a calculated column, complete the following actions:
    a. Click **Add calculated column**.
    b. Select the expression that is created.
    c. Type the expression 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* that is available here in the PDF section: IBM Cognos TM1 10.1.0 Information Center (http://publib.boulder.ibm.com/infocenter/ctm1/v10r1m0/index.jsp).
    d. Preview the results of the expression.

e. Use the calculated column to create new dimensions, levels, or attributes, or to map parent or child items in a parent-child hierarchy.

11. Complete one of the following actions:
    - If you are importing dimensions only, click **Finish**.
    - If you are importing a new cube and you want to display the imported data only in the Model design pane, click **Next**, clear the **Open cube viewer upon completion** check box, and click **Finish**.
    - If you are importing a new cube and you want to display the imported data in a cube viewer, click **Finish**.

Results

If you were running a guided import, 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.

Related concepts:

"Managing processes" on page 123
Manage processes to create, modify, and schedule how data is imported and used in IBM Cognos TM1 Performance Modeler.

Importing 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 running a guided import, complete one of the following actions:
   - If you are importing dimensions only, click **Guided Import** > **Dimensions**.
   - If you are importing a new cube, click **Guided Import** > **Cube**.
   - If you are creating a process, go to the next step.
2. In the **Source 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 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 here in the PDF section: IBM Cognos TM1 10.1.0 Information Center (http://publib.boulder.ibm.com/infocenter/ctm1/v10r1m0/index.jsp).
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 "Importing and mapping dimensions or cubes" on page 89.
11. If you are satisfied with the settings, click **Finish**.

Results

If you were running a guided import, 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.

Related concepts:

"Managing processes" on page 123
Manage processes to create, modify, and schedule how data is imported and used in IBM Cognos TM1 Performance Modeler.

Importing from a subset data source

A subset can be used as the data source for a new process.

Procedure

1. In the **Source Type** field, select **IBM Cognos TM1 Dimension Subset**.
2. In the **Dimension** field, select the dimension from the list of dimensions.
3. In the **Subset** field, select the subset from the list of subsets.
4. Click the **Maps** tab, and check **Import dimension only**.
5. To customize the properties of a dimension, select the heading for the item in the **Data Preview** field and complete the following actions:
   a. Expand **Advanced Mapping** to display all properties.
   b. To change the name of the dimensions, click the dimension under **Advanced Mapping** and type the new name in the **Dimension Name** field.
   c. If you are importing a dimension with multiple levels and the member names are not unique, select the **Qualify member names** check box and specify a character for the separator.

      If member names are all unique, clear the **Qualify member names** check box.

      An example of non-unique members 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 members 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.
   d. To create a member that displays a total for the dimension, ensure that the **Create total element** check box is selected.
   e. To move the dimension in the structure, change the **Dimension Index** field.

      You can also drag the dimension to a new location.
   f. Specify how the consolidated members will be sorted.
   g. Specify how the leaf, or child, members will be sorted.
   h. Specify how to update the cube. New values can be added to existing values or new values can replace existing values.
6. To compile process script, click the **Advanced** tab, and click the **Prolog** tab.
7. Save and close the process.
8. Right-click the process you have just created, click **Execute Process** and click **OK**.

Results

The new dimension shows under the root directory.

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 setting in the **Transfer Data** property in the Transfer Specification Editor 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. **Transfer 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.

About this task

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 use the **Add Dependencies** command 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. To copy your model elements to a directory before you transfer to a target environment, in Transfer Target, click **Files**.
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 **Show All**.

5. To add more elements from the source system, 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 or if you want to transfer only the objects that were changed. For example, if you changed a subset definition on a large dimension, you can transfer that specific change without transferring the entire dimension.
6. To add all the dependent objects that are related to a model object, in the Source pane, select the object that you want to transfer and click **Add Dependencies**.

   The object and its dependents are added to the Target tree.
7. To transfer cell data for a view, select the view and, in the Properties pane, set the **Transfer Data** property to **Yes**.
8. To record your selections to the folder you specified in step 4, 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"
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.

"Creating a transfer specification" on page 104
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.

About this task

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, suppose that three model objects were removed and four objects were added after the transfer specification was transferred from the source environment. When you transfer the same specification from the transfer archive, the **Action** column indicates that the three objects are added and the four new objects are removed from the target tree. This automatic analysis helps you to understand how the changes affect the target environment, and possibly to modify your selections, before you proceed with the transfer.

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. In the Transfer Source window, click **Files**.
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 **Show 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**.
   - To transfer cell data for a view, in the Source or Target pane, select the cube view that you want to update and, in the Properties pane, set the **Transfer Data** property to **Yes**.

     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, cube data is not moved. However, you can move data by selecting cube 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 import cube data, in the Source or Target pane, select the cube view that you want to update and, in the Properties pane, set the **Transfer Data** property to **Yes**.

     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.
4. Copy the contents of the target folder on your computer to the target IBM Cognos TM1 environment.

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. In Transfer Source, click **Files**.
3. In Select Folder window, click the Transfer Archive folder 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.
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 import cube data, in the Source or Target pane, select the cube view that you want to update and, in the Properties pane, set the **Transfer Data** property to **Yes**.

     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. Activate the application so that users can begin to use it.

What to do next

You can begin modeling by using the imported objects.

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 *`Program Files`*`\ibm\cognos\tm1\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.
6. Start Cognos TM1 Performance Modeler.

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 Transfer Target, 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. 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, enter the name of the folder in which the transfer specification is saved.

   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 might change it to reflect updates in the design of model elements and applications.

Procedure

1. In the Transfer Design pane, right-click the folder that contains 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:
   - 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.
   - To add all the dependent objects that are related to a model object, in the Source pane, select the object that you want to transfer and click **Add Dependencies**.

     The object and its dependencies are added to the Target tree.
   - To transfer cell data for a view, select the view and, in the Properties pane, set the **Transfer Data** property to **Yes**.
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.

Before you begin

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\6.0\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"`

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 104
Save your selection of model objects to a transfer specification so that other administrators can be involved in the transfer process.

Chapter 10. Designing and deploying applications and managing rights

The **Application Design** window includes a tool that guides you through the process of defining 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 a user to work with the deployed application, further steps are required in the IBM Cognos TM1 Applications portal.

IBM Cognos TM1 Applications is a good choice when you need a high degree of formatting or when you do not want to install the IBM Cognos Insight component on your local machine. Cognos TM1 Applications offers the rich formatting provided by websheets, in addition to slices and other detailed navigation of cube data.

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.

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.

Use the **Application Design** window to 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 **New Application** design window includes these major steps in creating an application:

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

The application types you can create are:

- **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.

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- **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** > **New Application**.
2. Type the name for the application of your choosing.
3. From the drop-down menu, select the application type.

Application type	Description
Approval	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.
Central	No reporting structure. All users have equal rights and the changes cannot be locked.
Responsibility	Based on a reporting structure. Changes can be made without having to be submitted and approved.

4. Click **OK**.
5. Save the application.

What to do next

You can add views or websheets to the application.

Defining application views

After you have created the application you can define the views to be used in the application.

About this task

The views 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 Guide*. Each view has two properties to help the user:

- **Help Text**, shows when a user clicks the **View** > **Help** option when working with a view in the IBM Cognos Applications. This property displays instructions or information to assist users in entering data in the view. The help text you enter is also available in the workflow page.
- **Tab Name**, the name displayed on the view tab in the client. Modify this property if you want the tab to display text other than the name of the view.

Procedure

1. In the Design pane, click the **Views** folder.
2. In the TM1 Objects pane, expand the **Cubes** folder and the cube containing the view 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 to the **Views** folder of the application. You can now set the properties for the views.
5. Click the view in the **Views** folder.
6. To edit the help text, in the **Properties** pane, type the **Help Text** and **Tab Name** to your requirements.
7. To rename the view, right-click the view in the **Design** pane, and select **Rename**. Type the new name of the view.
8. Save the application.

Related concepts:

"Defining views and websheets" on page 16
Views and websheets that are needed for this application are identified in the application design pane.

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 Guide*. Each websheet has two properties to help the user:

- **Help Text**, shows when a user clicks the **View** > **Help** option when working with a view in the IBM Cognos Applications. This property displays instructions or information to assist users in entering data in the view. The help text you enter is also available in the workflow page.
- **Tab Name**, the name displayed on the view tab in the client. Modify this property if you want the tab to display text other than the name of the view.

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

Procedure

1. Click the application you have just made, and in the Properties pane, set **Advanced Modeling** to Yes.
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 to the **Views** folder of the application. You can now set the properties for the websheet.
5. Click the websheet in the **Views** folder.
6. To edit the help text, in the **Properties** pane, type the **Help Text** and **Tab Name** to your requirements.

7. To rename the view, right-click the websheet in the **Design** pane, and select **Rename**. Type the new name of the websheet.
8. Save the application.
9. In the TM1 Objects pane, expand the **Cubes** folder.
10. 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.
11. Drop the cubes to the **Manual Dependencies** folder of the application.
12. Save the application.

Related concepts:

"Defining views and websheets" on page 16
Views and websheets that are needed for this application are identified in the application design pane.

Defining an approval hierarchy

The approval hierarchy determines the workflow of your application.

About this task

The application types **Approval** and **Responsibility** need to 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, you must save and redeploy the application. This ensures that security and other application artifacts are updated to reflect the new approval hierarchy structure. Failure to redeploy the application will prevent users from taking ownership of nodes.

Procedure

1. In the Design pane, click on the folder **Approval Hierarchy**.
2. In the TM1 Objects pane, expand the **Dimensions** folder and the subsets.
3. Click the dimension containing the subset you want to use as your approval hierarchy.
4. Right-click the subset you want to use as your approval hierarchy and click **Add to application**. Select the application to where you want to add the approval hierarchy, or drag the subset to the **Approval Hierarchy** folder.
5. When the **Add to Application** warning message appears, click **Yes** to accept.
6. Save the application.

What to do next

To be able to validate the application, you must first select the default client system for use with the application.

Related concepts:

"Defining an approval hierarchy" on page 14
If an approval hierarchy is needed for this application, the subset used is linked to the application here.

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.

   The Cognos TM1 Application Server needs the context of the workflow action, the approval hierarchy node 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:

   ```
   pExecutionId
   pAppId
   pNodeId
   pWorkflowAction
   ```

   pAppId

   Represents the GUID unique identifer 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.

   pNodeId

   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. To return a list of leaf nodes below this consolidated node, you can write your own process logic, or use the `tp_custom_process_util_get_editable_leaf_children_subset` utility process provided with the Cognos TM1 Application Server.

   pWorkflowAction

   Returns one of the following values:

Table 10. pWorkflowAction values

Value of pWorkflow Action	Description
ENTER	Open an approval hierarchy node with either the Cognos Insight or Cognos TM1 Application Web clients.
OWN	Take Ownership of a node.
SAVE	Commit data for a node.
SUBMIT	Submit a node.
REJECT	Reject a node.

Table 10. pWorkflowAction values (continued)

Value of pWorkflow Action	Description
LEAVE	Close the Cognos Insight or Cognos TM1 Application Web client after using a particular node.
SUBMITCHILDREN	Submit the leaf children of a consolidated node from the Cognos Insight or Cognos TM1 Application Web client.
ANNOTATE	
RELEASE	Release ownership of a node
OFFLINE	Take the approval hierarchy node Offline when using the Cognos Insight client in Distributed mode.
ONLINE	Return the approval hierarchy node to Online when using the Cognos Insight client in Distributed mode.

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:

```
vReturnValue = ExecuteProcess('}tp_error_update_error_cube',
  'pGuid', pExecutionId,
  'pProcess', 'tp_pre_action_validation',
  'pErrorCode', 'OtherRevWarning',
  'pErrorDetails', vErrorDetails,
  'pControl', 'Y');

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 localized corresponding to this Error Code can be configured in the Cognos TM1 Applications Portal as described in this topic.

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 localized. 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.

2. Determine the messages to return to the user.

   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, the 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 codes, click the **Maintenance** option found on the IBM Cognos TM1 Application **Configuration** menu.
4. To set the custom action, open the application in the **Application Design** tab of Cognos TM1 Performance Modeler.
5. Select the application and display the **Properties** tab in the pane.
6. Click the ellipses at the **Custom Processes** label to display the dialog box where you can set the Pre and Post Process names and whether it is enabled.
7. Click **OK**.

```
      Enabled    PreProcess          Enabled  PostProcess
Submit   Yes     Other Revenue Validation  No
Reject   No      Other Revenue Validation  No
Annotate  No      Other Revenue Validation  No
```

   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.

Selecting the default client systems for use with the application

A client can be defined for use with the application made in IBM Cognos TM1 Performance Modeler.

About this task

The client can be set in the properties window of the application highlighted in the 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 Design pane, select the application.
2. Select **Clients** in the Properties pane.
3. Click the ellipsis **...**
4. Select the default client to use with the application.
5. Click **OK**.

What to do next

Before you can edit the user rights for the application, you must first validate and deploy the application.

Validating and deploying the application

The validation process ensures that all conditions required to deploy the application are in place.

About this task

Before an application can be used, the application must pass validation and deployment. This process ensures:

- 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, **Hierarchical Approval** and **Continuous**, the **Approval Hierarchy** folder includes the dimension that contains the approval hierarchy.

Procedure

1. Right-click the application in the Design pane and click **Validate Application**. A **Validation performed successfully** message is displayed. Click **OK**.
2. Right-click the application and click **Deploy Application** . A **Deployment performed successfully** message is displayed. Click **OK**. If you select **Deploy Application**, the application is validated by default.
3. Click **OK**.

What to do next

The user groups and rights must be managed before the application is available for use.

Related concepts:

"Deploying the application" on page 18
Before reviewers or contributors can use the application, it is deployed to the IBM Cognos TM1 Application Service.

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 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 the those manually added to the **Manual Dependencies** folder are compiled and included into a section in the Application Definition.

Enabling advanced modeling

You have to enable advanced modeling to be able to add dependencies to the manual dependencies folder.

About this task

Dependencies that are shown in the TM1 Objects tree can be added to the **Manual Dependencies** folder. To be able to add dependencies, this facility must be enabled.

Procedure

1. Click **Application Design**.
2. Open the application you need from the design tree.
3. Click the property **Advanced Modeling** and select **Yes**.
4. Save the application.

Adding dependencies manually

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

About this task

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

Procedure

1. In the 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.

Managing rights for the application

After an application has been deployed, you must define rights for all user groups that you want to have 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.

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 that 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:

- **View** rights assigned at a consolidated node are also assigned to all descendent 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 overrides the cascading of **Review** and **Submit** rights on a consolidated node as follows:

- 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 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.
2. In the **Add Rights** pane, click the node in the hierarchy from the column **Select Node**.
3. Select the user group from the column **Select Group**.
4. Select the settings for **Right**, **Review Depth**, and **View Depth**, in the column **Define Security**. 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. Click **Save** in the **Rights** window.

Managing user groups for a central type application

After an application is deployed, you can assign user groups to a central type application.

About this task

For the application type **Central**, you can define the user group only.

Procedure

1. Double-click the **Rights** object in the Application Design pane.
2. From the column **Select Group**, select the user group.
3. Click **Add**.
4. Click **Save** in the **Rights** window.

Managing IBM Cognos TM1 Performance Modeler in the portal

To be able to work with the deployed IBM Cognos TM1 Performance Modeler application, further steps are required 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.

Related concepts:

"Activating an application" on page 19
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.

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.

About this task

An application should only be exported 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 describes 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. From the **File Download** dialog box, click **Save**.
4. Navigate to the directory to where you want to save the export file.
5. Click **Save**.

Importing an exported application to the portal

You can import an exported application back into the Applications Portal and use it as the basis for a new application.

Procedure

1. Open the Applications portal.
2. Click the **Import Application** button.
3. Select the server onto which you want to import the application.
4. Next to the **Application file** field, click **Browse**.
5. Navigate to the application (.zip) file, then click **Open**.
6. Select the **Import application security** option if you want to import security settings with the application.
7. Select the **Import application properties** option if you want to import property settings with the application.
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 Applications portal.

About this task

Resetting an application discards all progress made in the planning process so that you can restart the planning process. 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.

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 machine 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 `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 machine
- Enable/disable a server
- Reset the application (not included in the -h flag listing). Reset using this utility removes all existing sandboxes for cubes in the Application. When you use Reset from the TM1 Applications portal, 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. Tthe 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 machine.

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 machine, use the following command to package up the tool and its required objects: `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. Extract the compressed file on the secondary machine. Ensure that there is a Java runtime environment available on the secondary machine and that it is identified in the *javahome* or *jrehome* environment variable.

The following sample syntax that is used to deactivate an application called StorePlan (breaks in syntax are for formatting purposes only. Do not break these lines in your commands):

```
D:
cd "D:\Program Files\ibm\cognos\tm1_64\webapps\pmpsvc\WEB-INF\tools"
app_maintenance.bat
-serviceurl voltran.ibm.com:9510/pmpsvc
-username admin -pwd apple
-op deactivate
-app {d06b9060-c3cc-4c4f-ac5d-60276540a9ce}
```

The service URL is the URL used to browse to the TM1 Applications portal.

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. See "Using TM1Crypt.exe" in the *IBM Cognos TM1 Installation and Configuration Guide* for details on encrypting authentication.

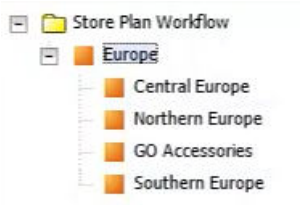
The GUID can be identified by the `aid` parameter in the browser link when you open the application in the TM1 Applications portal.

```
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 also use this utility as part of a TurboIntegrator process.

For example, suppose that you have a model with the following approval hierarchy:



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 processed. Then use the automation tool to refresh and update the application in an overnight batch process.

The TurboIntergrator processes will takes the following actions:

Deactivate
: Makes the application unavailable to users while the update is taking place.

Update Country and Region
: This action updates the approval hierarchy dimension for this application. The command adds Western Europe as a node beneath Europe.

Update Approval Hierarchy Subset
: This action updates the approval hierarchy subset with the new information.

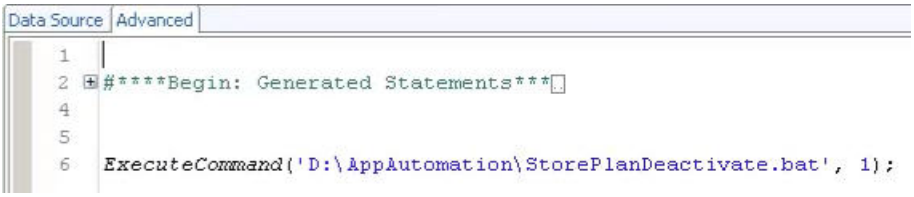
Deploy Store Plan app
: This action redeploys the application. In a production environment, data would be added first.

Refresh rights for Store Plan app
: This action updates the rights for users with review rights to Europe. Those users would inherity the rights to the new node.

Activate Store Plan app

This action makes the application available to users again after making those changes.

Following is a sample of the deactivate process:



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.

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. 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.

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Related tasks:

"Importing and mapping dimensions or cubes" on page 89
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 from a relational data source" on page 93
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 and mapping dimensions" or "Importing from a relational data source" in the *IBM Cognos TM1 Performance Modeler Guide*.

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" in the *IBM Cognos TM1 Performance Modeler Guide.*

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.

Scenario	Validity of script
Script created in Cognos TM1 Architect and opened in Cognos TM1 Performance Modeler.	Valid

Scenario	Validity of script
Script created in Cognos TM1 Performance Modeler and opened in Cognos TM1 Architect.	Valid
Script created in Cognos TM1 Performance Modeler, modified in Cognos TM1 Architect, and opened in Cognos TM1 Performance Modeler.	Not valid.

Example: the ViewZeroOut function

The ViewZeroOut function sets all data points in a view to zero. Syntax:
`ViewZeroOut(Cube, ViewName);.`

Argument	Description
Cube	The parent cube of the view you want to zero out.
ViewName	The view you want to zero out.

```
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.

Procedure	Description
Prolog	A series of statements to be executed before the data source is processed.
Metadata	A series of statements that update or create cube, dimensions, and other metadata structures during processing.
Data	A series of statements that manipulate values for each record in the data source.
Epilog	A series of statements to be executed after the data source is processed.

For more information, see "Using the process editor" in the *IBM Cognos TM1 Performance Modeler Guide*.

For a complete list of all available TurboIntegrator and Cognos TM1 rules functions, see the *IBM Cognos TM1 Reference Guide*.

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* one of these lines:
   - #****GENERATED STATEMENTS START****
   - #****GENERATED HEADER START****

   or *after* these lines:
   - #****GENERATED STATEMENTS FINISH****
   - #****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. 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 Database

IBM Cognos TM1 provides a sample scorecarding database called `GO_scorecards` that is available with the installation program.

You can run this sample as a TM1 server just like the other samples provided with the installation.

This sample includes a collection of scorecarding objects that are ready to use, including metrics cubes, impact diagrams, strategy maps, and custom diagrams.

The sample is installed to the following location:

`<`*`TM1 installation location`*`>\samples\tm1\GO_scorecards`

For example, on a Microsoft Windows 64-bit system, the sample is installed here:

```
C:\Program Files\IBM\cognos\tm1_64\samples\tm1\GO_scorecards
```

For more information about this sample, see the *IBM Cognos TM1 Installation and Configuration Guide*.

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

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- 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

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
- Impact diagram
- Strategy Map diagram
- Custom diagram

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.

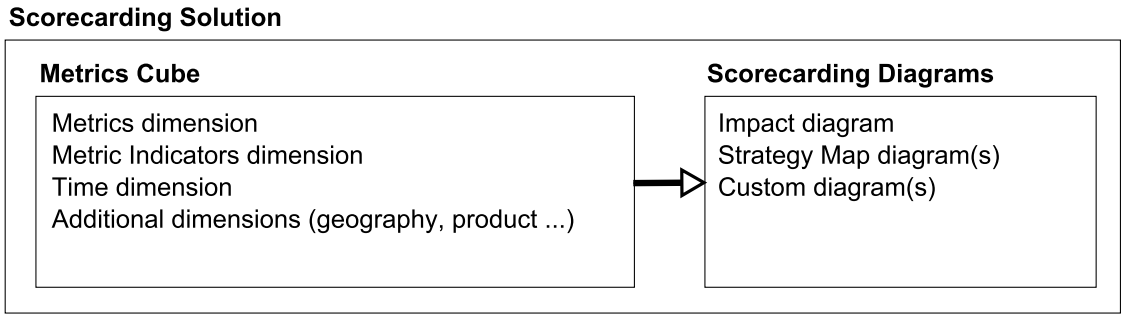


Figure 2. Cognos TM1 Scorecarding solution

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, at a minimum, the scorecarding solution includes the impact diagram that is automatically created when a metrics cube is created.

- Scorecarding solution:
  - Metrics Cube
    - Metric dimension
    - Metric Indicator dimension
    - Time dimension
    - Optional - more dimensions for geography, product, or customer.
  - Impact Diagram (automatically created for the metrics cube)
  - Optional scorecarding diagrams:
    - Strategy Map diagrams
    - Custom diagrams

Metric Dimension

A metric dimension contains your collection of important measures or key performance indicators (KPI) that you want to monitor in your business or organization. In IBM Cognos TM1 Scorecarding, these measures are called *metrics*. For example, an individual metric in a metric dimension identifies one aspect of performance, such as *Profit*, *Revenue, or Expenses*. Other examples include *Product Sales* and *Research Funding*.

You can use TM1 scorecarding to monitor the actual performance of a metric and compare it to expected or target values. When you monitor the performance of a metric, you combine it with metric indicators that provide the additional details about a metric's status, score, and trend. Metrics are typically shown in the row

dimension title of a cube view.

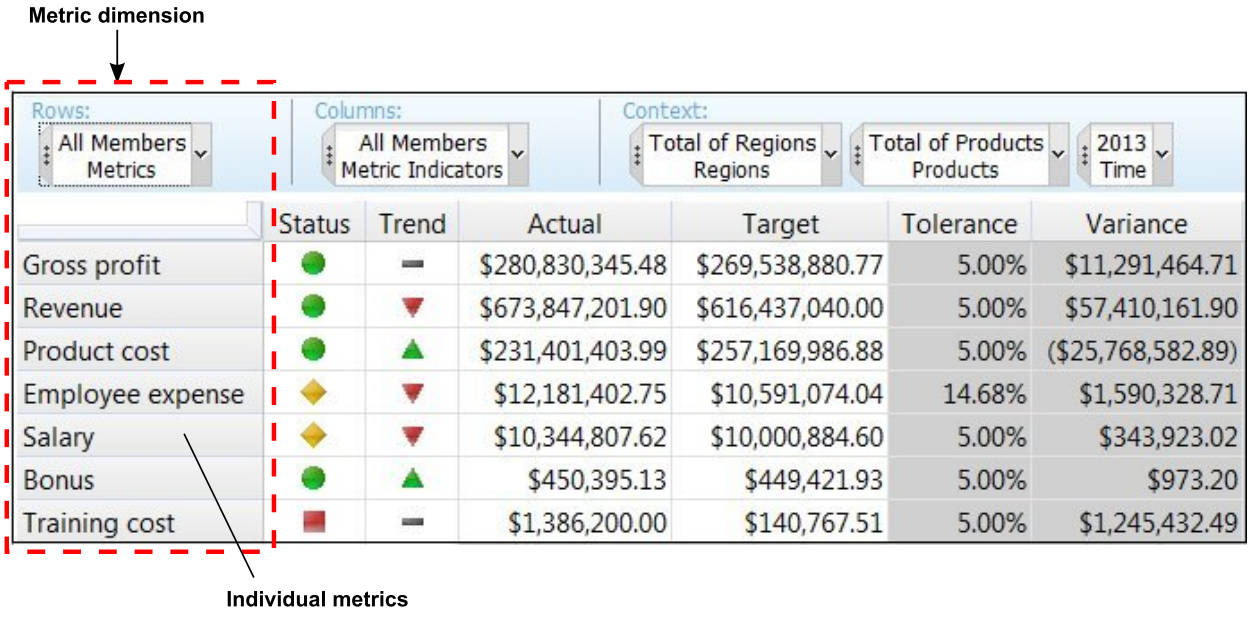


Figure 3. Metric dimension in a metrics cube

Designing your metric dimension

Because metric dimension definitions might not be stored in your existing TM1 data, you might need to create the dimension and related metric members. You use the metric dimension editor in Cognos TM1 Performance Modeler to build your 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 revenue forecast. However, expenses above a set target are a negative indicator and immediate attention is needed to find out why the expenses are higher than forecasted.

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**

Choosing a Performance Pattern depends on the specific metric you want to monitor. For example, profit above target is favorable, while expenses below target are favorable.

Tolerance Type

Tolerance type indicates how to interpret the value in the tolerance indicator.

- Choose **Absolute** to indicate that the value in the tolerance indicator is the tolerance and is used as is.
- Choose **Percent** to indicate that the value in the tolerance indicator is be used to calculate the tolerance as a percentage of target.

Metric dimension calculations

You can use standard TM1 functions when you define Metric dimensions. For example:

```
Profit = Revenue - Expenses
```

You can set separate calculations for leaf and consolidated level cells.

N Calculation

A simple calculation that is computed at the leaf level.

C Calculation

A calculation that is computed on aggregated results.

For more information, see "Creating calculations for Metric and Metric Indicator Dimensions" on page 152.

Metric Indicators Dimension

In IBM Cognos TM1 Scorecarding, a Metric indicators 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.

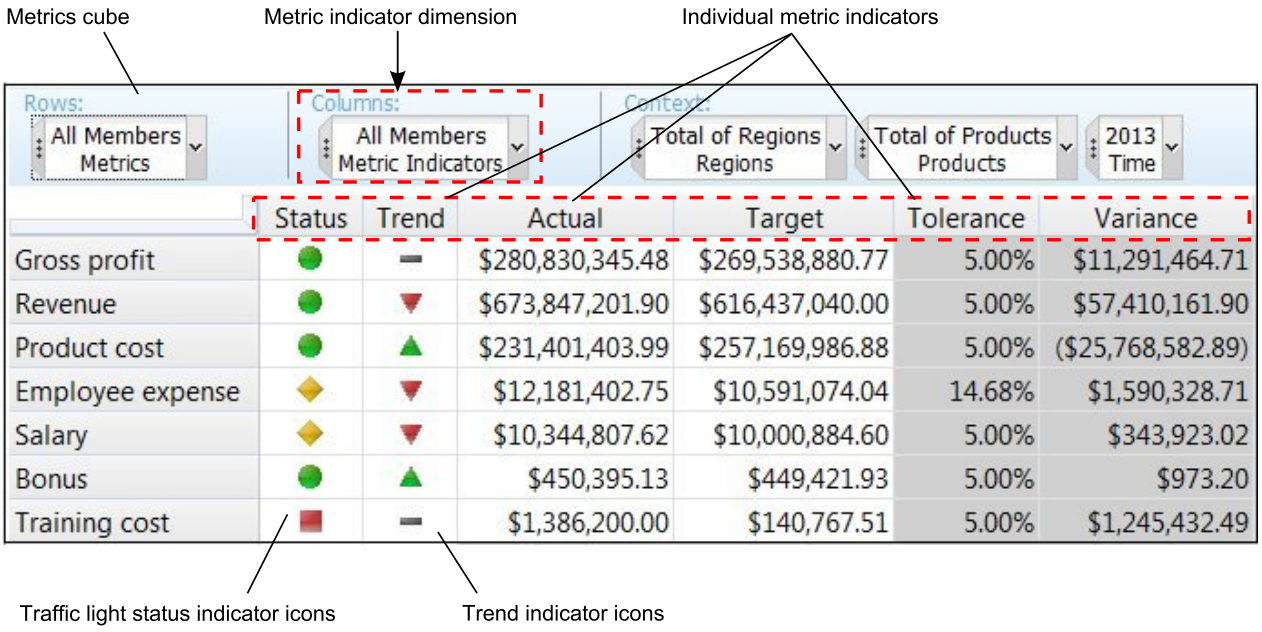


Figure 4. Metric Indicator dimension in a metric cube

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 11. Metric indicator traffic light status icons

Traffic light icon	Description
	A green circle icon indicates a satisfactory status for the associated Metric indicator.
	A yellow diamond icon indicates caution about the status for the associated Metric indicator.
	A red square icon indicates a warning about the status for the associated Metric indicator.
	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.

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 12. Metric indicator trend icons

Trend icon	Description
	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.
	A gray dash icon indicates that the trend value is unchanged.
	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.
Blank cell	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.

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 13. List of default Metric Indicators

Metric indicator name	Description
Status	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. • 1 - excellent (on target or above) • 0 - average (within 1 tolerance of target) • 1 - poorly (more than 1 tolerance from target) Uses the `SCORESTATUS` metric indicator function: `=SCORESTATUS('Score')`

Table 13. List of default Metric Indicators (continued)

Metric indicator name	Description
Trend	A calculated value that represents how a metric performance 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 metric indicator function: `=SCORETREND('Score')`
Actual	A value for 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'`
Score	Calculates a metric's score that 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: `SCORE(`*`Actual`*`,`*`Target`*`,`*`Tolerance`*`)`

Table 13. List of default Metric Indicators (continued)

Metric indicator name	Description
Score Change	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: `='Score'-LAG(0,'Score')`
Actual Trend	Not currently used.
Actual Change Percent	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: `=('Actual'-LAG(0,'Actual'))/LAG(0,'Actual')`
Status_1_Count	Internal use only.
Status_0_Count	Internal use only.
Status_-1_Count	Internal use only.

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 `SCORE` function to calculate this value.

  For example: `=SCORE('Forecast Actual','Forecast Target','Forecast Tolerance')`
- *Forecast Status* - Use the `SCORESTATUS` function to calculate this value.

  For example: `=SCORESTATUS('Forecast Score')`

  For the Renderer property, enter `trafficLight` to display a traffic light icon for this metric indicator.
- *Forecast Trend* - Use the `SCORETREND` function to calculate this value.

  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 151.
- "Metric Indicator functions."

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"
- *IBM Cognos TM1 Reference Guide Rules Functions*
- IBM Cognos TM1 Performance Modeler User Guide > Dimension calculations

Metric Indicator functions

IBM Cognos TM1 Scorecarding includes a collection of dedicated functions that are specific to metric indicator calculations. You can see examples of these functions in the default metric indicators, such as *Score*, *Status*, and *Trend*. You can also use them with your own metric indicators.

These functions are available in the Expression editor when you work with Metric indicators.

SCORE function for metric indicators

The SCORE function calculates a metric's score for a specified context of actual, target, and tolerance indicators.

Overview

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 only valid in a cube that has a Metric dimension and can determine the performance pattern of the metric and the tolerance type.

Syntax

```
SCORE(Actual,Target,Tolerance)
```

Arguments

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.

Example

For example, this function is used by the default metric indicator named Score.

```
=SCORE('Actual','Target','Tolerance')
```

SCORETREND function for metric indicators

The SCORETREND function calculates a value that represents how a metric performance changed since the previous period.

Overview

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.

Syntax

```
SCORETREND(Score)
```

Arguments

The *Score* argument is the name of the metric indicator that represents the Score indicator.

Example

For example, this function is used by the default metric indicator named Trend.

```
=SCORETREND('Score')
```

SCORESTATUS function for metric indicators

The SCORESTATUS function calculates a value that represents the performance of the score for a metric.

Overview

The **SCORESTATUS** 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)

Syntax

```
SCORESTATUS(Score)
```

Arguments

The *Score* argument is the name of the metric indicator that represents the score indicator for a metric.

Example

For example, this function is used by the default metric indicator named Status.

```
=SCORESTATUS('Score')
```

CAVERAGE function for metric indicators

This function calculates the average value in a metric consolidation and returns a single value.

Syntax

```
=CAVERAGE(flag-value)
```

The *flag-value* argument 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.

Example

For example, this function is used by the default metric indicator named Tolerance.

```
=CAVERAGE(3)
```

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 metric cube to monitor multiple metrics and metric indicators. Display the status and trends of a number of metrics at one time. The primary feature of a metric cube shows the current relative status of many rows in a table. It displays while you are viewing the current trend of many measures simultaneously.

The following list describes a standard scorecard layout for a metric cube:

- Row title dimension: Metrics dimension

- Column title dimension: Metric Indicator dimension
- Context dimensions: time, geography, and other data context dimensions

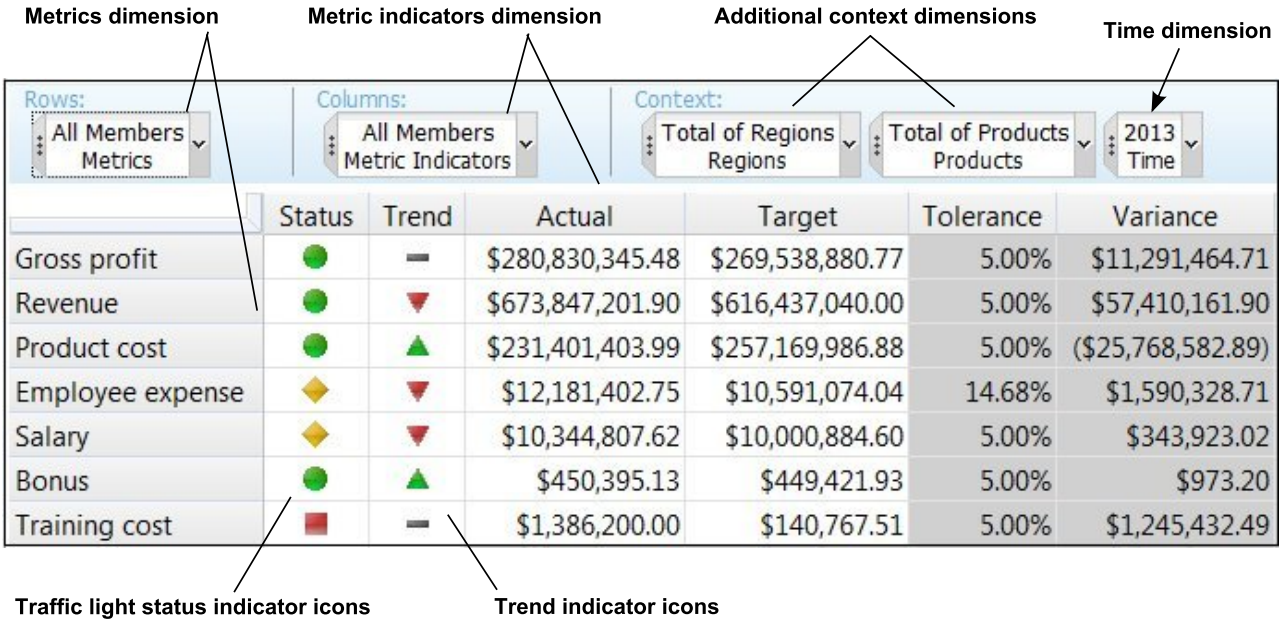


Figure 5. Metrics cube example

A metric cube combines your metrics 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 metrics dimension
- One metric indicator dimension
- One time dimension

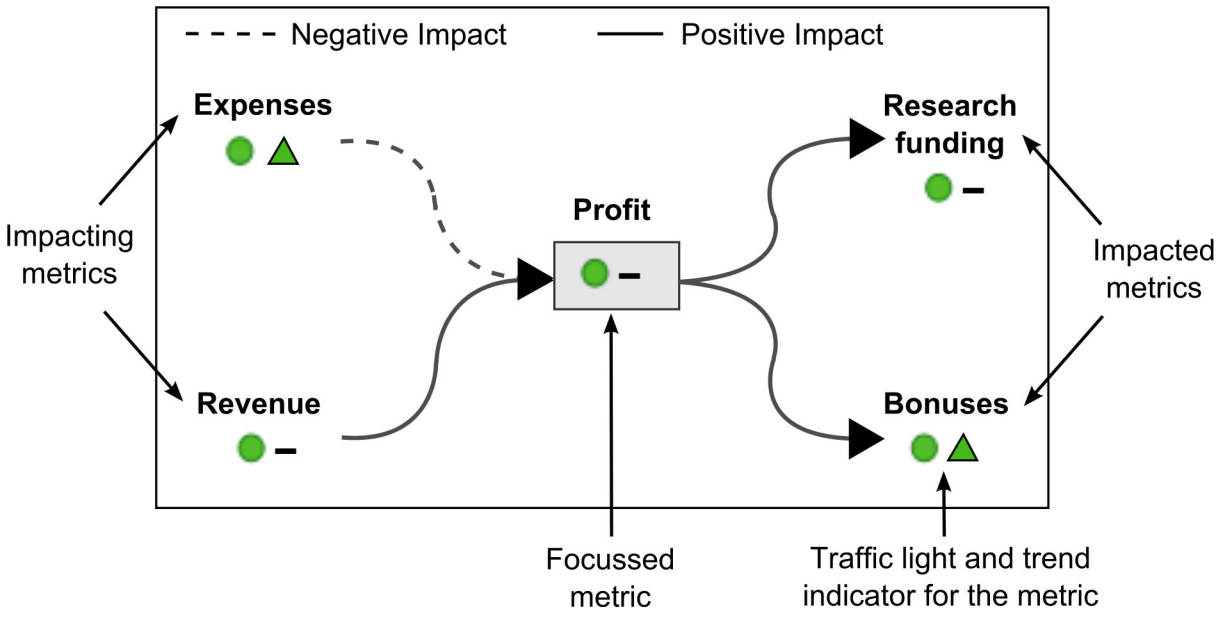
Optionally, you can also add other existing dimensions such as geography or products.

Note: When you create a metrics cube, an impact diagram is automatically created. A metrics cube can have only one impact diagram.

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 impacts another metric.

For example, an impact diagram might show how *Revenue* and *Expenses* impact *Profit*, which then impacts *Bonuses* and *Research Funding*.



Impact diagrams display traffic light and trend indicator icons to show the status and the trend of each metric in the diagram. When a user interacts with an impact diagram, they can select a different dimension context. The traffic light and trend indicators update with new values for the selected dimension.

Note: A metrics cube can have only one impact diagram and it is created automatically when you create a metrics cube.

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 impact relationships between the metrics in the diagram.

You can use the **Nature of Impact** property to show if a metric has a positive or negative impact in relation to the focused metric.

- **Positive** - Displays a solid line in the diagram to show a positive impact from one metric to another metric.
- **Negative** - Displays as a dashed line in the diagram to show a negative impact 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 diagram that tracks business performance by *perspectives*, *objectives, and metrics*. This type of diagram is also called a strategy map.

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 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

A Strategy Map combines perspectives, objectives, and metrics with traffic light status and trend indicators icons into one diagram. When you hover your mouse over the metric indicator icons for an objective, a list of the related metric indicators displays. It shows the status and trend icons for each one. Hovering your mouse over the indicator icons for a perspective shows the name of the diagram and perspective.

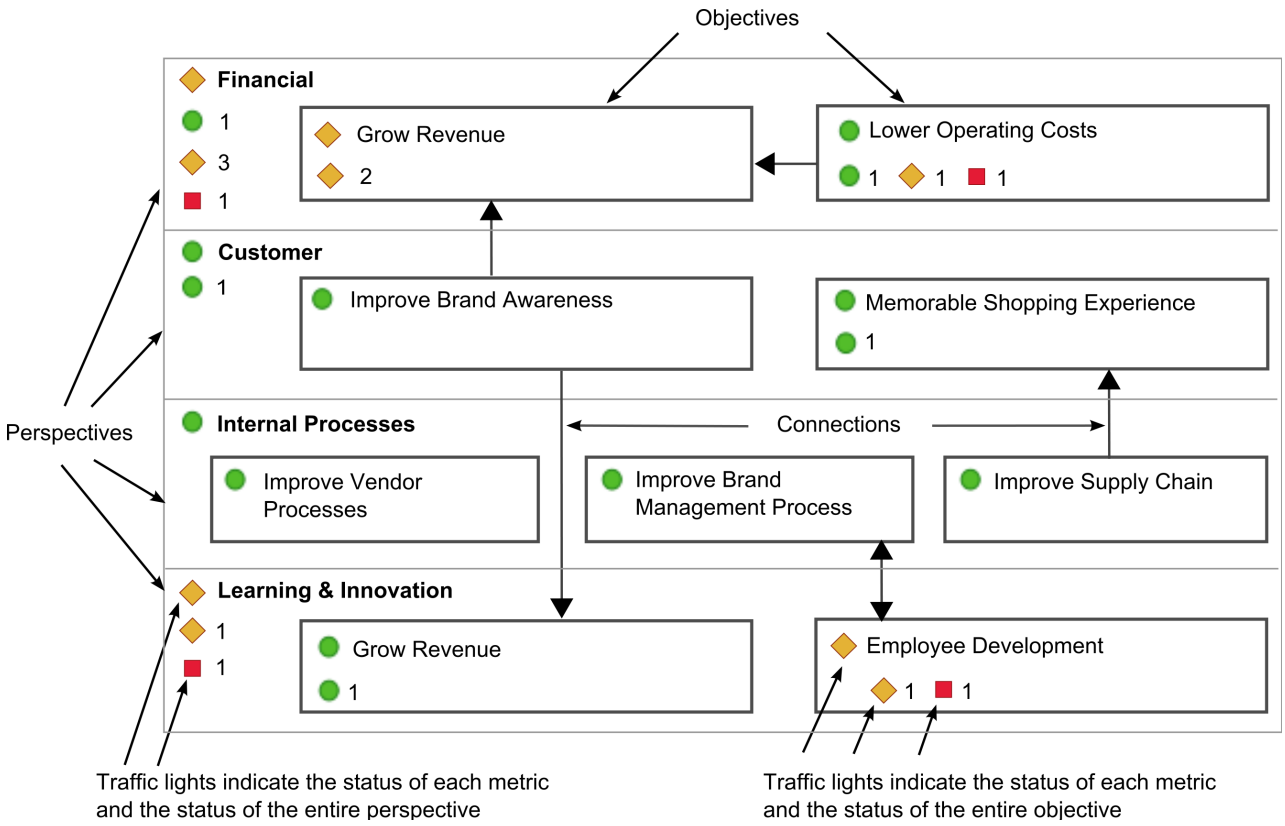


Figure 6. Example of a Strategy Map

Strategy Maps 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 you 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 diagram display a summary for the status of the underlying metrics in the diagram. You can set the status calculation option 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 the score for a metric. The returned numeric value is displayed as a traffic light indicator icon to visually show the status in the diagram. The possible values for status include Excellent, Average, Poor, and Incomplete as described in the following table.

Table 14. Status for summarizing metrics in Strategy Map diagrams

Status	Description
Excellent	A green circle icon indicates a satisfactory status for the associated metrics. The metric is on target or above.
Average	A yellow diamond icon indicates caution about the status for the associated metrics. The metric is within one tolerance of target.
Poor	A red square icon indicates a warning about the status for the associated metrics. The metric is more than one tolerance from target.
Incomplete	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.

The available status calculations that you can choose to control how metrics are summarized in the diagram are described in the following table.

Table 15. Status calculations for summarizing metrics in Strategy Map diagrams

Status Calculation	Description
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 frequently occurring status of all the metrics that are associated with this perspective or objective. For example, if the associated metrics were Excellent (2), Average (4), Poor (1), and Incomplete (0), a status of Average would be displayed.
Most positive status	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 were Excellent (1), Average (1), Poor (3), and Incomplete (1), a status of Excellent would be displayed.

Table 15. Status calculations for summarizing metrics in Strategy Map diagrams (continued)

Status Calculation	Description
Least positive status	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.

Custom Diagram

A Custom scorecard diagram is a strategy map where you import a custom image. You then place metrics with dimensional context onto the image as data points.

Some examples of a Custom diagram are identified in the following list:

Geographical maps
Show different focuses of your organization on fixed regions, such as inventory or cost metrics in North America or Europe.

Process diagrams
Show metrics in the 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.

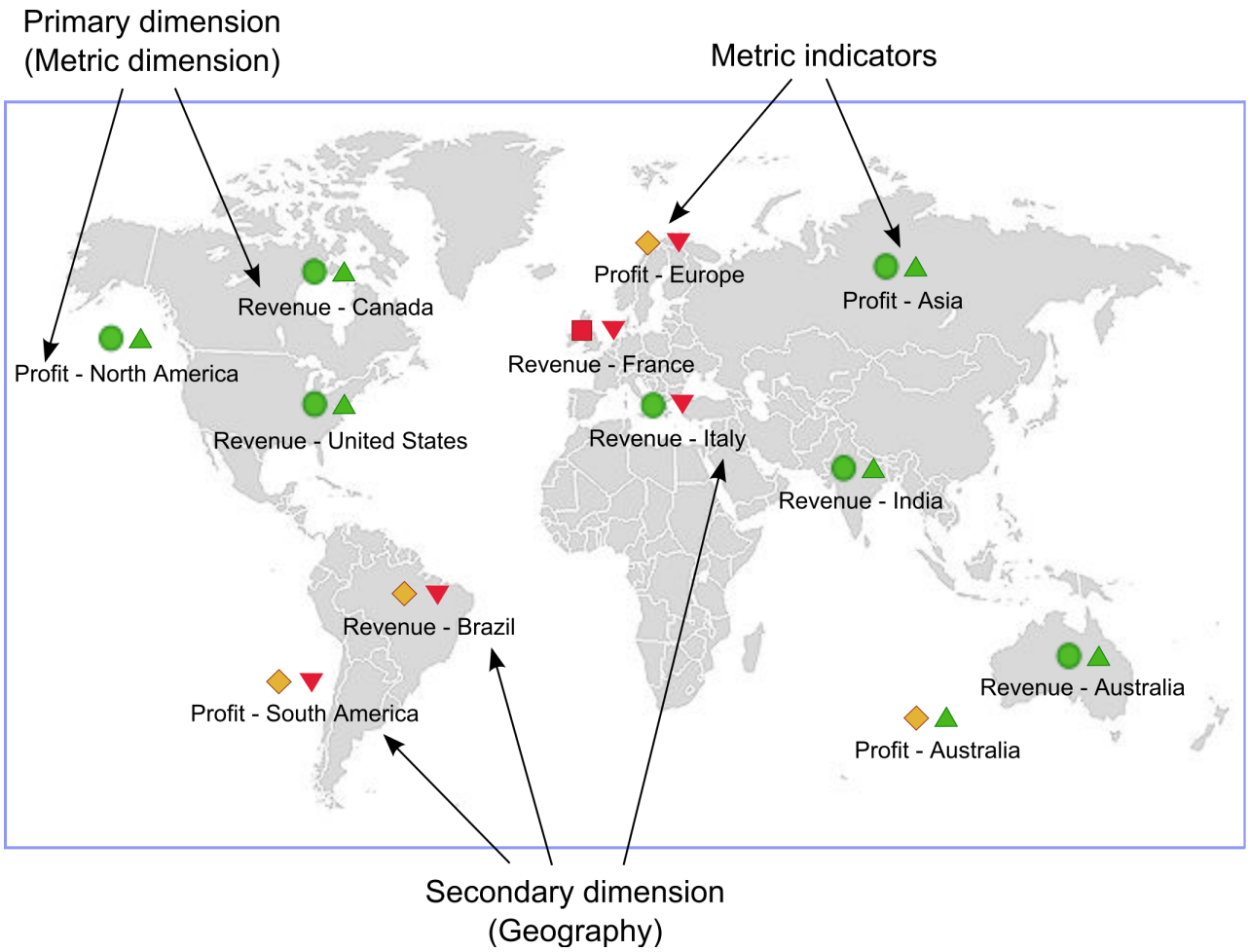


Figure 7. Example of a Custom scorecard diagram

Dimensions for a Custom Diagram

You create a custom diagram by selecting an image and then choosing 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

The following sample images are available in the custom diagram editor:

- World map (Example: Use map image with a geography 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 resize the image and control its opacity

Opacity

Maintain Aspect Ratio

Horizontal

Vertical

Pixels / Percentage
Select **Pixels** or **Percentage** to set the image measurement units.

Creating a Cognos TM1 Scorecard solution

A series of steps are required to create a Scorecard solution in IBM Cognos TM1 Performance Modeler.

About this task

To build and publish a scorecard 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 scorecard solution. After you assemble the required objects for a scorecard solution, you publish the solution to make it available for interaction and monitoring in IBM Cognos Insight.

Procedure

1. Open the Scorecards Welcome page:

   In Cognos TM1 Performance Modeler, click **Create Scorecards** on the **Model Design** Welcome page.

   The **Scorecards** Welcome page opens.
2. Build your scorecard objects:

   Use the **Scorecards** Welcome page to access the tasks that build your scorecard objects.

   a. Create a Metric dimension.
   b. Create a Metric indicator dimension.
   c. Create more dimensions.
   d. Create a Metrics cube.
   e. Create at least one scorecard diagram:
      - Edit the default Impact diagram.
      - Create a Strategy map.
      - Create a Custom diagram.
3. Add data to your Metrics cube.
4. Deploy your scorecard solution:

   Deploy an application to a TM1 server to make it available in IBM Cognos Insight, IBM Cognos Workspace, and IBM Cognos TM1 Web.
5. View and interact with your scorecard solution:

Use IBM Cognos Insight to create a dashboard from the objects in your scorecard solution.

Creating a Metric Dimension

Creating a Metric dimension is the first step for creating an IBM Cognos TM1 Scorecarding solution in IBM Cognos TM1 Performance Modeler.

About this task

A Metric dimension contains the list of all the metrics that you want to use to monitor business performance. A metric is a measurement of performance in a key area of a business that compares current results to planned values. Metrics are the lowest level of a scorecard application. Examples of metrics include *Revenue*, *Expenses*, and *Profit*.

For more information about Metric dimensions, see "Metric Dimension" on page 132.

Procedure

1. In Cognos TM1 Performance Modeler, on the **Model Design** Welcome page, click **Create Scorecards**.

   The **Scorecards** Welcome page opens.
2. On the **Scorecards** Welcome page, in the first task, **Create Metric Dimension**, click **Metric Dimension**.
3. Enter a name for the metric dimension and then click **OK**.

   Note: By default, the **Dimension Type** is automatically set to **Metric** and cannot be changed during this process.

   A new tab opens where you can edit the new metric dimension.
4. Add members to the metric dimension, such as *Revenue*, *Expenses*, and *Profit*:

   On the tab for the new metric dimension, add members to the dimension:

   a. In **Name** column, click **<Enter new member>** and enter a name for the new member.
   b. Click the icon in the **Format** cell to set a date/time or numeric format.
   c. Click the icon in the **N Calculation** to create a calculation for leaf level data.
   d. Click the icon in the **C Calculation** to create a calculation for aggregated results.
   e. Click the **Performance Pattern** cell to choose how you want the metric to be applied.
      - **Above target is favorable**
      - **On target is favorable**
      - **Below target is favorable**
   f. Click the list in the **Tolerance Type** cell to choose how to numerically evaluate the metric.
      - Choose **Absolute** to evaluate based on the raw actual value provided.
      - Choose **Percent** to evaluate based on a percentage of the target value.
   g. Repeat the previous steps to add more members to the metric dimension.
5. 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

Perform the following steps to build a Metric indicator dimension in IBM Cognos TM1 Performance Modeler.

About this task

A metric Indicator dimension contains the list of metrics qualifiers or indicators such as *Actual*, *Target*, *Trend*, and *Tolerance*. By default, when you create a new metric indicator dimension, it is pre-populated with members that are required to build a Metrics cube.

You can also add more members to a Metric indicator dimension that you want to display in the Metrics cube. For example, you can add a Forecast member and a Forecast Status member. These members display how the metric called Actual is performing against the metric called Forecast. When you add more members to the metric indicator dimension, you can also configure calculations to display multiple statuses for your metrics.

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.

For more information about Metric indicator dimensions, see "Metric Indicators Dimension" on page 134.

Procedure

1. On the **Scorecards** Welcome page, in the task **Create Metrics Dimensions**, click **Metric indicator Dimensions**.
2. Enter a name for the new metric indicator dimension and then click **OK**.

   Note: By default, the **Dimension Type** is automatically set to **Metric indicator** and cannot be changed during this process.

   A new tab is displayed and allows you to can add and edit members for the new dimension. A number of members are automatically pre-populated, such as *Status*, *Score*, and *Trend*.
3. Optionally, you can add more new members to the dimension.
   a. To add a member, click **Enter a new member** under the **Name** column and enter a name for the new member.
   b. Edit the related properties.

      Format
      Specifies the numerical or date/time display format.

      N Calculation
      A simple calculation that is performed at the leaf level.

      C Calculation
      A calculation that is performed on aggregated results.

Renderer

Specifies the indicator icon to use for the status or trend. Double-click the cell and then type in one of the valid values:

- `trafficLight`
- `metricTrend`
- Leave the cell blank to display a numeric value instead of an indicator icon.

4. Repeat the previous steps to add more members to the metric indicator dimension.
5. Click **Save**.

What to do next

After you create your metric indicator dimension, you can create a Metrics cube.

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, you can use the following standard TM1 functions for N Calculations (leaf level) and C Calculations (consolidated level):

- Simple (Arithmetic)
- Functions (Dimension functions, TM1 functions)
- Aggregation functions (C Calculations only)

For more information about standard TM1 functions, see the following topics:

- *IBM Cognos TM1 Reference Guide Rules Functions*
- IBM Cognos TM1 Performance Modeler User Guide > Dimension calculations

For metric indicator dimensions, you can also use the following metric indicator functions:

- SCORE
- SCORETREND
- SCORESTATUS
- CAVERAGE

For more information, see "Metric Indicator functions" on page 139

Procedure

1. To use standard TM1 calculations and functions with your metric dimensions, use the expression editor in Cognos TM1 Performance Modeler.
   a. In the dimension editor, click the icon in the **N Calculations** or **C Calculations** cell where you want to enter the calculation.

      The expression editor opens.
   b. Use the expression editor to build the expression that you want.

2. To use metric indicator functions with the members in your metric indicator dimension, type the functions directly into the **N Calculations** and **C Calculations** cells.

Creating a Metrics Cube

After you create your metric and metric indicator dimensions, you can then create a metrics cube in IBM Cognos TM1 Performance Modeler.

About this task

A metrics cube requires a minimum of the following dimensions:

- One metrics dimension
- One metric indicator dimension
- One time dimension

Optionally, you can also add other existing dimensions such as geography or products.

For more information about Metrics cubes, see "Metrics Cube" on page 141.

Note: When you create a metrics cube, an impact diagram is also automatically created. A metrics cube can have only one impact diagram.

Procedure

1. On the **Scorecards** Welcome page, click **Create Metrics Cube**.
2. Enter a name for the new metrics cube and then click **OK**.
   A new tab is displayed, where you can edit the new metrics cube.
3. Add the required dimensions to your cube by dragging them from the Model Design pane:
   a. Click and drag a *metric dimension* to the row area of the cube.
   b. Click and drag a *metric indicator dimension* to the columns area of the cube.
   c. Click and drag a *time dimension* to the context area of the cube.
4. Optionally, you can add more dimensions to your metrics cube by clicking and dragging them to the context area of the cube.
5. Click **Save**.

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 define the impact diagram for a metrics cube by organizing the metrics to use in the diagram. The metrics 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.

You create an Impact diagram by organizing your metrics into the following three groups:

- **Impacting Metrics** (for example *Expenses* and *Revenue*)
- **Focused Metrics** (for example *Profit*)
- **Impacted Metrics** (for example *Research Funding* and *Employee Bonuses*)

For more information about Impact diagrams, see "Impact Diagram" on page 142.

An example of organizing metrics for an Impact diagram is shown in the following figure.

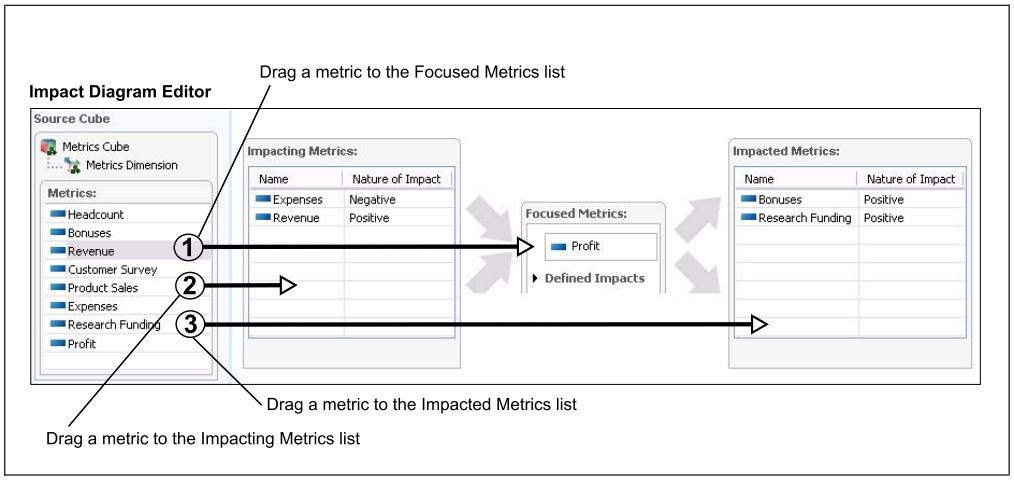


Figure 8. Example of editing the Impact Diagram

Procedure

1. On the **Scorecards** Welcome page, click **Edit Impact Diagram**.
2. Select the Metrics cube that you want to use with the diagram and then click **OK**.
3. Drag the desired metrics from the **Source Cube** list to the different lists for the diagram:
   a. Drag a metric to the **Focused Metrics** list.
   b. Drag a metric to the **Impacting Metrics** list.
   c. Drag a metric to the **Impacted Metrics** list.
4. 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.
5. Click **Save**.
6. Click the **Preview** tab to see an interactive preview of the diagram.

What to do next

After creating this diagram you can create additional scorecard diagrams or deploy the scorecarding application to use in IBM Cognos Insight.

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 suggested sample of perspectives and objectives are automatically created for it. You can use the samples as a starting point, edit them, or create you own combinations.

For more information about Strategy Maps, see "Strategy Map" on page 144.

Use the Strategy Map editor to organize your 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.

Procedure

1. On the **Scorecards** Welcome page, click **Create Strategies**.
2. Select a Metrics cube to use with the diagram.
3. Enter a name for the diagram
4. In the **Strategy Type** list, choose **Strategy Map** and then click **OK**.

   The Strategy editor opens.
5. Create a perspective:

   Under the **Perspectives** column, click **<Enter name of new Perspective>** in the cell, type a name for a new perspective, and then 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 a name for the new objective and then 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 144
   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 one of the available calculation types.
   - **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 frequently 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 diagram 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 diagram.
12. Click the **Preview** tab to see an interactive preview of the diagram.

What to do next

After you create this diagram you can create more scorecard diagrams or deploy the scorecarding solution to use in IBM Cognos Insight.

Creating a Custom Scorecard Diagram

You can create a custom diagram by importing an image file and overlaying metric dimension data points onto it.

About this task

You can import and use any of the following image file types:

- PNG
- GIF
- BMP
- JPEG

For more information about custom diagrams, see “Custom Diagram” on page 147.

Procedure

1. On the **Scorecards** Welcome page, 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:
   a. To use one of the provided sample images, click the **Background Image** list and select an image.
   b. To use your own image, click the **Background Image** list and click **Browse**.
5. Select the primary dimension that you want to use:

   Click the **Primary Dimension** list and select the main dimension to use in your diagram.
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. Place dimension members on the image:

   Click and drag a dimension member from the **Source Cube** list and place it on the image.
8. To delete a data point from the image, right-click on it and then click **Delete**.
9. Edit the image properties and resize options:
   - **Opacity**
   - **Maintain Aspect Ratio**
   - **Horizontal**
   - **Vertical**
   - Select **Pixels** or **Percentage** to set the image measurement units.
10. Click **Save**.

Controlling the display and format of Tolerance values

There are some limitations for displaying values 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.

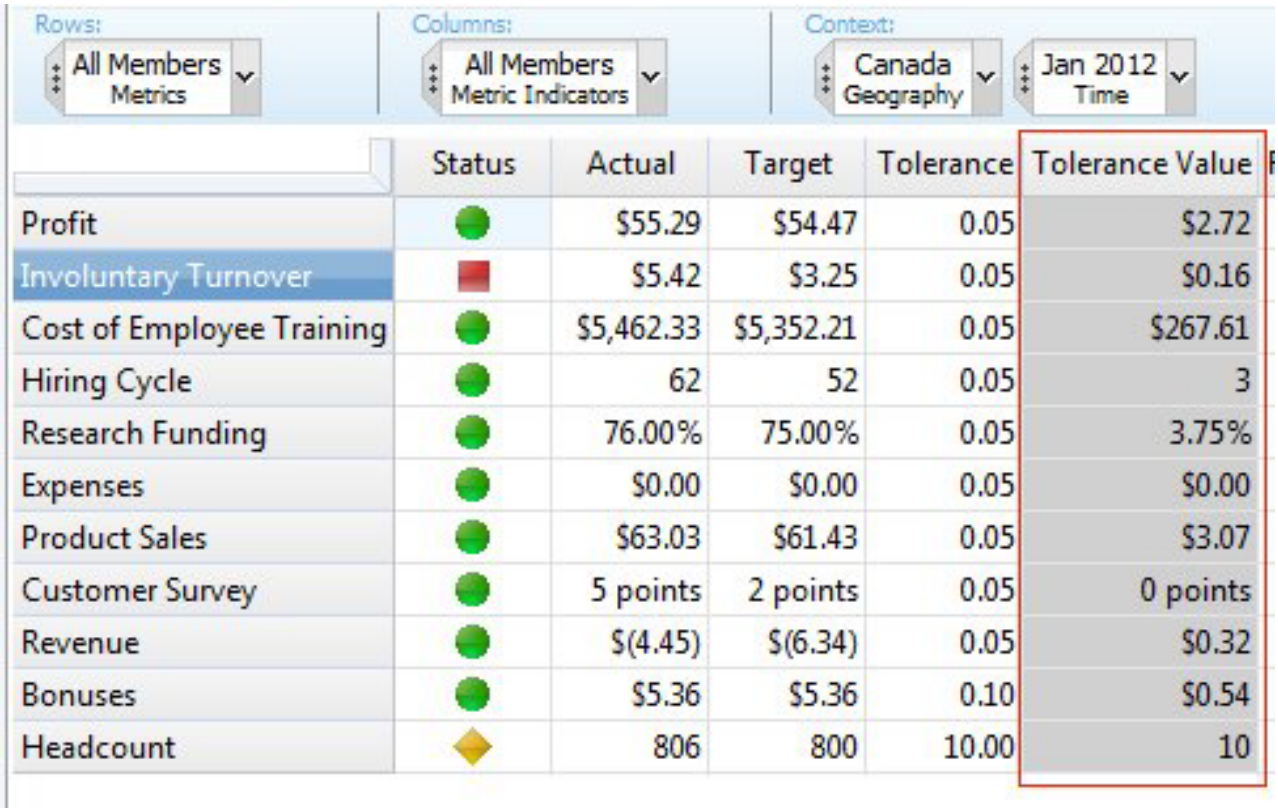
Before you begin

These steps require that you have already created a Metrics cube for your scorecard solution.

About this task

The overall steps for creating a specialized Tolerance Value column include creating a new member in the Metric Indicators dimension and adding a cube calculation for that member.

The following 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.



	Status	Actual	Target	Tolerance	Tolerance Value
Profit		$55.29	$54.47	0.05	$2.72
Involuntary Turnover		$5.42	$3.25	0.05	$0.16
Cost of Employee Training		$5,462.33	$5,352.21	0.05	$267.61
Hiring Cycle		62	52	0.05	3
Research Funding		76.00%	75.00%	0.05	3.75%
Expenses		$0.00	$0.00	0.05	$0.00
Product Sales		$63.03	$61.43	0.05	$3.07
Customer Survey		5 points	2 points	0.05	0 points
Revenue		$(4.45)	$(6.34)	0.05	$0.32
Bonuses		$5.36	$5.36	0.10	$0.54
Headcount		806	800	10.00	10

Figure 9. Example of a Metrics cube with a Tolerance Value column

This example uses a Metrics cube named Scorecards, a Metrics dimension named Metrics, and a Metric indicators dimension named Metric Indicators.

Procedure

1. Create a new Tolerance Value member in the Metric Indicators dimension.
   a. Open the Metric Indicators 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 Indicators dimension, see "Creating a Metric Indicator Dimension" on page 151.

      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 Indicators dimension is set as the column title for your Metrics cube.
   a. Open the Metrics cube for your scorecard.
   b. Right-click on 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 also 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

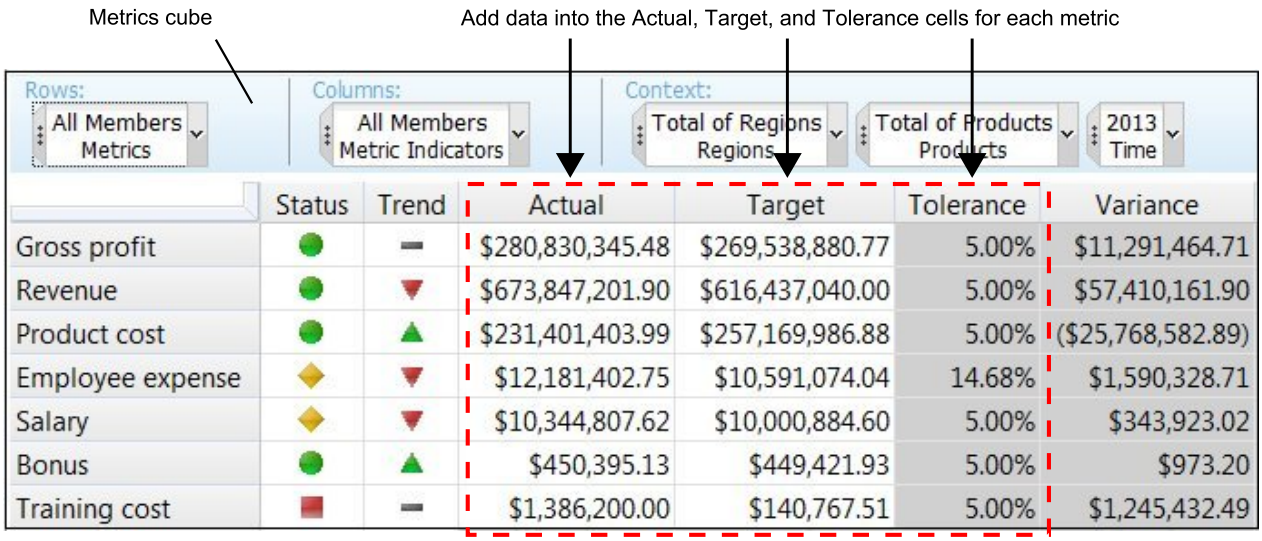
After you create your scorecard objects, you can then use different approaches to add data to your Metrics cube.

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, in order to calculate the metric indicator values for the Revenue metric:

1. You first populate the Actual and Target metric indicator cells with the respective values for Revenue.
2. Then, 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 a 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 Cognos TM1 Users Guide*, *IBM Cognos TM1 Applications Guide*, *IBM Cognos TM1 Web User Guide*, and the *IBM Cognos Insight User Guide*.
- Use data spreading:

  Spread values across a range of cells in a view or spread values to the children of a consolidation, as described in the topic *Using Data Spreading* in the *IBM Cognos TM1 Users Guide*.
- Import data with Cognos TM1 TurboIntegrator:

  Create a TurboIntegrator process to import data from any supported data source into a cube, as described in the *IBM Cognos TM1 TurboIntegrator Guide*.
- Use Rules-based calculations:

  Manually create rules that define data for a cube, as described in the *IBM Cognos TM1 Rules Guide*. You can also define cube calculation 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 on cube calculations, see *Cube Calculations* in the *IBM Cognos TM1 Performance Modeler Guide*.

  For details on dimension calculations, see *Dimension Calculations*, also in the *IBM Cognos TM1 Performance Modeler Guide*.

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 Insight to monitor business performance.

Procedure

1. In the **Application Design** pane, right-click the **Applications** folder and click **New** > **Application**.
2. Enter 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 or strategy diagrams 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 in 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>`

For more information about this parameter, see the "DistributedPlanningOutputDir" topic in the *IBM Cognos TM1 Installation and Configuration Guide*.

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 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 menu** > **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 diagram - 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 the 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 elements.

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 diagram, and custom scorecard diagram.

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 elements. When you apply security to scorecarding objects, you might be required to apply security to regular and control objects for cubes, dimensions, and dimension elements.

There are four objects that we are concerned with; the metrics cube, the impact diagram, the strategy map diagram, 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 name 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 diagram

The strategy map diagram 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 diagram 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 diagram, 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.

4. Set cube security using the CubeSecurity control cube.

   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 the 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 diagrams 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 element-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 element members in all of the dimensions that make up the metrics cube. To see some 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 element security rights or create rules to set them.

Blocking access to scorecard objects

In this use case we block the user's access to different scorecarding objects. These objects include the metrics cube, the strategy map diagram, 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 diagram:
   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 163.
   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 Connected.

      The user is able to see, interact, and drag new objects of only the following types to the canvas; metrics cube, custom diagram, and impact diagram.

      The user should see the Strategy map 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 should not see the Strategy map icon in the object tree so that it is not available to drag it on to the canvas.
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 metrics 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 Connected.

      The user is able to see, interact, and drag new objects of only the following types on to the canvas; metrics cube, strategy map diagram, and impact diagram.

      The user should see the custom 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 should not see the custom diagram icon in the objects tree so that it is not available to drag it on to the canvas.
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 metrics 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 Connected.

The user is able to see, interact, and drag new objects of only the following types on to the canvas; metrics cube, strategy map diagram, and custom diagram.

The user should see the impact diagram widget, but it should be empty except for a human readable error message that explains that this user does not have access to view the contents of the widget.

The user should not see the impact diagram icon in the objects tree, so that it is not available to drag it on to the canvas.

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 metrics 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 Connected.

      At this point an error message is displayed.

Limiting access to individual metrics in a Metrics dimension

In this use case, we block the user's access to one of the metrics in the metrics dimension, such as the Sales metric. This example shows how limiting access to an individual metric affects the four main scorecarding objects; metrics cube, strategy map diagram, 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 metrics 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 metrics objects.

   For information, see "Granting minimum access to scorecarding objects for non-administrator users" on page 163.
3. Remove the `READ` right for the NA_No_Metric_Group group to the Sales element in the Metrics 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 element 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 Connected.

   The user is able to see, interact, and drag new scorecarding objects onto the canvas; scorecard grid, strategy map diagram, 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/Scorecard grid - The Sales metric does not show up in the grid.
   - Strategy Map diagram - The Sales metric does not show up in the tooltip when you hover the mouse. It also does not contribute to the status count in Grow Revenue.
   - Custom diagram - The Sales point does not show up on the custom diagram.
   - Impact diagram - When revenue is the focused metric, then nothing is displayed adjacent to the focused metric.

Limiting access to Scorecarding perspectives and objectives

This example shows what happens if a user has access of NONE to one of the objectives in a Strategy Map diagram.

About this task

To configure this scenario, you grant NONE access for the Grow Revenue objective in a Strategy Map diagram 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. Display TM1 control objects:

   In IBM Cognos TM1 Performance Modeler, click **Actions menu** > **Show Control Objects**.
2. Set security for the control dimension's elements:
   a. In the **Model Design** pane of Cognos TM1 Performance Modeler, right-click on the **Balanced Strategy** control dimension and select **Configure Security** > **Set Access Permissions for** > **Elements**.
   b. You can 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.

      For that one objective, you can assign NONE access for the No_Objective group.
3. Access the object in IBM Cognos Insight:
   a. Open Cognos Insight as a user in the No_Objective group.
   b. Drag the strategy map diagram onto the workspace.

      The Strategy map diagram 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 Map diagrams, and Custom diagrams.

For more information about the Transfer feature, see "Transfer of model objects and applications" on page 95.

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 on the object and select **Transfer Out**.
3. Select the folder for the output location and click **OK**.

   TM1 automatically analyzes the object and determines whether any other objects must be included in the transfer process. When this process is complete, the Transfer tab is displayed.
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 that is associated with it.

Transfer of Strategy Map diagrams

Transferring out a Strategy Map diagram automatically includes the related metrics cube as a dependent object. A Strategy Map diagram 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 map diagrams.

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 diagram.

```
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.

For more information about enabling and configuring logging in Cognos TM1 Performance Modeler and Cognos Insight, see the *IBM Cognos TM1 Installation and Configuration Guide*.

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 16. Keyboard shortcuts

Action	**Keyboard shortcut**
Open the **Application** view	Alt+A
Open the **Model** view	Alt+M
Close the editor	Ctrl+W
Go to the next editor	Ctrl+F6
Go to the previous editor	Ctrl+Shift+F6
Go to the next view	Ctrl+F7
Go to the previous view	Ctrl+Shift+F7
Save	Ctrl+S
Save all	Ctrl+Shift+S
Show key assistance	Ctrl+Shift+L
Switch to the editor	Ctrl+Shift+E
Open a context menu	Shift+F10
Navigate a menu	Up and Down arrows
Activate a command on a menu or context menu	Enter
Move to and select the next enabled menu item or context menu item	Down arrow
Select the first enabled item in a submenu on a menu or context menu	Right arrow
Move to and select the previous enabled menu item or context menu item	Up arrow
Close an opened menu	Esc
Select or clear a check box	Space bar

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Table 16. Keyboard shortcuts (continued)

Action	Keyboard shortcut
Move to the next item in a dialog box or wizard	Tab
Move to the previous item in a dialog box or wizard	Shift+Tab
Move to the next choice in a drop-down list	Down arrow
Move to the previous choice in a drop-down list	Up arrow
Move to and select the next option button	Tab+Space bar
Move to and select the previous option button	Shift+Tab+Space bar
Open and display a drop-down list or menu	Alt+Down arrow
Close an open drop-down list or menu	Alt+Up arrow or Esc
Close a dialog box or wizard	Esc
Invoke a selected drop-down item	Enter
Apply the changes you made and close the dialog box or wizard	Tab to **OK** and press Enter
Close the dialog box or wizard without applying or saving the changes you made	Esc
Navigate between the tabs	Left and Right arrows or Tab or Shift+Tab
Move the current tab to the right	Shift+Page Up
Move the current tab to the left	Shift+Page Down
Navigate from icon to icon in the toolbar	Left and right arrows
Display members of a dimension in the cube viewer	Alt+Down arrow
Select several rows or columns in the cube viewer	Ctrl+Down arrow
Replace the existing dimension in the rows with the selected dimension	Ctrl+R
Replace the existing dimension in the columns with the selected dimension	Ctrl+C
Replace the existing dimension in the context with the selected dimension	Ctrl+T
Automatically expand the members in the selected dimension	In the context menu for the selected dimension, Down arrow to the **Expand to level** command and select the level that you want to display
Expand or collapse a parent in a dimension	Enter

Table 16. Keyboard shortcuts (continued)

Action	Keyboard shortcut
Refresh the model with the data on the server	F5
Exit the application	Alt+F4

Specify the data source type for the data source columns in the **Guided Import** wizard	Shift+F10
Move between the tabs and panes in the Query Builder	Context Menu key and select the tab or pane that you want.
Add data from relational data sources in the Query Builder	Arrow keys to navigate the tables in the Metadata Explorer. Up arrow or Down arrow to select a table. Press Context Menu key for the menu item list for table. Select **Add to Query**.
Select a view in the **Data View** tab in the Query Builder	Context Menu key, **Select View**
Delete a column from the **Data View** tab in the Query Builder	Context Menu key, **Delete Column**
Select a table in the list of tables in the **Query Diagram** tab in the Query Builder	Context Menu key, **Select Table**
Select a connection in the list of connections in the **Query Diagram** tab in the Query Builder	Context Menu key, **Select Connection**
View a specific level of detail in the **Query Diagram** tab in the Query Builder	Context Menu key, **Level of Detail**
Perform a tree layout for the selected table in the **Query Diagram** tab in the Query Builder	Context Menu key, **Tree Layout for Selected Table**
Perform a star layout for the selected table in the **Query Diagram** tab in the Query Builder	Context Menu key, **Star Layout for Selected Table**
Create a join in the **Query Diagram** tab in the Query Builder	Context Menu key, **Create Join**
Enable rules in the rules editor	Ctrl+E
Disable rules in the rules editor	Ctrl+D
Expand all rules in the rules editor	Ctrl+Keyboard_Divide
Collapse all rules in the rules editor	Ctrl+Shift+Keypad_Multiply

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. 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 Perfromance 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 Guide*.
- 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 Guide*.
- 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 Guide* 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 Guide*.
- If you want to add Microsoft Excel worksheets to a Cognos TM1 Application in the Application Organizer, you must do so in the Server Explorer. Cognos TM1 Applications are described in the *IBM Cognos TM1 Developer Guide*.
- 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.
- Subset creation is somewhat limited in Cognos TM1 Performance Modeler in comparison to Cognos TM1 Architect/Perspectives. There is no Expand Above

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capability in Cognos TM1 Performance Modeler, and 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 C. 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.

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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.

Related tasks:

"Creating N calculations using dimension functions" on page 23
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.

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.

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.

PERIODSTART

Purpose

The date and time at the start of this period.

=PERIODSTART()

PERIODMIDDLE

Purpose

The date and time at the middle of this period.

=**PERIODMIDDLE**()

PERIODEND

Put your short description here; used for first paragraph and abstract.

Purpose

The date and time at the end of this period.

=**PERIODEND**()

PERIODDAYS

Purpose

The number of days in the period.

=**PERIODDAYS**()

VARIANCE

Purpose

Computes the Variance between two datasets, denoted as <Actual> and <Budget>. For a calculation dimension member where a positive variance would be favorable, the result is computed as <Actual> minus <Budget>. For a calculation dimension member where a positive variance would be unfavorable, the result is computed as <Budget> minus <Actual>. If no calculation dimension is present in the cube, the function always returns <Actual> minus <Budget>

=**VARIANCE**(<Actual>,<Budget>)

VARIANCEPERCENT

Purpose

Computes the percentage Variance between two datasets, denoted as <Actual> and <Budget>. For a calculation dimension member where a positive variance would be favorable, the result is computed as (<Actual> - <Budget>) / <Budget> * 100. For a calculation dimension member where a positive variance would be unfavorable, the result is computed as (<Budget> - <Actual>) / <Budget> * 100.

If no Calculation dimension is present in the cube, the function will always return (<Actual> - <Budget>) \ <Budget> * 100.

=**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 ]`

- 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 D. 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.

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Table 17. Dimensions that are imported

Dimension	Description
Dimension types	Dimension types do not exist in Cognos Planning but dimensions are assigned the most appropriate type from calculation, hierarchy, time, or versions.
Calculations	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 19 for calculations that involve dlist formatted or text formatted items.
Formats	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.
Time averages	First period, last period, and time averages are imported.
Cubes	All dimensions import in the best order that can be determined with calculation type dimensions placed last.

Table 18. Links that are imported

Link	Description
Cube to cube links	Import as Fill mode.
Accumulation links	Import as Fill mode.
Look up links	Import as Substitute mode.
Allocation tables	Import as manual allocations between dimensions if the allocation table is linked to the dimensions on the source and target side.

Table 19. Objects that are imported but need adjustment

Type of Object	Action needed
Weighted averages	Reset as c-calcs in Cognos TM1 Performance Modeler dimensions.
Calculations involving IIDs of dlist-formatted items	Reset to include the item name rather than the IID.
Bifs which do not exist in Cognos TM1 Performance Modeler	Fix broken calculations.
Cubes with more than one calculation type dimension	Check to ensure the cubes work as expected. Manually reorder dimensions if necessary.
Cube to cube and accumulation links in any mode other than fill	Imports as fill mode. Remodel if necessary.

Table 19. Objects that are imported but need adjustment (continued)

Type of Object	Action needed
Look up links in any mode other than substitute	Imports as substitute mode. Remodel if necessary.
Links that use allocation tables or dcube allocation tables or cut subcolumns	Remodel if necessary with manual allocations or dimension attributes.
Links targeting subtotals or calculated items	Imports but does not generate breakback in target cubes. Requires remodeling.

Table 20. Objects that do not import

Object	Action to take
Access Tables	Re-create model security.
Allocation tables	There is no equivalent object in Cognos TM1 but dimension attributes can be used to achieve a similar result.
Validations	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 111.
Data	Not imported. Add manually.
Dimension Import Links	Not imported. Add manually.

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 *installation_location*`\bin` directory.
2. Start Cognos Analyst.
3. Click **Help** > **Updates** to ensure that the update is applied. The Updates applied dialog box now displays

   ```
   Update ID   Applied   Description
   XPJTM101    Yes     Migration to TM1
   ```
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 19 on page 184 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.

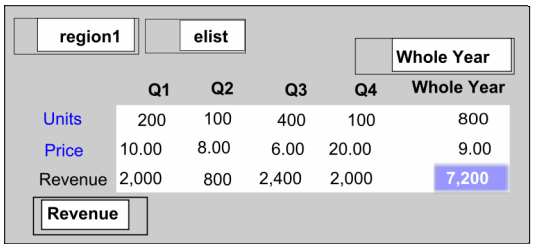
The following examples describe three ways to adjust the weighted averages often found in a Cognos Planning model.

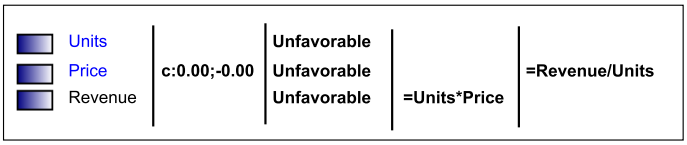
Weighted averages Example 1

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`.

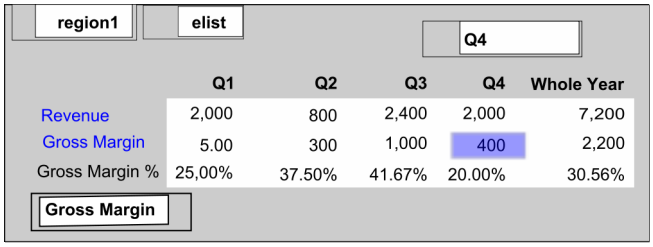
To get the same result in Cognos TM1 Performance Modeler, set a `C-` calculation for `Price`.



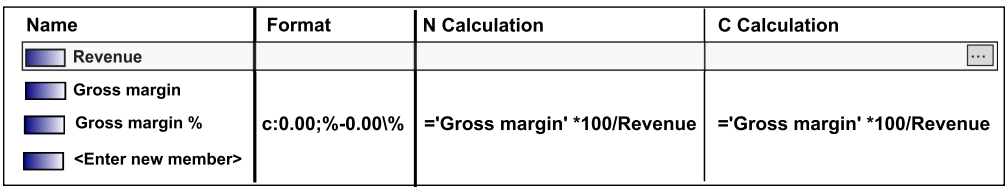


Weighted averages Example 2

In this example, you know the `Gross Margin` and can calculate `Gross Margin % = Gross margin *100/Revenue`

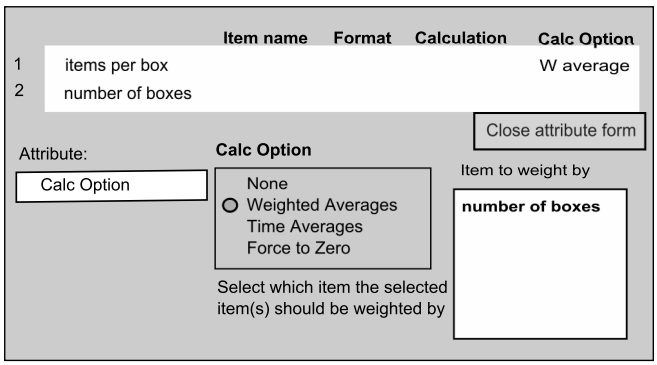


On an aggregate item such as whole year, use the same calculation `2200*100/7200 = 30.56%`



Weighted averages Example 3

In Cognos Planning, an implicit product is calculated in this scenario: This input results in the following calculation:



Name	N Calculation	C Calculation
Items per box		='Dummy product' /'Number of boxes'
Number of boxes Dummy Product <Enter new member>	='Items per box' * 'Number of boxes'	

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 remodelled 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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