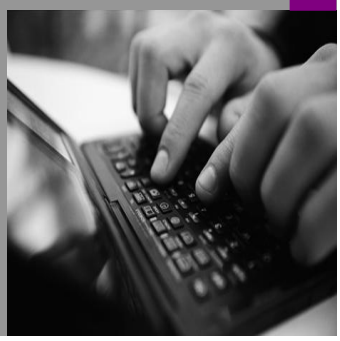

How-to Guide
Using Cube Builder

How To Create a PAS Model with Cube Builder

Version 1.00 – November 2008

Applicable Releases:
SAP Strategy Management 7.0

THE BEST-RUN BUSINESSES RUN SAP

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Table of Contents

1) STEPS TO CREATE A MODEL 2
5 Steps to Create a Model 2
2) THE DIMENSION CONCEPT 3
Dimension Structure 3
Measure (= Metrics = Variables) 4
Metrics to KPIs for Scorecarding 4
3) ENABLE THE CUBE BUILDER 5
Steps to Execute before you can use the Cube Builder 5
Cube Builder on MaxDB or SQL Server 6
4) USING CUBE BUILDER 7
Steps for creating a model with Cube Builder 7
1.1 Preliminary Dimension Information 8
1.2 Define and Change Dimension Members 9
1.3 Define the Measures 10
1.4 Build the PAS Model 11
Data Created by PAS Model (1) 12
Data Created by PAS Model (2) 13
Data Created by PAS Model (3) 14
5) CHANGING A MODEL IN CUBE BUILDER 16

Additional Resources 17

1 Steps to Create a Model

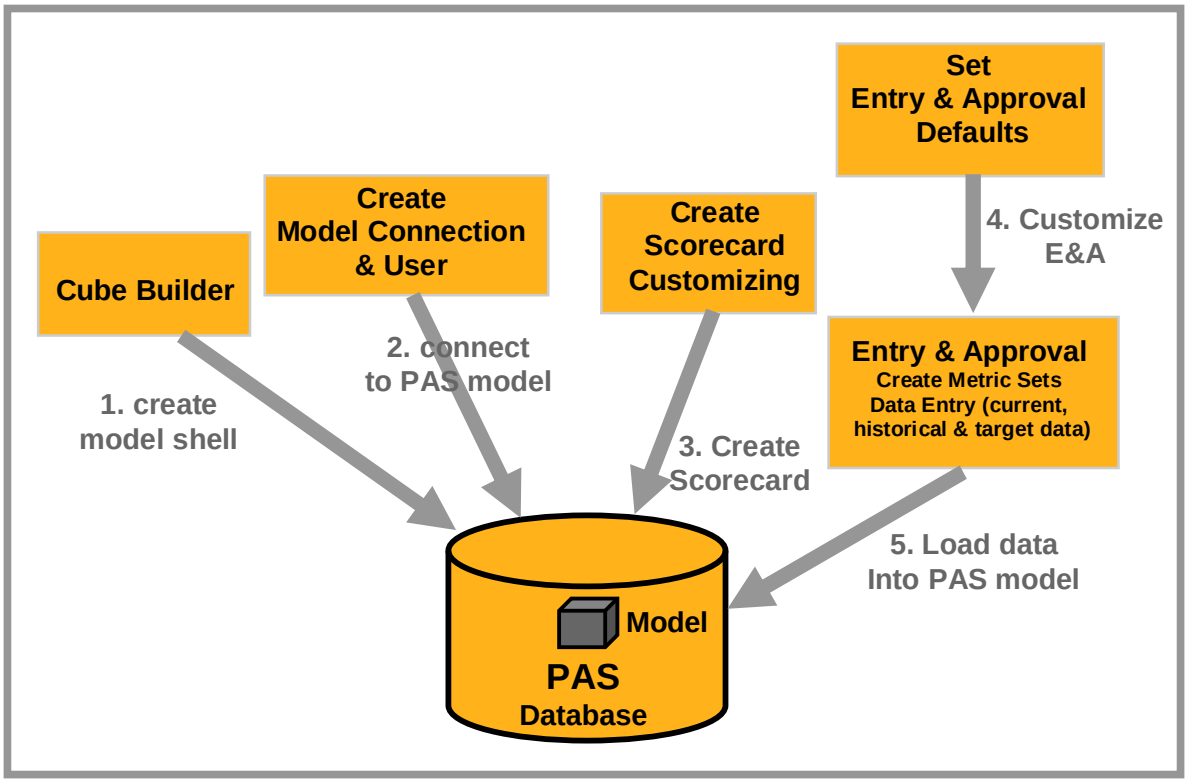
Introduction

The HTML Cube Builder is designed to allow savvy business users to create simple models., Models bring together the properties or elements important to users in understanding their business, arranged in a logical order so that users can see different aspects of the organization, its structure or processes in relation to the data being measured. While building models using PAS allows much more flexibility and complexity, savvy business users need a way to quickly build and maintain models without having to use PAS.

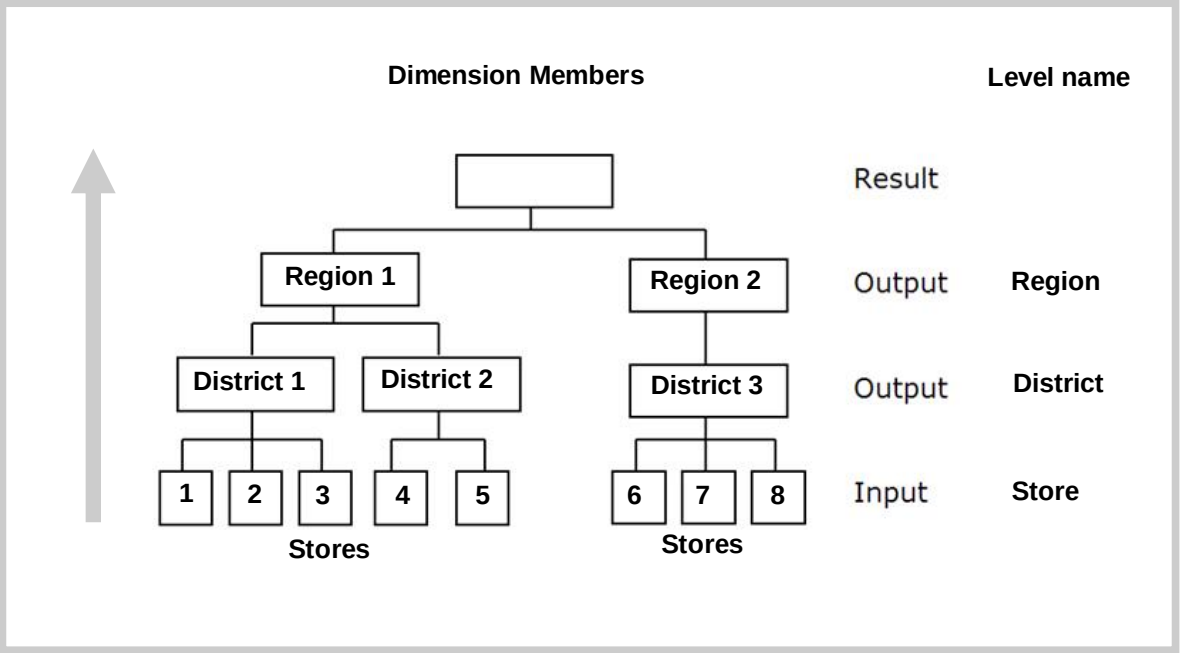
This guide gives a brief introduction to models, how to use the Cube Builder to create a PAS model, and what is created so it can be maintained or modified.

5 Steps to create a model

1. Create a model shell Using the HTML Cube Builder
2. Maintain Administration
    - Add user and system groups
    - Maintain application groups
    - Create a model connection
3. Customize the Scorecard (necessary step before you can enter & approve data)
4. Set customizing defaults for Entry & Approval defining:
    - Periods, Workflow Steps, E&A Administrators, Data Entry Permissions and metrics for E&A
5. Populate the model using Entry & Approval
    - Create metric sets
    - Enter & approve data
    - Load the model into PAS



2 The Dimension Concept



- Dimension Structure

Dimensions define properties and variables necessary in understand the organization, its processes and elements. To construct a logical order to for your cube, you develop a structure of these dimensions.

Dimensions have a basic structure consisting of the following members:

- **Input:** Input members are the lowest level of information. A dimension has only one level of input members.
- **Output:** Output members are intermediary levels in the hierarchy above input members. There can be multiple levels of output members. Each output member is a consolidation or aggregation of input members or output members from a lower level.
- **Result:** Result members are the top level of information in the hierarchy. It is a consolidation level. A dimension can have one result level or none, as this level is optional.

These members are in a hierarchical relationship and are referred to as levels. Each level has a name and represents a position in the hierarchy. By using a name for each member level, you can easily select that level by name and perform calculations or reporting for that group of members.

All members should be in the correct order, this typically means an output member has been defined before its input member.

- Measures (= Metrics = Variables)

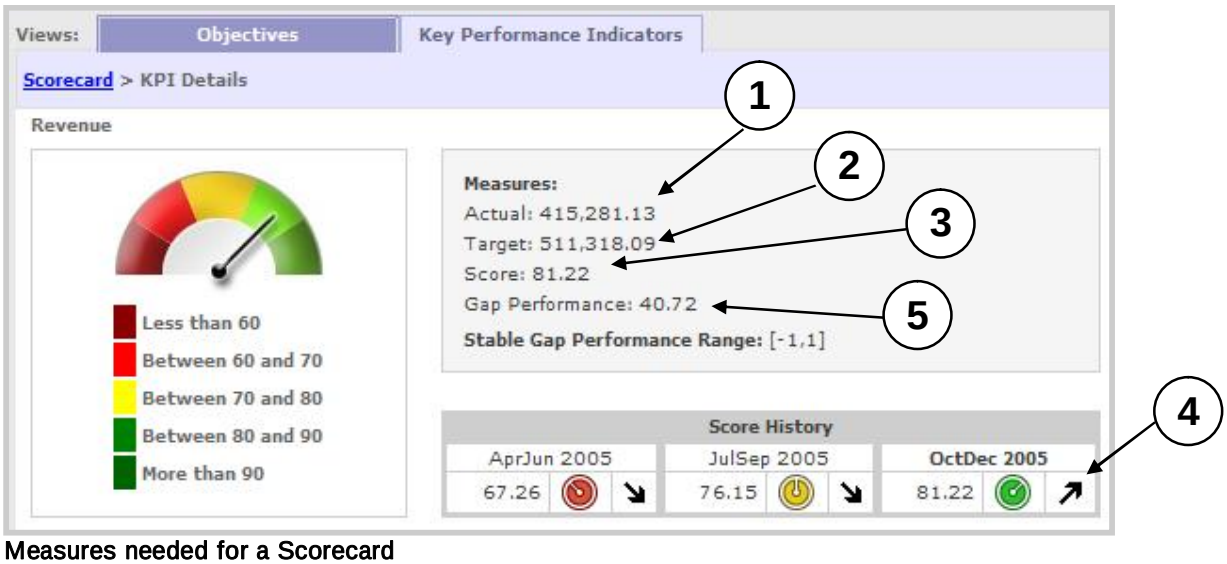
Measures store the measurable data for business. A variable is a measure, or the part of an attribute which stores the data relationship between the attribute dimension and the structural dimension it characterizes. The latter enables an attribute to act like a measure.
Metric Characteristics:

- ✓ **Dimensioned or non-dimensioned**
- ✓ **Periodicity**
- ✓ **Date Range**

- Metrics to KPIs for Scorecarding

For every KPI you want to explore, you must create the following five (5) measures:

- **Actual –** This measure is typically loaded from source data
- **Target** - This measure is the budget measure typically loaded from source data.
- **Target gap (score)** - This measure is calculated based on one of the four different target gap formulas, which depend on what type of target gap is identified:
  - Achievement target gap – where the Actual value more than the Target value is preferred - (e.g. Revenues)
  - Reduction target gap – where the Actual value less than the Target value is preferred - (e.g. Expenses)
  - Absolute target gap – where any deviation from Target is not desired - (i.e. Inventory Over/Under Stock)
  - Zero target gap – where you have a zero target value preferred (e.g., product defects or shipment days late)
- **Trend** - This measure is a moving average of the actual values
- **Trend deviation** - This measure is calculated based on one of the four different trend gap formulas, which depend on what type of trend gap is identified: Achievement trend gap, Reduction trend gap, Absolute trend gap or Zero trend gap



Measures needed for a Scorecard

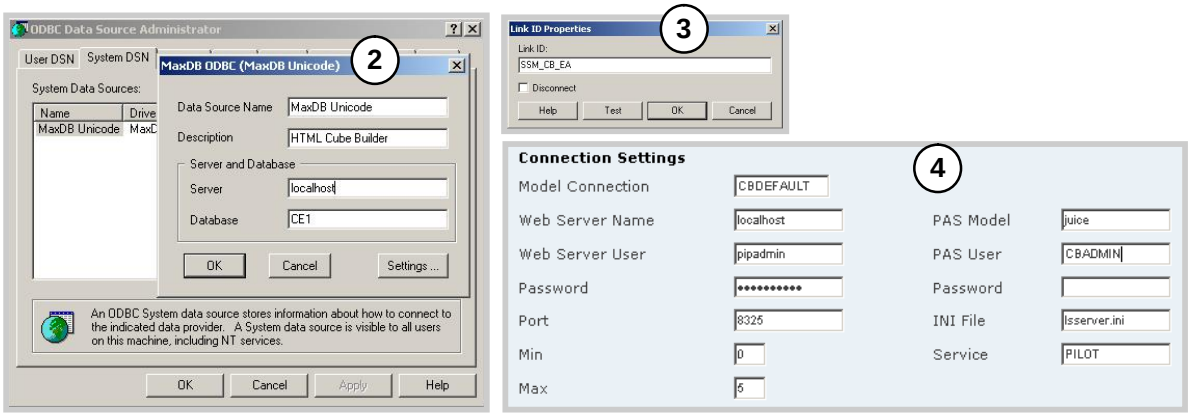
1. **Actual - _ACT**
2. **Target - _TAR**
3. **Target Gap (Score) - _TARDEV**
4. **Trend - _TRD**
5. **Trend Deviation (Gap Performance) - _TRDDEV**

3 Enable the Cube Builder

Steps to be executed before you can use the cube builder

1. MaxDB or SQL Server ODBC must be installed on PAS Server
    - The NetWeaver AS database ODBC driver must be installed on the system where PAS resides. The driver is put down with the SQLStudio install
2. Add a System DSN for MaxDB/SQL Server using the MaxDB (Unicode)/SQL Server driver
    - From the ODBC Data Source Administrator, accessible via *Control Panel -> Administrative Tools -> Data Sources (ODBC),* you must add a System DSN for your database using the database (Unicode) driver. The Data Source Name can be anything you want, the Server is the IP address of the system where the database resides, and the database is CE1, could be localhost as well.
3. Create a Link ID called *SSM_CB_EA*
    - In the PAS Administrator you must create a Link ID called *SSM_CB_EA*. Select the ODBC connection created in step 2 as the database type. After you enter the Link ID name, select the Test button and enter the User and Password. Create a Model Connection named *CBDEFAULT* with PAS user *CBADMIN* and any model
    - In the SSM Administrator you must go to the Manage Models screen and create a Model Connection to be used by the Cube Builder tool. The name of the connection must be *CBDEFAULT* and the PAS user for the connection must be *CBADMIN*. The user already exists in PAS. You can use JUICE as the PAS Model. This Model Connection will be used to make the initial connection to PAS to create cubes. The login information will be used to automatically create additional model connections for the new cubes.

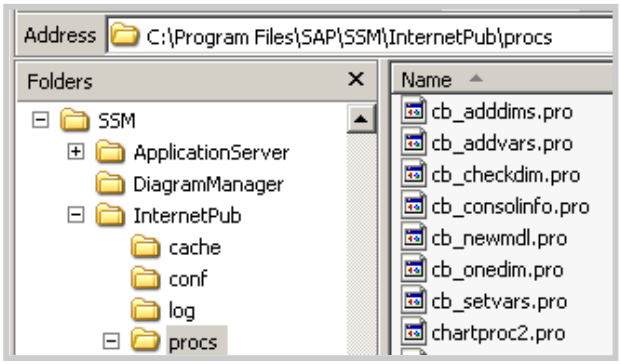
NOTE: Additional instruction on how to create an ODBC connection, a Link ID and a model connection can be found in the installation and configuration guides for Strategy Management.



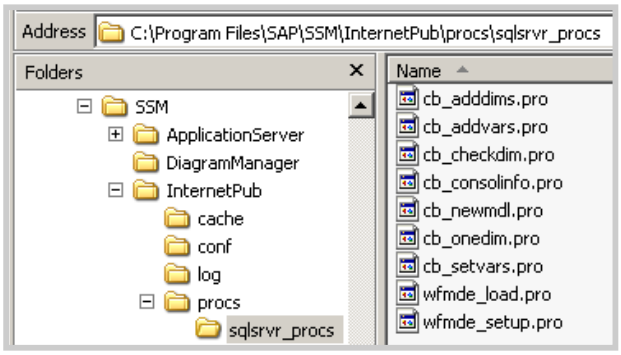
Cube Builder on MaxDB or SQL Server

Different PAS procedures are used by the Cube Builder based on the Database

- Using MAXDB



- Using SQL Server



The PAS procedures that are used by the Cube Builder to build the PAS model have complex SQL in them and some could not be written using OpenSQL-compliant syntax and functions. For that reason there are 2 versions of these procedures, one for MaxDB and one for SQL Server.

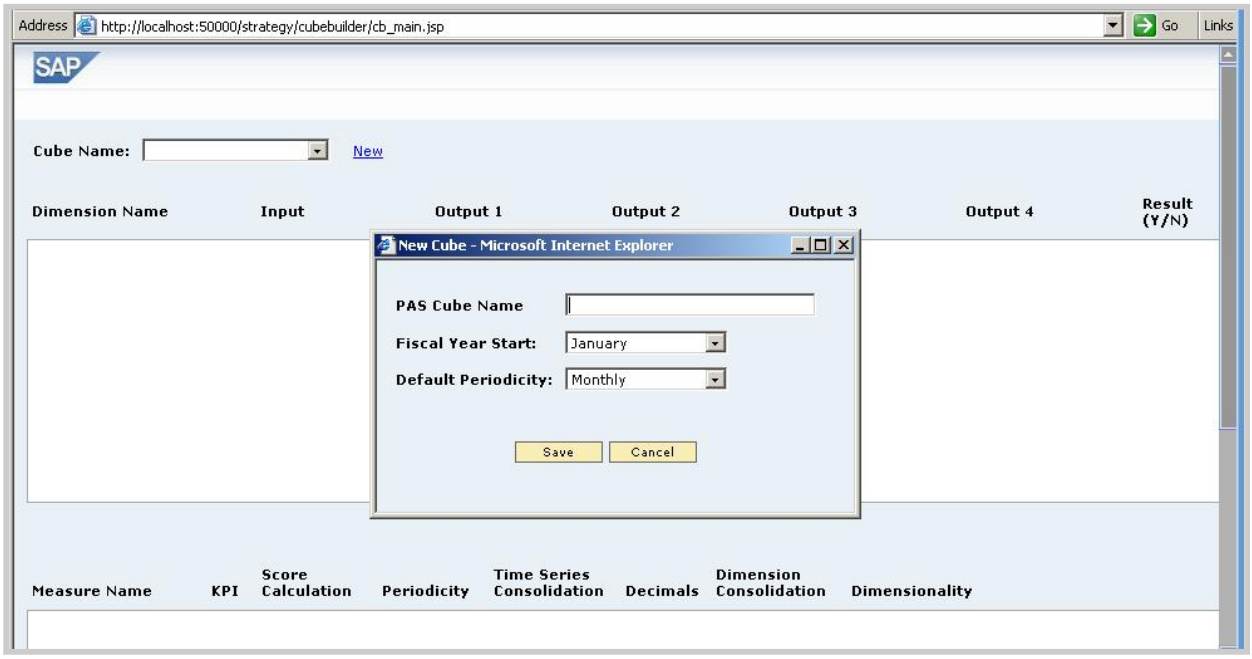
- The version of the files used for MaxDB are installed by default in the \Program Files\SAP\SSM\InternetPub\procs directory.
- If the SQL Server is being used as the system database, the files in the \Program Files\SAP\SSM\InternetPub\procs\sqlsrvr_procs directory should be copied over the version in the upper level procs directory.

Note: If someone running with SQL Server as their system database has any need to preserve the MaxDB version of the procedures then the same named files in the procs directory should be copied aside before being overwritten by the ones in the *sqlsrvr_procs* directory.

- There are 7 procedures for Cube Builder, all beginning with "*cb_*". *cb_newmdl.pro* which will be executed when creating the PAS model.

4 Access to Cube Builder

Use the link *http://<web_server>:<port>/strategy/cubebuilder/cube_builder.htm*



Steps for creating a model with the HTML Cube Builder

4.1 Identify Preliminary Dimension Information

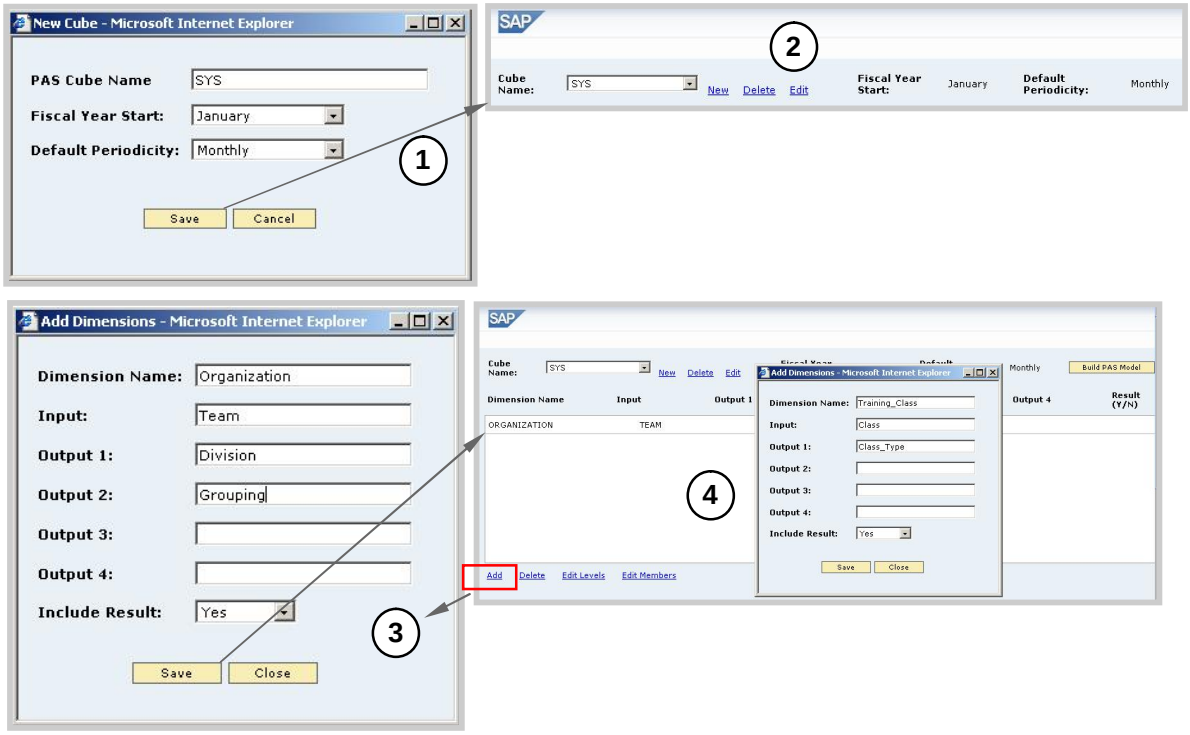
4.2 Define and Change Dimension Members

4.3 Define the Measures

4.4 Build the PAS model

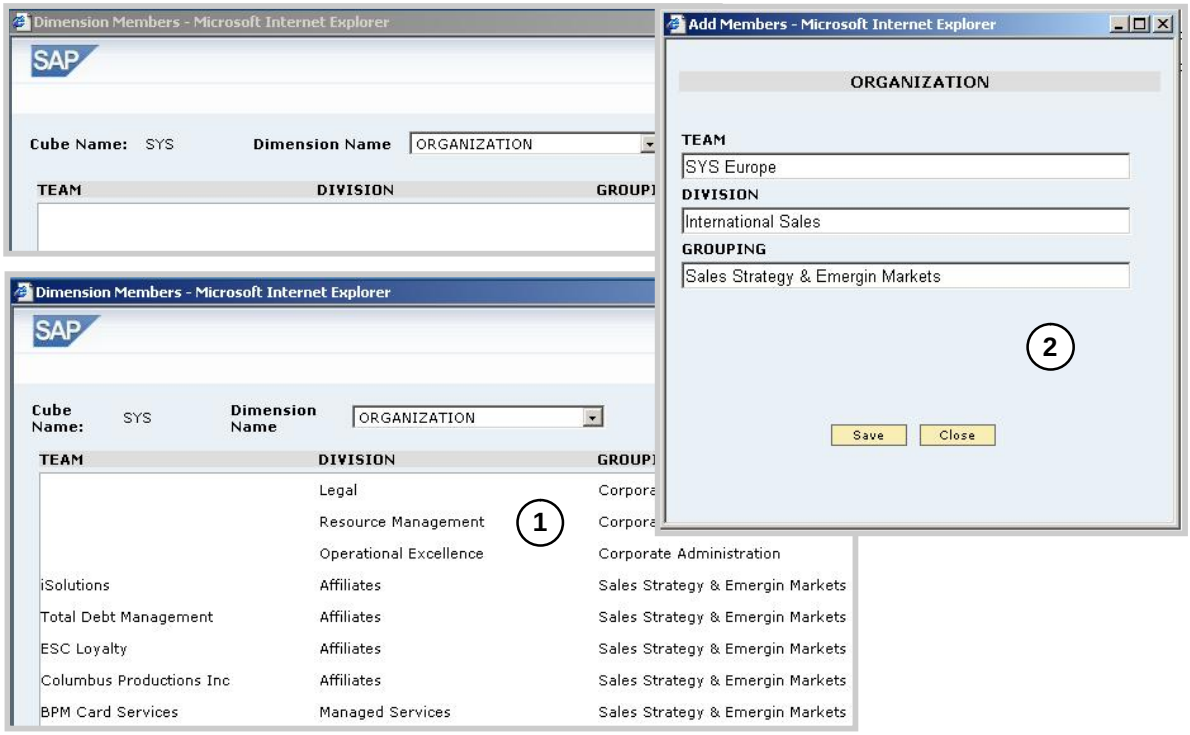
The Cube Builder will assist administrators with creating a PAS model that adheres to the guidelines for an Entry & Approval model.

1.1 Identify Preliminary Dimension Information



1. Upon opening the Cube Builder, a screen appears defining:
   - *PAS Cube Name* – Cube names are limited to 50 alphanumeric characters and must begin with a letter. Cube names in PAS are limited to 96 characters.
   - *Fiscal Year Start* – You may select any month of the year to be the start month of your fiscal year.
   - *Default Periodicity* – The default value will be used as a pattern for the periodicity of all KPIs, but can be overwritten. You can select between Monthly, Quarterly and Yearly.
2. Saving the presetting will let the cube appear in the header of the Cube Builder, where it can be deleted, edited, as well as an additional cube created. All Cubes you create in a session as well as those already stored in your NetWeaver AS Database will be available in the dropdown box of the cube name.
3. Press the *Add* link to define your dimensions. In the dialog box, you can enter preliminary information about the dimensions in your cube. If you leave the INPUT level blank, this is filled with the same name as the dimension. This tool supports up to 32 dimensions, each with up to 5 levels. The apex level or TOTAL_<dimension> member is added automatically by the code if 'Include Result' is set to 'Yes'. If your model has fewer than 20 dimensions or a dimension has fewer than 5 levels, leave the extra boxes empty. Dimension and level names are limited to 50 alphanumeric characters and must begin with a letter. The only special character allowed is the underscore.
4. Save the dimension and it will be listed on the screen. The dialog box will be ready for new data entry, so that you do not have to open it again. Maintain all dimensions needed. Pressing the *Edit Levels* button you could change the level of your dimensions.

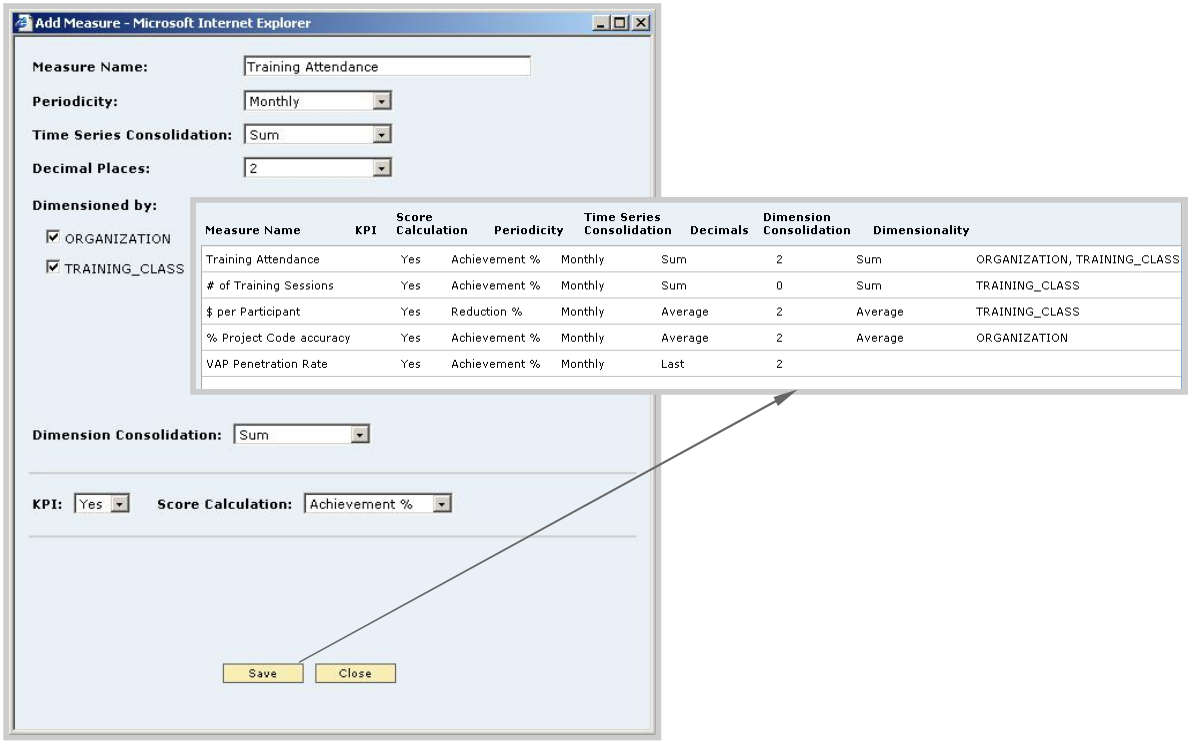
1.2 Define and Change Dimension Members



1. In the Dimension section, press *Edit* Members, located at the bottom of the list, to define the members of your dimensions. The *Dimension Members* screen will open, showing the selected cube name. From the Dimension Name dropdown box select the dimension for which you want to add members.
2. Press the link *Add New Members* to enter new members for the selected dimension. To create an uneven rollup in the dimension hierarchy, leave the appropriate level blank. Press Save to add the entry to the list. The input mask will just reset the input level to make it easier to add members on the same level. You must maintain at least one dimension member set per dimension, without getting an error message when creating your PAS model. There can be up to 20.000 dimension members at each level.
3. If you press close on your *Add Members* screen you see the full list of dimension members. You can go on adding the members for the other dimensions or deleting members, changing member descriptions or changing member hierarchies. Just click the appropriate link. Short names and the apex or "TOTAL" member will be generated automatically.
4. Press close window to end the Dimension member Maintenance.

- **Note**: There is no way of doing mass maintenance of more than one member at the same time. For a huge number of members, just maintain one dimension member set and load the mass data through a load procedure in PAS.

1.3 Define the Measures



To enter the measures required in your model press the *Add* link in the measures section. The *Add Measures* dialog box will open, where you can add one measure at a time. Once a measure is added you get the additional options of defining:

- **Measure Name –** This will be the long name or label for the measure.
- **Periodicity** – By Default the periodicity entered in the beginning will be pre-selected. You can replace it now.
- **Time Series Consolidation** – You can choose between AVERAGE, SUM, LAST, or FIRST.
- **Decimal Places** – Select between 0 and 10 decimal places for your measure. By default 2 is selected.
- **Dimensioned by** - This area shows a list of all available dimensions for selection. The maximum number of dimensions a KPI can be dimensioned by in the Cube Builder is 5. PAS supports up to 12 dimensions plus Time.
- **Dimension Consolidation** - If the measure should be summed for output members, set Dimension Consolidation to SUM. If outputs should be the average of inputs, select AVERAGE. If the outputs cannot be calculated and must be entered manually, select ENTER. In this case you could enter data for Entry & approval on all levels! The Dimension Consolidation is pre-set to NONE if the model has no dimensions or no dimensions are selected.
- **KPI** – By default, if Yes is selected the code creates the 5 model variables for each KPI, automatically generating the short names. The measure type suffixes (_ACT, _TAR, _TARDEV, _TRD, _TRDDEV) are added to the names by the code. If a measure will not be used to define a KPI, select No from the dropdown list and only one measure will be created.
- **Score Calculation** - Select the formula that will be used to calculate the Target Deviation/Gap, the value used to set the KPI dial position in the Scorecard.

1.3 Defining Score Calculation Types

4 Types of Target Gap values for developing the Score Metric for a KPI

There are four types of target gap values that are each calculated differently when developing the Target Gap metric for a KPI

1. ***ACHEIVEMENT TARGETS*** account for scenarios where you want actual to exceed the target
   - Actual **greater** than target is optimal
   - **Formula = Actual/Target * 100**

   (Example of KPIs with achievement targets: Revenue, # Cases shipped, # Customers)

2. ***REDUCTION TARGETS*** account for scenarios where you want actual to be less than the target
   - Actual **less** than target is optimal
   - **Formula = 100 - ((Actual - Target) / Target) * 100**

   (Example of KPIs with reduction targets: Cost, Expense, Overtime)

3. ***ABSOLUTE TARGETS*** account for scenarios where you want actual to always equal target
   - Actual **equal** to target is optimal
   - **Formula = 100 - ABS(((Actual - Target) / Target) * 100)**

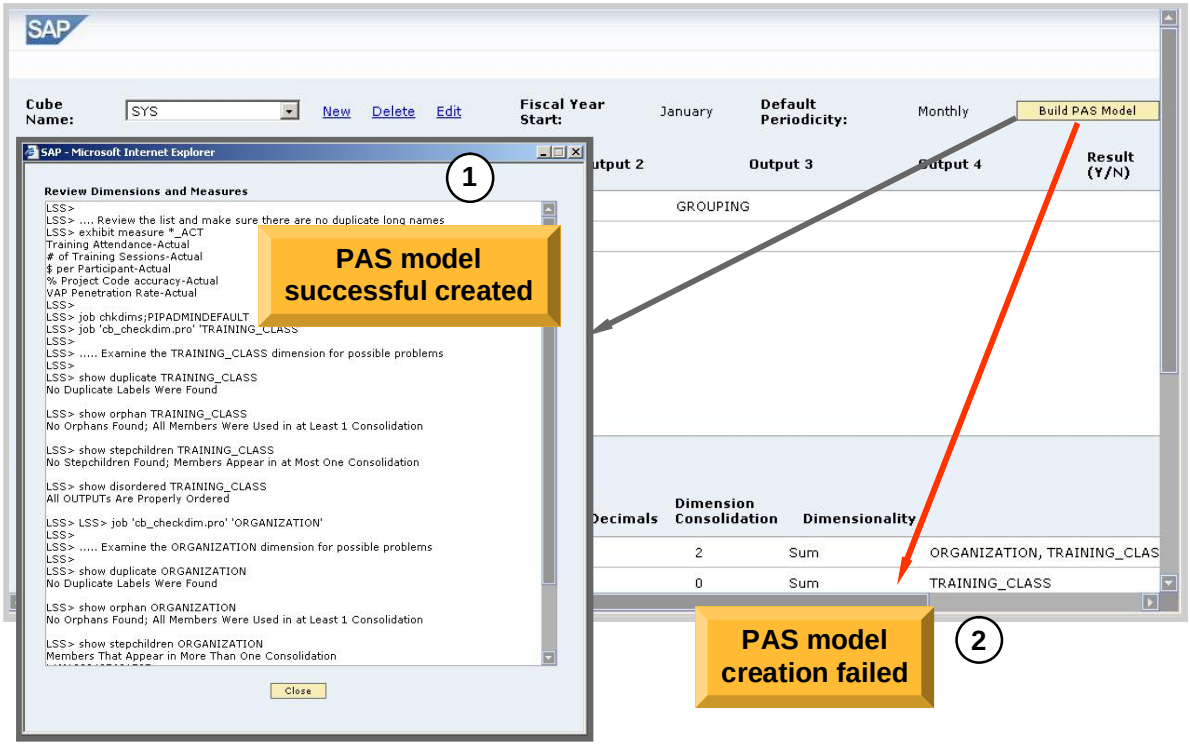
   (Example of KPIs with absolute targets: Inventory)

4. ***ZERO TARGETS*** account for situations when you want actual and target to be 0 or close to it.
   - Actual and target close to 0 is optimal
     NOTE: This target attainment does not follow the Letter grade method
   - **Formula = Actual – Target**

   (Example of KPIs with zero targets: Product defects, Employee sick days)

One way to determine index values for KPIs is to use the *letter grade method*, where you grade acceptable and unacceptable target gap values by a numeric equivalent of A, B, C, D, and F grades.

1.4 Build PAS Model



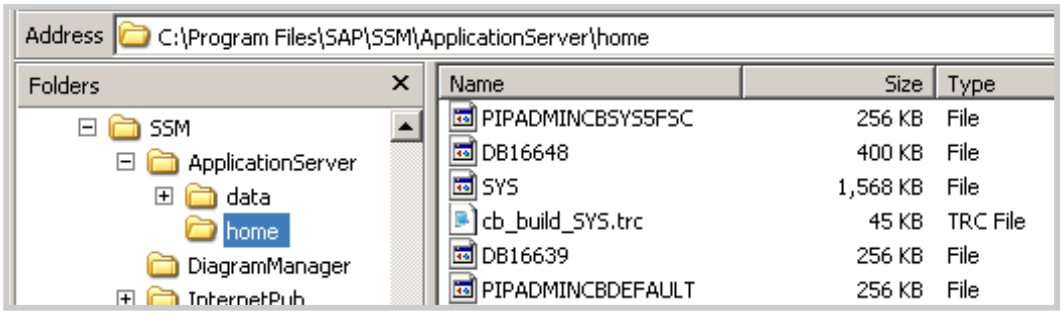
If you have finalized all your settings in the Cube Builder, you are now ready to create the model in PAS by pressing the button *Build PAS Model*. There are 2 things that can happen afterwards:

1. **PAS model successful created** – if a dialog box occurs showing you a lean protocol of the created dimensions and measures. You could open PAS to see the new model appearing in the list.

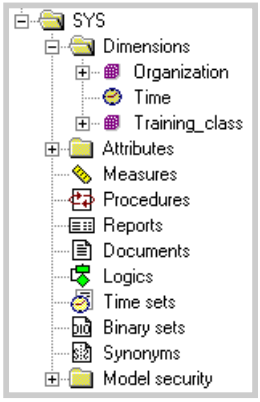
2. **PAS model creation failed** – if a dialog box occurs telling you there was a problem with the creation of the cube. Check the contents of the trace file cb_build_<PAS cube name>.trc in the home directory C:\Program Files\SAP\SSM\ApplicationServer\home.

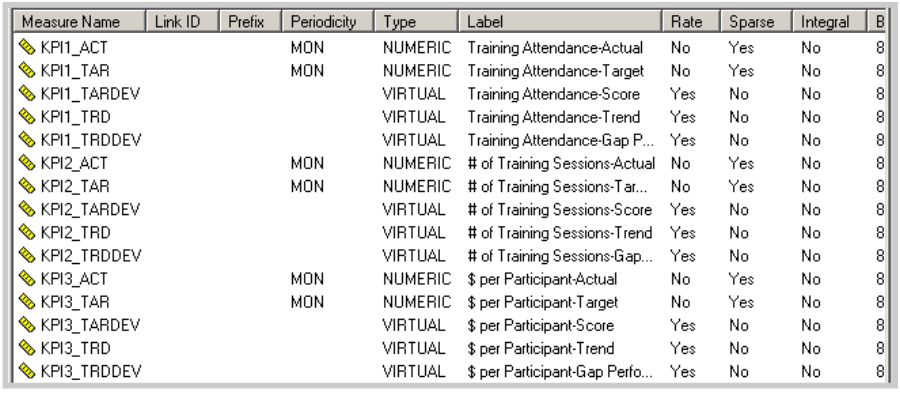
Data created by PAS model I

- Files are created/updated in the Home directory when building the PAS model



- Model created in PAS





Measure Name	Link ID	Prefix	Periodicity	Type	Label	Rate	Sparse	Integral	B
KPI1_ACT			MON	NUMERIC	Training Attendance-Actual	No	Yes	No	8
KPI1_TAR			MON	NUMERIC	Training Attendance-Target	No	Yes	No	8
KPI1_TARDEV				VIRTUAL	Training Attendance-Score	Yes	No	No	8
KPI1_TRD				VIRTUAL	Training Attendance-Trend	Yes	No	No	8
KPI1_TRDDEV				VIRTUAL	Training Attendance-Gap P...	Yes	No	No	8
KPI2_ACT			MON	NUMERIC	# of Training Sessions-Actual	No	Yes	No	8
KPI2_TAR			MON	NUMERIC	# of Training Sessions-Tar...	No	Yes	No	8
KPI2_TARDEV				VIRTUAL	# of Training Sessions-Score	Yes	No	No	8
KPI2_TRD				VIRTUAL	# of Training Sessions-Trend	Yes	No	No	8
KPI2_TRDDEV				VIRTUAL	# of Training Sessions-Gap...	Yes	No	No	8
KPI3_ACT			MON	NUMERIC	$ per Participant-Actual	No	Yes	No	8
KPI3_TAR			MON	NUMERIC	$ per Participant-Target	No	Yes	No	8
KPI3_TARDEV				VIRTUAL	$ per Participant-Score	Yes	No	No	8
KPI3_TRD				VIRTUAL	$ per Participant-Trend	Yes	No	No	8
KPI3_TRDDEV				VIRTUAL	$ per Participant-Gap Perfo...	Yes	No	No	8

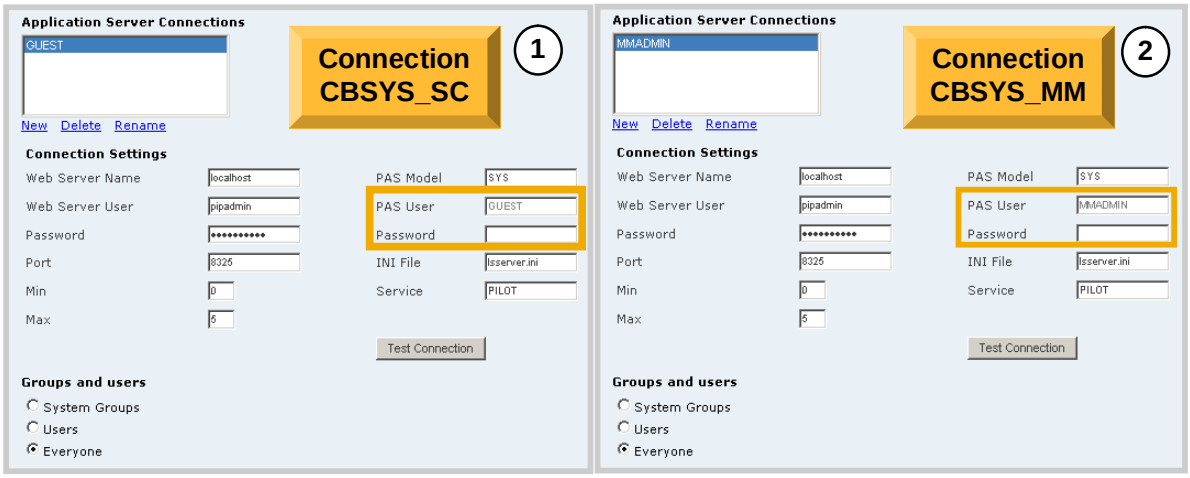
Files are created in the Home directory – by default the home directory is set \Program Files\SAP\SSM\ApplicationServer\home with the installation.

- **<model name>** - PAS database file
- **cb_build_<model name>.trc** – trace file, updated during build PAS model process.
- **DBnnnnn** – those files are created by the initial connection by PIP to PAS. Once it connects, it switches the work db to one that it names based on the user and model connection.
- **PIPADMINCBSYS5FSC** work database - After the model connections have been created, the CB<modelname>_SC one is used by the PIP connection that initiates the build. This accounts for the PIPADMINCBSYS5FSC work database. It uses this connection as opposed to the _MM one because the MMADMIN user is restricted by PIP when it comes to the PAS commands that it can issue.

Data created by PAS model -II

- **Two new model connections are automatically created**

    1. Scorecard connection CB<model name>_SC with PAS user GUEST
    2. Entry & Approval connection CB<model name>_MM with PAS user MMADMIN



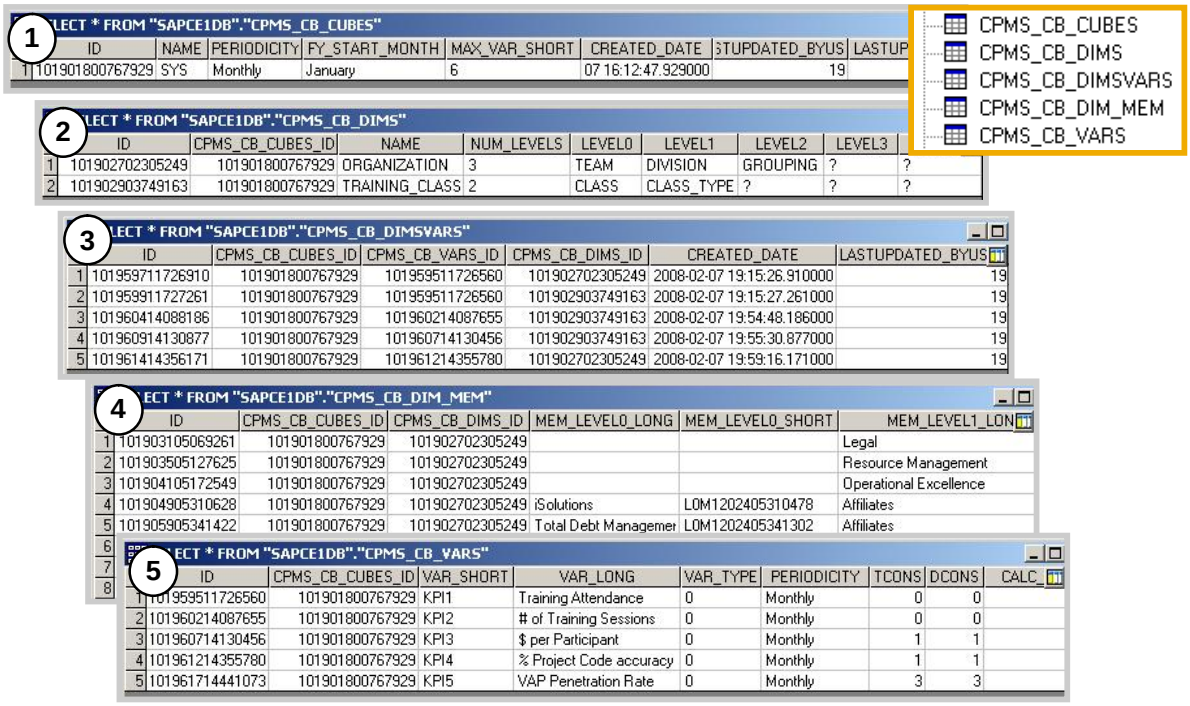
The first thing that happens with *Build PAS Model* is that the PAS "sup create data" command is issued to create the model if it doesn't exist already. This is done with the "CBDEFAULT" model connection you created in the beginning which accounts for the PIPADMINCBDEFAULT work database.

After that it will create 2 model connections for the model if they don't exist. One will be called *CB<modelname>_SC* (for Scorecard) and will have a PAS user of GUEST. The other will be called *CB<modelname>_MM* (for Metrics Manager the "old" name for Entry and Approval) and it will have a PAS user of MMADMIN. The assumption is that many people using the Cube Builder to create the PAS model also will be using E&A to populate it, that's why these model connections are created automatically. For more details refer to the section *Manage Model Connection*.

Note: If a password has been added to either the GUEST or MMADMIN users in PAS, these model connections will have to be created in advance or they will have to be modified. The name of the model connection doesn't matter. The procedures will identify if a model connection for the specific model will already exist and therefore not create an additional one with the predefined names.

Data created by Cube Builder III

- Five NetWeaver AS Database Tables to store Cube Builder data CMPS_CB_*



There are 5 tables in the NetWeaver AS database that store the data created by the Cube Builder all starting with *CPMS_CB_**:

1. CPMS_CB_CUBES – Stores the model name with unique ID, as well as periodicity and Fiscal Year start month.
2. CPMS_CB_DIMS – Stores all dimensions of a model with all the levels.
3. CPMS_CB_DIMSVARS – For each dimension, a variable is dimensioned by, a dataset is created.
4. CPMS_CB_DIM_MEM – Stores all Dimension Members
5. CPMS_CB_VARS – Stores all variable settings. VAR_TYPE 0 means KPI. As the numbering is related to the position of a value in the dropdown box.

5 Changing a model in Cube Builder

Only models created using the Cube Builder can be changed with it

- You can always add
  - new dimensions
  - new dimension member for existing dimensions
  - new KPIs

- You can change
  - KPIs – name, time series consolidation, decimal places, dimension consolidation
  - Dimension levels and dimension member description & hierarchies

If a model will be used by Entry & Approval or data is loaded already by a procedure, KPI's and dimensions cannot be deleted.

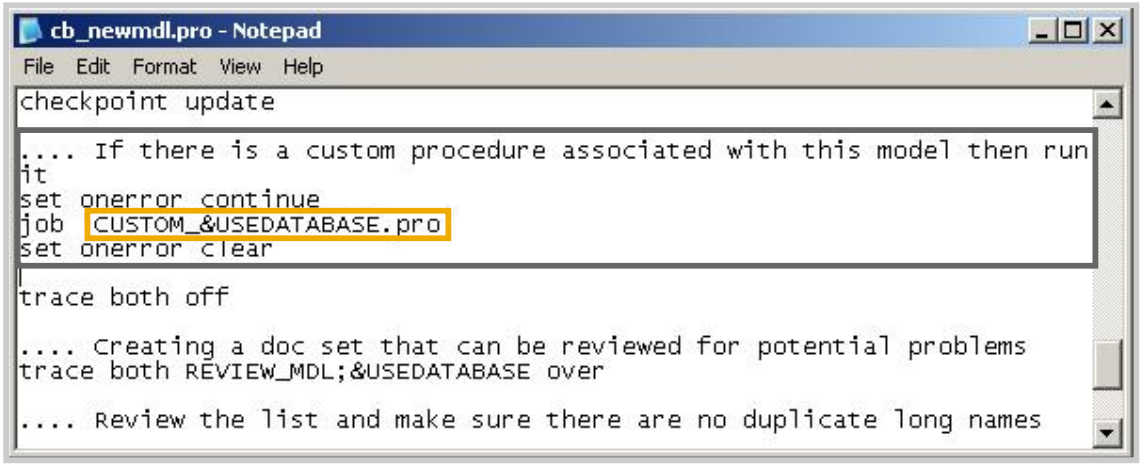
If a KPI is set to Dimension Consolidation of "ENTER", and you change dimension levels, metric sets defined in Entry & Approval may need to be updated or new sets may need to be created for the new levels.

In future SP releases we hope to have better checks in place between existing metric sets in Entry & Approval and a model being maintained in Cube Builder. For example, even if a model is configured for use in E&A, you may be able to delete a KPI if it has not been used in any metric set.

Custom Defined Model Changes

A model built with the Cube Builder & changed in PAS needs special attention!

- Anything added in PAS should be created by a procedure!
- Do not just change a formula of a KPI, it will be overwritten if you press Build PAS Model
- Procedure *cb_newmdl.pro* provides a customer exit.
- Add any new PAS procedure to a new procedure called *CUSTOM_<model name>.pro*
- All custom procedures will be executed each time you press Build PAS Model



- The Cube Builder saves its data in the NetWeaver AS database. Each time you change a model created with the cube builder opening it in the cube builder, only that data will be displayed, which are stored in the database tables. Any change you made to the model from within PAS, cannot be shown in the Cube Builder. If you press again Build PAS model after changing the model in the Cube Builder, the database tables will be updated and the PAS model will be changed as well according to the settings in the Cube Builder database tables.
- As the HTML Cube Builder cannot generate complicated formulas for KPIs or special consolidation procedures, a customer exit is provided.
- Each time you press Build PAS Model, the procedure *cb_newmdl.pro* located in the directory \Program Files\SAP\SSM\InternetPub\procs will be executed. This procedure provides a section to run a custom procedure associated with the model. So if a procedure named *CUSTOM_<model name>.pro* was created and placed in the same directory, it will be executed each time you press *Build PAS Model* in the Cube Builder.
- Therefore list any procedure you want to run each time you re-build the PAS model into the *CUSTOM_<model name>.pro* procedure.

6 Additional Resources

SAP Developer Network – SDN Community

http://sdn.sap.com

Access to discussion forums, wikis, articles, and events

Business Process Expert Community

http://bpx.sap.com

Enterprise Performance Management has additional information about Strategy Managemnt

Business Objects Enterprise Performance Management

http://www.businessobjects.com/product/epm/strategy.asp

Available product information on Strategy Management as well as the larger EPM Suite

NOTE: The HTML Cube Builder is currently not supported. Future releases of Strategy Management may include a support version.