

# CUBES

Microsoft Dynamics® AX

## Configuring the Default OLAP Cubes

White Paper

The default online analytical processing (OLAP) cubes that are provided with Microsoft Dynamics® AX require full license and configuration keys. If any license or configuration key is turned off, you must complete the procedures in this white paper. The procedures in this white paper will help you configure the cubes to work with the license and configuration keys you are using.

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[www.microsoft.com/dynamics/ax](http://www.microsoft.com/dynamics/ax)



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## Introduction

The default online analytical processing (OLAP) cubes that are provided with Microsoft Dynamics® AX require full license and configuration keys. If any license or configuration key is turned off, you must complete the procedures in this white paper. The procedures in this white paper will help you configure the cubes to work with the license and configuration keys you are using.

## Why you need to use this white paper

Functionality in Microsoft Dynamics AX can be turned on or off depending on license and configuration keys.

- A *license key* controls the modules that are available to you. For example, if you have the Additional Modules license, you can use the Human Resources I and Human Resources II modules. License keys must be purchased.
- A *configuration key* controls the functionality that is available to you within a module. For example, if you have the Recruiting (HRMMangementRecruting) configuration key, you can use the recruiting forms and functionality in the Human Resources II module.

The default OLAP cubes that are provided with Microsoft Dynamics AX require full license and configuration keys. When you turn off license or configuration keys, or when some keys are missing, data and functionality in Microsoft Dynamics AX is removed. As a result:

- Cubes cannot be processed (because they cannot access the data they were designed to retrieve).
- Errors are displayed in the Role Center web parts that use cubes.

The screenshot shows the Microsoft Dynamics AX Role Center interface. Two error messages are highlighted with red boxes:

- Reporting Services Error:** An error has occurred during report processing. (rsProcessingAborted) Get Online Help. Query execution failed for data set 'Company'. (rsErrorExecutingCommand) Get Online Help. The General Ledger Cube cube either does not exist or has not been processed.
- Reporting Services Error:** An error has occurred during report processing. (rsProcessingAborted) Get Online Help. Query execution failed for data set 'Company'. (rsErrorExecutingCommand) Get Online Help. The General Ledger Cube cube either does not exist or has not been processed.

The interface also displays a 'Bank Account Balance' table and a 'Work list' table.

Bank Account	Currency	Balance	Balance MST
Cash1	EUR	120,300.00	120,300.00
STB-DKK	DKK	3,195,050.00	511,206.00
STB-EUR	EUR	1,735,445.43	1,735,445.43
UTBANK	EUR	-93.78	-93.78

ID	Subject	Due date
1	Activity2	10/31/2007 2:30:00 PM
2	Activity1	10/31/2007 2:30:00 PM
3	Identify Key Decision Makers	10/31/2007 2:30:00 PM
4	Identify Primary Contact	10/31/2007 2:30:00 PM

The procedures in this white paper will help you modify the cubes so that they no longer try to retrieve data that depends on missing license or configuration keys. This white paper will also help you modify Role Center pages so that they do not display errors.

## Who should complete the procedures in this white paper

The procedures in this white paper are complex and should be completed by software developers or system implementers.

To complete the procedures in this white paper, you must:

- Be familiar with SQL Server Analysis Services.
- Have a good understanding of the Microsoft Dynamics AX relational architecture.
- Have experience modifying OLAP projects in SQL Server Business Intelligence Development Studio.

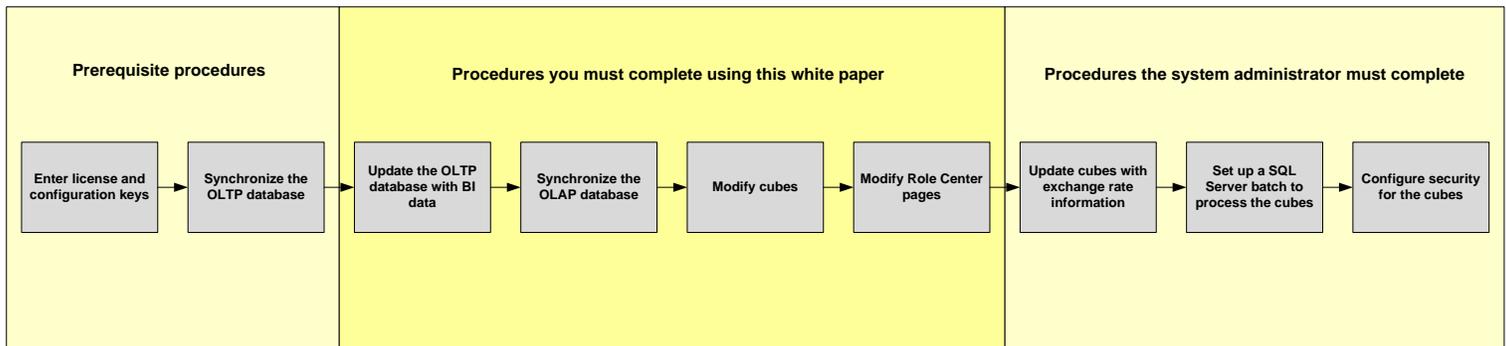
## When you should use this white paper

Before you complete the procedures in this white paper, it is critical that you have determined the license and configuration keys you need for your Microsoft Dynamics AX implementation. Enter the license and configuration keys before you complete the procedures in this white paper. For more information about entering license and configuration keys, see [Complete prerequisite procedures](#).

If you complete the procedures in this white paper, and then later turn off a license or configuration key, you may need to complete these procedures again.

## What is in this white paper

The following diagram shows the procedures that must be completed to configure the default OLAP cubes.



### Prerequisite procedures

Before you complete the procedures in this white paper, you or your Microsoft Dynamics AX system administrator must:

- **Enter license and configuration keys** Enter the license and configuration keys that you need for your Microsoft Dynamics AX implementation. Complete this procedure using the Microsoft Dynamics AX client.
- **Synchronize the OLTP database** The database that stores your Microsoft Dynamics AX data is classified as an online transaction processing (OLTP) database, and will be referred to here as the *OLTP database*. Synchronize the OLTP database using the Microsoft Dynamics AX client. The synchronization process will add or remove columns and tables from the OLTP database based on the license and configuration keys you are using.

For more information about the prerequisite procedures, see [Complete prerequisite procedures](#).

## Procedures you must complete using this white paper

The procedures in this white paper will help you modify the cubes so that they no longer try to retrieve data that depends on missing license or configuration keys. This white paper will also help you modify Role Center pages so that they do not display errors. Here are the procedures you must complete:

- **Update the OLTP database with BI data** Update your OLTP database with business intelligence (BI) data, including currency conversion information and time dimensions. Complete this procedure using the Microsoft Dynamics AX client. For more information, see [Update the OLTP database with BI data](#).
- **Synchronize the OLAP database** Synchronize your OLAP database with the schema from the OLTP database. During the synchronization process, columns and tables that do not exist in the OLTP database (due to license and configuration key settings) will be removed from the Analysis Services data source view (DSV). Complete this procedure using the Microsoft Dynamics AX client. For more information, see [Synchronize the OLAP database](#).
- **Modify cubes** Create a new OLAP project and modify the cubes so that they no longer try to retrieve data that relies on missing license or configuration keys. Modify the cubes using Microsoft® SQL Server® Business Intelligence Development Studio. For more information, see [Modify the cubes](#).
- **Modify Role Center pages** Modify and delete web parts on Role Center pages so that they do not display errors. Complete this procedure using Enterprise Portal. For more information, see [Modify Role Center pages](#).

## Procedures the system administrator must complete

There are some setup procedures your Microsoft Dynamics AX system administrator must complete to set up and maintain the cubes. These procedures include:

- **Update cubes with exchange rate information** Update the cubes with exchange rates and set up a Microsoft Dynamics AX batch to update the cubes with this information on a regular basis. Complete this procedure using the Microsoft Dynamics AX client.
- **Set up a SQL Server batch to process the cubes** Set up a SQL Server batch to process the cubes on a regular basis so that they are up-to-date and contain the latest data.
- **Configure security for the cubes** Security for OLAP data is set up independently from Microsoft Dynamics AX security. Within an instance of Analysis Services, user access to objects such as cubes and dimensions is granted through membership in one or more database roles. The system administrator must assign the Microsoft Dynamics AX users to these roles.

For more information about the procedures your Microsoft Dynamics AX system administrator must complete, see [Final steps](#).

## How much time is required

The time you will spend on each procedure in this white paper depends on your level of experience with cubes, your level of experience using the Business Intelligence Development Studio, and the number of cubes and Role Center pages you'll need to modify.

Here are some time estimates to help in your planning:

Procedure	Estimated time
Synchronize the OLAP database	30-60 minutes
Modify cubes	2-4 hours
Modify Role Center pages	1-3 hours

## Complete prerequisite procedures

Before you complete the procedures in this white paper, it is critical that you have determined the license and configuration keys you need for your Microsoft Dynamics AX implementation. You must:

- **Enter license and configuration keys**

For instructions on how to enter license keys, see the “Provide license information” section in the [Microsoft Dynamics AX Installation Guide](#).

For instructions on how to enter configuration keys, see the “Configure application functionality” section in the [Microsoft Dynamics AX Installation Guide](#).

- **Synchronize the OLTP database**

When you synchronize the OLTP database, the synchronization process will add or remove columns and tables from the database based on the license and configuration keys you are using. For instructions on how to synchronize the OLTP database, see the “Synchronize the database” section in the [Microsoft Dynamics AX Installation Guide](#).

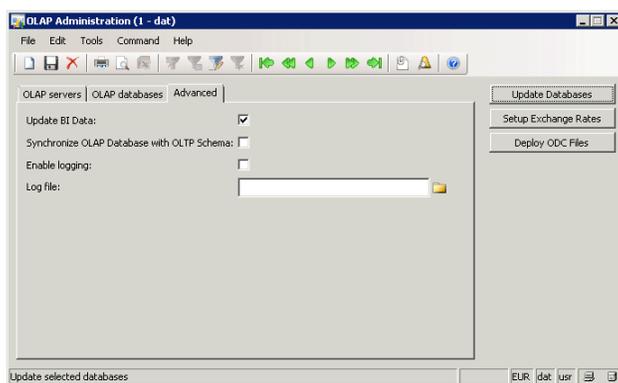
## Update the OLTP database with BI data

The following procedure explains how to update your OLTP database with business intelligence (BI) data, including currency conversion information and time dimensions.

You must complete this procedure when you are initially setting up the cubes. If you add a fiscal period at a later time, you must complete this procedure again.

**Note:** Before completing this procedure, we recommend that you make a backup of your OLTP database.

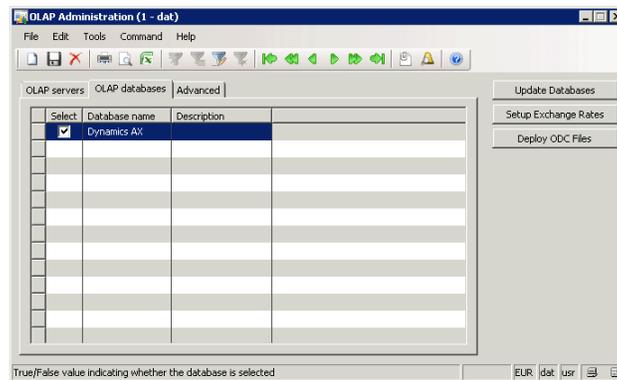
1. Open your Microsoft Dynamics AX client (**Start > Programs > Microsoft Dynamics AX 2009 > Microsoft Dynamics AX 2009**).
2. Open the **OLAP Administration** form (**Administration > Setup > Business analysis > OLAP > OLAP Administration**).
3. Click the **Advanced** tab.
4. Select the **Update BI Data** check box.



5. Click **Update Databases** to update the OLTP database with currency conversion information and time dimensions.



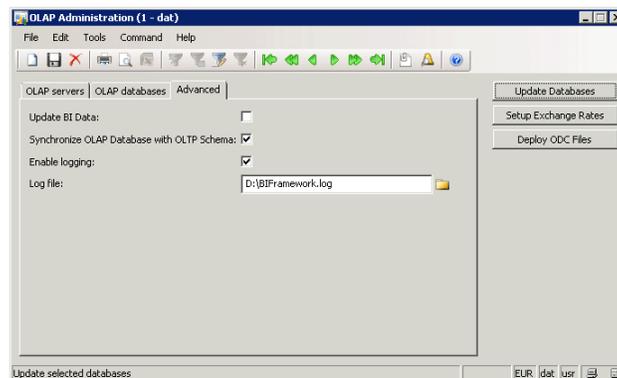
8. Select the check box for the OLAP database.



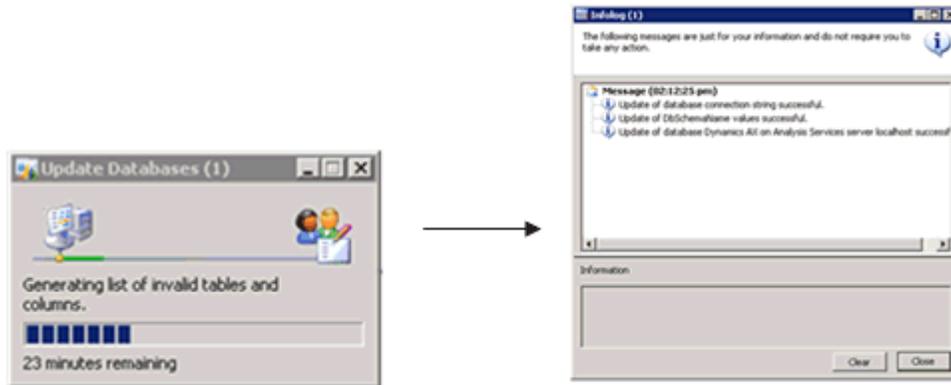
9. Click the **Advanced** tab.
10. Select the **Synchronize OLAP Database with OLTP Schema** check box.
11. Select the **Enable logging** check box.

Data will be recorded in a log file. Specify an existing location to save the log file to.

**Note:** You will need to refer to this log file when completing many of the procedures in this white paper.



12. Click **Update Databases** to synchronize the OLAP database with the schema from the OLTP database. This process may take an hour or more to complete.



The synchronization process does:

1. Compares the schema in the OLTP database to the schema in the OLAP database.
2. Removes tables from the data source view if the corresponding tables in the OLTP database were removed (due to license and configuration key settings).
3. Removes orphaned relationships contained in the data source view.
4. Removes invalid dimensions and dimension attributes.
5. Removes invalid measures and measure groups.

The synchronization process warns:

1. When a named query in the data source view may be broken. For example, the named query may refer to a column or table that was removed from the OLTP database.
2. When a dimension refers to a named query that may be broken.
3. When a measure group refers to a named query that may be broken.

## Modify the cubes

The next step in the process is to create a new OLAP project and modify the cubes so that they no longer try to retrieve data that is absent because of missing license or configuration keys.

Complete the following procedures:

- [Create a new OLAP project](#)
- [Delete the cubes that you do not need](#)
- [Review the log file](#)
- [Update named queries](#)
- [Repair or remove invalid dimensions](#)
- [Update cube elements](#)
- [Deploy the OLAP project](#)

## Create a new OLAP project

Complete the following procedure to create a new OLAP project in the SQL Server Business Intelligence Development Studio. You will use this new project to modify the cubes.

1. Open the Business Intelligence Development Studio (**Start > Programs > Microsoft SQL Server > SQL Server Business Intelligence Development Studio**).
2. Click **File > New > Project**. The **New Project** window is displayed.
3. In the **Templates** pane of the window, select the option to import an Analysis Services database.
4. At the bottom of the **New Project** window, in the **Name** field, enter **Dynamics AX**.
5. In the **Location** field, specify where you want to save the project.
6. Click **OK**. A wizard is displayed to help you import the Dynamics AX OLAP database.
7. In the **Welcome** window, click **Next**.
8. In the **Source database** window, do the following:
  - a) Enter the name of your OLAP server.
  - b) Select the **Dynamics AX** database.
  - c) Click **Next**.
9. When the database has been imported, click **Finish**.

Your new project is available in the **Solution Explorer** pane of the Business Intelligence Development Studio. Leave this project open. You will use this project to complete many of the procedures in this document.

## Delete the cubes that you do not need

Based on your license and configuration keys, determine which cubes you need. Delete the cubes that are not applicable to you based on your license and configuration keys.

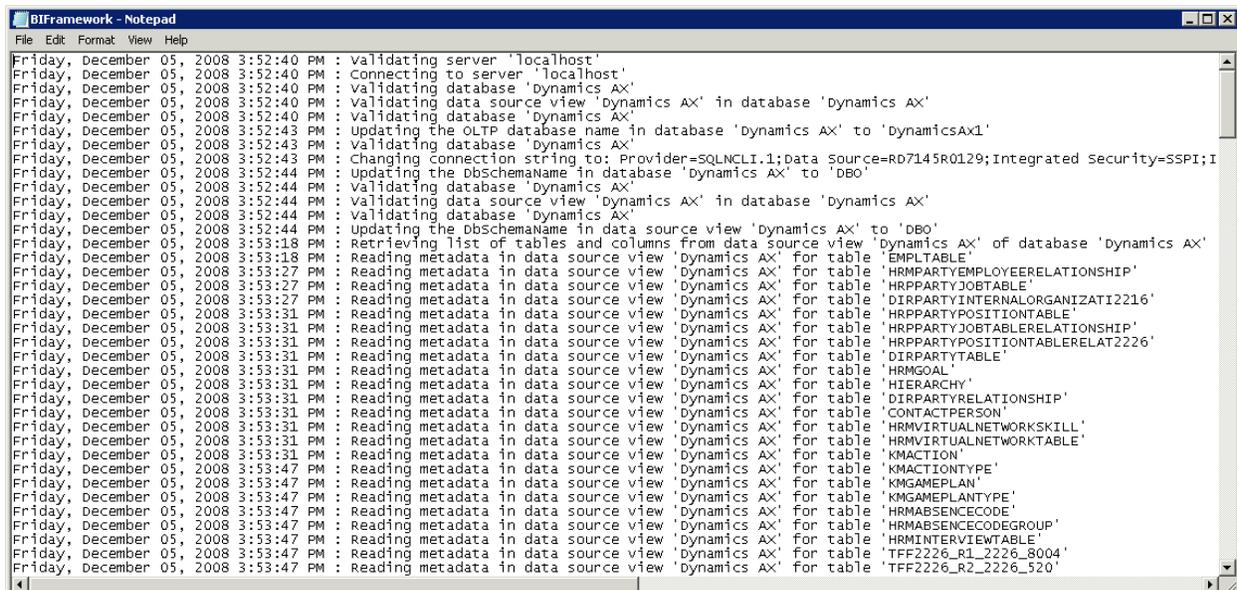
1. Open the Excel CrossRef.xlsx file. You can download this file at <http://go.microsoft.com/fwlink/?LinkID=124933&clcid=0x409>.
2. Go to the **Home** tab.
3. Make sure that the **License group**, **Module**, and **Configuration key** columns are not filtering out any data.
4. Sort the contents of the worksheet by the **Cube** column.
5. The **Sort Warning** dialog box may appear. Select **Expand the selection** and click **OK**.
6. Go to the **Cube** column. Note the modules each cube is associated with. If a cube is associated with modules that you do not use, you can delete the cube.

For example, you will notice that the Customer Relationship Management cube is associated with the Marketing Automation, Sales Force Automation, and Sales Management modules. If you do not use any of these modules, you can delete the Customer Relationship Management cube.

7. To delete a cube, do the following:
  - a) In the Business Intelligence Development Studio, go to the **Solution Explorer** pane.
  - b) Expand the **Cubes** folder.
  - c) For each cube that you do not need, right-click the cube and choose **Delete**.

## Review the log file

With a text editor, open the log file that was generated during the [Synchronize the OLAP database](#) procedure.



```
BIFramework - Notepad
File Edit Format View Help
Friday, December 05, 2008 3:52:40 PM : validating server 'localhost'
Friday, December 05, 2008 3:52:40 PM : connecting to server 'localhost'
Friday, December 05, 2008 3:52:40 PM : validating database 'dynamics AX'
Friday, December 05, 2008 3:52:40 PM : validating data source view 'dynamics AX' in database 'dynamics AX'
Friday, December 05, 2008 3:52:40 PM : validating database 'dynamics AX'
Friday, December 05, 2008 3:52:43 PM : updating the OLTP database name in database 'dynamics AX' to 'DynamicsAX1'
Friday, December 05, 2008 3:52:43 PM : validating database 'dynamics AX'
Friday, December 05, 2008 3:52:43 PM : changing connection string to: Provider=SQLNCLI.1;Data Source=RD7145R0129;Integrated security=SSPI;I
Friday, December 05, 2008 3:52:44 PM : updating the dbName in database 'dynamics AX' to 'dbo'
Friday, December 05, 2008 3:52:44 PM : validating database 'dynamics AX'
Friday, December 05, 2008 3:52:44 PM : validating data source view 'dynamics AX' in database 'dynamics AX'
Friday, December 05, 2008 3:52:44 PM : validating database 'dynamics AX'
Friday, December 05, 2008 3:52:44 PM : updating the dbName in data source view 'dynamics AX' to 'dbo'
Friday, December 05, 2008 3:53:18 PM : retrieving list of tables and columns from data source view 'dynamics AX' of database 'dynamics AX'
Friday, December 05, 2008 3:53:18 PM : reading metadata in data source view 'dynamics AX' for table 'EMPLTABLE'
Friday, December 05, 2008 3:53:27 PM : reading metadata in data source view 'dynamics AX' for table 'HRMPARTYEMPLOYEERELATIONSHIP'
Friday, December 05, 2008 3:53:27 PM : reading metadata in data source view 'dynamics AX' for table 'HRPPARTYJOBTABLE'
Friday, December 05, 2008 3:53:27 PM : reading metadata in data source view 'dynamics AX' for table 'DIRPARTYINTERNALORGANIZATI2216'
Friday, December 05, 2008 3:53:31 PM : reading metadata in data source view 'dynamics AX' for table 'HRPPARTYPOSITIONTABLE'
Friday, December 05, 2008 3:53:31 PM : reading metadata in data source view 'dynamics AX' for table 'HRPPARTYJOBTABLERELATIONSHIP'
Friday, December 05, 2008 3:53:31 PM : reading metadata in data source view 'dynamics AX' for table 'DIRPARTYPOSITIONTABLERELAT2226'
Friday, December 05, 2008 3:53:31 PM : reading metadata in data source view 'dynamics AX' for table 'DIRPARTYTABLE'
Friday, December 05, 2008 3:53:31 PM : reading metadata in data source view 'dynamics AX' for table 'HRMGOAL'
Friday, December 05, 2008 3:53:31 PM : reading metadata in data source view 'dynamics AX' for table 'HIERARCHY'
Friday, December 05, 2008 3:53:31 PM : reading metadata in data source view 'dynamics AX' for table 'DIRPARTYRELATIONSHIP'
Friday, December 05, 2008 3:53:31 PM : reading metadata in data source view 'dynamics AX' for table 'CONTACTPERSON'
Friday, December 05, 2008 3:53:31 PM : reading metadata in data source view 'dynamics AX' for table 'HRMVIRTUALNETWORKSKILL'
Friday, December 05, 2008 3:53:31 PM : reading metadata in data source view 'dynamics AX' for table 'HRMVIRTUALNETWORKTABLE'
Friday, December 05, 2008 3:53:31 PM : reading metadata in data source view 'dynamics AX' for table 'KMACTION'
Friday, December 05, 2008 3:53:47 PM : reading metadata in data source view 'dynamics AX' for table 'KMACTIONTYPE'
Friday, December 05, 2008 3:53:47 PM : reading metadata in data source view 'dynamics AX' for table 'KMGAMEPLAN'
Friday, December 05, 2008 3:53:47 PM : reading metadata in data source view 'dynamics AX' for table 'KMGAMEPLANTYPE'
Friday, December 05, 2008 3:53:47 PM : reading metadata in data source view 'dynamics AX' for table 'HRMABSENCECODE'
Friday, December 05, 2008 3:53:47 PM : reading metadata in data source view 'dynamics AX' for table 'HRMABSENCECODEGROUP'
Friday, December 05, 2008 3:53:47 PM : reading metadata in data source view 'dynamics AX' for table 'HRMINTERVIEWTABLE'
Friday, December 05, 2008 3:53:47 PM : reading metadata in data source view 'dynamics AX' for table 'TFF2226_R1_2226_8004'
Friday, December 05, 2008 3:53:47 PM : reading metadata in data source view 'dynamics AX' for table 'TFF2226_R2_2226_520'
```

## Informational messages

During the [Synchronize the OLAP database](#) procedure, columns and tables that do not exist in the OLTP database (due to license and configuration key settings) are removed from the Analysis Services data source view (DSV). As a result, you will notice the following types of informational messages in the log file.

These messages are provided for informational purposes only. You do not need to take any action based on these messages.

Object	Message text	Description
DSV	Reading metadata in data source view 'Dynamics AX' for table 'EMPLTABLE'	Indicates that metadata for a table in the data source view is being read.
DSV	Removing relation 'VENDPAYMMODETABLE_BASEENUM_NoYes_3_1033'	Indicates that an invalid relation has been deleted from the data source view.
DSV	Removing column 'ABSENCESETUPID' of table 'HRMPARTYEMPLOYEERELATIONSHIP'	Indicates that an invalid column has been deleted from a table.
DSV	Removing table 'HRMGOAL'	Indicates that an invalid table has been deleted from the data source view.
Cube	Removing invalid cube dimension 'Company information' from cube 'Accounts Receivable Cube'	Indicates that a dimension has been deleted from a cube.
Cube	Removing invalid measure group 'Goals' from cube 'Human Resource Management Cube'	Indicates that an invalid measure group has been deleted from a cube.
Dimension	Removing invalid attribute 'Cost percentage' from dimension 'Line property'	Indicates that an invalid attribute has been removed from a dimension.
Dimension	Removing invalid dimension 'Activities'	Indicates that an invalid dimension has been removed.

## Warning messages

The [Synchronize the OLAP database](#) procedure does not remove invalid columns from named queries. (An invalid column is a column that no longer exists in the OLTP database due to license and configuration key settings.) As a result, you will notice the following types of warning messages in the log file.

The procedures in this white paper will help you resolve these warning messages.

Object	Message text	What you need to do...
DSV	Warning: table 'KMACTION' in data source view 'Dynamics AX' contains one or more invalid column references in its QueryDefinition property. This must be corrected prior to processing the database.	You may need to update the named query, KMACTION, in the data source view. For more information, see <a href="#">Update named queries</a> .
Dimension	Warning: dimension 'Actions' refers to data table 'KMACTION' which has an invalid query definition. After fixing the query definition you may need to modify this dimension.	You may need to update the dimension, Actions (which refers to the named query, KMACTION). For more information, see <a href="#">Repair or remove invalid dimensions</a> .
Cube	Warning: measure group 'Actions' of cube 'Human Resource Management Cube' refers to data table 'KMACTION' which has an invalid query definition. After fixing the query definition you may need to modify this measure group.	You may need to update the Actions measure group (which refers to the named query, KMACTION) in the Human Resources Management cube. For more information, see <a href="#">Remove invalid measures</a> .

Keep the following points in mind when reviewing warning messages:

- A warning message doesn't necessarily mean that there is an error you need to resolve in the OLAP project. A warning message indicates closer investigation is needed.
- Ignore warning messages that pertain to the cubes you deleted.
- Ignore warning messages that refer to a table that starts with the letters *TFF*. For example, the following warning message should be ignored:

*Warning: table 'TFF2353\_R1\_2353\_103' in data source view 'Dynamics AX' contains one or more invalid column references in its QueryDefinition property.*

- Warning messages that refer to dimensions should be investigated further. Your investigation should determine if the dimensions are associated with the cubes that you need to modify.
- Warning messages that refer to tables are only important if those tables contain data for the cubes (and dimensions) that you need to modify.

## Update named queries

Use the following procedures to identify an invalid named query and to update it.

### ***To identify an invalid named query***

To identify an invalid named query, use the [Default Cube Advisor Tool](#) or complete the following tasks. (A CustomerSource login is required to access the Default Cube Advisor Tool.)

- **Determine which tables—with named queries—generated warning messages**

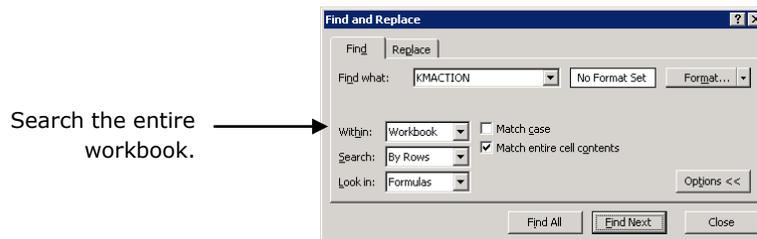
Using the log file that was generated in the [Synchronize the OLAP database](#) procedure, identify which tables—with named queries—generated warning messages.

For example, look for the following type of message in the log file:

*Warning: table 'KMACTION' in data source view 'Dynamics AX' contains one or more invalid column references in its QueryDefinition property. This must be corrected prior to processing the database.*

- **Determine if those tables contain data used by your cubes**

For each table that generated a warning message, determine if that table contains data used by a cube that you need. To determine this, open the Excel [CrossRef.xlsx](#) file. Search the entire workbook for the table name.



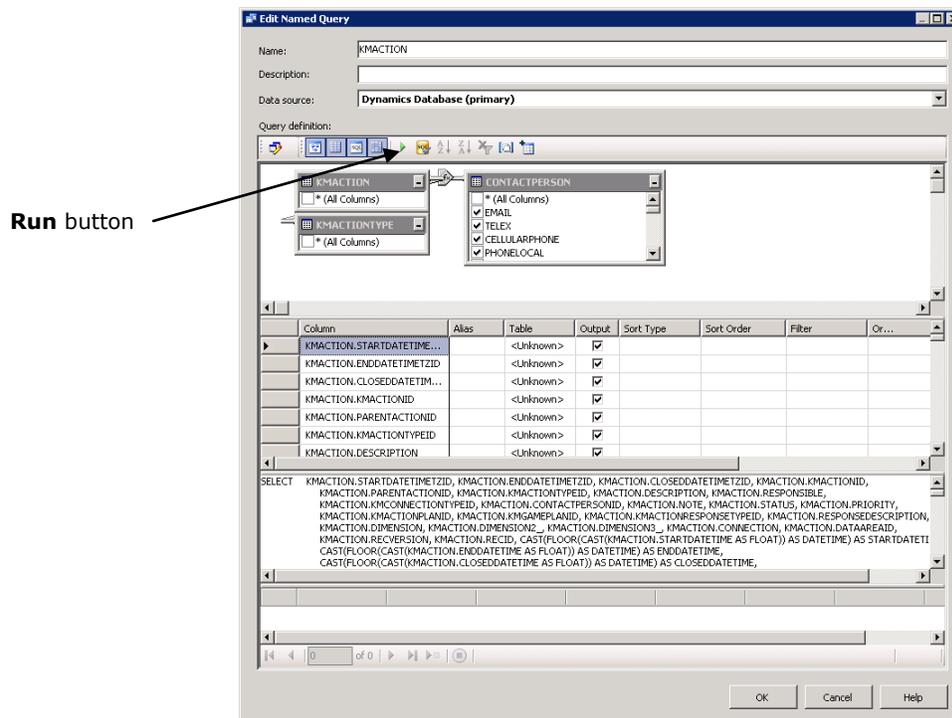
For example, you will find that the KMACTION table contains data used by the Human Resource Management cube. If you need this cube, you must update the named query for the KMACTION table.

### ***To update a named query***

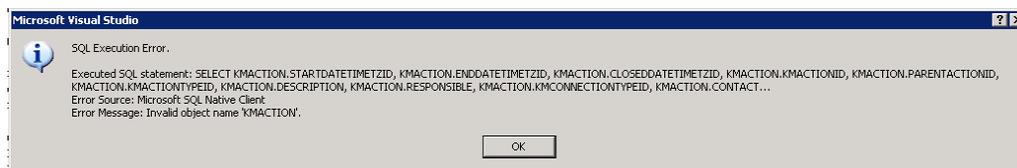
Complete the following steps to update a named query.

1. In the **Solution Explorer** pane, expand the **Data Source Views** folder.
2. Double-click the **Dynamics AX.dsv** file to open the data source view in design mode.
3. In the **Tables** pane, locate the table.
4. Right-click the table and select **Edit Named Query**. The **Edit Named Query** window is displayed.

- Click the **Run** button to display information about invalid columns and tables.



An error message is displayed. In this example, invalid columns and an invalid table are included in the named query.



- Remove invalid columns and tables from the named query. You can remove invalid columns and tables in one of the following ways:
  - Clear the **Output** checkbox for an invalid column. Some invalid columns have the word *<Unknown>* listed as their table name.

-Or-

  - Copy the SQL statement to a SQL query editor, such as the one in SQL Server Management Studio (To access the query editor in SQL Server Management Studio, click **File > New > Query with Current Connection**). Modify the SQL statement until it can be executed without errors. Then copy the modified SQL statement back into the **Edit Named Query** window.
- Repair or remove invalid join conditions from the named query.

**Warning:** Removing a join condition may change the intended query meaning and result in incorrect data being returned.
- Save the named query by clicking **OK**.

## Repair or remove invalid dimensions

Use the following procedures to identify an invalid dimension and to repair or remove it.

### **To identify an invalid dimension**

To identify an invalid dimension, use the [Default Cube Advisor Tool](#) or complete the following tasks. (A CustomerSource login is required to access the Default Cube Advisor Tool.)

- **Determine which dimensions generated warning messages**

Using the log file that was generated in the [Synchronize the OLAP database](#) procedure, identify which dimensions generated warning messages.

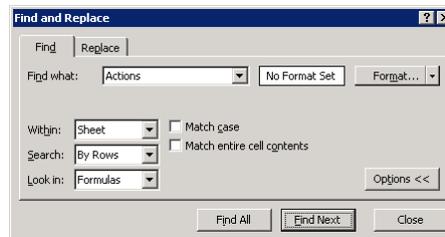
For example, look for the following type of message in the log file:

*Warning: dimension 'Actions' refers to data table 'KMACTION' which has an invalid query definition. After fixing the query definition you may need to modify this dimension.*

- **Determine if those dimensions are used by your cubes**

For each dimension that generated a warning message, determine if that dimension is used by a cube that you need. To determine this, open the Excel [CrossRef.xlsx](#) file. Go to the **Dimensions** worksheet and search for the dimension name.

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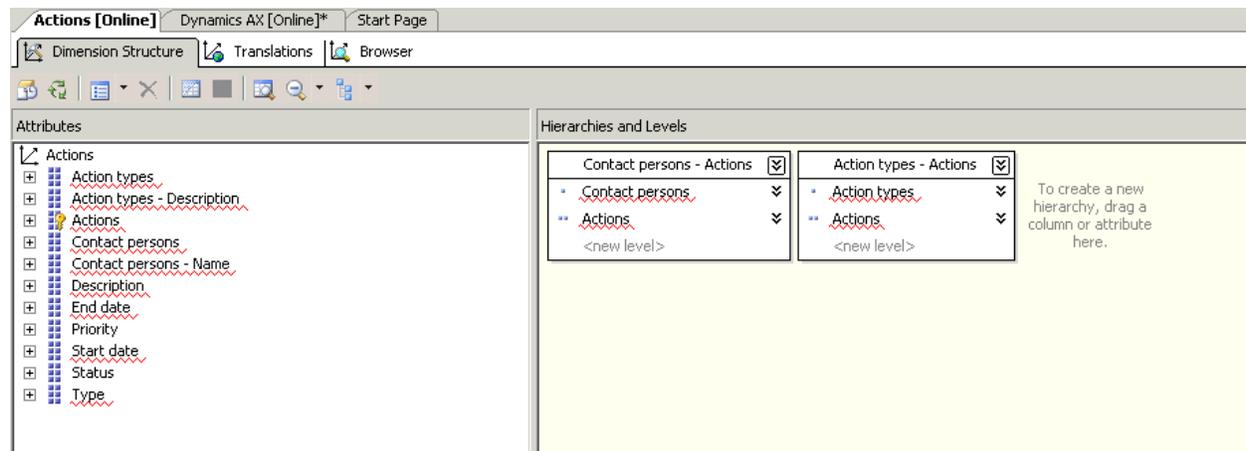


For example, you will find that the Actions dimension is used by the Human Resource Management cube. If you need this cube, you must repair or remove the Actions dimension.

### **To repair or remove an invalid dimension**

Complete the following steps to repair or remove an invalid dimension.

1. In the **Solution Explorer** pane, open an invalid dimension by double-clicking the dimension. The **Dimension Structure** tab is displayed.



2. Go to the **Attributes** pane.
  - If there are no attributes listed, delete the dimension. Delete the dimension by right-clicking it in the **Solution Explorer** pane and selecting **Delete**.
  - If an attribute is invalid, indicated by a red underline, delete the attribute. Delete the attribute by right-clicking it and selecting **Delete**.

For example, the **Action types** and **Contact persons** attributes shown in the previous screen illustration should be deleted.

**Note:** If a key attribute is invalid, we recommend you delete the entire dimension. For example, in the previous screen illustration, the **Actions** attribute is a key attribute. Because this attribute is invalid, the entire dimension should be deleted.
3. Go to the **Hierarchies** or **Hierarchies and Levels** pane. If a hierarchy has no levels, delete the hierarchy. Delete the hierarchy by right-clicking it and selecting **Delete**.
4. Save your changes.
5. To verify that the dimension is now valid, process the dimension by doing the following:
  - a) Go to the **Solution Explorer** pane.
  - b) Right-click the dimension and select **Process**.
  - c) You may be prompted to build and deploy the project. Click **Yes**.
  - d) The **Process Dimension - <Dimension Name>** window is displayed. Click **Run**.

The **Process Progress** window is displayed. When the processing is complete, the **Status** area of the window should display **Process succeeded** if the dimension is valid.

## Update cube elements

Cube elements become invalid if their underlying columns or tables are missing from the schema. Cube elements must be updated or removed so that they do not reference missing schema elements.

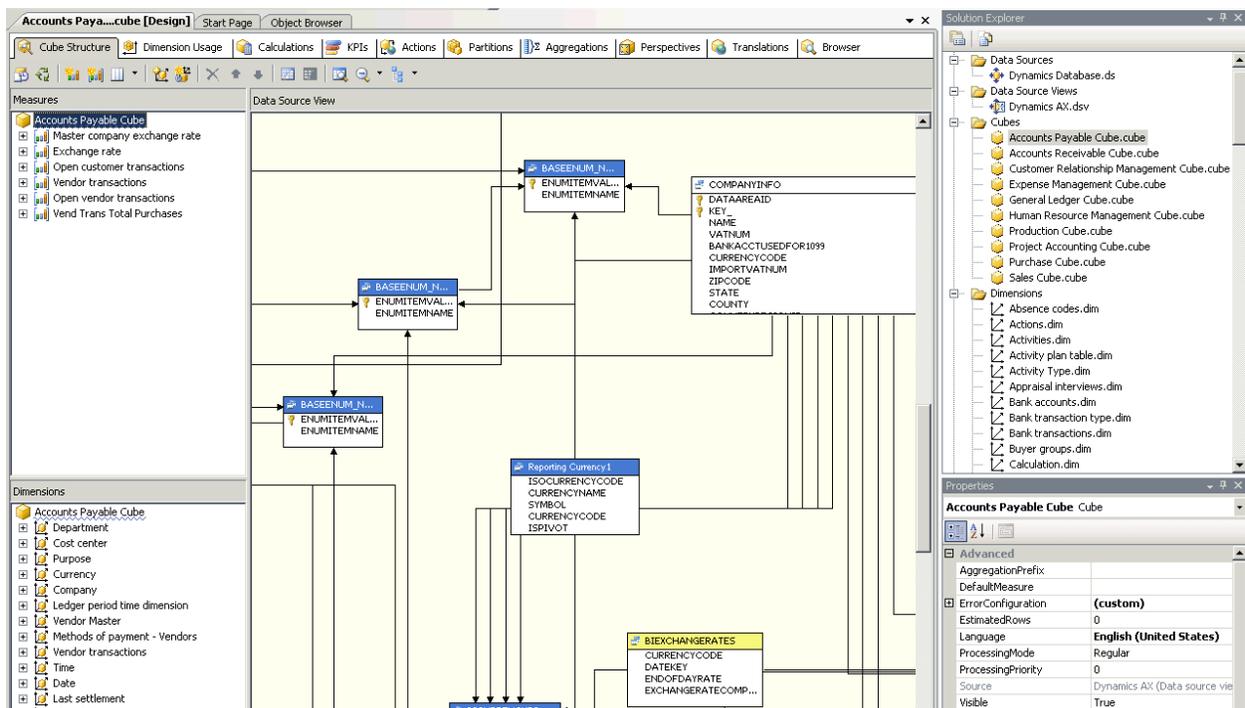
The following procedures will help you update elements of a cube. Complete these procedures for each of your cubes.

- [Open a cube](#)
- [Remove invalid measures](#)
- [Update dimension usage](#)
- [Process the cube](#)
- [Repair or remove calculated measures](#)
- [Repair or remove key performance indicators \(KPIs\)](#)
- [Verify cube data](#)

### Open a cube

From the **Solution Explorer** pane in the Business Intelligence Development Studio, open a cube by double-clicking the cube.

The cube is displayed in design mode.



While the cube is in design mode, complete the following procedures to update the elements of the cube.

## Remove invalid measures

Use the following procedures to identify an invalid measure and to remove it.

### **To identify an invalid measure**

To identify an invalid measure, use the [Default Cube Advisor Tool](#) or complete the following tasks. (A CustomerSource login is required to access the Default Cube Advisor Tool.)

- **Determine which measure groups generated warning messages**

Using the log file that was generated in the [Synchronize the OLAP database](#) procedure, identify which measure groups generated warning messages.

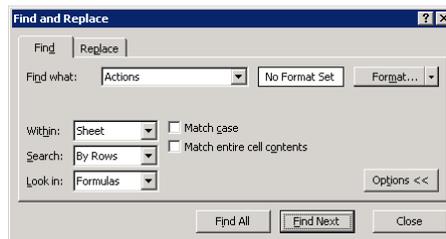
For example, look for the following type of message in the log file:

*Warning: measure group 'Actions' of cube 'Human Resource Management Cube' refers to data table 'KMACTION' which has an invalid query definition. After fixing the query definition you may need to modify this measure group.*

- **Determine if those measure groups are used by your cubes**

For each measure group that generated a warning message, determine if that measure group is used by a cube that you need. To determine this, open the Excel [CrossRef.xlsx](#) file. Go to the **Measures** worksheet and search for the name of the measure group.

Go to the **Measures** worksheet and search for the name of the measure group.



For example, you will find that the Actions measure group is used by the Human Resource Management cube. If you need this cube, you must remove the invalid measures within the Actions measure group (and possibly the entire Actions measure group).

### **To remove an invalid measure**

Complete the following steps to remove an invalid measure.

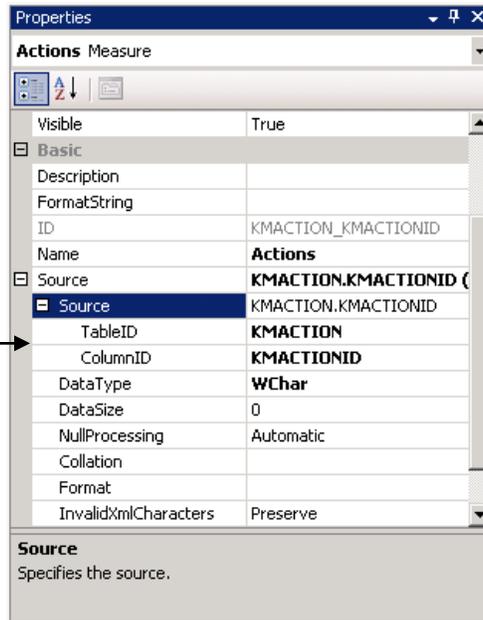
1. Click the **Cube Structure** tab.
2. Expand the measure group.

3. Determine if the measures within that group are valid. To determine if a measure is valid, do the following:

- a) Right-click the measure and choose **Properties**.
- b) In the **Properties** pane, expand the **Source > Source** node.

The column or table that this measure is mapped to is displayed. If the column or table no longer exists in the OLTP database (due to license and configuration key settings), you must delete the measure.

The column and table the measure is mapped to are displayed here.



- 4. Delete invalid measures. To delete a measure, go to the **Measures** pane. Right-click the measure and select **Delete**.
- 5. Delete any measure groups that have no measures within them. To delete a measure group, right-click the measure group and select **Delete**.
- 6. Save your changes.

## Update dimension usage

Dimension usage defines the relationship between a measure group and a dimension that it can be sliced by. Dimension usage may need to be updated based on changes made to a dimension or to a measure group.

**Tip:** BIDS Helper is an add-in tool that extends the functionality of the SQL Server Business Intelligence Development Studio. Using BIDS Helper, you can view and print a report encompassing all the information from the **Dimension Usage** tab. To download BIDS Helper, see <http://www.codeplex.com/bidshelper>. For information about how to print a report about dimension usage information, see <http://www.codeplex.com/bidshelper/Wiki/View.aspx?title=Printer%20Friendly%20Dimension%20Usage&referringTitle=Home>.

Complete the following procedure to update dimension usage.

1. Click the **Dimension Usage** tab.

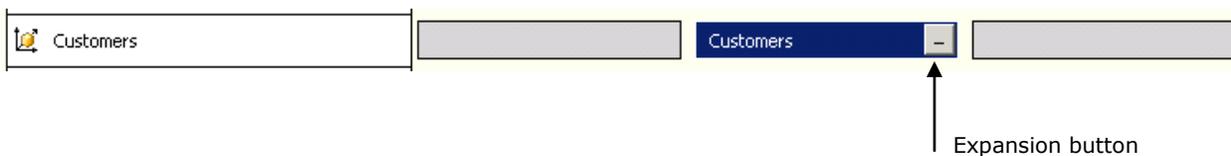
**Note:** Dimension usage between a dimension and a measure group will be removed automatically if the dimension or the measure group has been removed.

2. Modify dimension usage, if necessary.

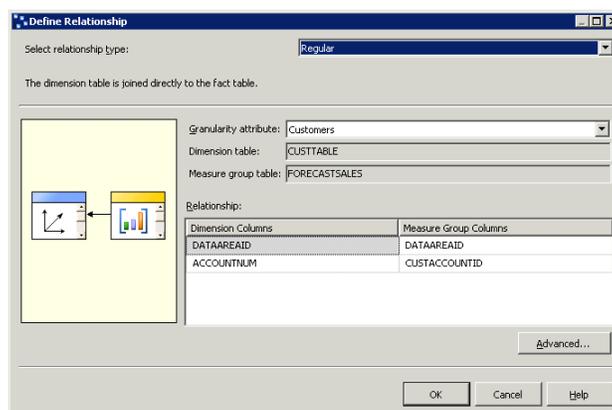
You must modify dimension usage if a dimension was changed in such a way that it affects how a measure group relates to the dimension. For example, if you removed a dimension attribute, you may need to modify the dimension usage.

To modify the dimension usage between a dimension and a measure group, do the following:

- a) Select the field that intersects the dimension and the measure group and click the expansion button located in the field.



- b) In the **Define Relationship** window, specify the relationship between the dimension and the measure group.

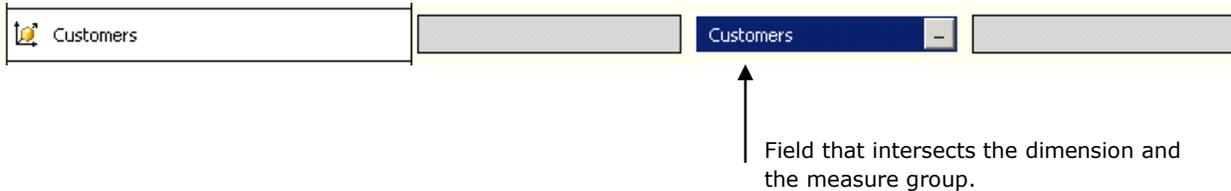


Typical changes may include modifying the relationship to remove columns that do not exist or changing columns that join the dimension to the measure group. Keep in mind that modifying the relationship can impact what data is returned by the cube. See the Analysis Services documentation for more details on defining dimension usage.

c) Click **OK**.

3. Delete dimension usage, if necessary.

To delete dimension usage between a dimension and a measure group, click the field that intersects the dimension and the measure group. Press **Delete**.

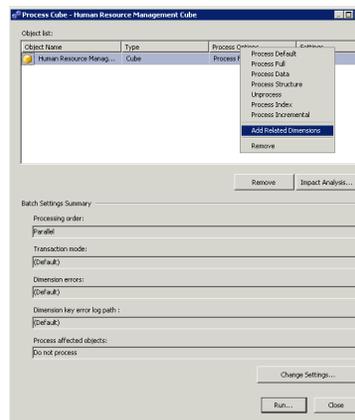


When you delete dimension usage, measure group data can no longer be sliced by that particular dimension.

### Process the cube

Process the cube you are working with. This will help you to determine if there are calculated measures and KPIs that you need to repair or remove. (The next two sections of this white paper explain how to repair or remove calculated measures and KPIs.)

1. In the **Solution Explorer** pane, right-click the cube you are working with. Click **Process**.
2. You may be prompted to build and deploy the project. Click **Yes**.
3. The **Process Cube – <Cube Name>** window is displayed. Right-click the **Process Options** column and select **Add Related Dimensions** to process the cube as well as the dimensions it uses.



4. Click **Run**.

The **Process Progress** window is displayed. When the processing is complete, the **Status** area of the window should display **Process succeeded** if the cube is valid.

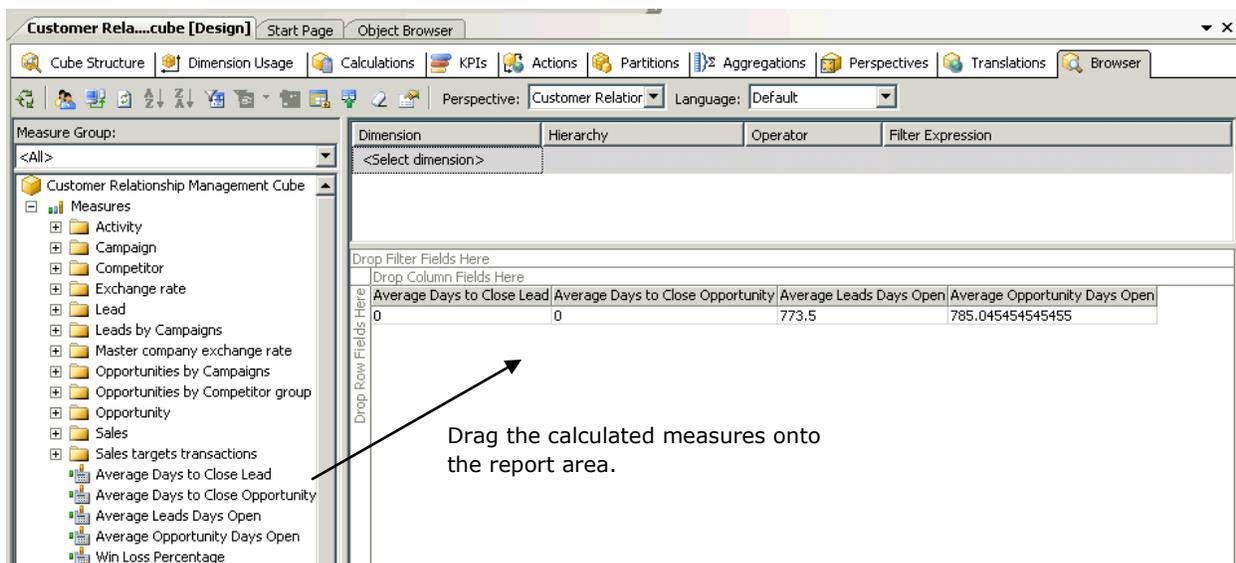
**Note:** A cube can process successfully even if its calculated measures and KPIs are invalid. Refer to the following procedures on how to repair or remove invalid calculated measures and KPIs.

## Repair or remove calculated measures

If you removed a measure in the [Remove invalid measures](#) procedure, you may need to repair or remove calculated measures that referred to that measure. Use the following procedures to identify an invalid calculated measure and to repair or remove it.

### **To identify an invalid calculated measure**

To identify an invalid calculated measure, use the [Default Cube Advisor Tool](#) or use the cube browser. To use the cube browser, click the **Browser** tab. Then drag the calculated measures onto the report area. A calculated measure that returns an error, or displays no data may need to be repaired or removed.



### **To repair or remove an invalid calculated measure**

Complete the following steps to repair or remove a calculated measure.

1. Click the **Calculations** tab.
2. Review each calculated measure and perform one of the following actions appropriate to your scenario:
  - Modify the calculated measure so that it does not have a dependency on a base measure that was removed.
  - Delete the calculated measure if it can no longer be supported without the base measure that was removed.
3. Review each calculated measure and look for currency conversion queries. Verify that each measure and dimension used in a currency conversion query still exists.

**Warning:** Currency conversion queries are executed at run time. If one of the measures or dimensions used in a currency conversion query has been removed, currency conversion will not be performed. Data will be displayed in the originating currency with no indication given to the user.

## Repair or remove key performance indicators (KPIs)

Complete the following procedure to repair or remove any KPIs that were affected by modifications you made to other cube elements.

### ***To identify an invalid KPI***

To identify an invalid KPI, use the [Default Cube Advisor Tool](#) or use the KPI browser. To use the KPI browser, click the **Browser View** icon, located on the toolbar of the **KPIs** tab. Review each KPI. Note the KPIs that do not return data, or those that display errors. You may need to modify or delete these KPIs.

### ***To repair or remove an invalid KPI***

Complete the following steps to repair or remove a KPI.

1. Click the **KPIs** tab.
2. Click the **Form View** icon, located on the toolbar of the **KPIs** tab.
3. For each invalid KPI, perform one of the following actions appropriate to your scenario:
  - Modify the KPI so that it does not have a dependency on deleted cube and dimension elements.
  - Delete the KPI if it can no longer be supported due to changes made in the cube.

## Verify cube data

Now that the invalid cube elements have been repaired or removed, we recommend that you verify that the cube returns the correct data. Compare the data returned by the cube to the data in the OLTP database.

For example, you can use the cube browser to view cube data. Click the **Browser** tab. Then drag cube elements onto the report area.

The screenshot shows the 'Customer Relationship Management Cube [Design]' window. The left pane displays a tree view of measures under 'Customer Relationship Management Cube'. The right pane shows a report area with a table of data. An arrow points from the 'Average Days to Close Lead' measure in the tree to the report area, with the text 'Drag cube elements onto the report area.'

Dimension	Hierarchy	Operator	Filter Expression
<Select dimension>			
Drop Filter Fields Here			
Drop Column Fields Here			
Average Days to Close Lead	Average Days to Close Opportunity	Average Leads Days Open	Average Opportunity Days Open
0	0	773.5	785.045454545455

Verify that the data displayed is correct based on the data that is entered in the OLTP database.

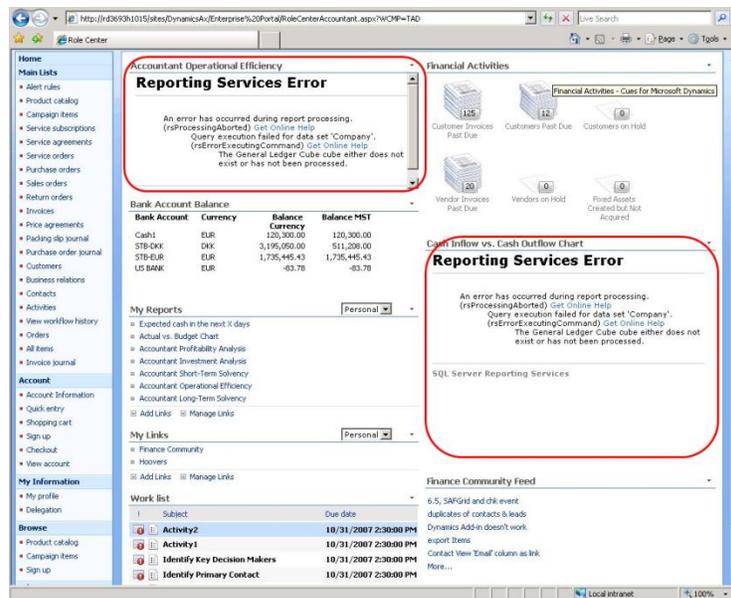
## Deploy the OLAP project

After you have repaired or removed the invalid elements of each cube, deploy your OLAP project by completing the following steps.

1. In the **Solution Explorer** pane, right-click the name of your OLAP project.
2. Click **Deploy**.

## Modify Role Center pages

Many of the Role Center pages have web parts, reports, and KPIs that rely on cubes. You'll need to remove or repair these Role Center pages.



To view the Role Center pages that are affected by cubes that you have modified, use the [Default Cube Advisor Tool](#) or complete the following steps.

1. Open the Excel [CrossRef.xlsx](#) file.
2. Go to the **Home** tab.
3. Filter the **License group** column so that it displays the license that you are using.
4. Filter the **Module** column so that it displays the modules that you are using.
5. Filter the **Configuration key** column so that it displays the configuration keys that you have turned **off**.

The **Role Centers** column of the worksheet now lists the Role Centers that you may need to modify.

To view the Role Center pages that are affected by cubes that you have deleted, use the [Default Cube Advisor Tool](#) or complete the following steps.

1. Open the Excel [CrossRef.xlsx](#) file.
2. Go to the **Home** tab.
3. Filter the **Cube** column so that it displays the cubes you deleted.

The **Role Centers** column of the worksheet now lists the Role Centers that you may need to modify.

For detailed instructions about modifying Role Centers, see the “Modify Role Center pages” topic in the Enterprise Portal online help. You can access the Enterprise Portal online help by clicking the Help icon in the top-right corner of each Enterprise Portal page.

## Final steps

The procedures in this white paper have explained how to:

- Configure the cubes to work with the license and configuration keys you are using.
- Remove web parts and reports (from Role Center pages) that referred to cubes that you deleted.

There are some additional procedures your Microsoft Dynamics AX system administrator should complete to set up and maintain the cubes. These procedures are listed in the following table.

Task	For more information
Update cubes with exchange rate information, and set up a batch to update the cubes with this information on a regular basis.	See the “Update cubes with exchange rate information” topic in the System and Application Setup help file. To access the System and Application Setup help file, open your Microsoft Dynamics AX client and click <b>Microsoft Dynamics AX &gt; Help &gt; System and Application Setup</b> .
Create a SQL Server batch to process the cubes on a regular basis.	See the SQL Server documentation on <a href="#">MSDN</a> .
Configure security for cubes.	See the “Configure security settings for cubes” topic in the System and Application Setup help file.

## Appendix: Default Cube Advisor Tool

Use the [Default Cube Advisor Tool](#) for Microsoft Dynamics AX 2009 to generate a list of cube elements (such as measures, dimension attributes, and key performance indicators) and Role Center elements that are not valid for the specific license and configuration keys you are using. Then, follow the procedures in this white paper to modify or remove the invalid elements.

(A CustomerSource login is required to access the Default Cube Advisor Tool.)

### Who should use this tool

If you plan on deploying Role Centers and/or the default cubes that are provided with Microsoft Dynamics AX 2009, you should use this tool to identify elements that must be modified or removed based on the license and configuration keys you are using.

### Install prerequisites

The Default Cube Advisor Tool works with Microsoft Dynamics AX 2009 and Microsoft Dynamics AX 2009 Service Pack 1.

Before you can install the Default Cube Advisor Tool, you must install the following software components:

Requirement	How to install
Microsoft .NET Framework 3.5	Download the <a href="#">.NET Framework</a> from the Microsoft Download Center.
Microsoft.ACE.OLEDB.12.0	This OLE DB provider is installed with Microsoft Office 2007. If you do not have Microsoft Office 2007 installed, you can install this OLE DB provider by installing the components on this Web page: <a href="http://go.microsoft.com/fwlink/?LinkId=98155">http://go.microsoft.com/fwlink/?LinkId=98155</a> .
Microsoft Dynamics AX .NET Business Connector	See the <a href="#">Microsoft Dynamics AX Installation Guide</a> .

### Install the Default Cube Advisor Tool

To install the [Default Cube Advisor Tool](#), complete the following steps.

1. Download the Default Cube Advisor Tool.
2. Double-click the CubeAdvisorSetup.exe file.
3. Click **Yes** to accept the license agreement.
4. Specify a location to save the tool to. Click **OK**.
5. After the installation is complete, click **OK**.

The following files are now installed:

- CrossRef.xlsx
- CUBE.exe
- CUBE.exe.config
- EULA.doc
- Readme.doc

## Command line options

The Default Cube Advisor Tool is a command line tool that can generate a report listing invalid cube and Role Center elements. To use this tool, you must be a user in Microsoft Dynamics AX.

The following command line options are available.

```
CUBE.exe [-t Target] [-c "Configuration Name"] [-a Account] [-b "Cross Ref filename"] [-o "Output filename"]
```

-t {All | CUBE | RoleCenter}, to specify the result, default value is All

-c Configuration Name, to specify the configuration to use. System's current setting will be used by default

-a Domain account, to specify an account to logon AOS. Current logon account will be used by default

-b Cross Ref filename, to specify cross reference file name, default value is crossref.xlsx

-o Output file name, to specify output file name

-h or -? to show this help

### Examples 1

```
Cube.exe -t ALL -o Report.txt
```

This command generates a report that lists the cube elements and Role Center elements that are invalid and must be modified or removed. The Default Cube Advisor Tool will connect to the AOS specified in the current client configuration.

### Examples 2

```
Cube.exe -t CUBE -c AOS2 -o Report.txt
```

This command generates a report that lists the cube elements that are invalid and must be modified or removed. The Default Cube Advisor Tool will connect to the AOS from the specified configuration, which in this example is AOS2.

## Limitations and known issues

Data required to run the Default Cube Advisor Tool is contained in the CrossRef.xlsx file. This is the same Excel workbook referenced by the this white paper.

**Warning:** You should not modify the CrossRef.xlsx file. If you modify this file, the report generated by the Default Cube Advisor Tool may not be accurate.

## Structure of the output file

The Default Cube Advisor Tool will generate a report similar to the following example.

```
Default Cube Advisor Tool for Microsoft Dynamics AX2009, version 1.0
Run Date: 26-Jan-2009 15:35
AOS: Default
Cross Reference Document name: C:\public\crossref.xlsx
Run Options: All
```

### 1. Human Resources Cube

1.1 Following Query definitions (Named queries) in the DSV must be edited using BI Dev studio since they are used by the cube to source data

Query name	Affected Field name	Recommended action
EMPLTABLE	EMPLTABLE.ITEMBUYERGROUPID	Remove from SELECT statement
EMPLTABLE	DIRPARTYTABLE.PREFIX	Remove from SELECT statement
EMPLTABLE	INVENTSITE.NAME	Fix the JOIN condition

1.2 Following cube measures must be deleted since the fields used by these measures are no longer valid given the disabled configuration keys

Measure Group	Measure Name	Recommended action
Recruitment project	Recruitment project Count	Delete the measure
Recruitment project	RequisitionApprovalDate	Delete the measure
Recruitment project	Recruitment project	Delete the measure
Actions	Actions Count	Fix or remove after fixing named query KMACTION
Actions	Actions	Fix or remove after fixing named query KMACTION

1.3 Following Calculated measures defined in the Cube must be removed or fixed since the fields used by the measures to source data are no longer valid given the disabled configuration keys. Depending on the action you have taken for dependent measures in section 1.2, you may remove or fix corresponding calculated measures

Calculated measure name	Dependants on Cube Measure(s) & Dimensions
Days to Fill	Actions.Actions count Actions.Actions
Number of Employees	Applicants.Status Employees.Count

1.4 Following Key Performance Indicators (KPI) defined in the Cube must be removed or fixed since the fields used by the KPIs to source data are no longer valid given the disabled configuration keys. Depending on the action you have taken for dependent measures in section 1.2, you may remove or fix corresponding calculated measures

KPI name	Dependent on Cube Measure(s) & Dimensions
Percentage of applicants interviewed	Actions.Actions count Actions.Actions Employees.Status
Percentage of applicants hired	Actions.Actions Employees.Status
Average days to fill positions	Actions.Actions Employees.Status

1.5 Following dimensions referenced by the cube need to be fixed or removed since dimension members source data from tables that are no longer valid given disabled configuration keys

Dimension	Attribute	Recommended action
Applicants	Applicants - Name	Remove attribute
Applicants	Applicants	Remove attribute
Application	Date of Reception	Remove attribute
Application	Reason code	Remove attribute
Employee	Paid vacation	Remove or fix after fixing named Query EMPLTABLE
Employee	Personal days	Remove or fix after fixing named Query EMPLTABLE

1.6 Following cube and dimension relationships may need to be validated and fixed in dimension usage tab in BI Dev studio for the cube.

Dimension name	Recommended action
Applicants	Remove or fix
Application	Remove or fix
Employee	Remove or fix

## 2. Role center pages

2.1 Following Role center pages need to be reviewed. Any content such as KPIs and/or Reports that refer to invalidated cube must be removed

Role center	Recommended action
Accountant	Validate and Remove content that indicates errors
Account Manager	Validate and Remove content that indicates errors
Account payable Coordinator	Validate and Remove content that indicates errors

-----< end of Report >-----

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