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# Working with OLAP Cubes

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Intellicus Enterprise Reporting and BI Platform



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## **Acknowledgements**

Intellicus acknowledges using of third-party libraries to extend support to the functionalities that they provide.

For details, visit: <http://www.intellicus.com/acknowledgements.htm> .

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# Designing Cube Objects

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Intellicus can connect to an OLAP Server, import OLAP cube metadata in Intellicus repository, which in turn can be used to create OLAP layouts (OLAP reports). OLAP layouts are then used by your end-users to perform data analysis.

Intellicus provides creating cubes and persisting cube data in its own system. This document explains the steps for a data administrator to design and build cubes.

Intellicus cubes are multi-dimensional, pre-aggregated data of your source data. The cubes are persisted in file system under Intellicus folders.

## Pre-requisites

### License

Ensure that Intellicus system you are using is licensed for OLAP designer feature. This is an add-on feature in many editions.

### Disk Space

Each cube can take from few KB of disk space to many GBs based on certain factors used to design the cube. We will study the factors later in this document. The designer cum build tool shows you the current size occupied by the cube on the disk.

Ensure you have enough disk space for all the cubes you plan to create and build.

### Memory

Cube building is an activity of pre-aggregation. It requires sorting and other data processing activities. Intellicus uses minimum required memory at a given point in time, using streaming-in data and disk swapping.

Ensure that each cube being built in parallel has at least 1 GB of RAM available to it during the build time. This is considering building cube of 2-3 GB size from a 5-10 million transaction rows.

Refer to our benchmark document for different scenarios.

## Intellicus OLAP Glossary

**Cube Object:** Cube Object is definition of cube, which is editable by data administrator. It is not visible to end user till it is built into a cube with data.

**Cube:** Cube is a persistent data representation of a cube object. Data administrator builds a cube from Cube Object. End User can browse a cube on OLAP Viewer or View reports that draws data from a Cube.

**OLAP Viewer:** A browser based viewer with grid and charting options that helps end user to slice and dice a cube. OLAP Viewer allows end user to save the slice and dice status for future use.

**OLAP Report:** A slice and dice status saved by end user on the OLAP Viewer is an OLAP Report.

## Preparing Data Source for Cubes

To Design a cube you will need two types of data.

**Fact Data:** Transactional data with multiple value fields that need to be pre aggregated. Each of these value fields is called a **Measure**. Fact data also has multiple keys on which aggregation needs to be grouped upon.

**Dimension Data:** Master Data that maps to grouping keys in the fact data.

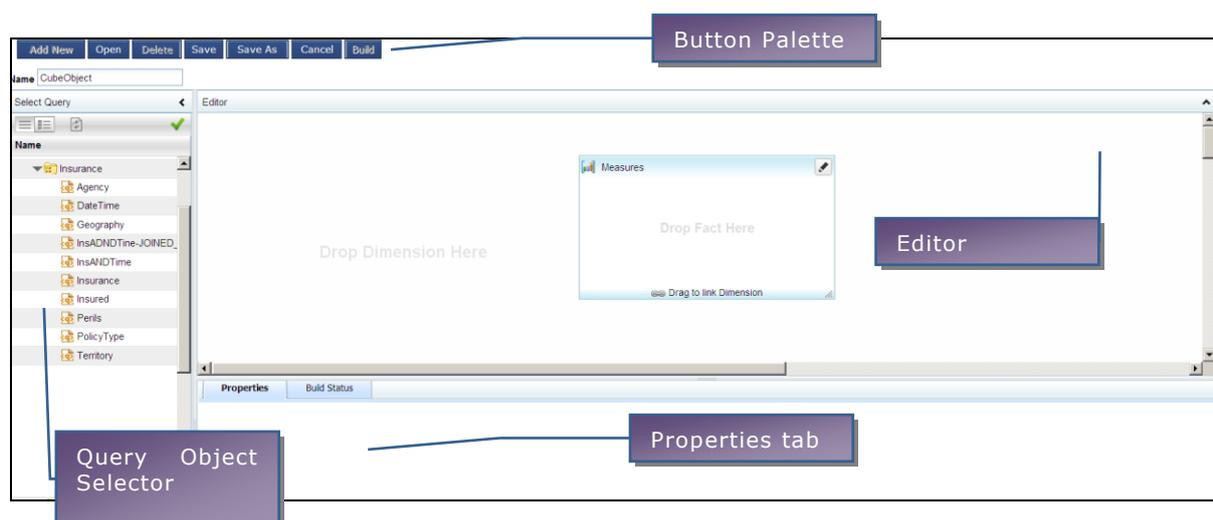
You can source both these types from Intellicus **Query Objects**. Intellicus Query Objects can fetch data from RDBMS or file sources. Refer to Query Objects manual for more details.

You will design Query Objects – one for the fact data that gives transaction records and as many query objects one for each master.

## Cube Designer

Following are main sections in the cube designer.

- 1) Editor or design canvas - the central area of the cube designer that diagrammatically represents the design of the currently opened cube.
- 2) Query Object Selector – the left pane from where you can drag required Query Objects to design the cube object
- 3) Properties tab – the right bottom area where you can edit properties of any selected item on the editor
- 4) Button palette – Action buttons on the top for CRUD operations and Build
- 5) Build Status

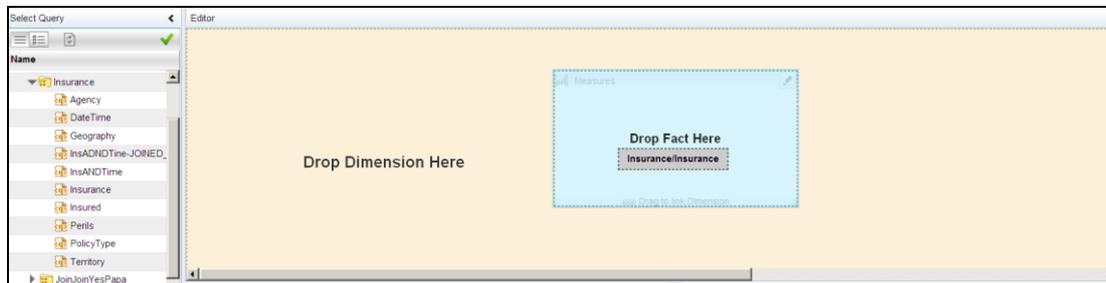


## Editor

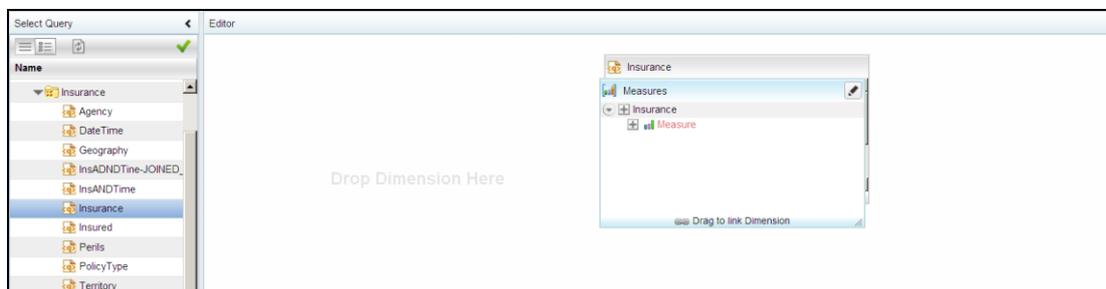
Editor section shows two sub sections

- 1) A box titled - Measures
- 2) A canvas area for dropping Dimension on

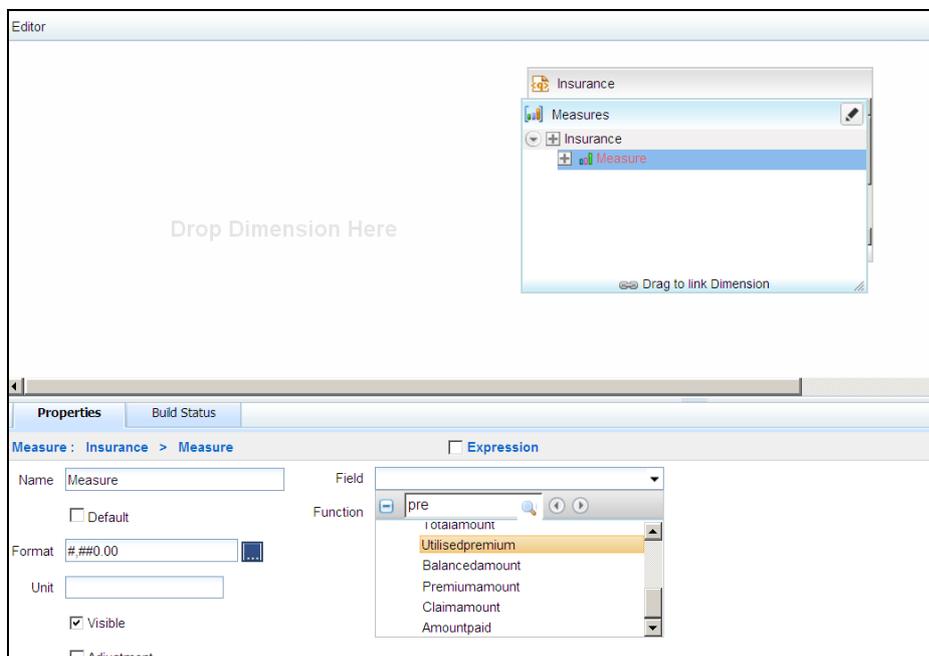
Drag the transaction Query Object into the measures box.



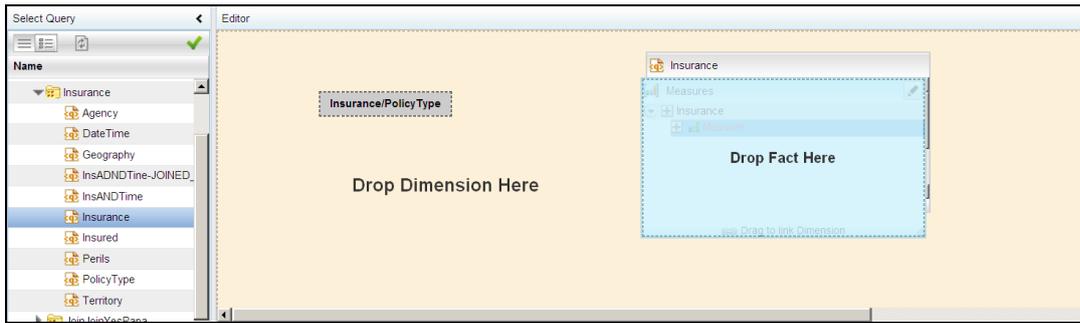
Now it shows that Measures is 'sourced' by selected Query Object.



You can click + to add measures to the cube definition and select the source field in the property tab below.



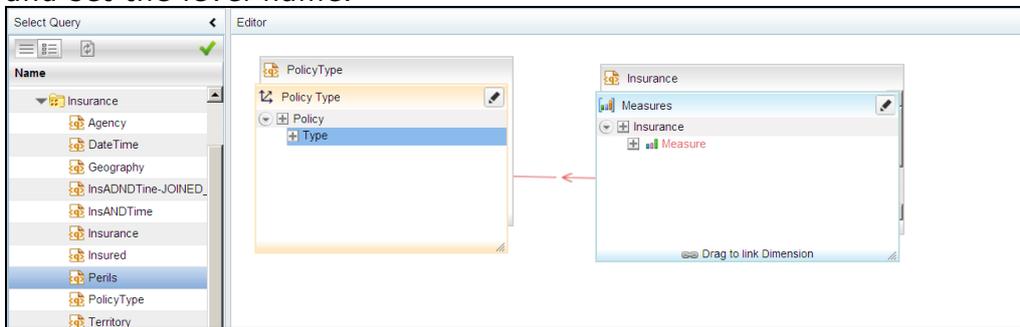
Drag the Master Query Object to the Dimension area.



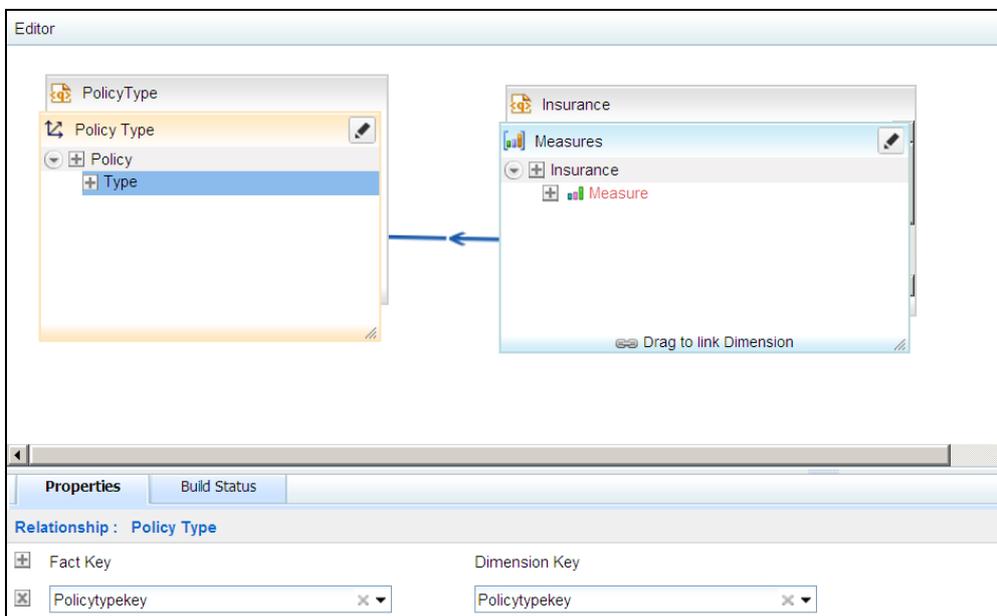
Now a dimension is created with the dragged Query Object as source.

Select Hierarchy item and set the Hierarchy name in property tab.

Select Level item and set the Level source field from the source Query Object and set the level name.



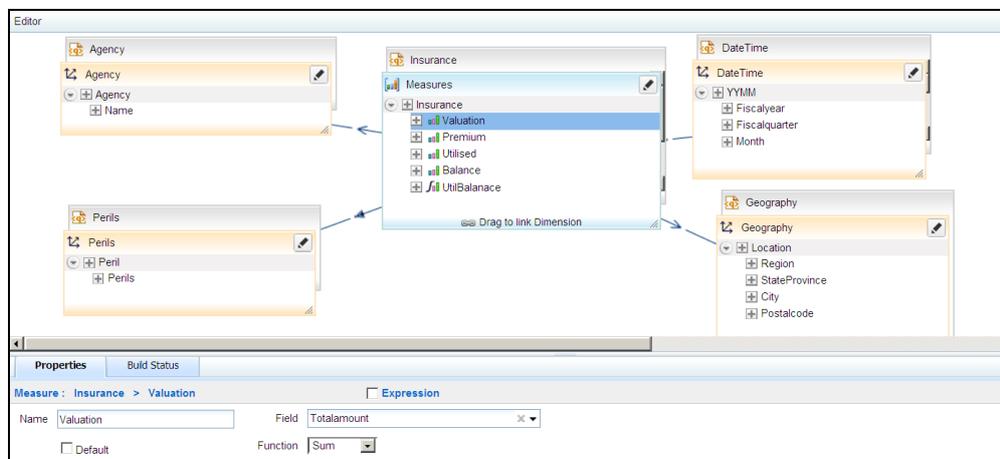
The Joining line appears Red till the time Key joining attributes are not set.



Select the line and set the key joining attributes in the properties tab. As soon as you set the Key joining attributes the line turns blue.

You can add multiple measures each sourcing a field from the Query Object. You can add multiple dimensions by dragging multiple Query Objects on the dimension area.

A typical designed Cube Object shall look like below:



## Query Selector

Query Selector provides a categorized list of Query Objects accessible to current user. It allows dragging Query Objects from the list to the design area.

Once the Cube Object is designed, the Query Selector can be collapsed for larger design area.

## Properties tab

The properties tab shows and captures properties of selected item on the design area.

Following is the list of properties:

### Measure Properties

Item	Property	Values	Comments
Measure	Name	Type yourself	End User sees this name for this measure on the OLAP viewer and reports.
	Field	Select from the Query Object Fields	
	Function	SUM, COUNT, MINIMUM, MAXIMUM	Select from the list as per need.

	Default?	Yes/No	Is this the default measure for this cube?
	Format	Format String ##,###.00 000.00 \$###,##.00	This format will applied on this measure on Viewer and reports.
	Unit		Currently used as a suffix for the measure value. True value will be in future when we implement conversions.
	Visible	Yes/No	Yes - End user sees this measure on viewer No -End user cannot see this measure. You can only use it to express another calculated measure
	Adjustment	Yes/No	This is a waterfall type chart related property. If you set this property to Yes, then this measure becomes a floating bar on a waterfall type of chart.
	Adjustment-Yes Negative/ Positive	Negative/ Positive	If the adjustment property is Yes, then you will see this property.  If you set as negative adjustment - the floating bar will be Red in color and will be drawn downwards from previous measure's top.  If you set as positive adjustment - the floating bar will be Green in color and will be drawn upwards from previous measure's top.
	Expression	Yes/No	Yes - This is a calculated measure No - This is a field sourced measure.
	Solve Order	0-N	You can set any number from 0 to N. The lower Solve Order Calculated Measures will be evaluated prior to higher Solve Order Calculated Measures

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## Calculated Measures

Calculated Measures are expressions based on existing field based measures. Calculated measures are NOT calculated during cube build and they don't consume any disk space.

Calculated Measures are evaluated at the time of slicing and dicing on the result set extracted for current view and analysis.

If you can achieve a measure using an expression, it is always efficient to make it a calculated measure. For example: Field1 + Field2, % of contribution etc.

Calculated measures are evaluated in the increasing order of "Solve Order" value.

## Expression Syntax

The basic syntax supported is MDX liner syntax.

Measure values at the same level are accessed by

```
[Measures].[Field1]
```

## Linear calculation

To Sum field1 and field2 in a calculated measure field3, do the following:

Select Field3 measure -> Check Expression in properties tab.  
In the Expression box, type:

```
[Measures].[Field1] + [Measures].[Field2]
```

## Previous Row Value

To calculate Running Total of field1 in a calculated measure field3, do the following:

Select Field3 measure -> Check Expression in properties tab.  
In the Expression box, type:

```
[Measures].[Field1]
+ ( [Measures].[Field3], prevRowMember() )
```

### Contribution calculation – inner most group

To find Contribution of field1 in field1's lowest grouped total, in a calculated measure field3, do the following:

Select Field3 measure -> Check Expression in properties tab.  
In the Expression box, type:

```
(( [Measures].[Field1] ) /
 ( [Measures].[Field1], currRowMember().PARENT ))
```

### Contribution calculation – outer most group

To find Contribution of field1 in field1's lowest grouped total, in a calculated measure field3, do the following:

Select Field3 measure -> Check Expression in properties tab.  
In the Expression box, type:

```
(( [Measures].[Field1] ) /
 ( [Measures].[Field1], currentDim().defaultMember ))
```

### Dimension Properties

Item	Property	Values	Comments
Dimension	Name	Type yourself	End User sees this name for this dimension on the OLAP viewer and reports.
	Type	Regular	Will be adding DATETIME type in future

### Hierarchy Properties

Item	Property	Values	Comments
Hierarchy	Name	Type yourself	End User sees this name

			for this Hierarchy on the OLAP viewer and reports.
	Has Member	'All'	Yes/No
	'All' member caption		Type yourself
	Default		Yes/No

## Level Properties

Item	Property	Values	Comments
Level	Name	Type yourself	End User sees this name for this Level on the OLAP viewer and reports.
	Field		
	Display Field		

## Button Palette

### Action Buttons

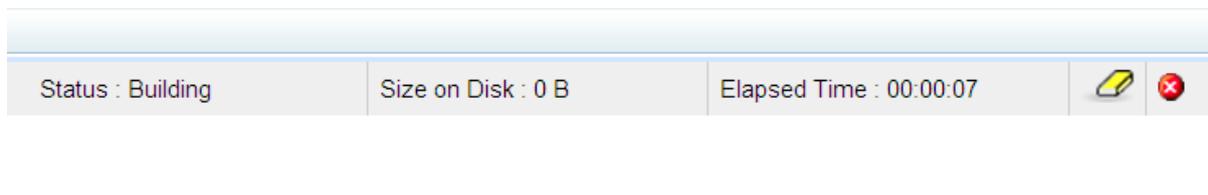
Item	Action
Add New	Closes currently opened cube object and provides a clean designer screen for designing a new Cube Object
Open	Opens Cube Selector dialog and opens the selected Cube Object for editing
Delete	After a confirmation prompt dialog, deletes currently opened Cube Object from repository. This action is not reversible!
Save	Saves any editing work done on the Cube Object to the repository. This saves the definition of Cube Object only. It doesn't refresh Cube Data.
Save As	Saves currently edited Cube Object with a new ID and Name in repository. You can choose a different folder location to Save As. The Cube Data from previous Cube Object will not be connected to this new Cube Object. Build will be required before end user can see and use this Cube.
Cancel	Cancels current editing action of Add New or Open and closes currently opened Cube Object.
Build	<p>Initiates the Cube Build activity in the background. Cube build activity is a background activity. You can leave this screen after initiating the build, leaving the screen doesn't cancel Build activity.</p> <p>The Build Status tab shows up when Build starts. You can initiate Build only once concurrently for a given cube.</p> <p>If you Open a Cube Object and its Build activity is going on, then you will see a disabled Build button.</p> <p>You may need to wait till build is completed or you can Cancel the Build before you can reinitiate Build activity.</p>

## Build Status

Build Status is a Tab shown next to the properties tab.

When the Build activity is going on, then this tab shows:

- Log entries of current data processing details by OLAP Engine.
- Status: Building, Error, Completed
- Size on Disk
- Time elapsed from initiation
- An eraser icon  to clear the logs from this screen
- A Cancel icon  to cancel the background Build activity.



When No Build activity is going on, then this tab shows:

- Last Build Status
- Size on Disk
- Time elapsed in building last cube

## Miscellaneous

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### Navigating to and editing desired Cube

From Repository Explorer select the folder containing the cube object. Select Object Type – Cube Objects. Select the desired Cube Object. Double click on the Cube Object name or Select Edit Details icon from the toolbar.

From the Cube Object Designer, click on the Open action button. On the Cube Object selector dialog, select the folder containing desired cube and click on Open.

### Things to Expect

This is a section that would give a glimpse of what features would appear in next minor releases

EnHn524	Multiple Hierarchies in a dimension
EnHn5245	Multiple Facts for sourcing measures
EnHn526	Date Time Line type of dimension

