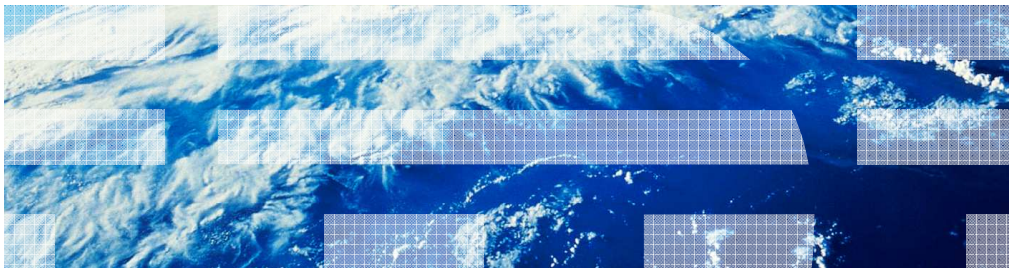# IBM Business Monitor

Multi-dimensional analysis

This presentation should provide an overview of multi-dimensional analysis in IBM Business Monitor.

Goals

- Introduce multi-dimensional analysis in IBM Business Monitor

This presentation will give you an overview of multi-dimensional analysis and the use of the report designer widget and report viewer widget in IBM Business Monitor.

Agenda

- What are dimensions?
- What is dimensional analysis?
- What is multi-dimensional analysis?
- Report designer widget
- Report viewer widget

Multi-dimensional analysis

The agenda for this presentation begins with a discussion of the concepts behind dimensions and multi-dimensional analysis. Then it provides an overview of the report designer widget and how to create reports. The report viewer widget is shown next, with an overview of the capability of the widget, followed by configuration guidance.

What are dimensions?

- Process data can be described in terms of:
  - Quantitative data or **measures** (what you measure or count)
  - Groupings or **dimensions** (how you divide up the data)

- **Dimensions** provide structure that summarizes **measures**

- Example measures:
  - Order price, number of sales, shipping time

- Example dimensions:
  - Customer, product, location

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Begin by looking at what dimensions provide for you in this analysis. The measurements might be quantitative data, for example 'number of sales'. They might also be more related to a grouping, for example 'customer'. The groupings are dimensions. They allow you to look at quantitative data and summarize them in various ways for further analysis.

What is dimensional analysis?

- Dimensional analysis enables a breakdown of quantitative data (measure) by some grouping (dimension)
- Typically this format:
  - 'function' of a 'measure' by a 'dimension'
- For example:
  - **Average** of **profit** by **country**
  - **Total** of **order value** by **customer**
  - **Maximum** of **employee salary** by **time**

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Dimensional analysis can be defined as looking at aggregated quantitative measures for specific groupings or dimensions. The aggregated data is a 'function of a measure', for example 'average of profit' and then the dimension is the grouping, for example 'by country'. Using the country dimension is a way of grouping your data so that you can analyze the average profit for each country.

Multi-dimensional analysis

- Look at measures by more than one dimension at a time
- **Average** of **profit** by **business unit** and by **country**
- Dimensions and measures are defined in WebSphere Business Modeler or in the IBM Business Monitor toolkit

Multi-dimensional analysis

Multi-dimensional analysis can be thought of as slicing your data by more than one dimensional criteria. For example you can look at the average profit per business unit but then you can add country to that analysis so you can see average profit broken down by both business unit *and* country.

Dimensions and measures can be defined in the business measures view in WebSphere Business Modeler or in the monitor model editor in the IBM Business Monitor toolkit.

Dimension levels – Drill up and drill down

- Dimensions can optionally have multiple levels

- Location
  – Country
    • Region
      – City

- Drill down means to move down to a lower level of analysis
  – Drill down on country to see information by region
  – Drill down on region to see information by city

- Drill up is the opposite
  – Drill up from city to see information by region

7   Multi-dimensional analysis   © 2011 IBM Corporation

Yet another useful capability with dimensions are levels. Instead of looking at the average profit by country, let's introduce different levels of an overall dimension called location. Then you can analyze data by country, region or city. Time is a classic multi-leveled dimension and can be broken down by year, month and day.

Once you have created multi-leveled dimensions you can analyze your data at different levels and can drill up and down amongst these levels, providing bigger or smaller granularity to the analysis.

Multidimensional reports

- Generate multidimensional reports that analyze different business aspects of historical business performance data
- Charts and tables present data for analysis against different dimensions
- Use report designer widget and report viewer widget

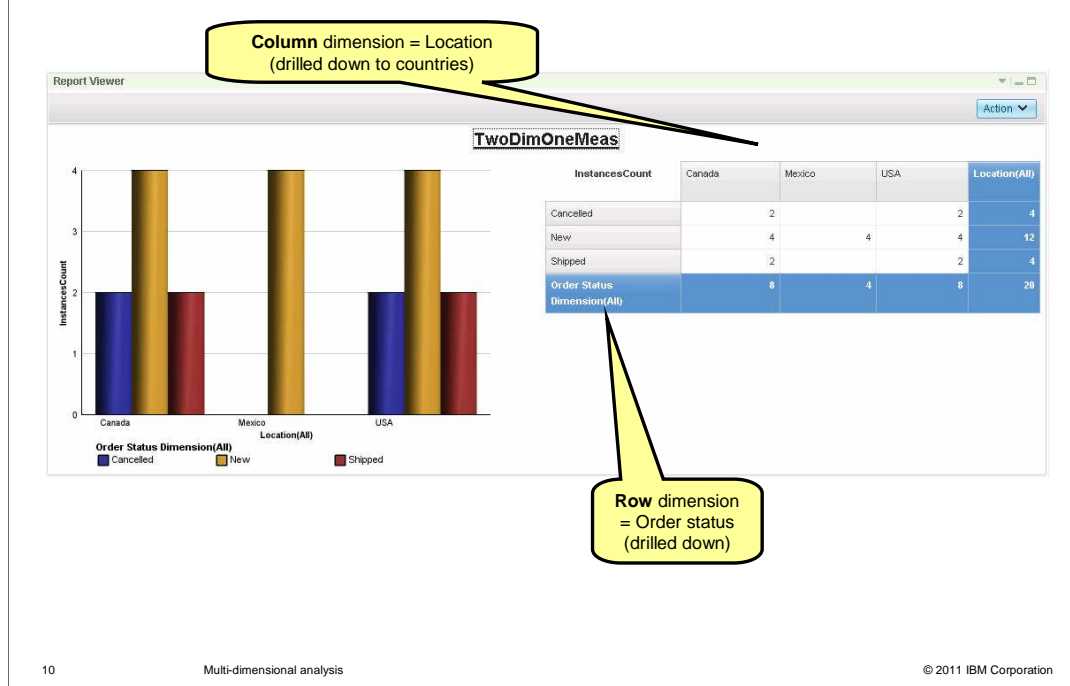8   Multi-dimensional analysis   © 2011 IBM Corporation

Using the report widgets you can create reports that help you perform dimensional analysis. Each report consists of a chart and a table. The chart can display many different chart types. You can perform very sophisticated analysis with this widget. In this example you see the monitored instance count grouped by the location dimension and the order status dimension.

Built-in dimensions and measures

- Built-in dimensions
  - CreationTime
  - TerminationTime
- Built-in measure
  - InstancesCount

Every monitor model automatically contains certain dimensions and measures and these are shown on this slide. CreationTime and TerminationTime are time based dimensions that contain year, month and day levels. So you can see when the monitor instance is created or terminated. The monitor model automatically includes a built-in quantitative measure called 'InstancesCount', which provides the number of monitor instances that have been created. These dimensions and measures are available in addition to the ones that you define explicitly in the monitor model.

Row and column dimensions

Column dimension = Location (drilled down to countries)

Row dimension = Order status (drilled down)

TwoDimOneMeas

InstancesCount	Canada	Mexico	USA	Location(All)
Cancelled	2		2	4
New	4	4	4	12
Shipped	2		2	4
Order Status Dimension(All)	8	4	8	20

The dimensions widget allows you to set each of your dimensions as either row or column dimensions. This affects how the chart and table look. The column dimensions are shown on the table across the top. They are shown on the chart as separate sections on the x-axis. The row dimensions are shown on the table across the left side. They are are shown on the chart as separate colored bars on the x-axis.

In this example, the location has been specified as a column dimension and has also been drilled down to the country level. So this causes the x-axis in the chart to break up into separate sections for the country. The order status has been specified as a row dimension so this causes the x-axis in the chart to show each order status as a different colored bar. The instances count measure is configured for display so the quantities in the table reflect the monitored instance count. Also the y-axis in the chart relates to instance count.

Drill downs
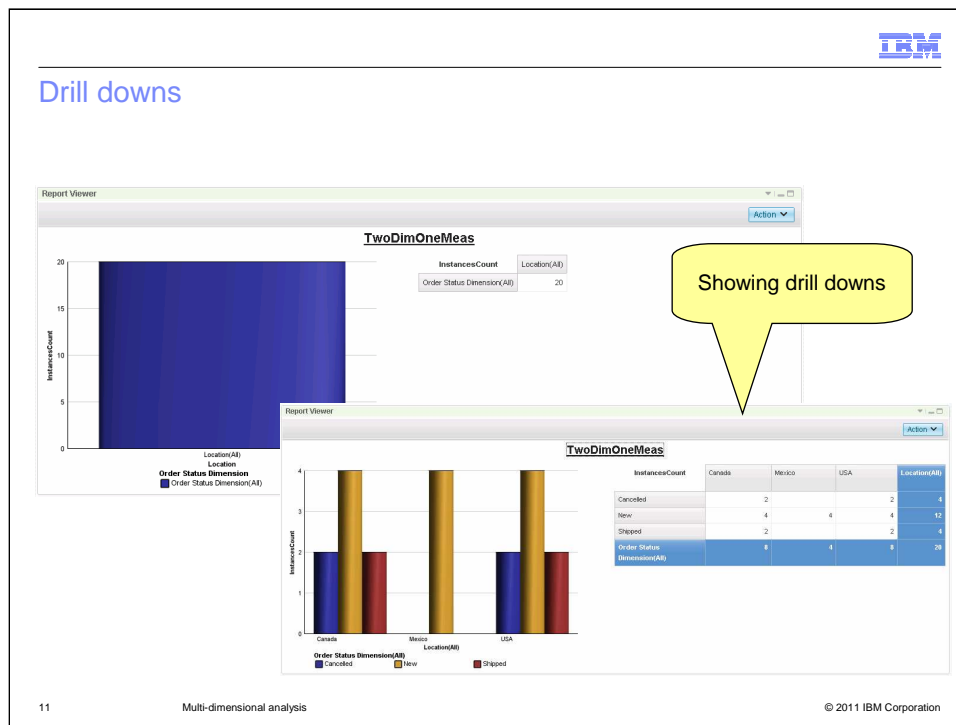
On initial display the dimensions are at their top level so there is no breakdown into specific sub-groups. In the first example you see the initial display and there are 20 instances across all locations and all order statuses.

Right clicking on the chart or table allows you to select the drill down menu option. In the second example you can see that after drilling down on location, the country level is shown. So now you see that there are 20 instances for all locations and that includes eight instances in Canada, four instances in Mexico and eight instances in the USA. In the second example you all see drill down on order status. So you can quickly determine the Canadian orders that have been shipped.

You can add any number of dimensions and measures to the report. The first dimension is placed in the rows. The second dimension is placed in the columns. The remaining dimensions are nested in the rows. For multiple measures, they are nested in columns. In this example, there are three dimensions and three measures configured. You see dimension creation time and location on the rows. And you see dimension order status on the columns. Also, three measures are defined – instances count, average order price and sum order price. All three are displayed in the columns.
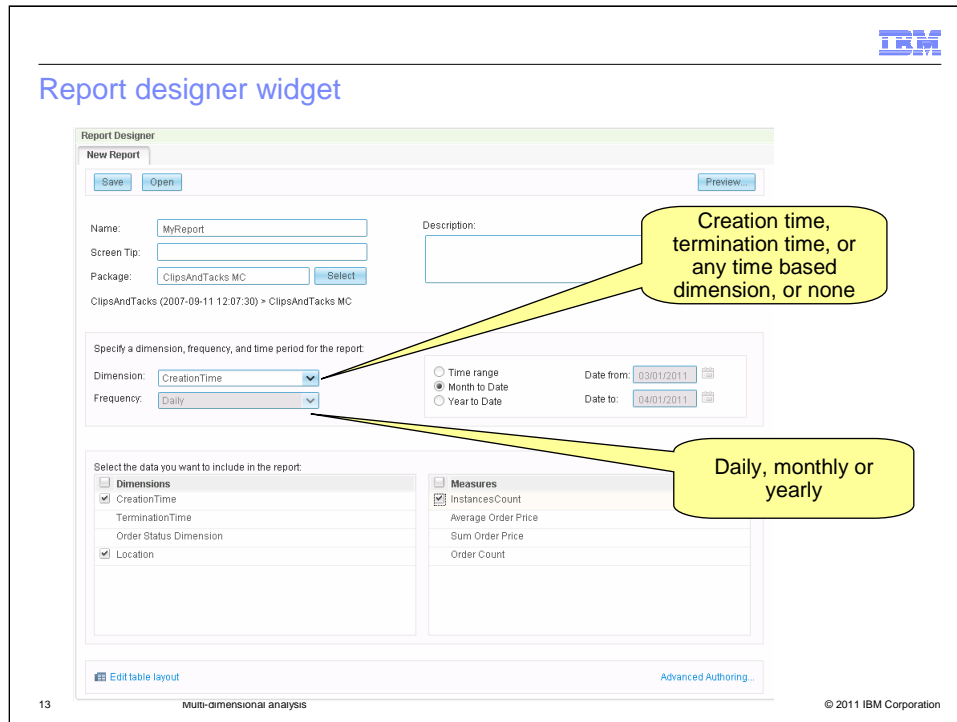
You can use the report designer widget to create a custom report using dimensions and measures which are defined in your models. Use the open button to open an existing report in the repository for modification, or select a package and click the save button to save a new report to the repository.

You can specify a time dimension and frequency for the report, and select a time range, month-to-date or year-to-date.

Also, you can select the dimensions and measures to display on the report.

Report designer – Edit table layout
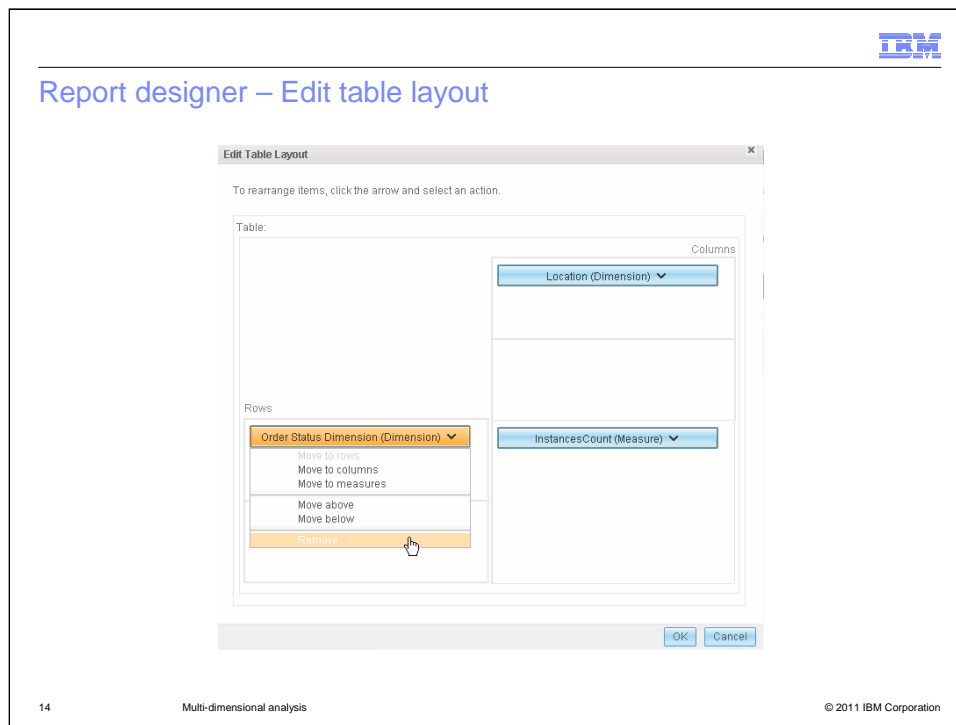
On the report designer there is a link marked 'Edit table layout'. This allows you to designate where the dimensions and measure should be displayed. You can move them to rows or to columns. Also, you can dictate the order that they are displayed on the report.

Report designer - Advanced authoring

- Advanced authoring
- Many different tools are available in the Launch menu
- Click question mark at the top right of the window to access documentation
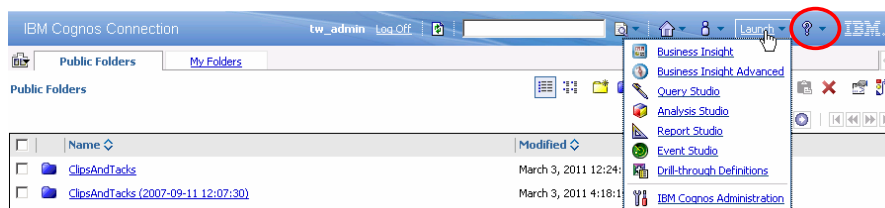
On the report designer there is a link marked 'Advanced authoring'. Click it to open a new tab with IBM Cognos Connection for access to advanced Cognos tools for report authoring. There is an extensive set of tools as you can see in the launch menu. For online help with any of these tools, click the question mark at the top right in the window.

Report viewer widget - Popup menus
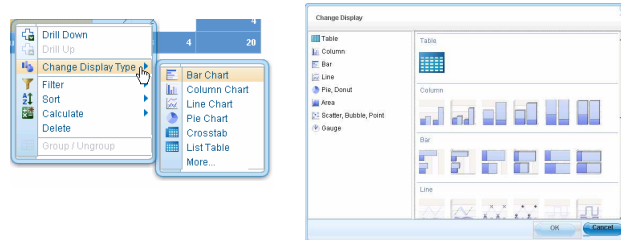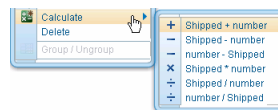
In the report viewer widget, you configure it to display a specific report from the repository. Then you can make many more adjustments to the display of the information. From the popup menus, you can select the type of chart to display, such as bar chart or pie chart. You can filter a dimension so it includes or excludes specific values. In this example, 'Shipped' is one of the values of the order status dimension, so you can include or exclude only the shipped instances. You can also perform calculations on a dimension, then display the calculated number. For example you can display the shipped dimension multiplied by a constant value.
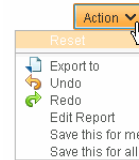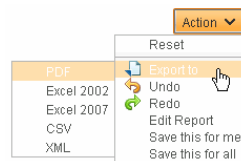
In the actions menu of the report viewer, you can export, undo, redo, edit, and save. You can select to edit the report even if you don't have business space edit authority. The edit option allows you to perform advanced report formatting tasks. The next few slides show you more about this option. Other options on the action menu allow you to save the changes that you have made. You can save the changes just for yourself or save them for everyone. In order to save them for all, you do need business space edit authority. On the export menu, you can select to export to PDF, Excel, CSV and XML files.

Report viewer - Edit report

IBM Cognos Business Insight Advanced
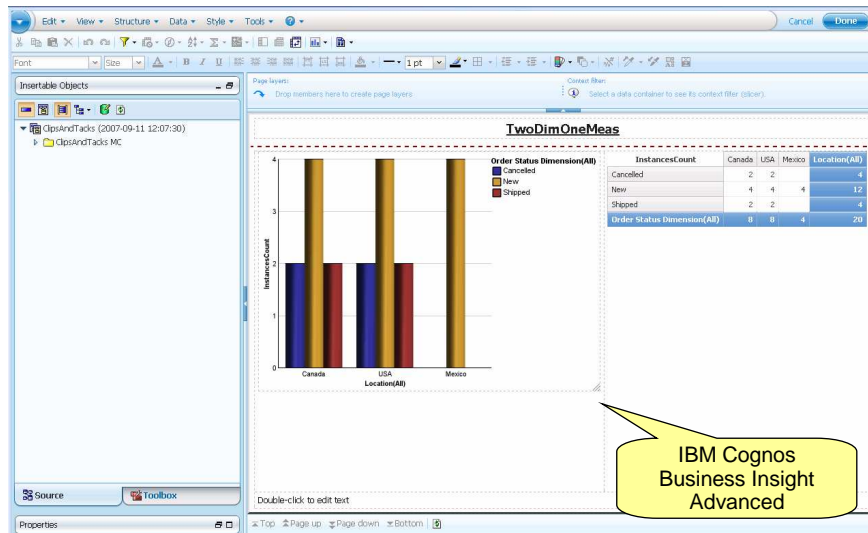
When you select the option to edit the report on the actions menu, you are taken to IBM Cognos Business Insight Advanced. Here you can perform many actions to tailor the report display to your exact needs. The following slides show you these options.

Report viewer - Edit report menus
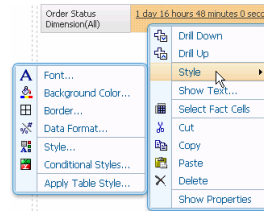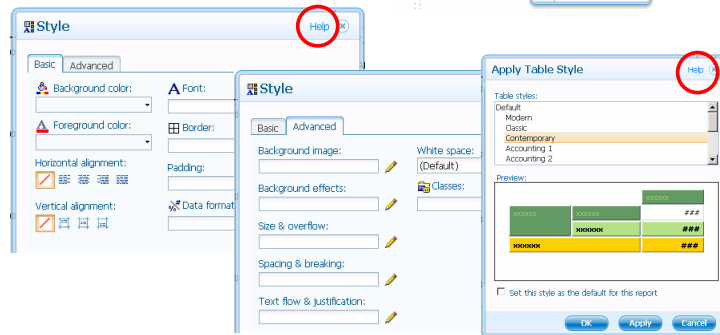
In the formatting menu you can adjust the font, colors, borders, data format and styles. At the bottom of this slide you can see some of the style pages where you can change many aspects of the rendering of the report. You can change fonts, colors, borders, and background images. You can also select from a list of built-in table styles.

Report viewer - Data formats

- Data format
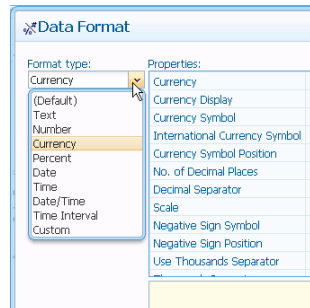
- Rename measures and dimensions
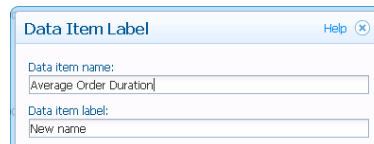
On the data format page, you can pick from various format types. For example you can adjust the currency display by adding a currency symbol or setting the number of decimal places. There are also various properties to set for text, number, percent and date and time fields. In addition you can easily rename the measures and dimensions as they are displayed on the report, by changing the data item labels.

With conditional styles you can automatically highlight cells in the report table based on conditions, such as numerical values exceeding specified thresholds. In this example, values greater than 2000 are highlighted in green. Values less than 2000 are highlighted in red. And cells with missing values have a white color.

Summary

- Covered an overview of multi-dimensional analysis in IBM Business Monitor

Multi-dimensional analysis   © 2011 IBM Corporation

In summary, this presentation covered an overview of multi-dimensional analysis and the use of the dimensions widget and reports widget with IBM Business Monitor.

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