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WebSphere® Business Monitor V6

Measures in the Business Measures Editor



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This presentation will cover measures available in the Business Measures Editor.

Goals

- Explain Business Measures available in the Business Measures Editor

The goal of this presentation is to explain the various measures available in the Business Measures Editor

Agenda

- Types of Business Measures
- Instance Measures
- Aggregate Measures
- Data typing observations



The agenda for this presentation is to explain the types of measures available in the Business Measures Editor, and then to cover each in a little more detail.

Section

Types of Business Measures

This section describes the types of Business Measures available.

Instance and Aggregate Measures

- Instance Measures
 - ▶ Data calculated for an individual process instance
 - ▶ Defined in the Attributes tab in lower pane
 - ▶ Examples include Metrics, Stopwatches, Counters, Triggers
- Aggregate Measures
 - ▶ Data calculated against all completed process instances
 - ▶ Defined in the Key Performance Indicators (KPIs) and Aggregate Metrics tab in upper pane
 - ▶ Examples include Aggregate Metrics, KPIs



Instance measures provide data **per process**. For example an orderprice metric measures the orderprice **for each individual process**.

Aggregate measures provide data that is determined from all of the **finished** runs of the process, whether they completed normally or were administratively ended. Typically some aggregation function is needed (for example, average, or sum, or max, or min).

Section

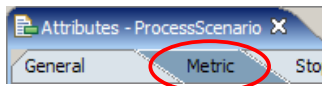
Instance Measures

This section covers Instance Measures.

Metrics



- Metrics are a type of **Instance Measure**
 - ▶ They can also be aggregated as Aggregate Measures
- A Metric measures some piece of data about a process
 - ▶ For example the value of data in a business item used within the process
- Numeric or non-numeric values
- Defined on the Metrics tab of the Attributes view

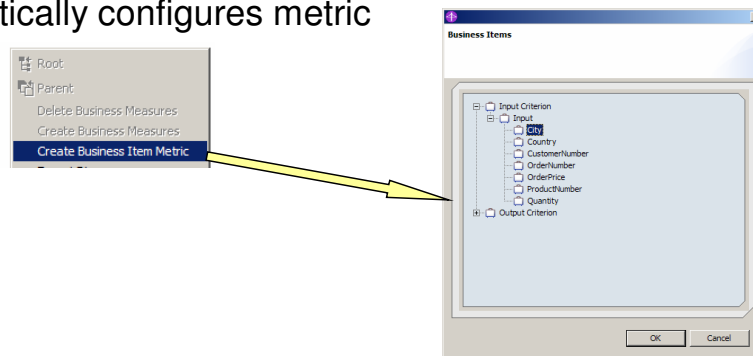


Metric is the most generic and most frequently used type of measure. You create measures for all kinds of data that you want to Monitor. You can also specify that your measures are to be used in 'Multi Dimensional analysis'. You will see more about multi-dimensional analysis later, but this type of analysis allows you to look at the metric value or values for a set or sets of process instances.

Metrics



- Metrics can capture a business item value from within any business object used by the process
 - ▶ Right click on process diagram
 - Wizard for 'Create Business Item Metric...'
 - ▶ Automatically configures metric



There is a simple wizard if you want to create a metric for a piece of business data that is used within the business items that are found in your process.

This is a very simple yet very powerful way of immediately saying that you are interested in some data value for your process instances.

For example you may be interested to monitor the City for your orders in an order processing scenario.

Metrics



- Metrics can also be calculated based upon one or more business items using the expression builder
- For example, Quantity and UnitPrice are metrics you defined using the 'Create Business Item Metric' wizard
- You can then create an additional 'Order Value' metric, even if Order Value is not a field in any business item within the process
 - ▶ Combine two business item metrics to make another metric using an expression:

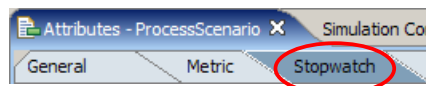
$$\text{OrderValue} = \text{ItemQuantity} * \text{UnitPrice}$$

The Expression Builder allows to build calculations/expressions graphically without writing code, and helps the non-programmer specify complex calculations.

Stopwatches



- Stopwatches are instance measures (per process)
 - ▶ They can also be aggregated as Aggregate Measures
- A Stopwatch is a specialized metric for measuring duration
 - ▶ Provides start, stop and reset functions
- Defined on the Stopwatch tab of the Attributes view

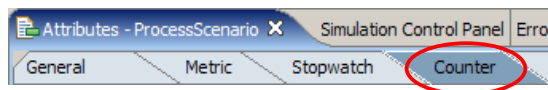


Stopwatches are a special type of measure – a special type of the ‘metric’ measure actually. They provide a pre-built mechanism for timing durations within the process.

Counters



- Counters are instance measures (per process)
 - ▶ They can also be aggregated as Aggregate Measures
- A Counter is a specialized metric for tracking the number of times something happens
 - ▶ Provides increment (+1), decrement (-1) and reset-to-zero functions
- Defined on the Counters tab of the Attributes view




Counters are also a specialized version of the 'Metric' measure. They provide a pre-built mechanism for counting how many times things happen within a process.

Section

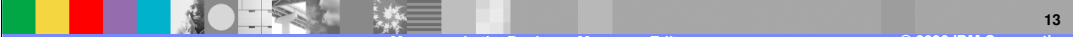
Aggregate Measures

This section covers aggregate measures.

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KPIs and Aggregate Metrics KPIs Metrics

- KPIs and Aggregate Metrics calculate data based upon all finished process instances
- The calculation uses a function to aggregate:
 - ▶ Average, Total, Minimum, Maximum
- Provide an 'aggregation source' for the function
 - ▶ Instance measure – Metric, Stopwatch or Counter
- Must be numeric
 - ▶ Integer, Long, Short, Byte, Double, Float, Date, DateTime, Time, Duration


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Key Performance Indicators, or KPIs, are special types of aggregate metrics. Specifically they have some acceptable range or target defined in addition to the aggregated measure itself.

They allow you to calculate an aggregated metric or KPI by performing some aggregation function – average, min, max, sum or user defined. This calculation must be done on a source.


An aggregation is in the form of “Function of source”, for example, Average of OrderPrice metric.

The calculation is made against all **Finished** instances – finished means completed, terminated, or failed.

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KPIs and Aggregate Metrics KPIs Metrics

- Can also use 'User-Defined' calculation for the function
- 'Aggregation source' becomes a calculation that can be based upon zero or more of the other Aggregate Metrics and KPIs
- Use Expression Builder to define the calculation

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You can also define your own calculation for the function instead of avg, sum, min, max. When you do this your 'source' is no longer a single metric, it is a calculation based on one or more of the other aggregate metrics or KPIs.

You use the Expression Builder to do this – shown on next slide.

Expression Builder

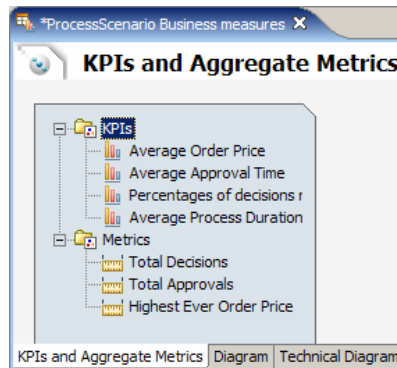
The screenshot shows the 'Expression Builder' dialog box. The 'Expression Tree' on the left displays a binary expression structure. The 'Expression text' field contains the formula: $(\text{ProcessScenario.Total Approvals} / \text{ProcessScenario.Total Decisions}) \times 100.0$. The 'Expression Composer - Root expression' section is divided into three panels: 'First term' (Sub-expression: ProcessScenario.Total Approvals), 'Operator' (x), and 'Second term' (Number: 100.0). The dialog includes 'OK' and 'Cancel' buttons at the bottom right.

Notice how you can define an expression. Here you see an aggregated 'percentage approved' which is calculated by dividing the total approvals (an aggregate metric) by the total decisions made (another aggregate metric) and multiplying by 100 to get a percentage.

KPIs and Aggregate Metrics



- Both are defined on the KPIs and Aggregate Metrics tab in the Upper Pane



Both are defined on the KPIs and Aggregate Metrics tab in the upper pane

Aggregate Metrics



- Aggregate Metrics are simply values that can be shown in the 'Active Instances' view in the Monitor Dashboard
- For example:

ProcessScenario aggregates

Results 1 to 1 of 1

Average Approval Time	Average Order Price	Average Process Duration	Highest Ever Order Price	Percentages of decisions requiring approval	Total Approvals	Total Decisions
1 h, 49 m, 32 s	947.778	1 h, 49 m, 34 s	10,000	96.296	104	108

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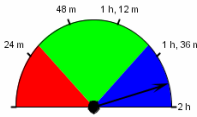
Here is what it means to monitor an Aggregate Metric.

Aggregate Metrics are simply numeric data values calculated by aggregating all the finished instances. The slide shows how they are reported in the Monitor dashboard. The Monitor Dashboard has a view called 'Active Instances' which, despite the name, can be configured to show aggregate metrics for finished instances.

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KPIs and Aggregate Metrics KPIs Metrics

- KPIs measure business performance
- Two ways of specifying expected values/ranges
 - ▶ Target value with percentage deviation margins
 - ▶ Upper and Lower Limits
- KPI performance against expected values/ranges can be shown in the Monitor Dashboard using a variety of views:
 - ▶ Gauges, Scorecards, KPIs



Status ↑↓	Value	Target	Score
✓	947.778	1,000	95%

Status ↑↓	Value
⊘	1 h, 49 m, 32 s

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KPIs can be displayed in a much richer set of views in the Monitor Dashboard because they are not just data values – they also have acceptable ranges, or targets, which allows for good business performance visualization. By comparing the value with the target/limits, rich views can be built such as those shown. For example a gauge to indicate performance against a KPI or SLA. It a scorecard, or a simple report on the KPI.

They can also be viewed in the ‘Reports View’ in WebSphere Business Monitor’s Dashboard, which allows for the grouping of multiple KPIs into a ‘perspective’. For example a financial perspective on the company would group all the financially relevant KPIs.

Section

Data typing observations

This section presents some observations about using data types.

Data typing

- Be careful with data typing when using User-Defined calculations and the Expression Builder
- Be careful of type conversions



Each of your measures will have a data type – for example String, int, double, float, Integer. You must be aware of what conversions you are implicitly performing when you use the Expression Builder. For example if you divide two floats by each other to produce an answer, but the answer is an Integer type, then be wary of the results.

See the next slide for an example.

Data typing Example

- For example
 - ▶ Aggregate Metrics: TotalApprovals, TotalApplications
 - Both Integers
 - TotalApprovals is less than TotalApplications
 - ▶ KPI: Percentage of Applications Approved
 - Defined as an Integer
 - ▶ Calculation:
 - $KPI = (TotalApprovals / TotalApplications) * 100$
- KPI will always equal 0% due to Integer rounding
- Fixes:
 - ▶ Change calculation:
 - $(100 * TotalApprovals) / TotalApplications$
 - ▶ Change types:
 - Make all types float or double

In this example there are two measures called TotalApprovals and TotalApplications. They are both Aggregate Metrics and both have the type 'Integer'. TotalApprovals is also known to be less than TotalApplications.

A KPI is defined to work out the percentage of applications that are approved. This involves dividing the two numbers to get a ratio and then multiplying by 100 to get a percentage. The KPI is also defined as an Integer.

It may be surprising to find that the KPI will always equal zero. The reason for this is because of Integer rounding. The calculation is evaluated by first dividing two integers that would give a result between 0 and 1. However, the result of the division of two Integers will be stored as an Integer. Anything between 0 and 1 becomes 0 when it is converted to an Integer. The calculation is then completed by multiplying by 100 but $0 * 100 = 0$!

The solution is to ensure that the rounding does not affect the result. By first multiplying the number of approvals by 100, and *then* dividing by the number of applications, this issue is avoided and the correct percentage figured is obtained.

Note: The calculations will be made using the Java™ language. However, the expression builder does not allow you to write free-form Java code so you cannot write your own Java casting logic to convert data types.

Summary

- Defined Types of Measures
- Talked about Instance and Aggregate measures
- Illustrated data typing ramifications



In summary, this presentation has covered the available types of measures, discussed Instance and Aggregate measures, and illustrated an area of caution regarding data type conversions.

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