crystal decisions™

Crystal Analysis

Dr. MDX Demonstrates Variances and Ratios

Dr. MDX Overview

Dr. MDX is a regular column in the Developer Zone section of the Crystal Decisions' web site. Every two weeks the Doctor answers a reader's MDX problem and suggests some solutions.

MDX, short for Multi Dimensional Expressions, is a query language for accessing data from OLE DB for OLAP (ODBO) compliant servers, such as Microsoft SQL Server Analysis Services.

Column Overview

This column covers common business calculations: variances and ratios. All of the examples used in this document are illustrated using Crystal Analysis Professional and the Sales cube in Microsoft's Foodmart 2000 sample.

Variances and Ratios

Variance Calculation

Variance is a term used in this context for calculating the difference between two values, for instance the difference between actual figures and budgeted figures. If the actual value is *a* and the budgeted figure is *b* and they are measures of costs, then values of *a* which are more than values of *b* are bad. The variance is calculated as

$100*(b - a) / b$ or $(b - a)$

depending on whether the variance is required as a percentage of the target value or not.

Another example is a variance against a benchmark figure, for example a retail manager may want to measure the performance of one region against another. **Figure 1** shows the use of the Crystal Analysis Professional calculation expert to compare stores in 'CA' to the stores in 'OR'.

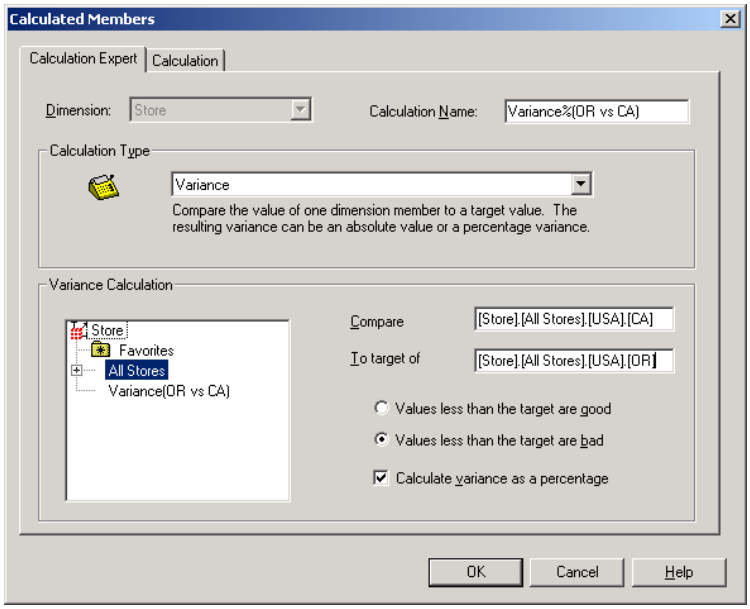

Figure 1: Use of Crystal Analysis Professional calculation expert for variances

The MDX generated by the calculation expert is:

```
([Store].[All Stores].[USA].[CA] - [Store].[All Stores].[USA].[OR]) / [Store].[All Stores].[USA].[OR] * 100
```

as can be seen in **Figure 2** below.

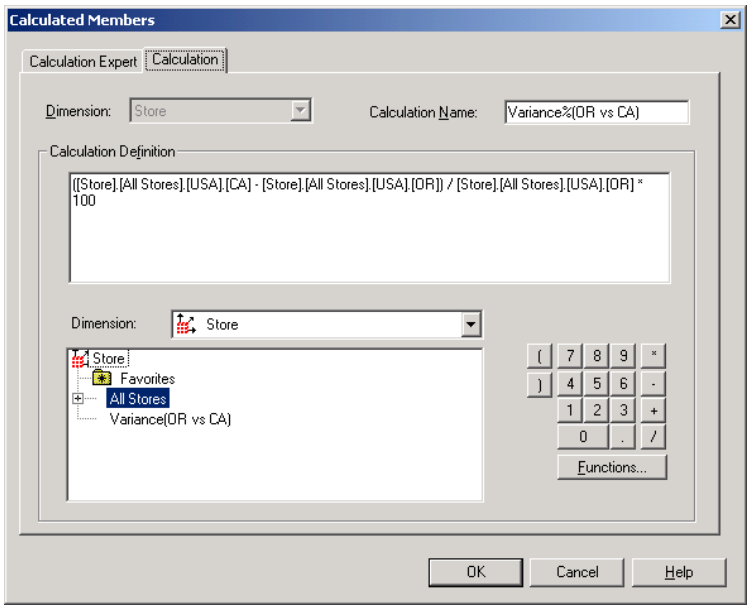

Figure 2: Variance calculation defined in the Crystal Analysis Professional calculation expert

If the 'Calculate variance as a percentage' is unchecked in **Figure 1** then the MDX generated is:

```
[Store].[All Stores].[USA].[CA] - [Store].[All Stores].[USA].[OR]
```

and the result of these two variance calculations are shown in **Figure 3**.

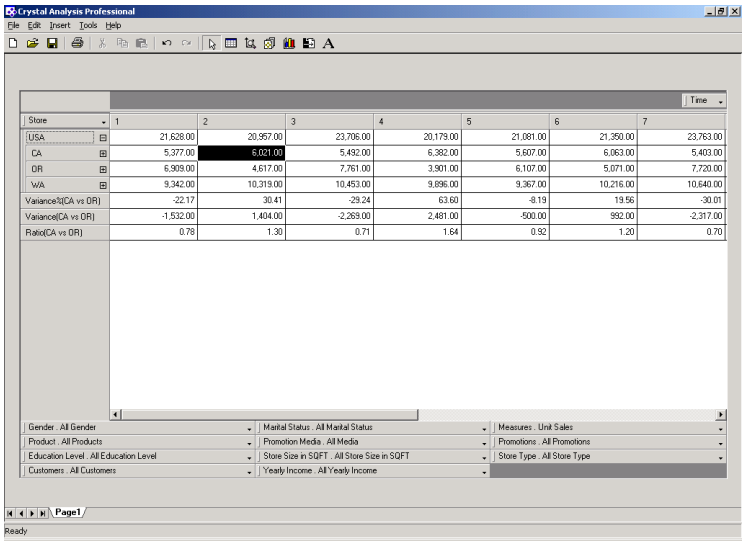

Figure 3: Crystal Analysis Professional worksheet showing the result of the variance calculations

Ratio Calculation

A Ratio is a very straightforward calculation, dividing one member by another. This introduces the possibility of divide by zero errors; we will address methods for avoiding these in a future Dr. MDX column.

Ratio to another member

The MDX code to calculate the ratio of all the stores in 'CA' to the 'Unit Sales' in all the stores in 'OR' is as follows:

```
[Store].[All Stores].[USA].[CA] / [Store].[All Stores].[USA].[OR])
```

Ratio to parent

The ratio of a member to its parent can also be calculated. The MDX code for calculating the ratio of the 'Store Sales' in all the stores in 'WA' to its parent ('USA') is as follows:

([Store].[All Stores].[USA].[WA],[Measures].[Store Sales]) / ([Measures].[Store Sales], [Store].Parent)

with the Crystal Analysis Professional calculation expert in **Figure 4**, with the result in **Figure 5.**

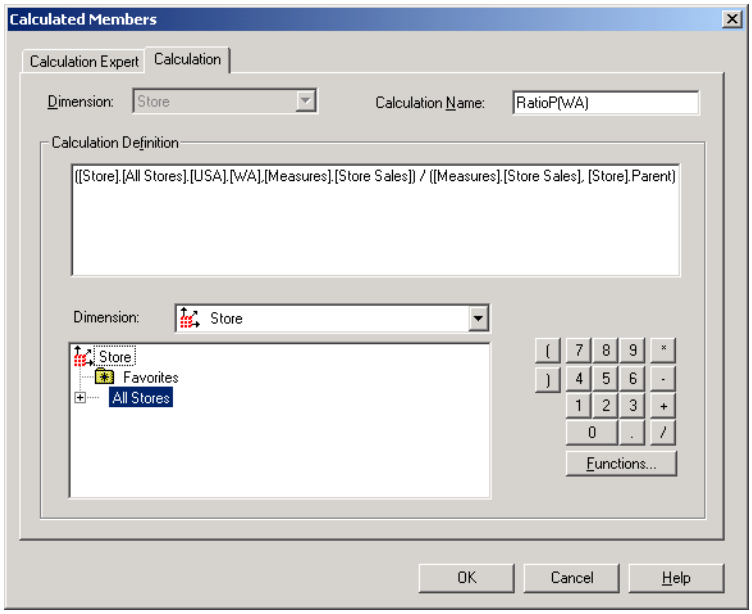

Figure 4: Ratio to Parent Calculation defined in the Crystal Analysis Professional calculation expert.

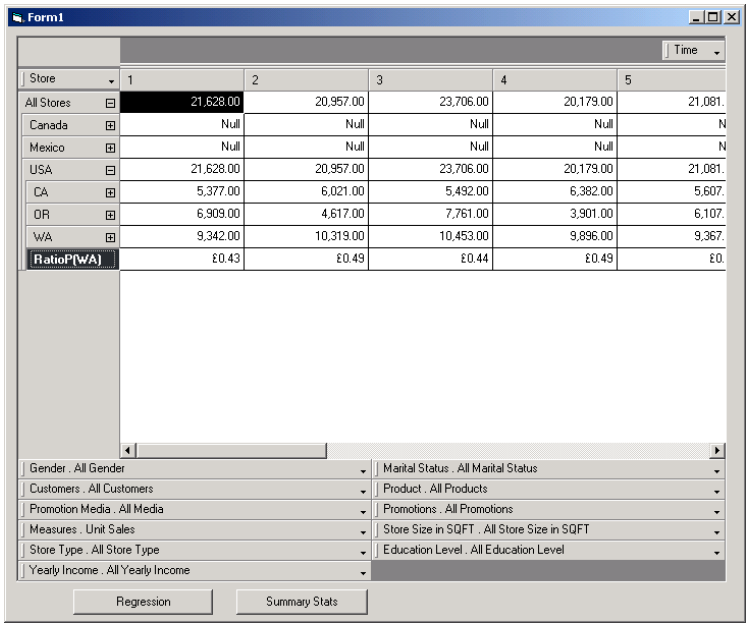

Figure 5: Crystal Analysis Professional worksheet showing the result of the ratio calculation

Finding More Information

For more information on Crystal Analysis Professional and the Crystal Decisions family of business intelligence products, please visit:

- http://www.crystaldecisions.com/products
- http://support.crystaldecisions.com
- http://www.crystaldecisions.com/products/dev_zone

To view more Dr. MDX columns, please visit:

http://www.crystaldecisions.com/products/dev_zone/archives

Contacting Crystal Decisions for Technical Support

We recommend that you refer to the product documentation and that you visit our Technical Support web site for more resources.

Self-serve Support:

http://support.crystaldecisions.com/

Email Support:

http://support.crystaldecisions.com/support/answers.asp

Telephone Support:

http://www.crystaldecisions.com/contact/support.asp

Contacting Dr. MDX

Send your MDX questions to dr.mdx@crystaldecisions.com.