

# SAP Solutions for Performance Management



## Business Planning and Consolidation 5.x Logic Explained Part 1 of 3

# SAP Solutions for Performance Management



**Logic Overview – Part 1**

**Script Formulas Overview – Part 2**

**Script Formulas Advanced – Part 3**

# Agenda

## Logic overview

- What
- Where
- When
- How

## Logic Advice

## Dimension Logic

# What is “logic” in SAP BPC

## General understanding of what “logic” is for BPC

- At the most basic level logic is just a calculation
- The questions are where, when and how the logic is executed that requires the expertise

## Where – calculations can be generated by:

- Analysis Services
- BPC Application Server
- Excel

## When - calculations can be executed:

- As data is queried from the application
- As data is written to the application
- After data is written to the application

## How – calculations are defined

- Within the definition of a dimension using Microsoft MDX language
- A script using a proprietary language
- Using a rules based engine for specific pre-defined business requirements
- Excel formulas

### **Analysis Services**

- **Microsoft provides capability of defining calculations within a dimension**
- **Calculations performed as user queries the data**
- **Results stored in the cache only**
- **First query will allow take longer than subsequent queries**

### **BPC Application Server**

- **BPC proprietary logic engine reads script or rules based definition**
- **Application Server tier retrieves data and calculates results**
- **Results stored in database directly**

### **Excel/Live Reporting**

- **Excel based formulas calculate on data retrieved within workbook**
- **Results stored only in workbook**
- **Live Reporting on the web supports simple calculations**

## When logic is executed

### **As data is queried from the application**

- **Analysis Services member calculations, on the fly**
- **Excel calculations, on the fly or on demand (F9)**
- **Live Reporting calculations, on the fly**

### **As data is written to the application**

- **Calculation on the fly when user send data from Data Loads, Excel, Live Reporting, Word, PowerPoint or Journal Entries**
- **Mechanism = default logic script**

### **After data is written to the application**

- **Calculates on demand via Data Manager packages**
- **Script or rules based logic supported only**

## How logic is defined

### **Dimension Logic (use sparingly!)**

- Within the definition of a dimension using Microsoft MDX language
- Calculations defined for a specific member ID
- Calculations can be defined for specific intersections within one application only (cube)

### **Script Logic**

- A script using a proprietary language or MDX
- Calculations defined for a specific member ID
- Creates base level data in the application
- Calculations can cross applications

### **Rules Based (table driven) Logic**

- Using a rules based engine for specific pre-defined business requirements
  - ◆ Legal consolidation
  - ◆ Currency
  - ◆ Elimination
- Rules not specific to a single member ID
- Calculations will cross applications

### **Sheet Based Logic (not covered in these presentation)**

- Exists in worksheet only

In general you want to create data for logic to avoid performance issues in production

Apply best practices to help determine which type of logic to use

- do not assume just because it is possible in development that it will be successful in production.

Application specifics can help determine approach – use holistic approach

- Application Size (dimensions, data)
- # of Users
- Application functionality (read,write)

MDX logic structure has changed in BPC 5

**BPC logic is a powerful tool – but can be a performance issue if not written correctly**

- **Logic syntax is not easy to grasp – plus limited training availability**
- **The logic design is not very intuitive to a business user**
- **Multiple ways to do the same thing with only 1 or 2 that perform as desired – hard to know best practice**

**The good news is we are working on:**

- **Improving knowledge dissemination**
- **Usability in the product**
- **Thinking on next generation logic has begun**

## Logic Approach – Dimension Formulas

**Necessary when calculating after the aggregation (parent calculations)**

- Ratios, KPI's etc.

**Use of SOLVEORDER**

- Control calculation order across dimensions – does not apply if all formulas are in one dimension
- Control relationship to the Measures Dimension (a separate dimension)

**Dimension Logic will have a **negative impact** on retrieval times when system is in use by multiple users!**

- Don't get fooled by the development environment performance

**For BPC 5 see formula guidance**

- Requires tuples with IIF statements on ALL logic statements
- SQL 2005 currently has serious performance issues when formula property exists in dimension! Microsoft says they are working on it.

- **BPC 5 implements multiple hierarchies as separate dimensions in Analysis Services (AS).**
  - For example if the account dimension has two hierarchies AS will create two dimensions named account.h1 and account.h2.
  - The top member of these dimensions will be named [all account.h1] and [all account.h2.] All members of the dimension roll up to this top level member.
  - An understanding of this concept is important because it relates to how MDX formulas need to be written.

## BPC 5 Dimension Formula Guideline

Suppose we want to define a formula as following in a dimension with 3 hierarchies:

**#CF\_ST\_FIN\_RATE= ((#IFRSTRATE/#WKSYSR)\*#WKSCURMTH)**

Where IFRSTRATE, WKSYSR and WKSCURMTH are base members of hierarchy H1 of Account dimension, and CF\_ST\_FIN\_RATE is a dimension formula in H1 of account dimension.

- **The correct formula for H1 is**

**IIF(Account.H2.CurrentMember is Account.H2.[All Account.H2] And  
Account.H3.CurrentMember is Account.H3.[All Account.H3],  
(Account.H1.IFRSTRATE/Account.H1.WKSYSR)\*Account.H1.WKSCURMTH, NULL)**

- **An example of this formula for H2:**

**IIF(Account.H1.CurrentMember is Account.H1.[All Account.H1] And  
Account.H3.CurrentMember is Account.H3.[All Account.H3],  
(Account.H2.IFRSTRATE/Account.H2.WKSYSR)\*Account.H2.WKSCURMTH, NULL)**

Note:

- **All variables need to be fully qualified with dimension name and hierarchy name, such as *account.h1.IFRSTRATE*. Otherwise AS returns a syntax error.**

## BPC 5 Dimension Formula Guideline

### Note:

- When defining a formula on H1, you have to specify that formula returns a valid result only if the current members on other hierarchies are at the top level of each hierarchy.
- Previous example is for the case that base member has dimension formula. If you need to define dimension formula for parent member, you have to use a different type of formula because you need to roll up the value of children. So in previous case, if CF\_ST\_FIN\_RATE is parent member, you have to define the following.

The correct formula for H1 is

```
IIF(Account.H2.CurrentMember is Account.H2.[All Account.H2] And  
Account.H3.CurrentMember is Account.H3.[All Account.H3],  
(Account.H1.IFRSTRATE/Account.H1.WKSYR)*Account.H1.WKSCURMTH,  
rollupchildren(Account.H1.currentMember,"+"))
```

An example of this formula for H2:

```
IIF(Account.H1.CurrentMember is Account.H1.[All Account.H1] And  
Account.H3.CurrentMember is Account.H3.[All Account.H3],  
(Account.H2.IFRSTRATE/Account.H2.WKSYR)*Account.H2.WKSCURMTH,  
rollupchildren(Account.H2.currentMember,"+"))
```

Please see the “V5x DimensionFormula Guide.doc” for full details

## Dimension Formula Example

### **Calculate Net Income per Head as NetIncome/Headcount**

- **Does the calculation have to be run at aggregated levels?**
- **What is the relationship with the Measures Dimension?**
- **ACCTYPE considerations?**
- **What is the relationship to the Time Dimension?**

## Dimension Formula Example

Does the calculation have to be run at aggregated levels?

- Yes. In fact, it **MUST** be run at aggregated levels in order to generate the correct result.

	Entity1	Entity2	Entity3	Entity Total
Net Income	120,000	130,000	110,000	360,000
Headcount	12	13	11	36
NI per Head	10,000	10,000	10,000	10,000

After  
Aggregations

	Entity1	Entity2	Entity3	Entity Total
Net Income	120,000	130,000	110,000	360,000
Headcount	12	13	11	36
NI per Head	10,000	10,000	10,000	30,000

Before  
Aggregations

## Dimension Formula Example

### What is the relationship with the Measures Dimension?

- This calculation should be run after the Measures calculation. Use a `SOLVE_ORDER = 4` or higher.

### Any ACCTYPE Considerations

- NetIncome – INC
- HEADCOUNT - AST
- Since the calculation happens after the Measures calculation the ACCTYPE will not come into play.

## Dimension Formula Example

### What is the relationship with the Time Dimension

- In this situation an average may be required when looking at Headcount at a parent in the Time Dimension.

	Jan	Feb	Mar	Q1
Net Income	100,000	115,000	127,000	342,000
Headcount	10	11	12	12
NI per Head	10,000	10,455	10,583	28,500

	Jan	Feb	Mar	Q1
Net Income	100,000	115,000	127,000	342,000
Headcount	10	11	12	11
NI per Head	10,000	10,455	10,583	31,091

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