MDX and SAP sources:
How to deploy enterprise analytics with MDX sources, SAP BW, and SAP HANA

Peter Huegel – Senior Solution Architect SAP Solutions
A Unified Platform for Enterprise Analytics, Mobility, and Security

Focus of this session
Agenda

OLAP vs. Relational Reporting

Connecting to OLAP Sources

OLAP to MicroStrategy Objects

OLAP feature: Hierarchies and other

OLAP and Relational: SAP

Q&A
OLAP vs. Relational Reporting
Working With Multidimensional Data vs. Relational Data

The main difference between working on a relational data warehouse vs working on multi dimensional data is the fact that the latter is an application – a relational dwh is not.

Working with SAP BW/MSAS/Essbase/TM1

MicroStrategy makes use of the application logic to work/interact with this application. Consequently the rules set by the applications apply.

Good news: We get metadata “for free” - meta data modeling is already done.

Flip side: We can not change these metadata. But we can extend them.
“OLE DB for OLAP (Object Linking and Embedding, Database for Online Analytical Processing abbreviated ODBO) is Microsoft published specification and an industry standard for multi-dimensional data processing.”

**OLAP Reporting in MicroStrategy**

**ODBO**

**OLAP Provider**
- MSAS
- Essbase
- TM/1
- SAP BW

**ODBO**
- Catalog
- Schema
- Cube
- Dimension
- Hierarchy
- Level
- Member
- Member Properties

**MicroStrategy**
- Schema (per DB Instance)
  - Ignored
  - MDX Cube
  - Dimension
  - Hierarchy
  - Attribute
  - Attribute Element
  - Attribute Forms

**ODBO Drivers**
- SAP JCO
- Essbase C API

**MicroStrategy objects**
OLAP vs. Relational Reporting
How do OLAP and Relational reporting compare?

ROLAP

Schema Objects
- Attributes
  - Facts
  - Transformations
  - Hierarchies
  - Others (Partition Map, etc.)
  - --

Application Objects
- Metrics
  - Filters
  - Prompts
  - Consolidations
  - Custom Groups
  - Derived Elements
  - Reports
  - Documents
  - Etc.

MOLAP

- Attributes
  - --
  - --
  - Hierarchies
  - --
  - Metrics

- Metrics
  - Filters
  - Consolidations
  - Custom Groups
  - Prompts
  - Derived Elements
  - Reports
  - Documents
  - Etc.

It’s a gift and it’s a curse
(Monk)
OLAP and Relational Reporting
Overview: Connecting to OLAP Sources
Connecting to OLAP Sources
Overview of Components & Protocols to Connect to OLAP Sources

Intelligence Server

MicroStrategy MDX Provider

XMLA (HTTP)

Java Connector (JCO)

SAP JCO (SAP BAPI)

ODBO (MSSAS)

ODBO (TM1)

Essbase C API

Third-party Libraries

Microsoft® Analysis Services OLE DB Provider

TM1 OLEDB Provider

Oracle Essbase C API
Connecting to OLAP Sources
Connecting to SAP BW

Intellegence Server

Java Connector (JCO)

SAP JCO (SAP BAPI)

Windows: Add SAP JCO libraries to Intelligence Server’s home directory. (E.g. C:\Program Files(x86)\Common\MicroStrategy)

Linux: Set SAP JCO library location in env/SAP.sh
Connecting to OLAP Sources

Connecting to SAP BW

Intelligence Server

Java Connector (JCO)

SAP JCO (SAP BAPI)
Connecting to OLAP Sources
MicroStrategy MDX Cube Provider

Install MDX Cube Provider

MicroStrategy MDX Provider

XMLA (HTTP)
Connecting to OLAP Sources
MicroStrategy MDX Cube Provider

Configure MDX Cube Provider one time in Datasources.xml
(only one provider per MDX Cube Provider instance)

Type of provider (Essbase, MSSAS, TM1)
Authentication methods (simple/Integrated)

XMLA (HTTP)
MicroStrategy MDX Provider
ODBO (MSSAS) ODBO (TM1) Essbase C API

IIS
Intelligence Server

MicroStrategy MDX Cube Provider

ODBO (MSSAS) ODBO (TM1)
Connecting to OLAP Sources
MicroStrategy MDX Cube Provider with MSSAS

MicroStrategy MDX Provider

ODBO (MSSAS)

IIS

XMLA (HTTP)

Microsoft® Analysis Services OLE DB Provider

Microsoft® Analysis Services OLE DB Provider for SQL Server 2012 Setup

Installing Microsoft® Analysis Services OLE DB Provider for SQL Server 2012

Please wait while the Installation Wizard installs Microsoft® Analysis Services OLE DB Provider for SQL Server 2012. This may take several minutes.

Status:
PUBLISHING PRODUCT INFORMATION
Connecting to OLAP Sources
MicroStrategy MDX Cube Provider with MSSAS

Intelligence Server

MicroStrategy MDX Provider

XMLA (HTTP)

IIS

ODBO (MSSAS)

Microsoft® Analysis Services OLE DB Provider

URL to MDX Cube Provider
MSSAS Server
Database/Catalog

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Connecting to OLAP Sources
MicroStrategy MDX Cube Provider with Oracle Essbase

Hyperion Foundation Services Downloads
Includes:
- Oracle Hyperion Enterprise Performance Management Client Install
- Oracle Hyperion Enterprise Performance Management Architect
- Hyperion Shared Services
- Oracle Hyperion Workspace
- Oracle Hyperion Calculation Manager
- Weblogic

Register Essbase API: Program Files (x86)/Common/MicroStrategyEssbaseConnector_SetEnv_64_64.bat
Connecting to OLAP Sources
MicroStrategy MDX Cube Provider with Oracle Essbase
Connecting to OLAP Sources
MicroStrategy MDX Cube Provider with TM1
Connecting to OLAP Sources
MicroStrategy MDX Cube Provider with TM1

IIS
XMLA (HTTP)

MicroStrategy MDX Provider

IIS
ODBO (TM1)

TM1 OLEDB Provider

TM1 Server
TM1 Configuration/Catalog

URL to MDX Cube Provider

Database Instances

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OLAP Reporting: Hierarchy Principle in MicroStrategy
About Hierarchy…

Balanced Hierarchy

All leaf nodes at same level

Unbalanced Hierarchy

Leaf nodes at different levels
About Hierarchy…

Sometimes the whole... is more than the sum of its parts
Standard Display of Hierarchy (Levels)

Standard hierarchy reports can easily consume too much space on your screen.

<table>
<thead>
<tr>
<th>Account Level 01</th>
<th>Account Level 02</th>
<th>Account Level 03</th>
<th>Account Level 04</th>
<th>Account Level 05</th>
<th>Account Level 06</th>
<th>Account Level 07</th>
<th>Account Level 08</th>
<th>Amount</th>
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<td>Net Interest Expense</td>
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<td>Current deferred income taxes</td>
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<tr>
<td>Non-current deferred income taxes</td>
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<td>Total Current Income Taxes</td>
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<td>Current income taxes</td>
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<td>2000</td>
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<td>Large Corporations Tax</td>
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<td>3000</td>
</tr>
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</table>
Display of Hierarchy Attribute (on MSAS)
Hierarchy and its Level and members are treated as a single object

<table>
<thead>
<tr>
<th>Accounts</th>
<th>Metrics</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
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<tr>
<td>Net Income</td>
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<td>40,000</td>
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<tr>
<td>Pre-tax income</td>
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<td>54,000</td>
</tr>
<tr>
<td>Earnings before interest and Taxes</td>
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<td>83,000</td>
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<tr>
<td>Operating Income</td>
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<td>EBITDA</td>
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<td>Total Revenue</td>
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<td>Total Cost of Revenue</td>
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<tr>
<td>Total Net Expenses</td>
<td></td>
<td>10,000</td>
</tr>
<tr>
<td>Depreciation &amp; Amortization</td>
<td></td>
<td>20,000</td>
</tr>
<tr>
<td>Total investment income</td>
<td></td>
<td>5,000</td>
</tr>
<tr>
<td>Dividend Income</td>
<td></td>
<td>4,000</td>
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<tr>
<td>Other Investment Income</td>
<td></td>
<td>1,000</td>
</tr>
<tr>
<td>Total other expenses</td>
<td></td>
<td>2,000</td>
</tr>
<tr>
<td>Net interest Expense</td>
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<td>1,000</td>
</tr>
<tr>
<td>Minority Interest</td>
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<tr>
<td>Minority interest income</td>
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<tr>
<td>Total taxes</td>
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<td>Total current income taxes</td>
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<tr>
<td>Large Corporation Tax</td>
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<td>3,000</td>
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<tr>
<td>Current income taxes</td>
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<td>2,000</td>
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<tr>
<td>Deferred income taxes</td>
<td></td>
<td>3,000</td>
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<tr>
<td>Current deferred income taxes</td>
<td></td>
<td>2,000</td>
</tr>
<tr>
<td>Non-current deferred income taxes</td>
<td></td>
<td>1,000</td>
</tr>
</tbody>
</table>

Single object to place on report
Single column display is more intuitive and conserves screen real estate
Activate Hierarchy Reporting (Financial Reporting) since V10.7
How to use hierarchy reporting with MSAS and Essbase
What you get using hierarchy reporting
Create compound metric in Dossier

New in 10.10
Query Details

New in 10.10

MDX Statements:

```
PASS0 - Duration: 0:00:02.95
Rows selected: 3787

WITH set [dim0_filter_comp0] as '{AddCalculatedMembers(Distinct( Descendants ({{[Account],
[Accounts]}.[47]})),)}
set [dim0_filter_comp1] as '{AddCalculatedMembers(Distinct( Descendants ({{[Account],[Accounts]}.[88]})),)}
set [dim0_filter_comp2] as 'Except([dim0_filter_comp0], [dim0_filter_comp1])'
set [dim0_filter_comp3] as 'AddCalculatedMembers(Distinct( Descendants ({{[Account],[Accounts]}.[94]})),}
set [dim0_filter_comp4] as 'Except([dim0_filter_comp2], [dim0_filter_comp3])'
set [dim0_recursive_attr] as '{Generate([dim0_filter_comp4], {[Account],
[Accounts].CurrentMember})}
set [dim1_filter_comp0] as '{AddCalculatedMembers(Distinct( Descendants ({{[Date],[Fiscal],[Fiscal Year],[2010]}),})}
set [dim1_filter_comp1] as '{AddCalculatedMembers(Distinct( Descendants ({{[Date],[Fiscal],[Fiscal Year],[2011]}),})}
set [dim1_filter_comp2] as '{AddCalculatedMembers(Distinct( Descendants ({{[Date],[Fiscal],[Fiscal Year],[2012]}),})}
set [dim1_filter_comp3] as '{AddCalculatedMembers(Distinct( Descendants ({{[Date],[Fiscal],[Fiscal Year],[2013]}),})}
set [dim1_filter_elements] as '{[dim1_filter_comp0], [dim1_filter_comp1], [dim1_filter_comp2],
[dim1_filter_comp3]}
set [dim1_recursive_attr] as '{Generate([dim1_filter_elements], {{[Date],[Fiscal].CurrentMember}})}
set [ascendants_set0] as '{Generate([dim1_recursive_attr], Ascendants([Account],
[Accounts].CurrentMember))}
set [ascendants_set1] as '{Generate([dim1_recursive_attr], Ascendants([Date],
[Fiscal].CurrentMember))}
member [Measures].[h1] as 'IF(RANK([Account], [Accounts].CurrentMember, [dim0_recursive_attr]) > 0,
"1", "0")'"IF(RANK([Date],[Fiscal].CurrentMember, [dim1_recursive_attr]) > 0, "1", "0")'
set FS as '{NONEMPTY(CROSSJOIN(hierarchize(Union([dim0_recursive_attr], [ascendants_set0])),
hierarchize(Union([dim1_recursive_attr], [ascendants_set1]))),), {{[Measures].[Amount]}})'
```
MicroStrategy and SAP – OLAP and Relational
Latest addition to features on SAP

Extract data from SAP systems into MicroStrategy in-memory cubes
Access to full range of SAP data
HANA
BW, OpenHub, DSO, InfoProviders, hierarchies, DeltaQ

And now also:
SAP R/3, ECC
Aspect Performance OLAP/MDX

What can you expect to get?

- **Standard Setup – MicroStrategy with SAP BW**
  - Good performance for small and medium data sets from BW
  - Less good performance for big data sets from BW
    - Larger data sets are possible >= 1m cell
    - yet, performance definitely not google-like

- Best results: use MDX interface for what it is designed for

SAP brought SAP HANA to market for a reason
> Handling of large data sets
> Get more control over performance
> Get some agility
…comes to mind
# SAP HANA Best Practices

<table>
<thead>
<tr>
<th>Measure</th>
<th>HANA</th>
<th>MicroStrategy Can use</th>
</tr>
</thead>
<tbody>
<tr>
<td>Avoid transferring large data sets between HANA and MicroStrategy</td>
<td>Set Analytic Privileges</td>
<td>Yes</td>
</tr>
<tr>
<td>Filter as early as possible</td>
<td>Define Input Parameters</td>
<td>Yes</td>
</tr>
<tr>
<td>Aggregate data (by group by)</td>
<td>Use Analytic Views*</td>
<td>Yes</td>
</tr>
<tr>
<td>do calculation after aggregation (when business case allows)</td>
<td>Modelling View</td>
<td>Yes</td>
</tr>
<tr>
<td>Model joins in HANA</td>
<td>One view (output) providing needed information</td>
<td>Yes</td>
</tr>
</tbody>
</table>

*or equivalent Calculation View
Questions and Answers
Thank You

phuegel@microstrategy.com