



# DMM270 – Advanced Data Modeling in SAP HANA



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# Agenda

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## SAP HANA Modeling Overview

- SAP HANA Information Models

## Hands-On Exercises Overview

- Workshop Scenario
- Section 1 – Stacking of Calculation Views
- Section 2 – Making use of Value Help Views
- Section 3 – Using Dimension-Views with dynamic hierarchies
- Section 4 – Leveraging Decision Tables with Calculation Views
- Section 5 – Applying dynamic modeled Analytic Privileges
- Section 6 (Optional) – Exploring the execution of Calculation Views

# SAP HANA Modeling Overview

SAP HANA Information Models

# SAP HANA Modeling Views - Overview

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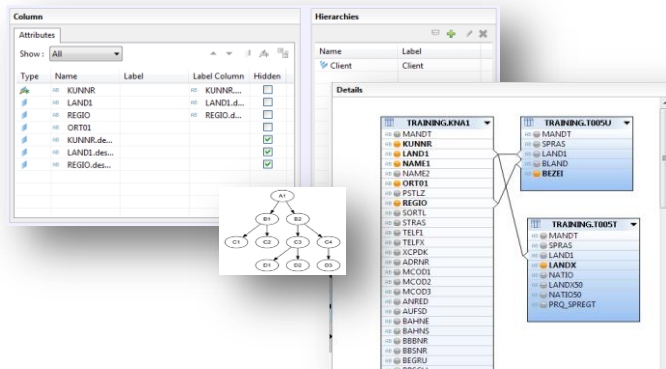
## Data and Processing in SAP HANA

- In-Memory Data Stores: Column- and Row Store
- Optimized for Query and OLTP Workload
- SQL & OLAP Processing and specific Calculation Operators
- Application Function Library for specific Scenarios, e.g. Predictive Analytics

## Modeling in SAP HANA

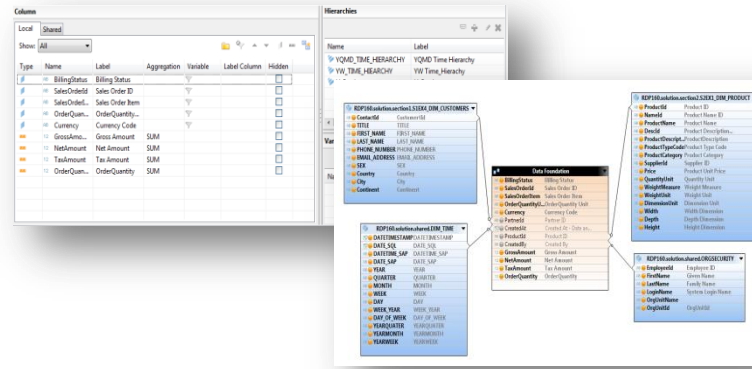
- Information Models (SAP HANA Views) are optimized for SAP HANA Engines and Calculation Operators
- Data/Columns are classified as Attributes or Measures in SAP HANA Views
  - Attributes – descriptive data (known as Characteristics SAP BW terminology)
  - Measures – data that can be quantified and calculated (known as key figures in SAP BW)
- No materialized aggregates
- Three levels of modeling: Attribute View > Analytic View > Calculation View

# SAP HANA Modeling Views - Overview



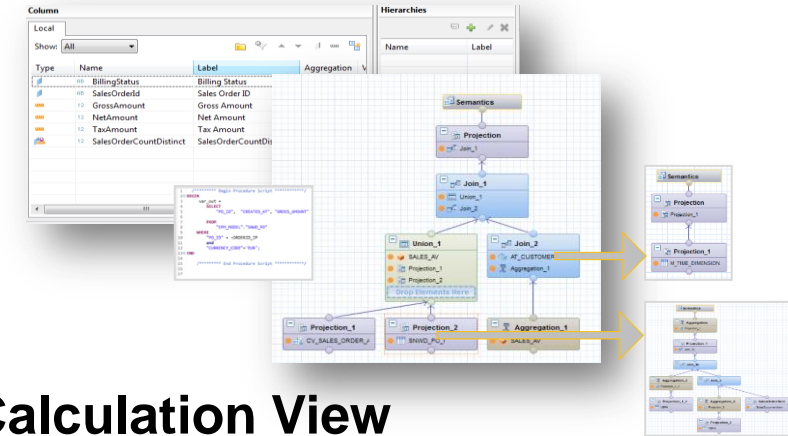
## Attribute Views

- Compose a dimensional view with a series of attributes derived from a collection of tables  
e.g. Master Data Views
- Highly re-used and shared in Analytic- and Calculation Views
- Used to build Hierarchies
- Hierarchies are key elements in use with Analytic View for multi-dimensional reporting



## Analytic Views

- Combines Fact-Tables with Attribute-Views to Star-Schema- or OLAP Cube-like objects for multidimensional reporting.
- Stores no aggregates and mass-aggregates on the fly
- Hierarchies are key for multi-dimensional access (navigation, filtering, slicing and aggregation)

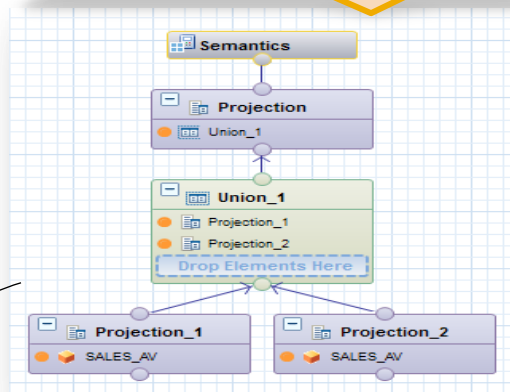


## Calculation View

- Great flexibility for advanced use
- Approach to model custom scenarios like
  - Combined use of Multiple-Fact Tables/Analytics Views
  - Build Models on Normalized Data
  - Re-Use and stack views
  - Make use of custom scripted views

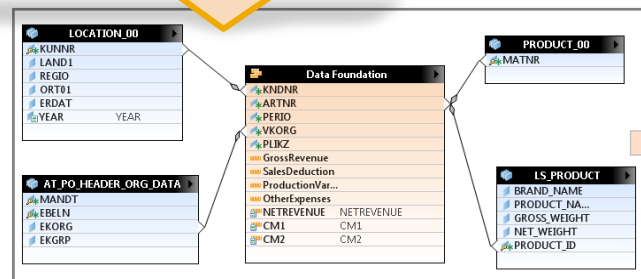
# SAP HANA Modeling Views - Multidimensional Model Scenario

## Calculation View

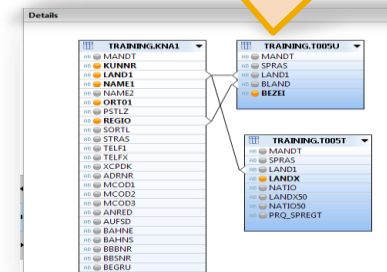


Calculation Views are usually build upon Analytic-, Attribute-Views, and Column Tables

## Analytical View



## Attribute View

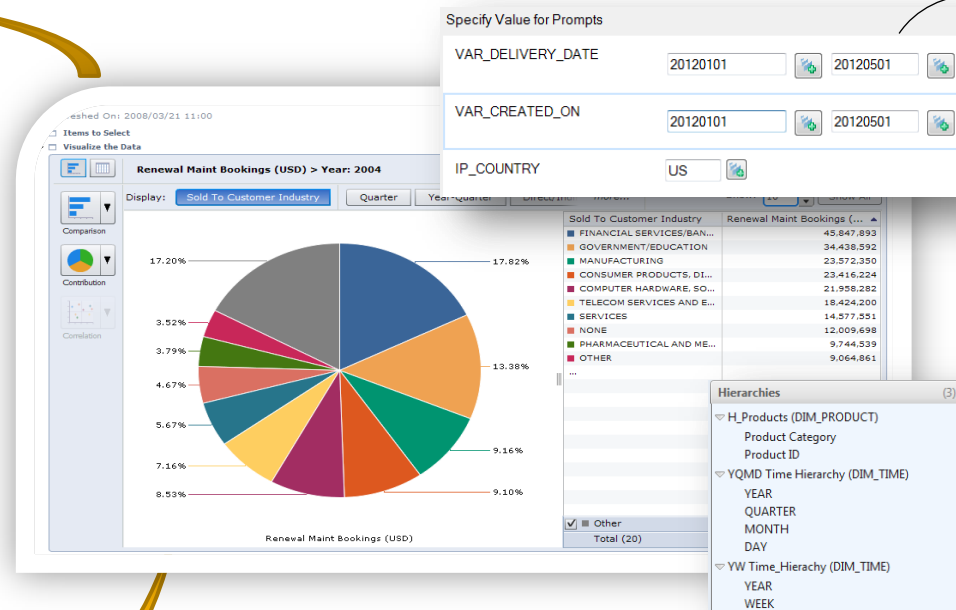


## Column Table

Table Name: MARA			
Columns	Indexes	Further Properties	Runtime Information
Name		SQL Data Type	Dim
1 MANDT		NVARCHAR	3
2 MATNR		NVARCHAR	18
3 ERSDA		NVARCHAR	8
4 ERNAM		NVARCHAR	12
5 LAEDA		NVARCHAR	8
6 AENAM		NVARCHAR	12
7 VPSTA		NVARCHAR	15
8 PSTAT		NVARCHAR	15
9 LVORM		NVARCHAR	1
10 MTART		NVARCHAR	4

Reporting Tools can usually directly consume HANA Calculation Views or Analytic Views.

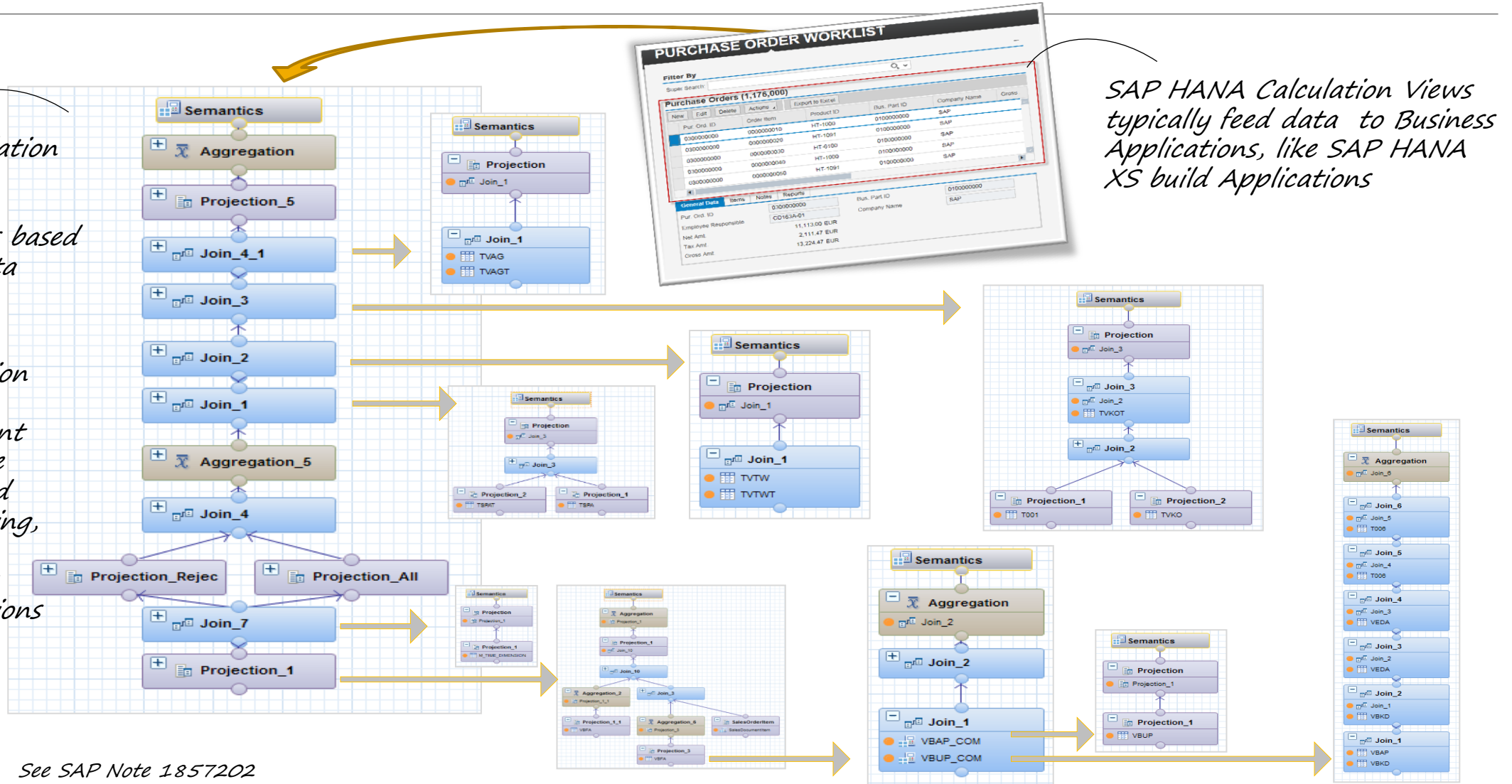
Multidimensional Tools support Hierarchies for Navigation, Filtering and Aggregation and HANA Prompts (Variables & Input Parameters) for efficient Pre-Filtering of Data.



# SAP HANA Modeling Views - Normalized Data Model Scenario

SAP HANA Calculation Views provide the means to model sophisticated views based on normalized data structures.

Complex Calculation Views demand a more explicit intent and control of the modeled set-based data flow, i.e. slicing, aggregation and filtering of sets as input to joins, unions etc.





# Hands-On Exercises Overview

Workshop Scenario

Section 1 – Stacking of Calculation Views

Section 2 – Making use of Value Help Views

Section 3 – Using Dimension-Views with dynamic hierarchies

Section 4 – Leveraging Decision Tables with Calculation Views

Section 5 – Applying dynamic modeled Analytic Privileges

Section 6 (Optional) – Exploring the execution of Calculation Views

# Exercises Scenario

## The Enterprise Procurement Data Model

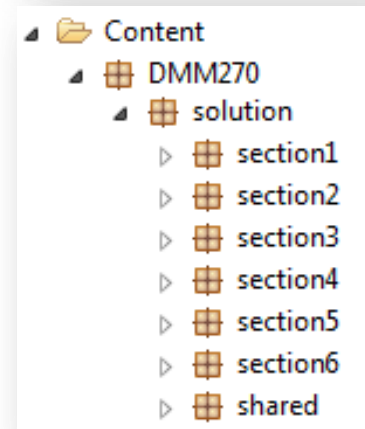
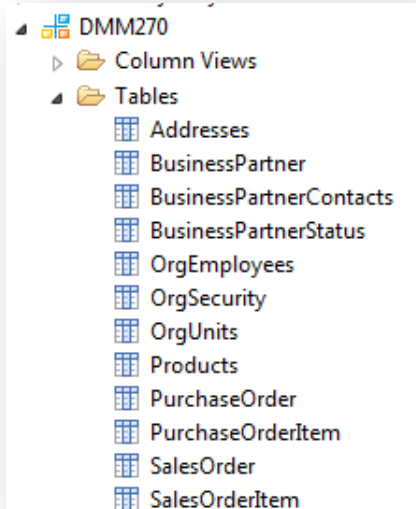
### Primary Entities:

- Sales Orders
- Deliveries

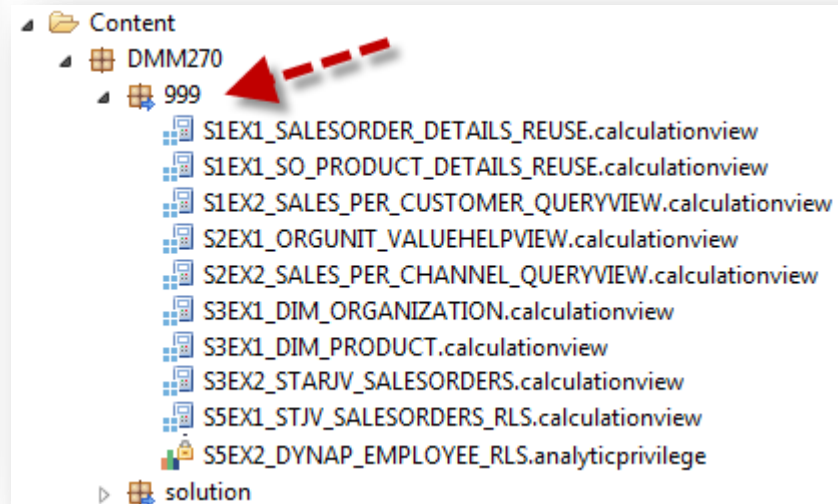
### Supporting Entities:

- Products
- Address
- Business Partner

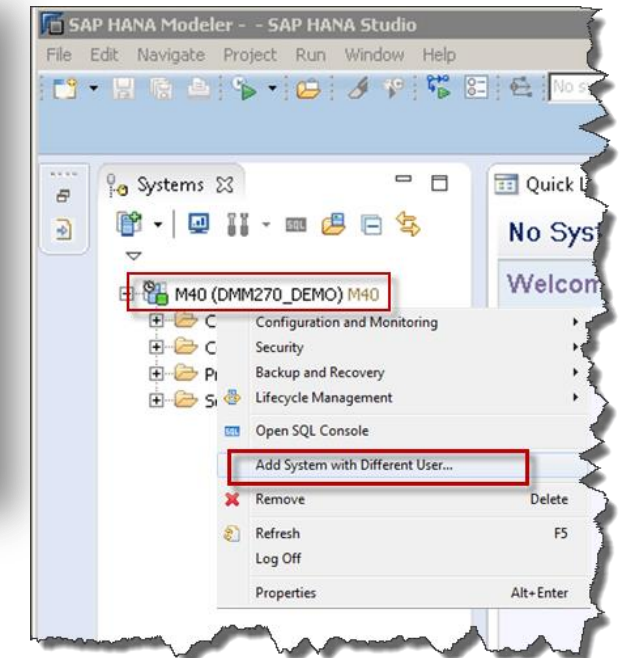
### Solution Content:



### Exercise work area location:



### System Information:



# Exercises Scenario

## The Enterprise Procurement Data Model



### Two Primary Entities:

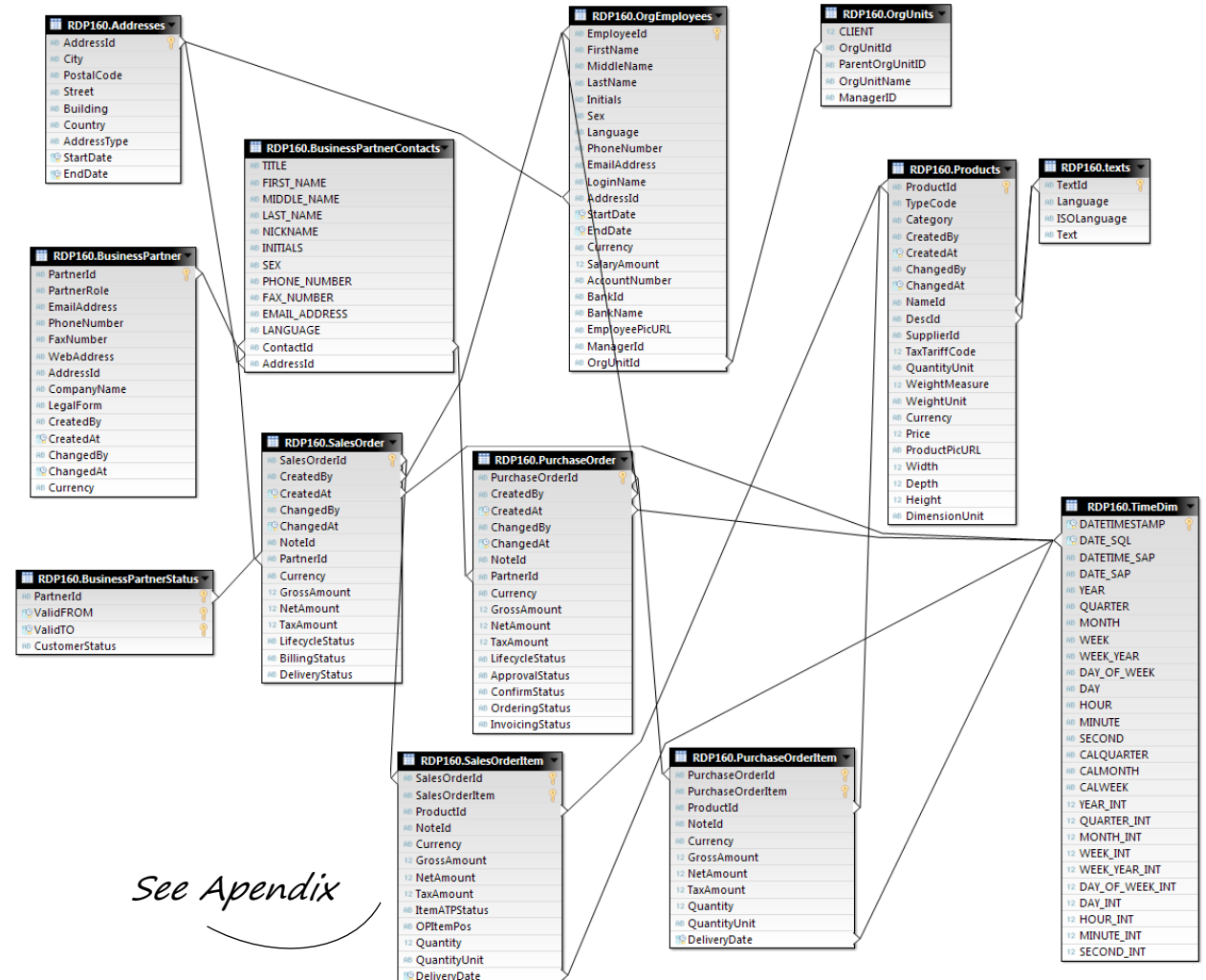
- Sales Orders
- Purchase Orders

### Supporting Entities:

- Employees
- Partners (Customers, Suppliers)
- Addresses
- Texts
- Products

### Infrastructure Entities

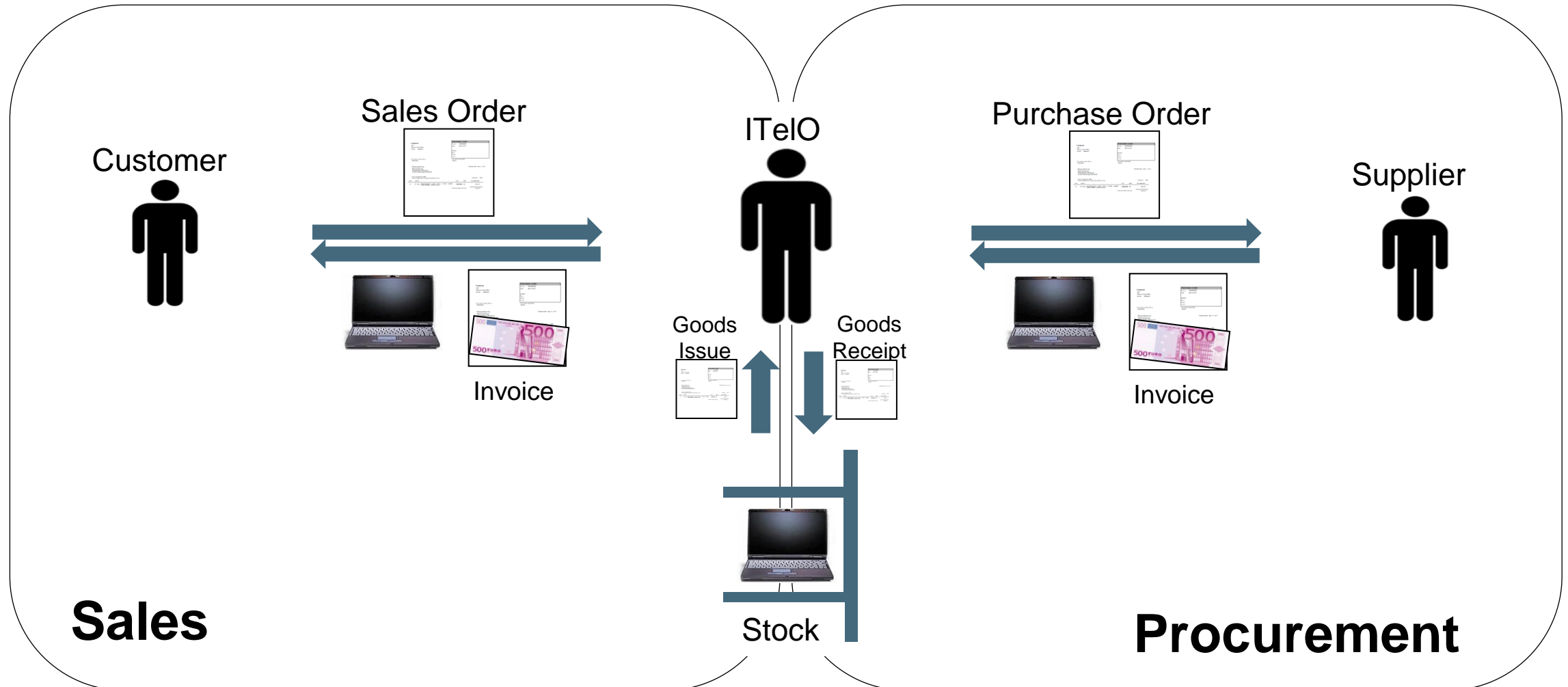
- Currency Rates
- Unit of Measures



*See Appendix*

# Exercises Scenario

## The Enterprise Procurement Data Model

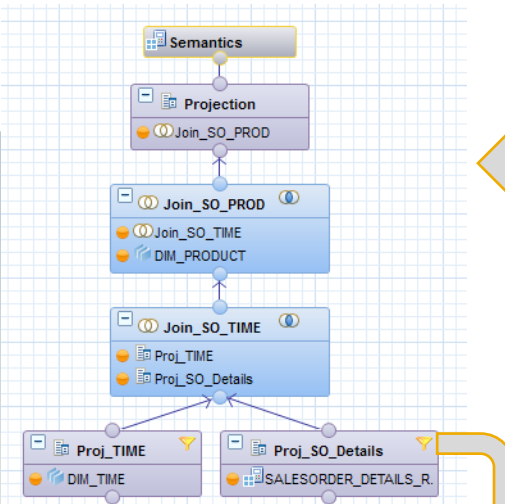


# Exercises Section 1

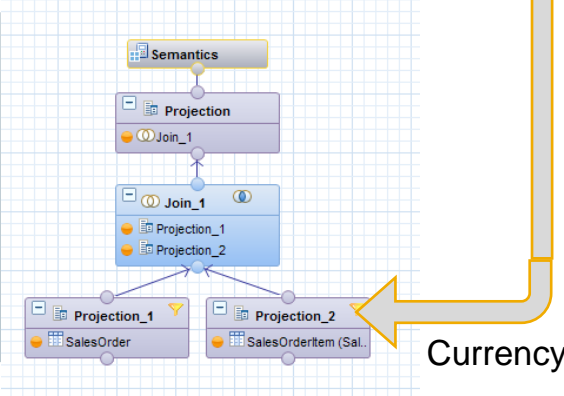
## Stacking of Calculation Views

### 1.1 Decompose into multiple re-use Calculation Views

S1EX1\_SO\_PRODUCT\_DETAILS\_REUSE

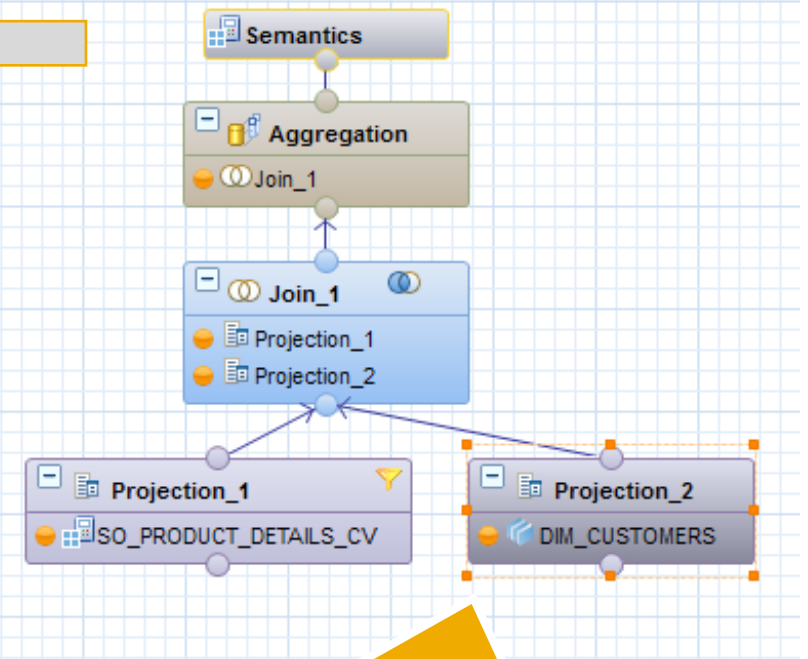


S1EX1\_SALESORDER\_DETAILS\_REUSE



← Currency Quarter

S1EX2\_SALES\_PER\_CUSTOMER\_QUERYVIEW

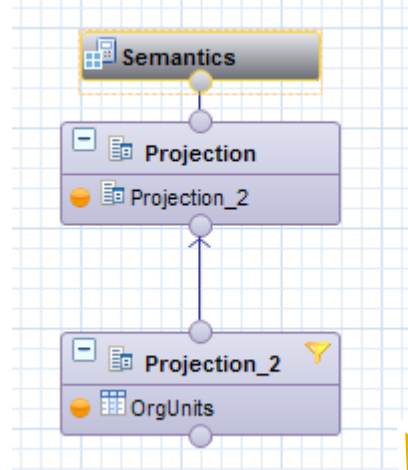


### 1.2 Build a Query-View with Parameter-Mapping for Filter-Push Down

# Exercises Section 2

## Making use of Value Help-Views

S2EX1\_ORGUNIT\_VALUEHELPVIEW



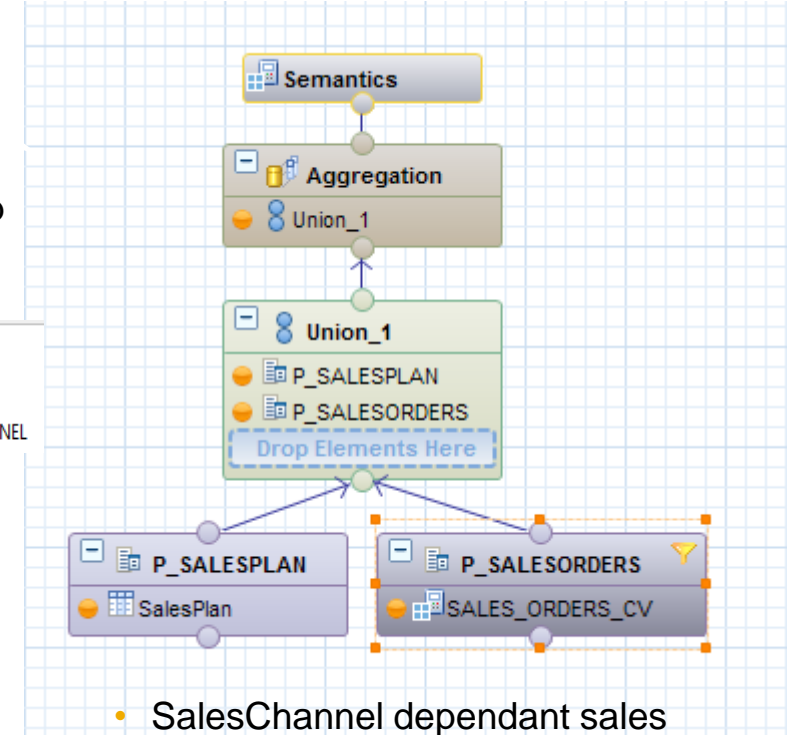
### 2.1 Create Value Help-View for Sales Departments Information

### 2.2 Create Query-View with referenced Value Help-Views

- Leverage external Views for Value Help
- Use Variable-mapping external Views for Value Help



S2EX2\_SALES\_PER\_CHANNEL\_QUERYVIEW



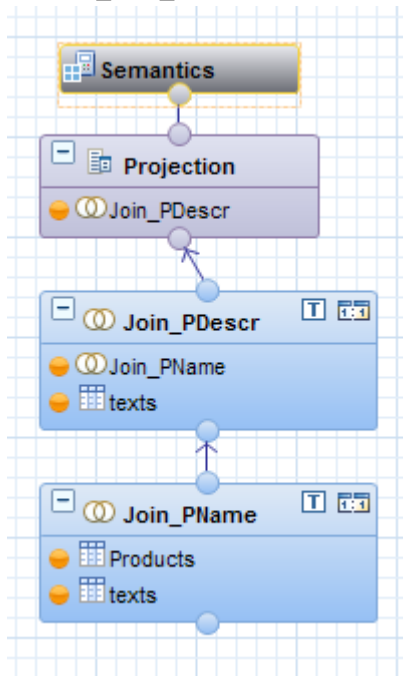
- SalesChannel dependant sales department list values in data preview

V_OrgUnitName	Equal	Retail Sales US
V_SALESCHANNEL	Equal	RETAIL

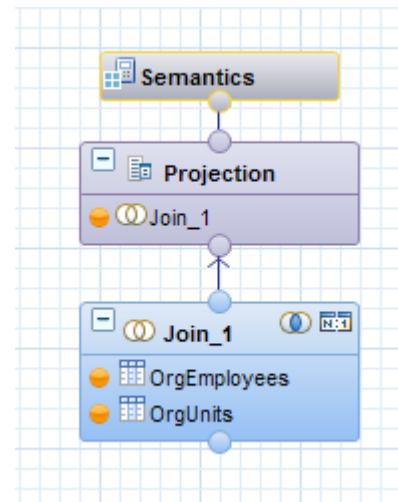
# Exercises Section 3

## Using Dimension-Views and dynamic hierarchies in multidimensional scenarios

S3EX1\_DIM\_PRODUCT



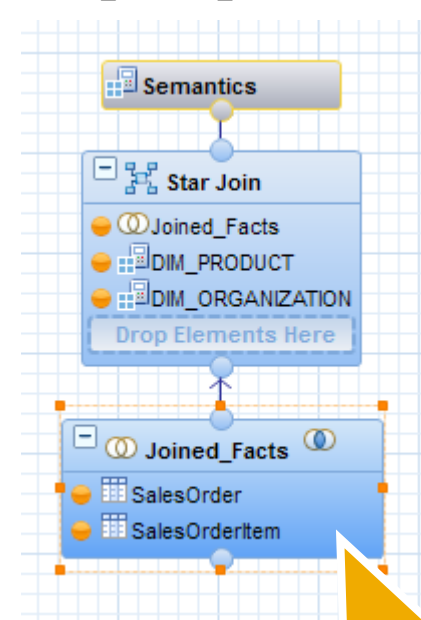
S3EX1\_DIM\_ORGANIZATION



- Including parameters in hierarchies

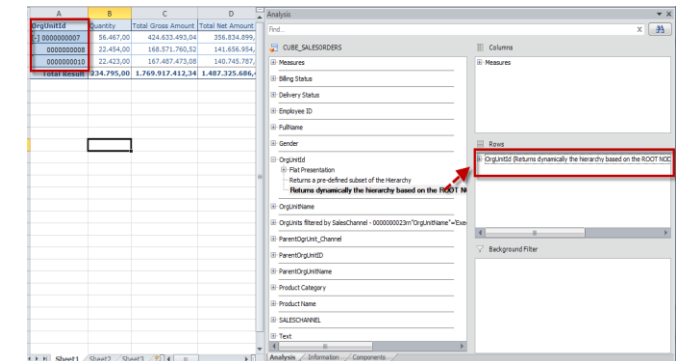
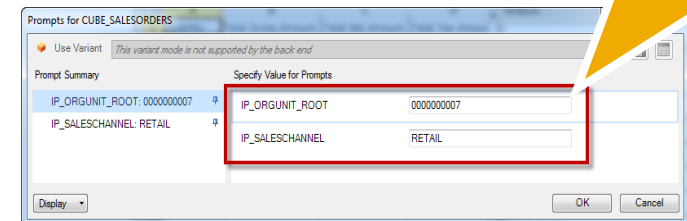
### 3.1 Create type Dimension Calculation Views

S3EX2\_STARJV\_SALESORDERS



### 3.2 Create a StarJoin-type multidimensional Calculation View

### 3.3 Exploring the dynamic hierarchy multidimensional scenario



- Explore with Analysis for Office

# Exercises Section 4

## Leveraging Decision Tables with Calculation Views

S4EX1\_nnnn

City	ProductCate...	OUT_DISCO...
Mendoza	*	3
Buenos Aires	*	4
Manchester	*	5
Karlsruhe	Flat screens	16
	Notebooks	17
	*	18
Hannover	*	7
Muenster	*	8
Tokyo	Notebooks	10
	Software	12
	*	20

- nn

**4.1 Create nn**

AB	City	AB	ProductCategory	12	OUT_DISCOUNT
	Karlsruhe		Notebooks		17
	Shanghai		Others		1
	Mnchen		Flat screens		1
	Karlsruhe		Ink jet printers		18
	Rio de J...		Others		1
	Tokyo		Flat screens		20
	Puebla		Multi function printers		1
	Karlsruhe		Laser printers		18
	Dallas T...		Input device		1
	Tokyo		Multi function printers		20
	Karlsruhe		Notebooks		17
	Karlsruhe		Flat screens		16

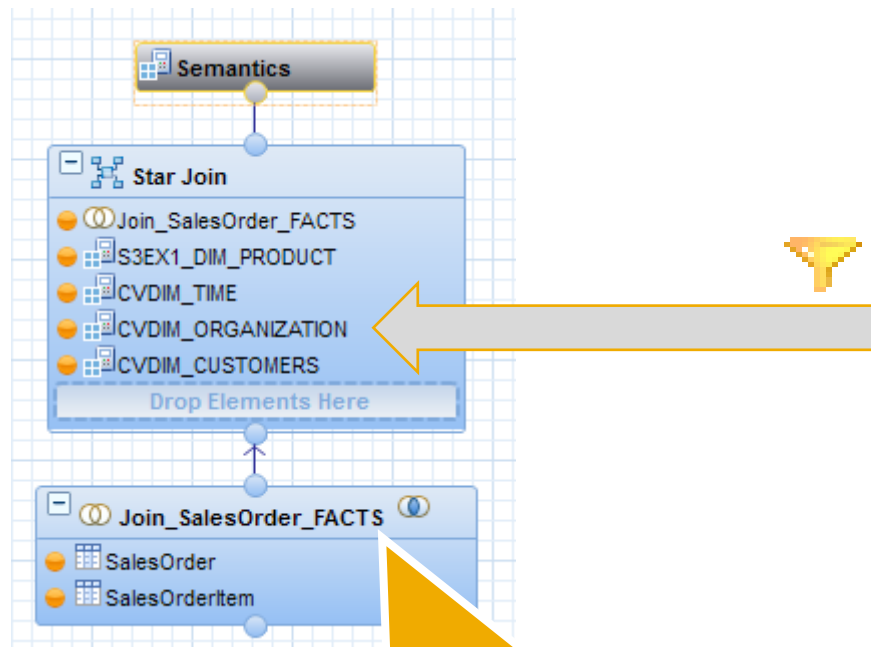
**4.2 Create nn**



# Exercises Section 5

## Using Dimension-Views and dynamic hierarches in multidimensional scenarios

S5EX1\_STJV\_SALESORDERS\_RLS



**5.1 Create a Calculation View for multidimensional reporting**

S5EX2\_DYNAP\_EMPLOYEE\_RLS

**General**  
Describes general information about the Analytic Privilege  
Name: S5EX2\_DYNAP\_EMPLOYEE\_RLS ☐ Applicable to all information models  
Label: S5EX2\_DYNAP\_EMPLOYEE\_RLS

**Privilege Validity**  
Defines the Privilege Validity

Operator	Inclusion	From	To
			T

**Reference Models**  
Restrictions apply to all the models shown in the list below.

- Content
  - CVDIM\_ORGANIZATION (DMM270.solution.shared)
  - S5EX1\_STJV\_SALESORDERS\_RLS (DMM270.999)

**Associated Attributes Restrictions**  
Select attributes to assign analytic privileges.

Model Name	Attributes	Description	Count
S5EX1_STJV_SALESORDERS_RLS...	BillingStatus		0
CVDIM_ORGANIZATION (DM...	EmployeeId		1

**Assign Restrictions**  
Assign the restrictions for EmployeeId

Type	Operator	Value
Repository Procedure	In	DMM270.solution.shared:ORGEEMPLOYEE_SECFILTER

**5.2 Create and apply dynamic Analytic Privileges**

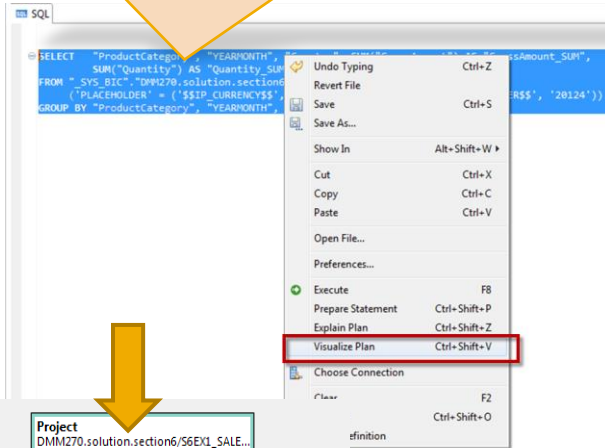
ORGEEMPLOYEE\_SECFILTER.procedure

```
varout = Select "OrgUnitId" from "DMM270"."OrgEmployees" where "LoginName"=Session_User;
```

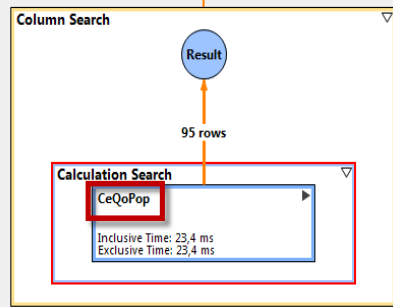
# Exercises Section 6

## Explore the execution of Calculation Views

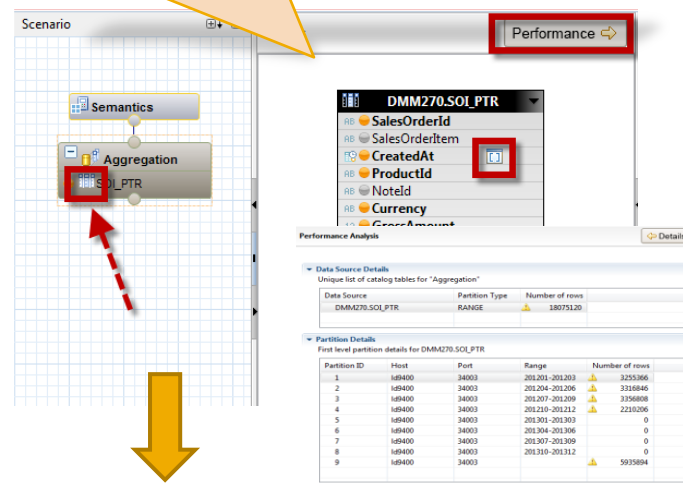
SQL Editor > Context Menu



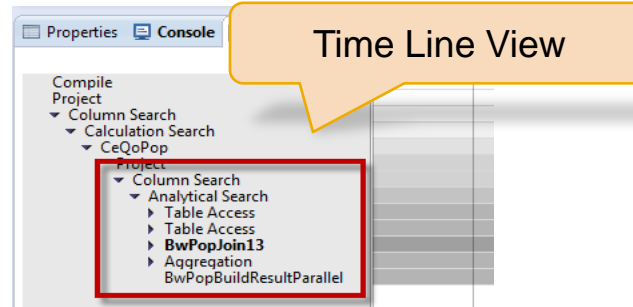
Visualize Plan



Performance Analysis Mode

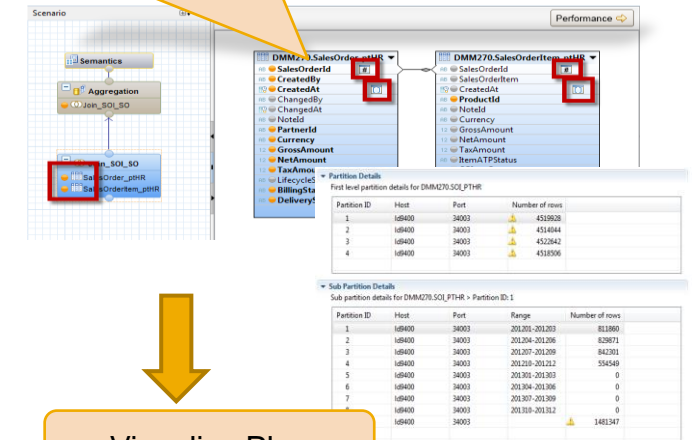


Visualize Plan

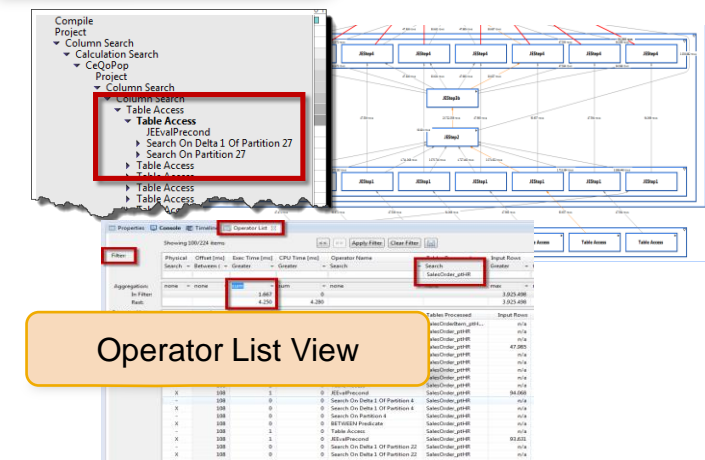


Time Line View

Performance Analysis Mode



Visualize Plan



Operator List View

# Hands-On Time.



Now it's your time! Good Luck!

# Further Information

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## SAP Public Web

[scn.sap.com](http://scn.sap.com) <http://scn.sap.com/community/developer-center/hana>  
[www.sap.com](http://www.sap.com) [www.saphana.com](http://www.saphana.com)

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[www.sap.com/education](http://www.sap.com/education)

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[www.saptech.com/online](http://www.saptech.com/online)

## Related Workshops/Lectures at SAP TechEd 2014

**DMM161 - Introduction to Data Modeling in SAP HANA, Hands-On Workshop**

**DMM103 - New and Best Practices for Data Modeling with SAP HANA, Lecture**

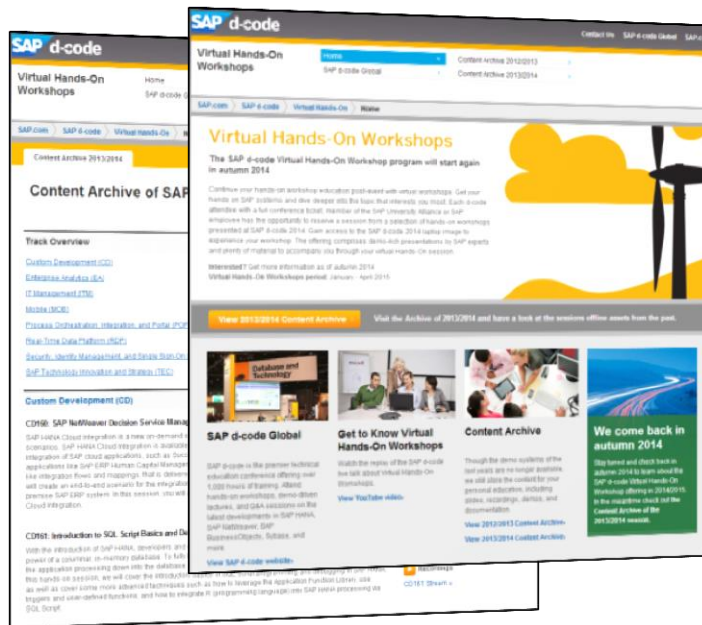
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### SAP d-code Virtual Hands-on Workshops

- Access hands-on workshops post-event
- Starting January 2015
- Complementary with your SAP d-code registration

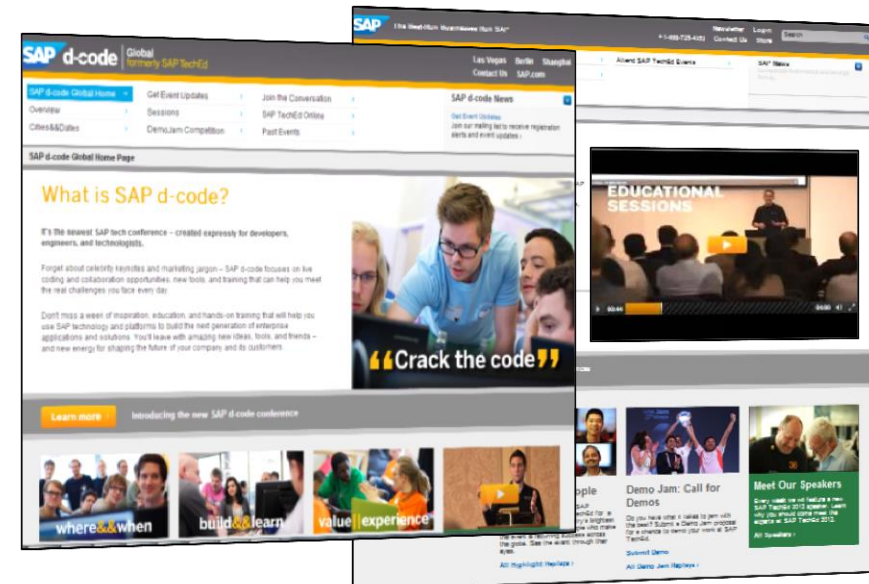
<http://sapdcodehandson.sap.com>



### SAP d-code Online

- Access replays of keynotes, Demo Jam, SAP d-code live interviews, select lecture sessions, and more!
- Hands-on replays

<http://sapdcode.com/online>





# Thank you!

Contact information:

Christoph Morgen

SAP HANA Product Management

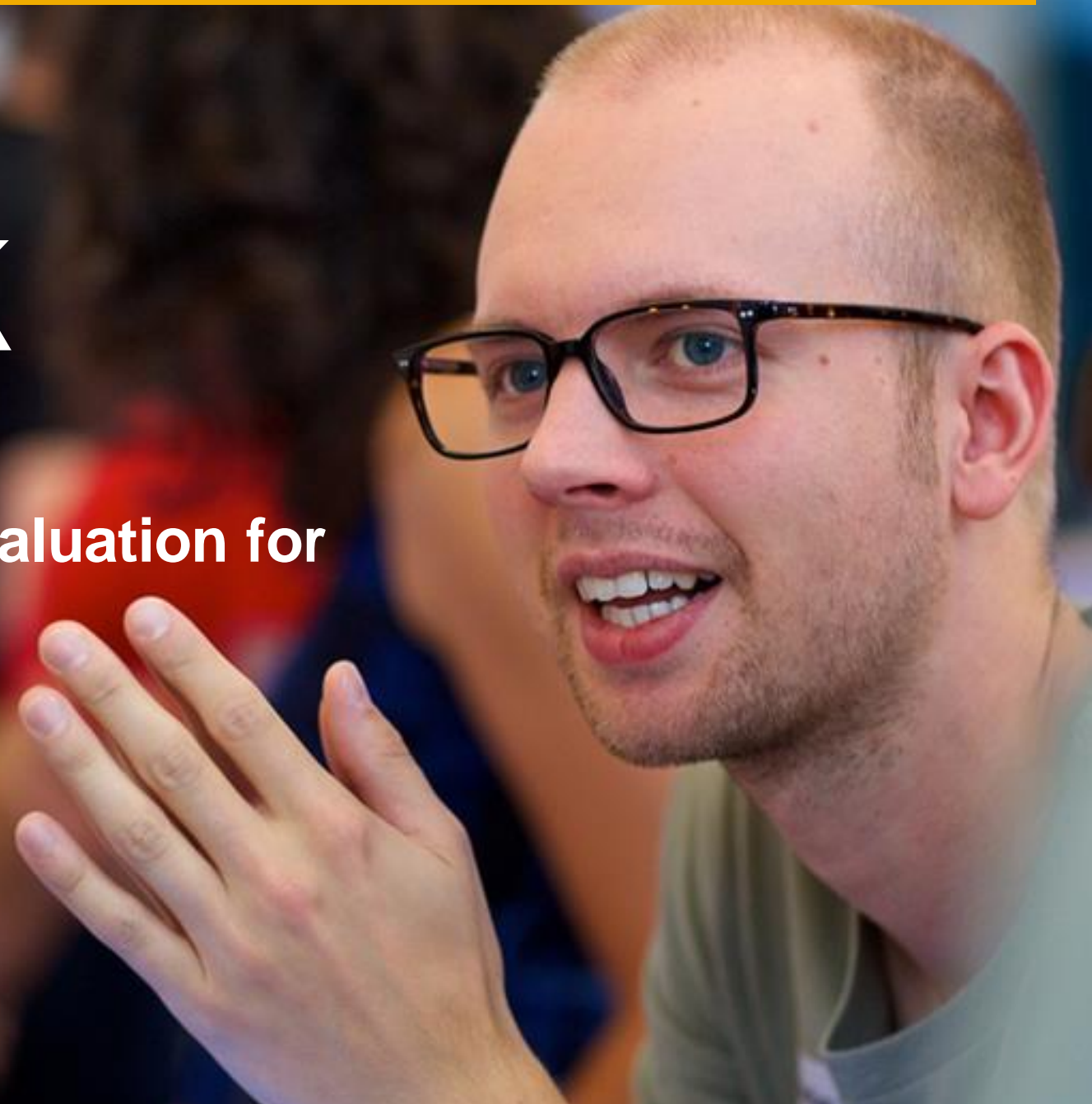
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