

## Exercise 1: Build Analytic Model to prepare data consumption for end-user

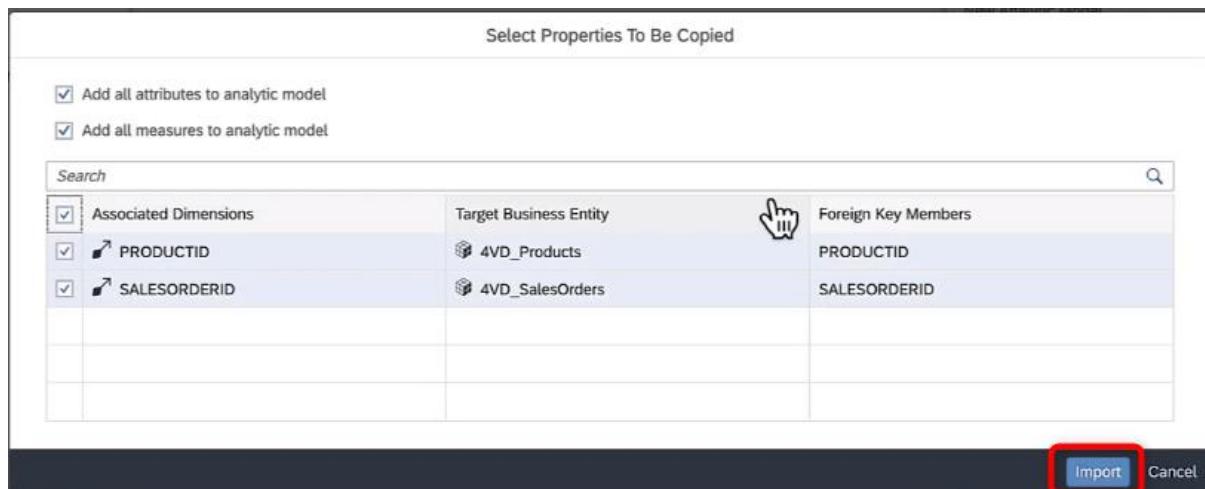
**Goal:** In this step we prepare consumption of the imported data model via an Analytic Model. We start with a minimal model and subsequently enhance it step by step. On the way, we get to know the features of the Analytic Model editor including adding of dimensions, modelling of measures, preparation of variables and previewing data.

### Create Initial Analytic Model

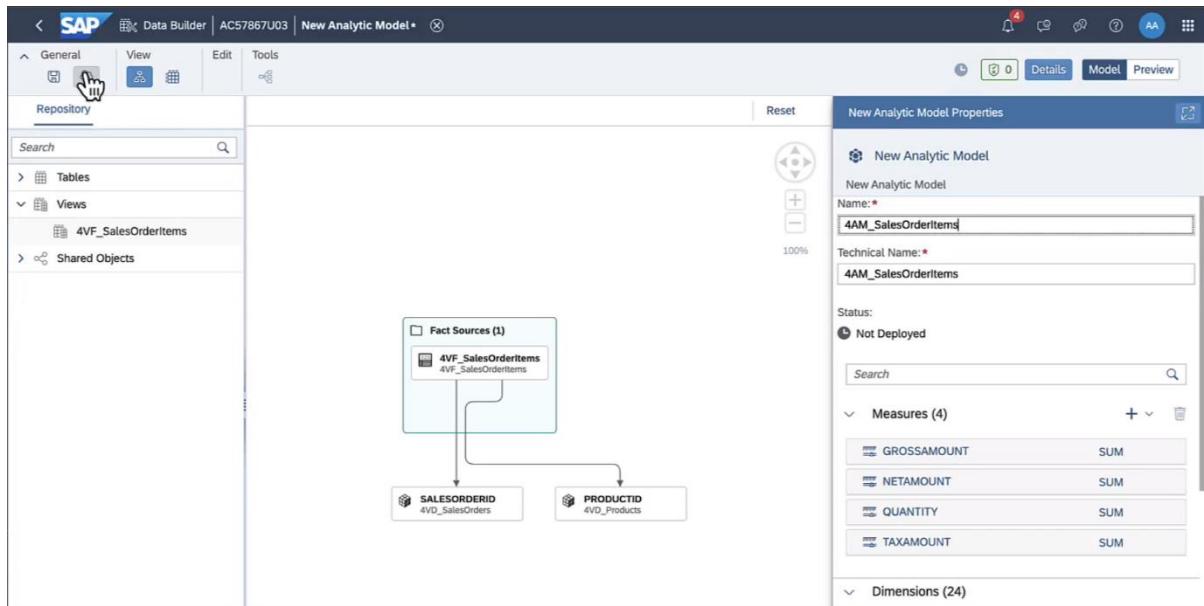
We will now create an Analytic Model to support consumption of the imported data model.

User Steps:

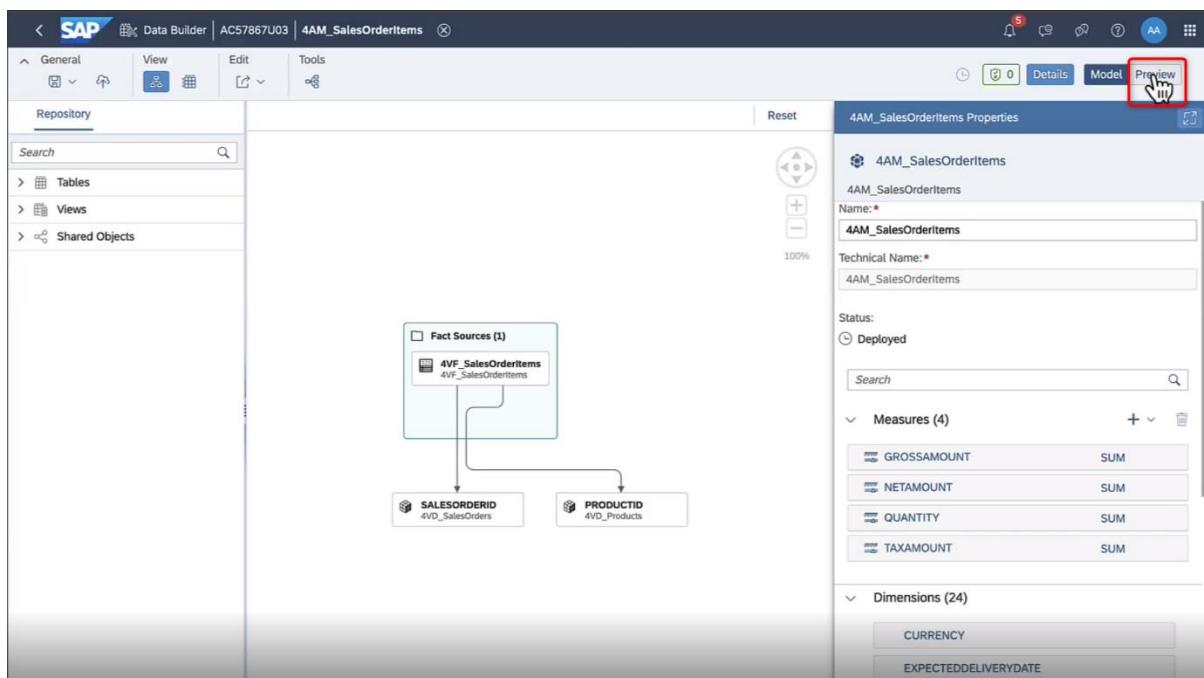
- Select the menu option **Data Builder** on the left-hand side
- Under the **Analytic Model** tab, click on **New Analytic Model**
- Drag view **4VF\_SalesOrderItems** from the left panel and drop it onto the canvas.
- The system analyzes its structure (i.e. measures, attributes & associations) and let's you select which one to include by default
  - **Enable** all measures and attributes, as well as the associated dimensions, and click **Import**



This is a first, minimal model that you'll subsequently enhance step by step.



- Deploy your model and name it **4AM\_SalesOrderItems**
- Preview the data



Check various dimensions to drill by, change their order, add a filter, etc.:

- The **Builder** panel is automatically displayed at the right side of the application. You can show it or hide it by choosing **Query Builder Designer Panel**.
- In section **Available Objects**, you see a list of all available measures & dimensions of the Analytic Model. Here you can select dimensions and measures and assign them directly to the table's rows or columns by clicking (add as column) or (add as row).

- In the screenshot below, all measures have been selected and are being examined by dimension PRODUCTID. Additional dimensions could be added also and their order rearranged via drag & drop.

The screenshot shows the SAP Data Builder interface with the following details:

- Available Objects Panel:**
  - Measures:** NETAMOUNT, GROSSAMOUNT, TAXAMOUNT, QUANTITY. All are selected (indicated by checked boxes).
  - Dimensions:** PRODUCTID, CURRENCY, EXPECTEDDELIVERYDATE, IETMATPSTATUS, NOTEID, OPITEMPOS, PRODUCTID (selected), CURRENCY, PRICE, PRODCATEGORYID, PRODUCTID.
- Rows:** PRODUCTID
- Columns:** Measures (NETAMOUNT, GROSSAMOUNT, TAXAMOUNT, QUANTITY) and Dimensions (CURRENCY, EXPECTEDDELIVERYDATE, IETMATPSTATUS, NOTEID, OPITEMPOS, PRODCATEGORYID, PRODUCTID).
- UI Elements:**
  - A red box highlights the "Available Objects" button in the top right of the panel.
  - A red box highlights the "X" button in the top right of the panel.
  - A red box highlights the "Select All" checkbox under Measures.
  - A red box highlights the "PRODUCTID" checkbox under Dimensions.
  - A red box highlights the "CURRENCY" checkbox under Dimensions.
  - A red box highlights the "NETAMOUNT" checkbox under Measures.
  - A red box highlights the "GROSSAMOUNT" checkbox under Measures.
  - A red box highlights the "TAXAMOUNT" checkbox under Measures.
  - A red box highlights the "QUANTITY" checkbox under Measures.
  - A red box highlights the "EXPECTEDDELIVERYDATE" checkbox under Dimensions.
  - A red box highlights the "IETMATPSTATUS" checkbox under Dimensions.
  - A red box highlights the "NOTEID" checkbox under Dimensions.
  - A red box highlights the "OPITEMPOS" checkbox under Dimensions.
  - A red box highlights the "PRODCATEGORYID" checkbox under Dimensions.
  - A red box highlights the "PRODUCTID" checkbox under Dimensions.
  - A red box highlights the "PRICE" checkbox under Dimensions.

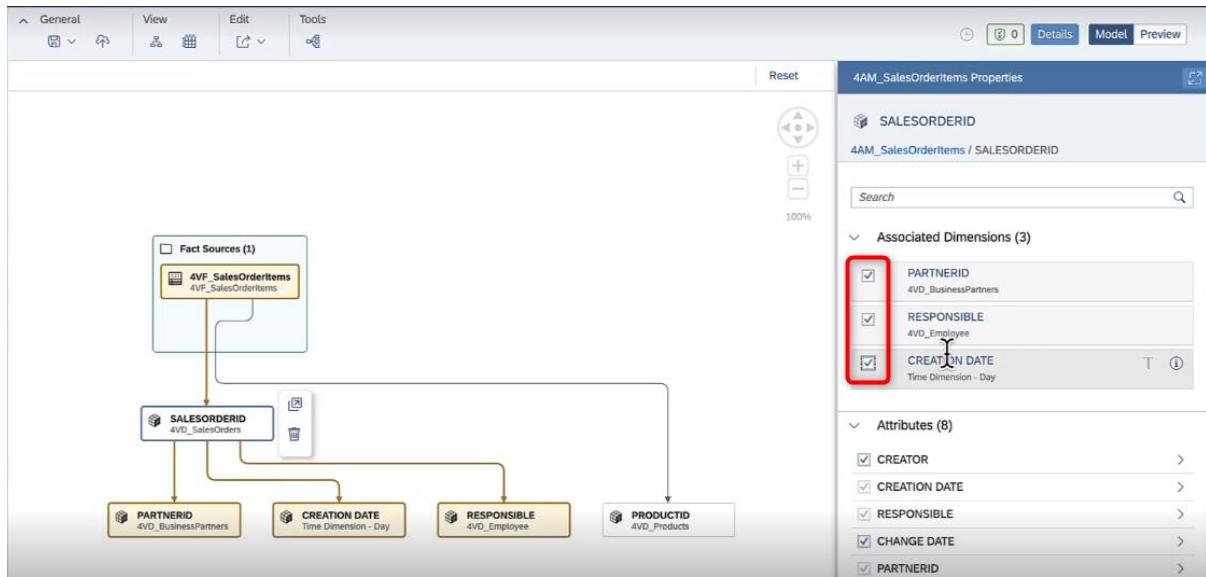
- You can set filter on dimensions and measures using the button (top-left area)
- Click on **Model** to return to your analytic model

## Add Associated Dimensions

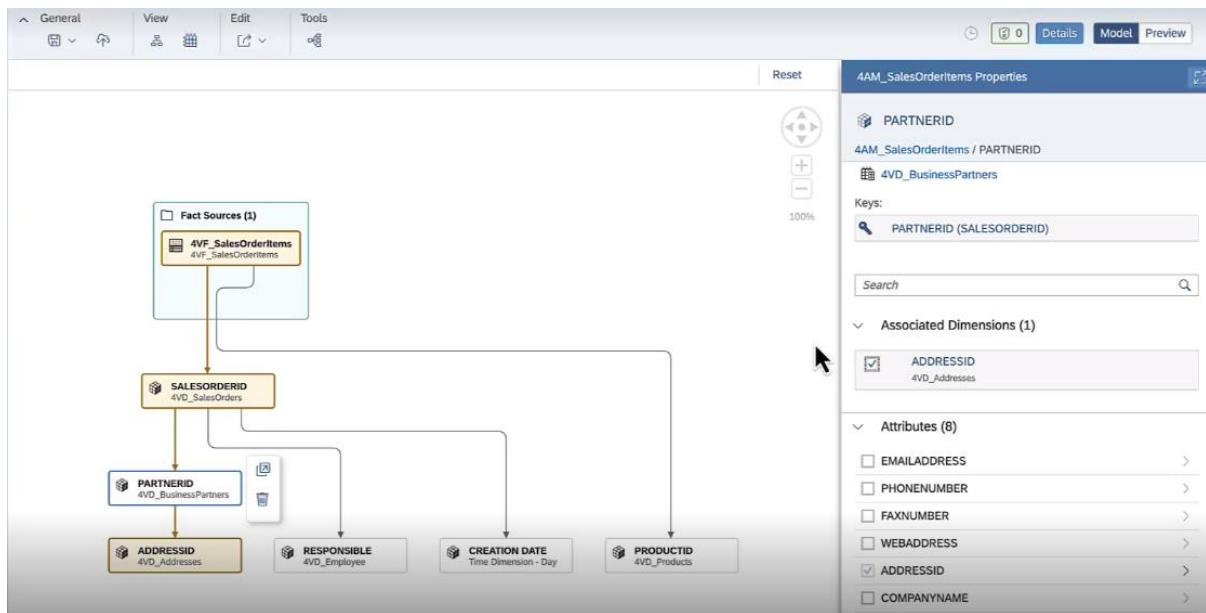
Add additional drill-dimensions by adding nested dimensions

User steps:

- Select node the **SALESORDERID (4VD\_SalesOrders dimension)** in the canvas. This will update the properties panel on the right.
- Within the properties panel, in section **Associated Dimensions** section, select dimensions **PARTNERID, RESPONSIBLE & CREATION DATE**  
These dimensions are automatically added to the canvas as well.



- To get addresses of business partners, we similarly select node **PARTNERID (4VD\_BusinessPartners)** and add its associated dimension **4VD\_Address** dimension.  
The updated canvas will look like this:



- Within the **Attributes** section of **Properties**, enable the following attributes for the given dimensions:
  - Choose node PARTNERID and select its attribute COMPANYNAME
  - Choose node ADDRESSID and add attributes COUNTRY, REGION, CITY, STREET, POSTALCODE
- Reopen data preview and confirm that you can now also drill by these dimensions (if, for any reason you do not see your added dimensions, **deploy** your Analytic Model first before continuing to preview data)

## Add Measures

Add calculated & restricted measures. In large organizations, it's crucial to agree on common definition of KPIs. This is helpful for their reusability (saves time) and governance (all parties use the same definitions).

User steps:

- Jump to the overview of the Analytic Model by clicking anywhere on the canvas (i.e. anything that is not a node). The properties panel will update to show the properties of the Analytic Model as a whole.
- To add a calculated measure, locate the **Measures** section within **Properties** and click the + sign. Select Calculated Measure

4AM\_SalesOrderItems Properties

4AM\_SalesOrderItems

Name: \*

4AM\_SalesOrderItems

Technical Name: \*

4AM\_SalesOrderItems

Status:

🕒 Deployed

Search

Measures (4)

GROSSAMOUNT

NETAMOUNT

QUANTITY

TAXAMOUNT

SUM

Calculated Measure

Restricted Measure

Count Distinct Measure

Currency Conversion Measure

+ ▾

- Add calculated measure Avg Price (Avg\_Price) as GROSSAMOUNT / QUANTITY  
Note that you could also build much more complex measures by making use of the dimensions, variables (none defined yet) or operators.

4AM\_SalesOrderItems Properties

/x Calculated Measure

4AM\_SalesOrderItems / Avg Price

Business Name: \*

Avg Price

Technical Name: \*

Avg\_Price

Expression

Expression     +     -     /     \*     (     )     Validate

GROSSAMOUNT / QUANTITY

Measures   Dimensions   Functions   Operators

Search 

NETAMOUNT

NETAMOUNT

- To navigate back to the main properties window, click on the object link, as shown below

4AM\_SalesOrderItems Properties

fx Calculated Measure

4AM\_SalesOrderItems / Avg Price

Business Name:\*

Avg Price

Technical Name:\*

Avg\_Price

Let's now create **restricted measures**, i.e. measures that build on existing measures but restrict them along a filter. This is typically used for comparing values by status like e.g. comparing of the value of **all** orders with the value of **all open** orders. Here we'll compare domestic sales with international sales.

- Choose to create a measure of type **restricted measure**.
- Create **Domestic Gross Sales** based on source measure GROSSAMOUNT and with restriction as COUNTRY = 'DE' in the expression
- Create another restricted measure
- Call it **International Gross Sales**, base it on source measure GROSSAMOUNT and add restriction as COUNTRY != 'DE' in the expression

#### Add variables

Analytic Models offer various variable types depending on usage, cp. [SAP Help](#).

We'll simply use a filter variable to choose which years (multi-select) we want to see. If user does not set any filter, all data - regardless of creation year of the sales order - is selected.

- Find section **Variables** and add a new variable of type **Filter variable**
- Set filter on dimension **YEAR** with the filter type of **Multiple single values**

## 4AM\_SalesOrderItems Properties



### Filter Variable

4AM\_SalesOrderItems / SALESORDERID

Business Name:\*

YEAR

Technical Name:\*

YEAR

Dimension:

YEAR (CREATION DATE)



Filter Type:

Multiple single values

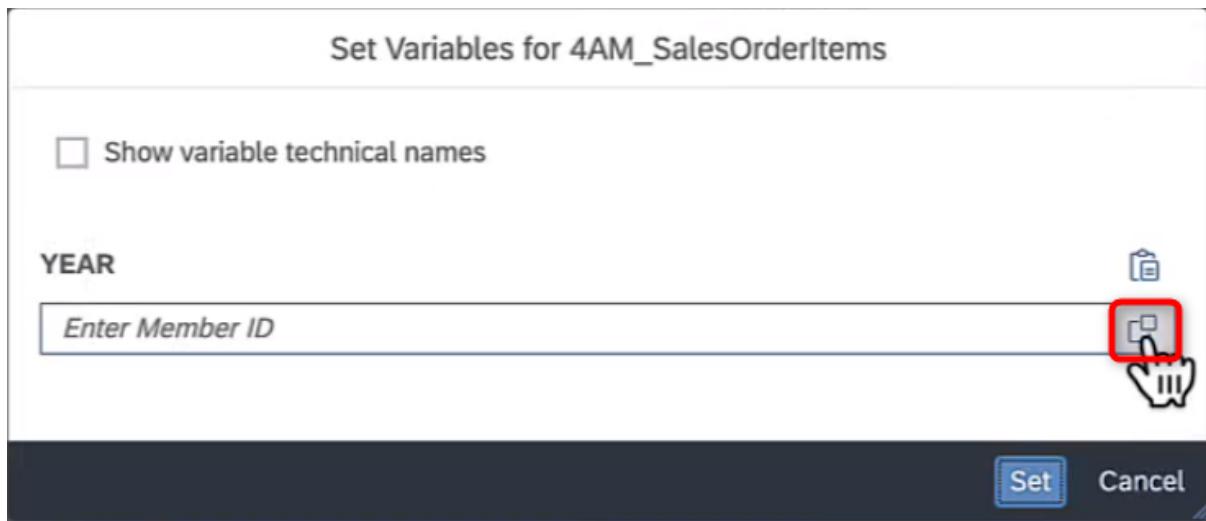


Default Value:

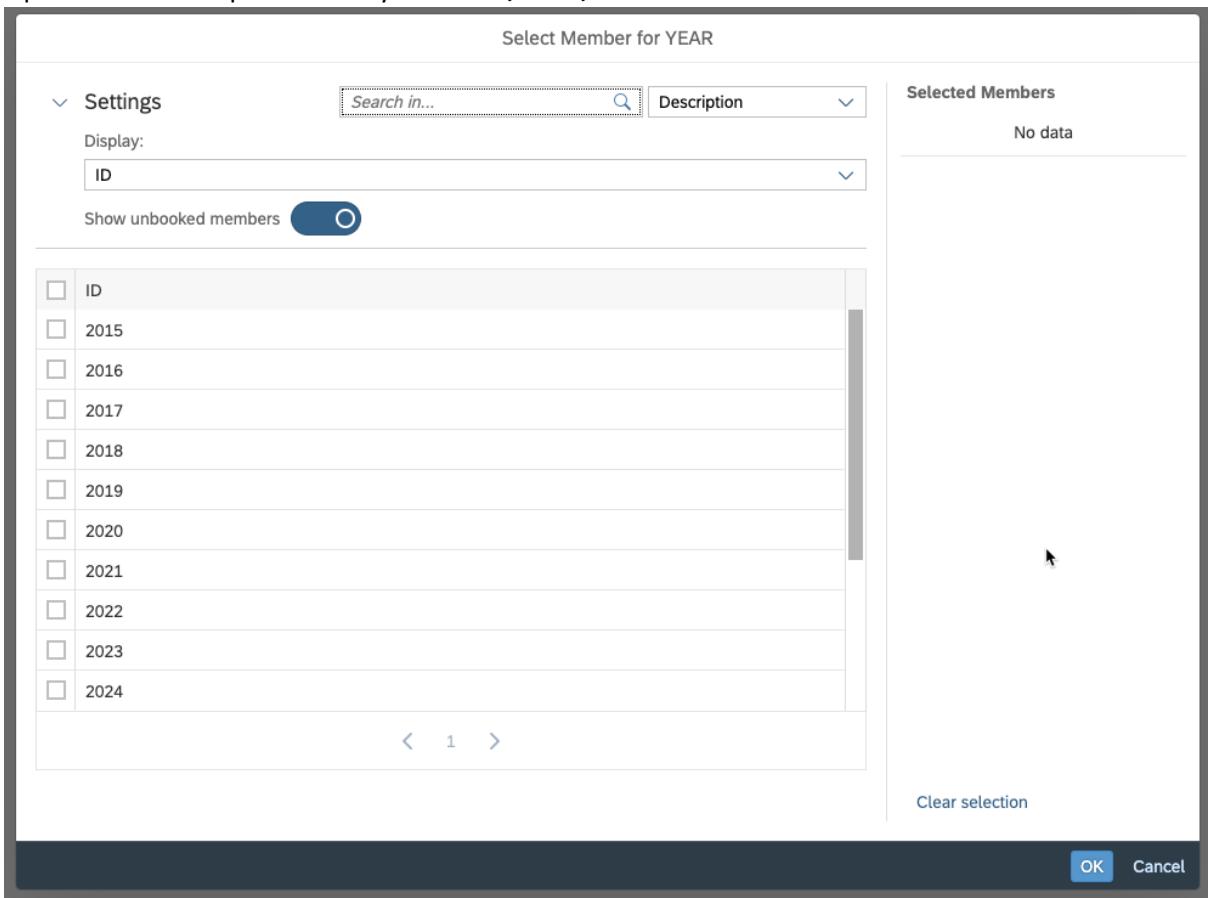
Mandatory

Many users will want to see only data for e.g. the current year. With the prompt, they can now readily do. Similarly, we could set filters on region, country or other relevant dimensions.

- Deploy your Analytic Model
- Preview data
- You will be prompted automatically for the **Year** variable.



- Open the value help and select years **2021, 2022, 2023** and click **OK**



If you look closely, you might note that the measure values have changed

- Under **Dimensions**, drill into **Creation Date** and enable the row on **YEAR** to reveal the filtered years. Confirm that only the selected years have indeed been retrieved by the system.

The screenshot shows the SAP Analytic Model builder interface. On the left is a table with columns: Measures, NETAMOUNT, GROSSAMOUNT, TAXAMOUNT, QUANTITY, Avg, and YEAR. The data rows are: 2021 (NETAMOUNT: 62,292,493.00, GROSSAMOUNT: 70,079,039.89, TAXAMOUNT: 7,786,546.89, QUANTITY: 22,775, Avg: 3.0), 2022 (NETAMOUNT: 61,718,406.00, GROSSAMOUNT: 69,433,192.46, TAXAMOUNT: 7,714,786.46, QUANTITY: 22,438, Avg: 3.0), and 2023 (NETAMOUNT: 21,282,215.00, GROSSAMOUNT: 23,942,486.93, TAXAMOUNT: 2,660,271.93, QUANTITY: 7,748, Avg: 3.0). To the right is the 'Available Objects' panel, which includes sections for Measures, Dimensions, and Columns. Under Measures, 'Select All' is checked. Under Dimensions, ADDRESSID, CREATION DATE, CALMONTH, CALQUARTER, CALWEEK, Date, and YEAR are listed. Under Columns, NETAMOUNT, GROSSAMOUNT, TAXAMOUNT, QUANTITY, Avg Price, Domestic Gross Sales, and International Gross Sales are listed.

## Add Complex Measures

Much more complex measures can be defined via Analytic Model functionalities like count distinct, constant selection or exception aggregation. All measures can also be stacked, resulting in potentially complex chains of calculations that modellers can consciously design.

For the case at hand let's use count distinct & constant selection features to compute

- Share of overall sales
- Avg sales by customer This fixes their formular, but final results always depend on current drill-down & filter set by the analytics user.

## User Steps

- Add **Restricted Measure** Gross Sales All Countries (Gross\_Sales\_All\_Countries) based on measure GROSSAMOUNT and with an empty expression (i.e. no restriction)
- Still within the same measure, activate **Constant Selection** on dimension COUNTRY (ADDRESSID)

4AM\_SalesOrderItems Properties

Restricted Measure

4AM\_SalesOrderItems / Gross Sales All Countries

Business Name: \*

Gross Sales All Countries

Technical Name: \*

Gross\_Sales\_All\_Countries

Source Measure: \*

GROSSAMOUNT

Aggregation Type:

Inherited (SUM)

> Expression

> Exception Aggregation

Constant Selection

Constant Dimensions:

Selected Dimensions

Selected Constant Dimensions: \*

COUNTRY (ADDRESSID) X

 **Constant Selection** ensures that for the measure at hand, a given dimension is taken out of drill-down or dynamic filter EVEN if it is a part of drill-down. This is important to compute reference figures (in this case, all countries) that can then be used as reference figure for display or subsequent calculations (like share of sales)

Additionally, we could also have used a variable and used it in the restriction expression to make the list of reference countries configurable

Next, we use the measure for subsequent calculations:

- Add calculated measure **Share of All Countries Sales** (Share\_Of\_All\_Countries\_Sales) with expression *GROSS\_AMOUNT / Gross\_Sales\_All\_Countries*

4AM\_SalesOrderItems Properties

*fx* Calculated Measure

4AM\_SalesOrderItems / Share of All Countries Sales

Business Name: \*

Share of All Countries Sales

Technical Name: \*

Share\_of\_All\_Countries\_Sales

Expression

+ - / \* ( ) Validate

GROSSAMOUNT / Gross\_Sales\_All\_Countries

Measures Dimensions Functions Operators

Search

 Gross\_Sales\_All\_Countries  
Gross Sales All Countries

 International\_Gross\_Sales  
International Gross Sales

We are also interested in the average spend per customer. To that end, we count individual customers in the current drill-down and use that to compute their average spend amount.

- Add **Count Distinct Measure** Customer Count (CUSTOMER\_COUNT) based on **Dimension** PARTNERID (SALESORDERID)

## 4AM\_SalesOrderItems Properties



### Count Distinct Measure

4AM\_SalesOrderItems / Customer Count



Business Name:\*

Customer Count

Technical Name:\*

Customer\_Count

### Attributes

Dimensions:\*

PARTNERID (SALESORDERID) X



### Settings

Is Auxiliary

- Add **Calculated Measure** Avg Spend per Customer (AVG\_GROSSAMOUNT\_PER\_CUSTOMER)  
w expression GROSSAMOUNT / CUSTOMER\_COUNT

## 4AM\_SalesOrderItems Properties



### fx Calculated Measure

4AM\_SalesOrderItems / Avg Spend per Customer

Business Name:\*

Avg Spend per Customer

Technical Name:\*

Avg\_Spend\_per\_Customer

### Expression

Expression

+ - / \* ( ) Validate

GROSSAMOUNT / Customer\_Count

The expression is valid.

Measures

Dimensions

Functions

Operators

Search



Customer\_Count

Customer Count



Share\_of\_All\_Countries\_Sales

Share of All Countries Sales

- Deploy your Analytic Model
- Preview data.
  - Drill by COUNTRY think about the results you see
  - Take COUNTRY out of the drill and drill by PARTNERID only. Think about the results

- Drill by COUNTRY and PARTNERID and again understand what you see

### Motivate subsequent modelling steps Model Enhancements

We have come pretty far and the Analytic Model provides users with aligned KPI definitions and a multitude of drill possibilities. Nonetheless we realize that the model is lacking in some crucial ways. If we healed those, our analytics users would have a much easier time and could also apply more flexible analyses. Concretely these are:

- No human-readable descriptions to all abbreviations used like products code, company codes, employee IDs or region names
- No hierarchical display of things that are inherently hierarchical like regional hierarchy, organizational hierarchy or product hierarchy
- No details on currencies or units in the measures and certainly no automatic currency conversion Let's investigate where these topics hit us concretely.

User Steps:

- **Preview** data
- Drill by REGION and COUNTRY. Realize the need to understand their respective abbreviations

The screenshot shows a software interface for building analytic models. On the left, there is a preview window displaying a table with columns: Measures, GROSSAMOUNT, Avg\_Price, and Gross\_Sales\_All\_Countries. The table data includes rows for various countries and regions. A red box highlights the first two columns (COUNTRY and REGION). On the right, there is a 'Available Objects' pane with sections for Rows, Dimensions, and Columns, each containing a list of objects with checkboxes. The 'Rows' section includes NETAMOUNT, QUANTITY, Share of All Countries Sales, and TAXAMOUNT. The 'Dimensions' section includes ADDRESSID, CITY, COUNTRY, and REGION. The 'Columns' section includes CREATION\_DATE, CURRENCY, EXPECTEDDELIVERYDATE, PARTNERID, and PRODUCTID. The 'Available Objects' pane has a search bar at the top and a 'Builder' tab.

COUNTRY	REGION	GROSSAMOUNT	Avg_Price	Gross_Sales_All_Countries
AU	APJ	9,191,348.20	3,145.57	18,
CA	AMER	165,500,120.58	3,112.43	329,
DE	EMEA	167,954,807.21	3,100.28	515,
DU	EMEA	7,467,484.10	3,146.85	515,
FR	EMEA	168,292,204.04	3,099.87	515,
GB	EMEA	171,792,085.07	3,095.80	515,
IN	APJ	9,434,612.58	3,100.43	18,
US	AMER	164,143,018.11	3,089.52	329,

- Drill by PARTNERID. Realize the need to also drill by COMPANYNAME to realize which customer this is

The screenshot shows a data visualization interface. On the left is a table with the following data:

COUNTRY	REGION	PARTNERID	COMPANYNAME	Measures	GROSSAMOUNT
AU	APJ	100000015	iCare Australia		2,041,538.
		100000016	CC SportWorld		1,810,042.
		100000017	DigiPay		2,161,439.
		100000018	TechCycle Canberra		2,029,147.
		100000019	eBike 100		1,149,180.
CA	AMER	100000030	Hudson SportsTec		33,264,100.
		100000031	Ebike 36		31,710,168.
		100000032	Wichita Sport		35,190,778.
		100000033	Move by Bike		35,013,360.
		100000034	TechCycle		30,321,713.
DE	EMEA	100000005	Alpha AG		31,577,332.
		100000006	BuchungsKreis 1010		32,815,109.
		100000007	Trek Cycle AG		35,740,405.
		100000008	Tona Bikes AG		32,107,438.
		100000009	Meine Bicycle		35,714,521.
DU	EMEA	100000025	Homerun Millwork Inc.		1,452,536.

The right side of the interface shows the 'Available Objects' pane with various dimensions and measures listed, and the 'Builder' pane where specific objects are selected.

- Drill by EMPLOYEEID. Realize you need to add Full Name into drill to realize which user this is. If you only drill by Full Name and two users had the same name, you'd not realize which individual this is. Also realize there is no way to know/see the organizational hierarchy

The screenshot shows a data visualization interface. On the left is a table with the following data:

EMPLOYEEID	Measures	GROSSAMOUNT	Avg_Price	Gross_Sales_All_Countries	International_Gross_Sales
0000000003	Ellis Robertson	48,506,629 61 \$	3,108.20 \$/EA	48,506,629 61 \$	
0000000004	William Mussen	3,375,100 63 \$	3,193.09 \$/EA	3,375,100 63 \$	
0000000006	Haseena al Yousf	45,806,569 52 \$	3,101.74 \$/EA	45,806,569 52 \$	
0000000007	Roberta Holloway	47,938,687 04 \$	3,093.62 \$/EA	47,938,687 04 \$	
0000000009	Kirk Lee	50,984,794 22 \$	3,095.05 \$/EA	50,984,794 22 \$	
0000000010	Janet Gray	45,893,176 47 \$	3,109.29 \$/EA	45,893,176 47 \$	
0000000011	Nelson Wilkens	47,118,687 93 \$	3,093.81 \$/EA	47,118,687 93 \$	
0000000012	Willard Chatman	48,710,487 72 \$	3,109.11 \$/EA	48,710,487 72 \$	
0000000013	Carroll Pewitt	46,553,640 06 \$	3,108.96 \$/EA	46,553,640 06 \$	
0000000014	Kenneth Weise	42,443,665 25 \$	3,097.40 \$/EA	42,443,665 25 \$	
0000000015	Frank Gottschalk	45,177,117 58 \$	3,109.66 \$/EA	45,177,117 58 \$	
0000000016	Hobie van der Woerd	46,580,688 93 \$	3,106.01 \$/EA	46,580,688 93 \$	
0000000017	Lada Svobodová	46,803,575 28 \$	3,028.97 \$/EA	46,803,575 28 \$	
0000000019	Oscar Lind	48,387,444 78 \$	3,096.80 \$/EA	48,387,444 78 \$	
0000000020	Ritta Johnson	48,943,949 71 \$	3,125.41 \$/EA	48,943,949 71 \$	
0000000021	Ludvig Kristensen	48,632,577 78 \$	3,099.20 \$/EA	48,632,577 78 \$	
0000000022	Sári Aranika	44,304,109 76 \$	3,098.84 \$/EA	44,304,109 76 \$	
0000000023	Aurelio Russo	46,797,415 47 \$	3,146.04 \$/EA	46,797,415 47 \$	
0000000024	Fardou van Gennip	45,566,302 00 \$	3,072.78 \$/EA	45,566,302 00 \$	
0000000025	Eden Krajkjik	4,131,086 87 \$	3,122.51 \$/EA	4,131,086 87 \$	
0000000026	Charu Kasthuriaani	3,408,383 68 \$	3,087.30 \$/EA	3,408,383 68 \$	
0000000027	Van Schultz	4,438,652 80 \$	3,095.29 \$/EA	4,438,652 80 \$	
		3,272,736 80 \$	3,125.82 \$/EA	3,272,736 80 \$	

The right side of the interface shows the 'Available Objects' pane with various dimensions and measures listed, and the 'Builder' pane where specific objects are selected.

- Drill by PRODUCTID & PRODUCTCATEGORY. Realize there are no product names or custom groupings of products (e.g. strategic products, low-end products or else)

The screenshot shows the SAP Analytic Model builder interface. On the left is a data grid with columns: PRODUCTID, PRODCATEGORYID, GROSSAMOUNT, and Avg\_Price. The data grid contains numerous rows of product information. To the right of the grid are several configuration panels:

- Available Objects**: A search bar and a list of objects: International Gross Sales, NETAMOUNT, QUANTITY, Share of All Countries Sales, and TAXAMOUNT.
- Builder**: A panel for defining rows, dimensions, and columns. It includes sections for Rows (selected: International Gross Sales), Dimensions (AddressID, Creation Date, Currency, Expected Delivery Date, PartnerID, ProductID, ProductCategoryID), and Columns (Measures: GROSSAMOUNT, Avg Price, Gross Sales All Countries, International Gross Sales).
- Available Objects**: A sidebar listing available objects: PRODUCTID, PRODCATEGORYID, CURRENCY, PRICE, PRODUCTID, QUANTITYUNIT, SUPPLIER\_PARTNERID, WEIGHTMEASURE, WEIGHTUNIT, RESPONSIBLE, EMPLOYEEID, and SALESORDERID.

## Summary

You built an Analytic Model that provides a rich, analytical view on your data with governed KPI definitions, that contains a conscious selection of which dimensions to expose to end-users and also flexibly takes user input to e.g. filter or calculate.

You have also double-checked all of your modelling by immediately previewing the data and flexibly analyzing it in a multi-dimensional grid.

Continue to - [Exercise 2 - Add Labels & Internationalization](#)

**⚠️** If you are short on time, you can alternatively also choose to do the exercises on [hierarchies](#) or [currency conversion](#), since all exercises from now on are independent of each other.