

Forecast Level Optimizer

Find the best forecast strategy

SAP Consulting
August 2011



Agenda

The challenge: A better forecast strategy

The solution: SAP's forecast level optimizer

Details to the forecast level optimizer

- Possibilities
- Data Input
- Output and analysis

The challenge: A new strategy to forecast

Current situation:

Forecasting by using „Demand planning interactive“ or batch-job

Definition of characteristic value combinations

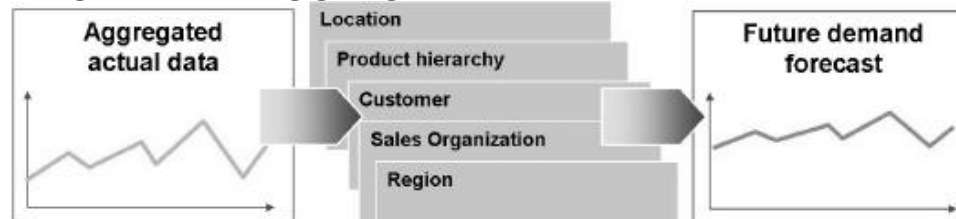
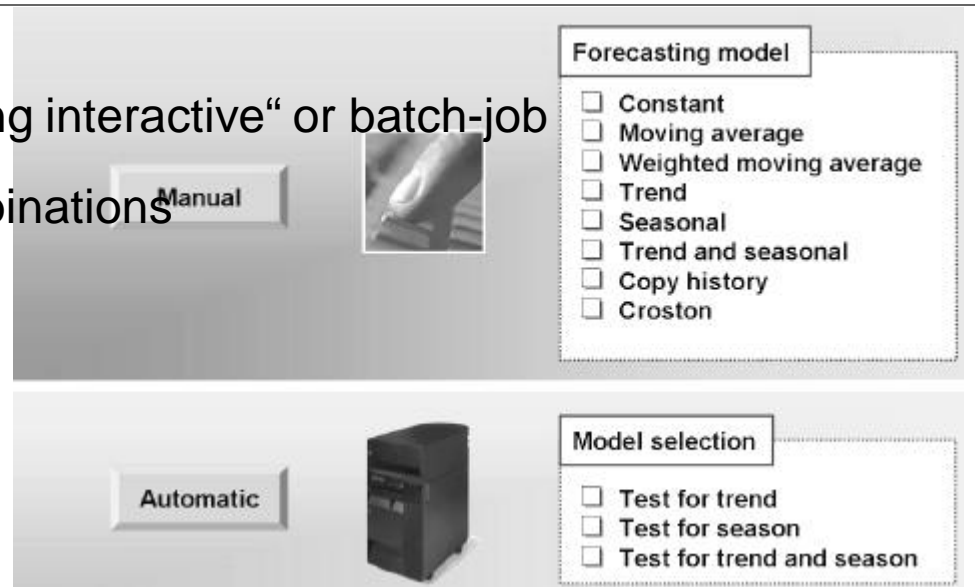
Choose of mathematical model:

- Manually or
- „Automatic Model Selection“

Manual choose of aggregation level

Problem:

- Finding the best mathematical method at manual choose
- „Automatic Model Selection“ does not contain all available methods
- Is the used Planning Level (Aggregation level) for elements to forecast really the best one?



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Questions and answers to SAP's forecastlevel optimizer

■ Which prerequisites must customers fulfil?

The use of SAP SCM with integrated APO

■ Which advantages offers the tool?

Calculation of the best forecast strategy comparing mathematic methods, smoothing parameters and aggregationlevel

Shows analysis of result (e.g. 'How often is method XXX used')

Shows following forecast errors for each characteristical combination of choosed aggregationslevel(s):

- MAD, MAPE, MPE, MSE, RMSE

■ Is the forecastlevel optimizer a modification?

No. It is an Add-on, no modification.

■ Is Customizing necessary to use the tool?

No, customizing is not needed.

■ How time-consuming is the adoption?

The solution will be installed and available within one day.

■ What's the whole amount of costs for the forecastlevel optimizer?

Please send an inquiry to Marc Hoppe

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Details to SAP's forecastlevel optimizer

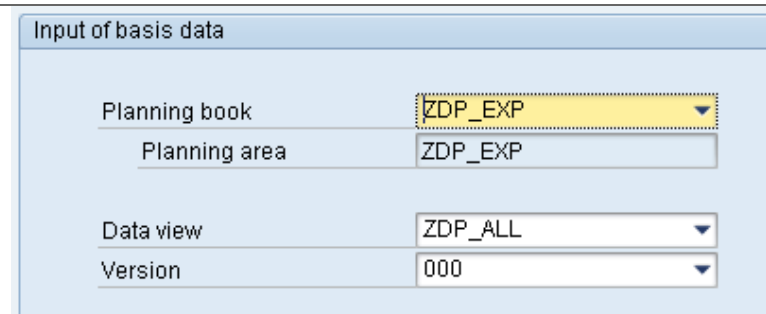
The first necessary step is the selection of a planning book, a data view and a planning version.

The next step is to choose basic data from planning area for forecast optimization:

On the first tab strip you enter:

- Range of history data
- Selection area
- History key figure
- „Aggregation target level“

The “Aggregation Target Level” is the level on which your forecast later will be executed, for example: „Product“.



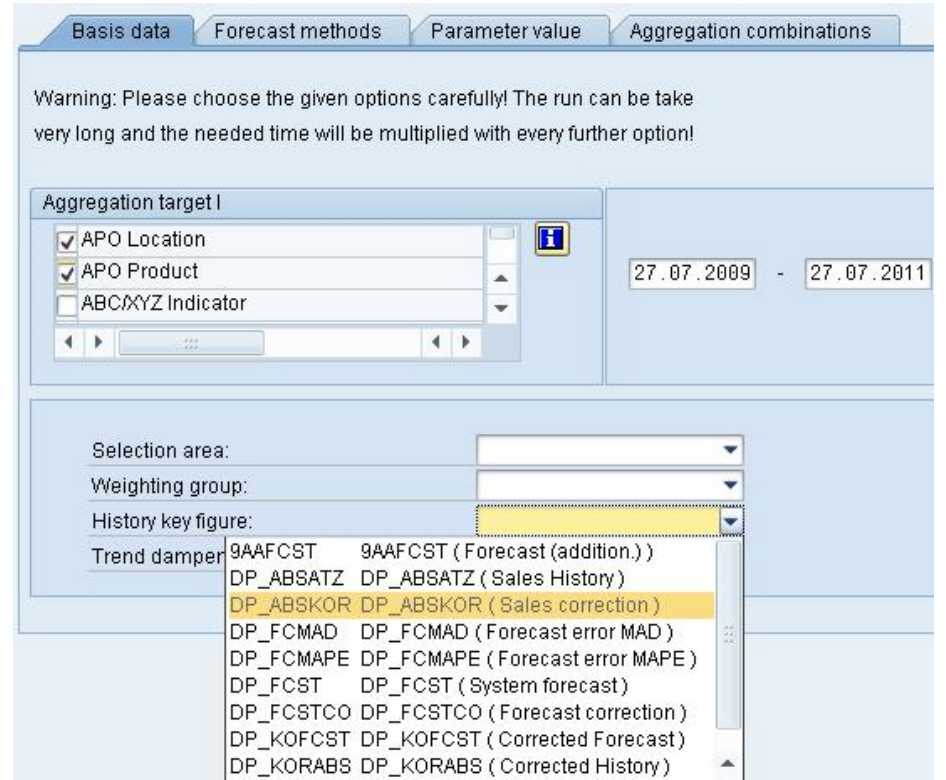
Input of basis data

Planning book: ZDP_EXP

Planning area: ZDP_EXP

Data view: ZDP_ALL

Version: 000



Basis data | Forecast methods | Parameter value | Aggregation combinations

Warning: Please choose the given options carefully! The run can be take very long and the needed time will be multiplied with every further option!

Aggregation target I

APO Location

APO Product

ABC/XYZ Indicator

27.07.2009 - 27.07.2011

Selection area: []

Weighting group: []

History key figure: [DP_ABSKOR DP_ABSKOR (Sales correction)]

Trend damper: 9AAFCST 9AAFCST (Forecast (addition.))

DP_ABSATZ DP_ABSATZ (Sales History)

DP_ABSKOR DP_ABSKOR (Sales correction)

DP_FCMADE DP_FCMADE (Forecast error MAD)

DP_FCMAPE DP_FCMAPE (Forecast error MAPE)

DP_FCST DP_FCST (System forecast)

DP_FCSTCO DP_FCSTCO (Forecast correction)

DP_KOFCST DP_KOFCST (Corrected Forecast)

DP_KORABS DP_KORABS (Corrected History)

Details to SAP's forecastlevel optimizer

In the next tab strip you can enter

The forecast methods which should be used in the optimization run

- In tab strip 3 the smoothing parameters can be adjusted

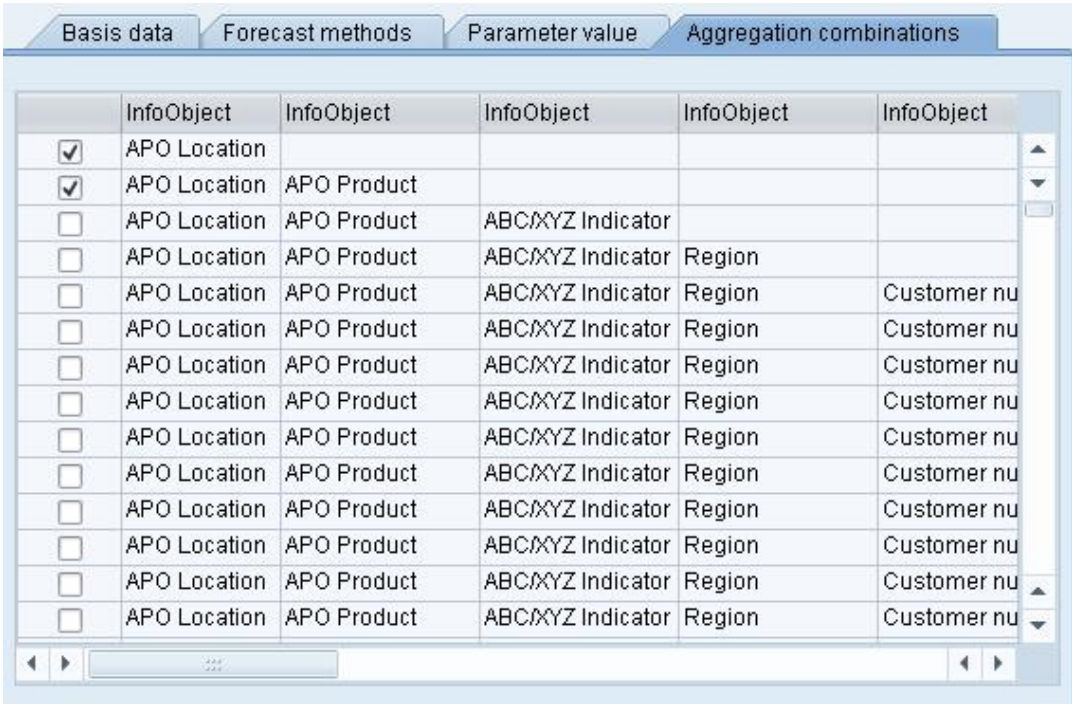
The screenshot displays the SAP forecastlevel optimizer interface. The top tab strip includes 'Basis data', 'Forecast methods', 'Smoothing parameters', and 'Aggregation level combinations'. The 'Forecast methods' tab is active, showing several model categories:

- Constant models:** Median method, Linear regression, Floating average, Constant model (exp. smoothing 1. grad), Constant model + alpha optimization (1.), Floating average.
- Saison models:** Periode(Wochen) / Saison, Seasonal linear regression, Saison of Winters.
- Trend models:** Exponential smoothing 2. Grade, Trendmodell, Trendmodell + alpha optimization (2. Grd).
- Automatic models:** Automatic Model Selection 1, Aggregation combinations.
- Other models:** Seasonal trend model, Croston's Model.

The 'Parameter value' tab is also visible, showing 'Intervals for forecast methods' with input fields for Alpha, Beta, and Gamma start values, steps, and end values, as well as Alpha2 and Sigma. The 'Other settings' section includes a checked option 'Consider same results'.

Details to SAP's forecastlevel optimizer

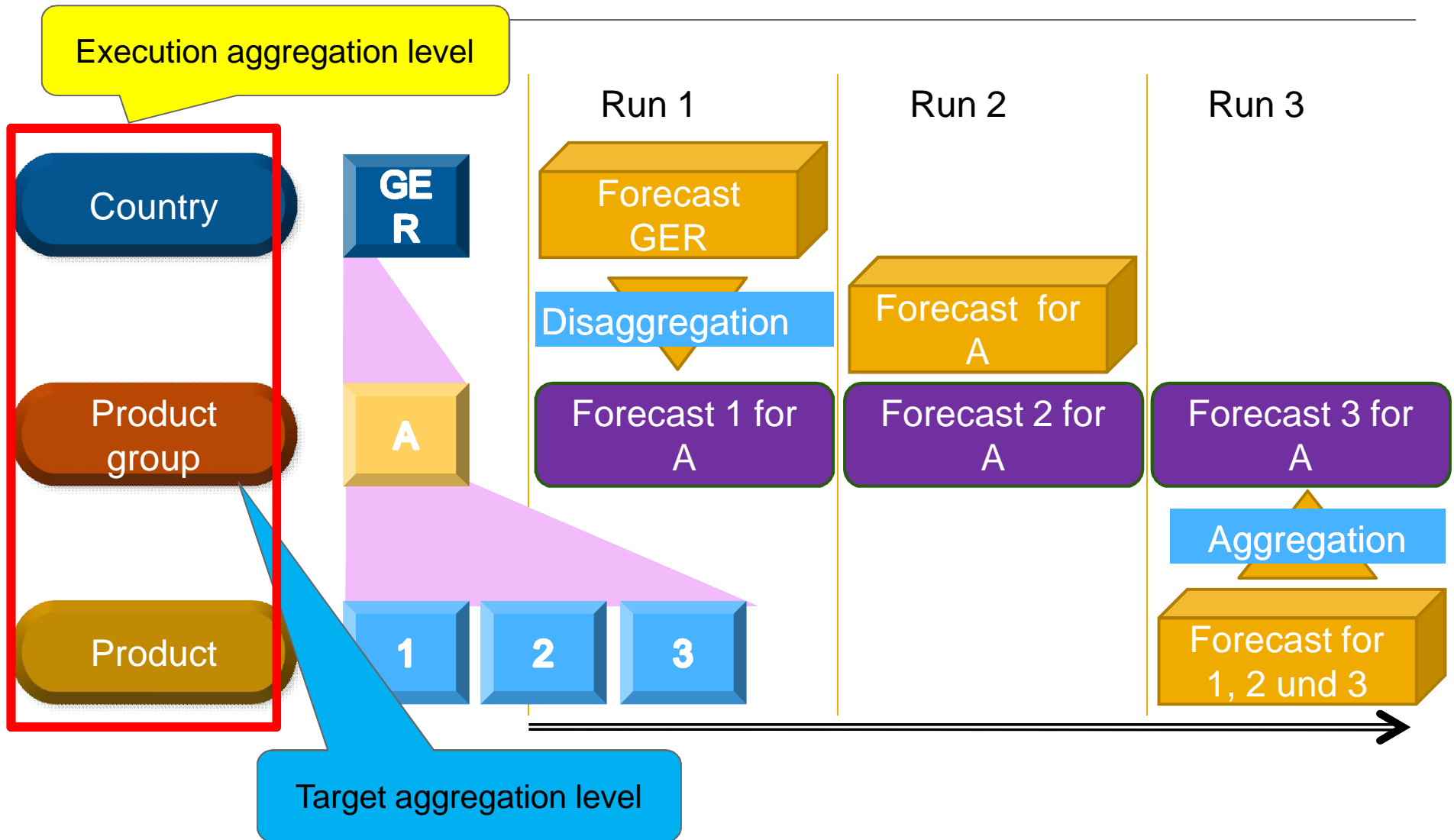
In the 4th tab strip you can choose all possible aggregation level combinations from the planning area. The optimization tool will forecast all CVC's from the chosen selection profile (in basic data). The tool will generate a forecast on all chosen levels here. After, it will compare the results for each CVC in all aggregation levels by aggregation / disaggregation and will determine the level with the best results.



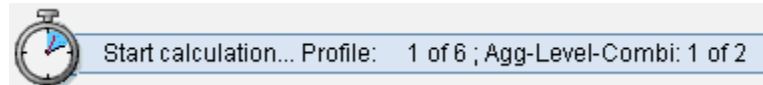
The screenshot shows the 'Aggregation combinations' tab in the SAP forecastlevel optimizer. It features a table with columns for 'InfoObject' and a list of aggregation levels. The first two rows are checked, indicating they are selected for optimization.

	InfoObject	InfoObject	InfoObject	InfoObject	InfoObject
<input checked="" type="checkbox"/>	APO Location				
<input checked="" type="checkbox"/>	APO Location	APO Product			
<input type="checkbox"/>	APO Location	APO Product	ABC/XYZ Indicator		
<input type="checkbox"/>	APO Location	APO Product	ABC/XYZ Indicator	Region	
<input type="checkbox"/>	APO Location	APO Product	ABC/XYZ Indicator	Region	Customer nu
<input type="checkbox"/>	APO Location	APO Product	ABC/XYZ Indicator	Region	Customer nu
<input type="checkbox"/>	APO Location	APO Product	ABC/XYZ Indicator	Region	Customer nu
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<input type="checkbox"/>	APO Location	APO Product	ABC/XYZ Indicator	Region	Customer nu
<input type="checkbox"/>	APO Location	APO Product	ABC/XYZ Indicator	Region	Customer nu

Forecast level optimizer: Idea: Forecast on different levels:



Details to SAP's forecastlevel optimizer



- After the confirmation the calculation of forecasts follows. The tool uses for the forecast **all choosed forecast methods** with a variation of **all smoothing parameters** in **all choosed combinations of aggregation levels**. Following forecast errors will be calculated:
 - ✓ Error amount
 - ✓ MAD,
 - ✓ MPE,
 - ✓ MSE,
 - ✓ RMSE and
 - ✓ MAPE

Details to SAP's forecastlevel optimizer

On the result view there are three tab strips.
The first one displays only the entered data before the run like:

- Planning area
- Target aggregation level
- Time range of history
- Number of forecast runs

The screenshot displays the SAP Forecastlevel Optimizer interface. At the top, there are three tabs: 'Basis data', 'Characteristics:', and 'Report'. The 'Basis data' tab is active, showing a table with the following data:

Basis data	
Planning Area	ZDP_EXP
Planning Book	ZDP_EXP
Data View	ZDP_ALL
Version	000

Below the table, there is a section for 'Aggregation target level:' with a list of items:

- APO Location
- APO Product
- ABC/XYZ Indicator
- Region

Further down, the 'Historic data:' section shows a date range: 27.07.2009 - 31.07.2011.

The 'Runs:' section at the bottom contains two input fields:

- Forecast profile: 31
- Aggregation level: 3

Details to SAP's forecastlevel optimizer

The second tab strip consists of a list of all CVC's of the chosen Target Aggregation Level and the chosen Selection Profile.

In this example the Target level:
APO Location and

- APO Product.

With a click on one CVC a window opens which displays the individual recommendation for the forecast strategy:

- Forecast method

- Smoothing parameters

- Target aggregation level

Based on the chosen error-measure the result can change

The screenshot displays the SAP forecastlevel optimizer interface. It features a tab strip with 'Basis data', 'Characteristics:', and 'Report'. Below the tabs is a table with columns 'APO Locati' and 'APO Produc'. The table contains the following data:

APO Locati	APO Produc
8522	ZB0100
8522	ZB1000
8522	ZB1001
8522	ZB2022
8522	ZB2023
8522	ZB4000

A 'Details to chosen CVC' window is open, showing the 'Chosen combination' as 8522 ZB0100. The 'Forecast strategy' tab is active, displaying the 'Error measure' as 'MAD' with a value of 26. The 'Forecast profile' section includes 'Variable values' and 'Fixed values'.

Variable values:

- Prognosestrategie: 31 (Seasonal Model Based on Winters' Method)
- Alpha Wert: 0,30
- Beta Wert: 0,00
- Gamma Wert: 0,30

Fixed values:

- Alpha 2: 0,10
- Sigma: 1,50
- Ausreißerkontrolle
- Lebenszyklusplanung

The 'Aggregation target level' is set to 'APO Location'.

Details to SAP's forecastlevel optimizer

The second tab strip on the popup-window is an information about the history values and the calculated expost-values with the best forecast strategy of the selected CVC.

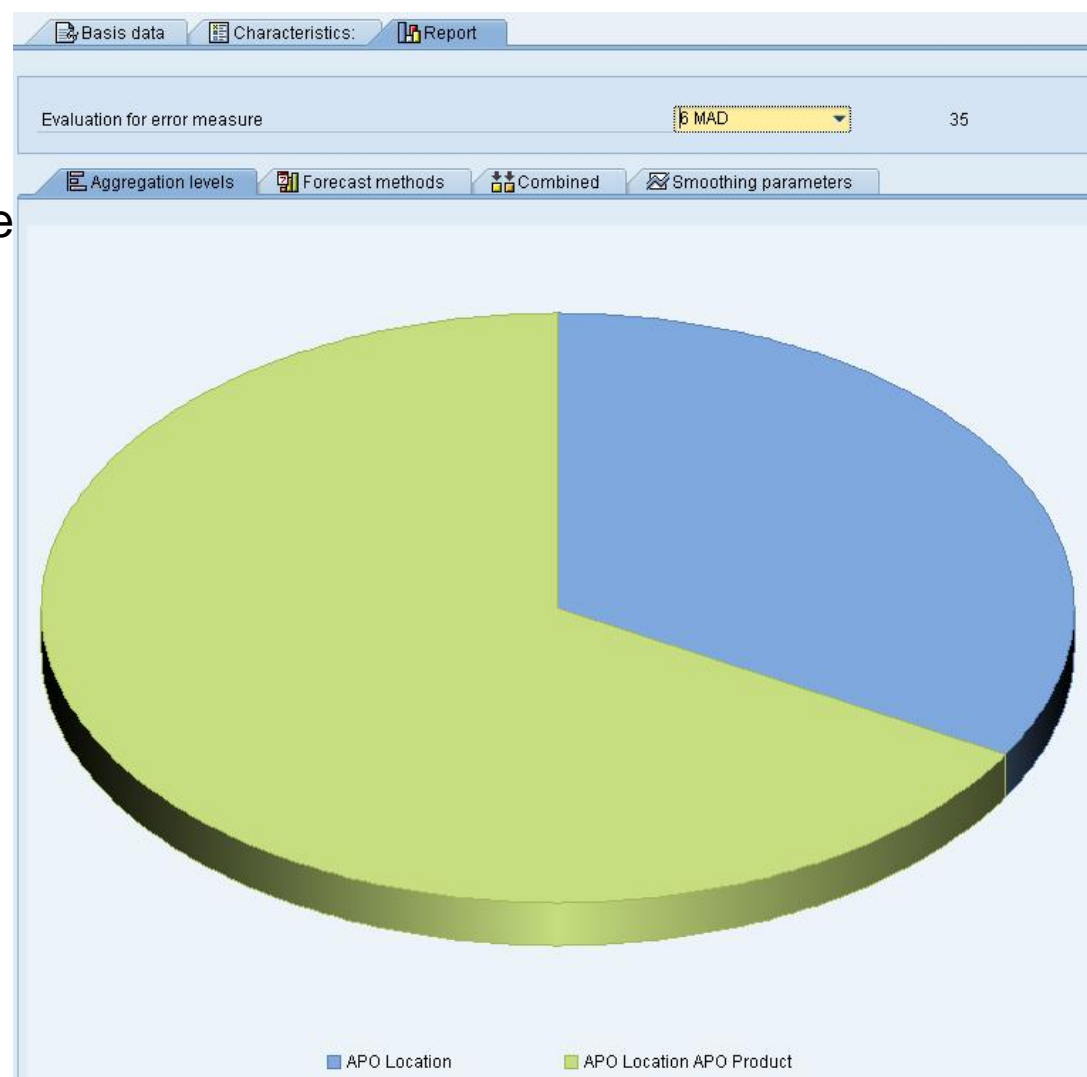
The screenshot displays the SAP APO forecast level optimizer interface. It features a tab strip with three tabs: 'Basis data', 'Characteristics:', and 'Report'. The 'Characteristics:' tab is active, showing a table with two columns: 'APO Locati' and 'APO Produc'. The first row is highlighted in yellow, showing '8522' and 'ZB0100'. Below this table, a popup window titled 'Details to chosen CVC' is open. It has a sub-tab strip with 'Forecast strategy' (checked) and 'Detailview'. The 'Detailview' tab is active, displaying a table with four columns: 'Period St...', 'Period End', 'History value:', and 'Expostvalue'. The table contains 20 rows of data, showing historical values and calculated expost values for various periods.

Period St...	Period End	History value:	Expostvalue
2010.08.02	2010.08.08	296,00	277,00
2010.08.09	2010.08.15	265,00	278,00
2010.08.16	2010.08.22	266,00	276,00
2010.08.23	2010.08.29	276,00	274,00
2010.08.30	2010.09.05	600,00	275,00
2010.09.06	2010.09.12	900,00	346,00
2010.09.13	2010.09.19	298,00	469,00
2010.09.20	2010.09.26	300,00	443,00
2010.09.27	2010.10.03	276,00	404,00
2010.10.04	2010.10.10	318,00	382,00
2010.10.11	2010.10.17	275,00	373,00
2010.10.18	2010.10.24	270,00	355,00
2010.10.25	2010.10.31	274,00	340,00
2010.11.01	2010.11.07	290,00	326,00
2010.11.08	2010.11.14	306,00	318,00
2010.11.15	2010.11.21	268,00	316,00
2010.11.22	2010.11.28	273,00	320,00
2010.11.29	2010.12.05	267,00	317,00
2010.12.06	2010.12.12	299,00	282,00
2010.12.13	2010.12.19	303,00	283,00

Details to SAP's forecastlevel optimizer

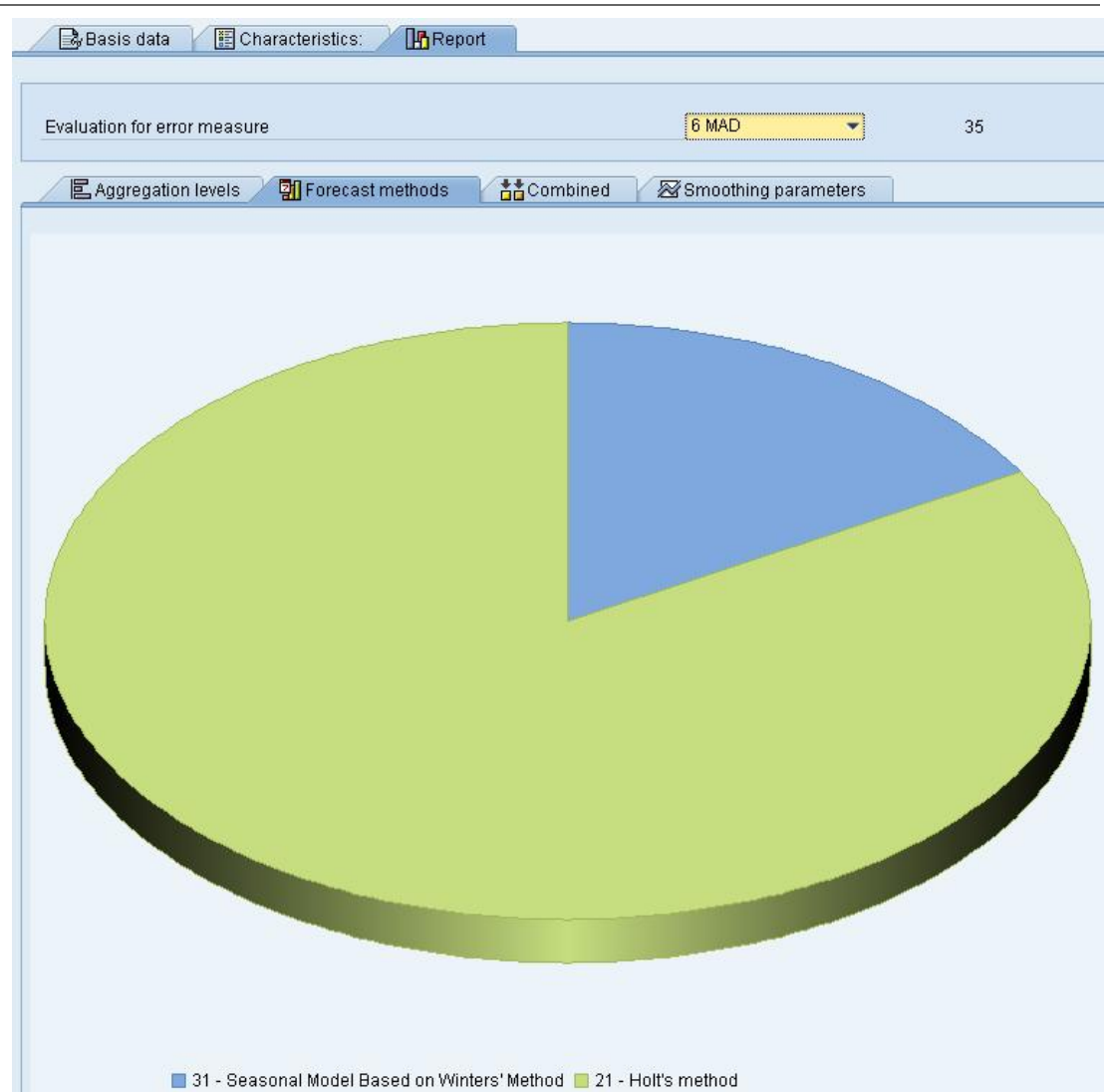
Tab strip 3 offers a graphical mass-analysis about the forecast results. This analysis is also based on the error measure which can be selected in the drop-down box.

The graphic on the first sub-tab strip displays, how often the tool determined the best forecast on which aggregation level.



Details to SAP's forecastlevel optimizer

In the sub-tab-strip "Forecast methods" it is shown which forecast methods achieved the best forecast result for all CVC in the chosen selection profile.



Details to SAP's forecastlevel optimizer

The sub tab-strip “Combined” is a combined analysis if the first two:

- Aggregation levels
- Forecast Methods

It shows, which forecast method brought the best forecast results on which aggregation level.

This is important to find a complete forecast strategy and not a forecast method or an aggregation level only

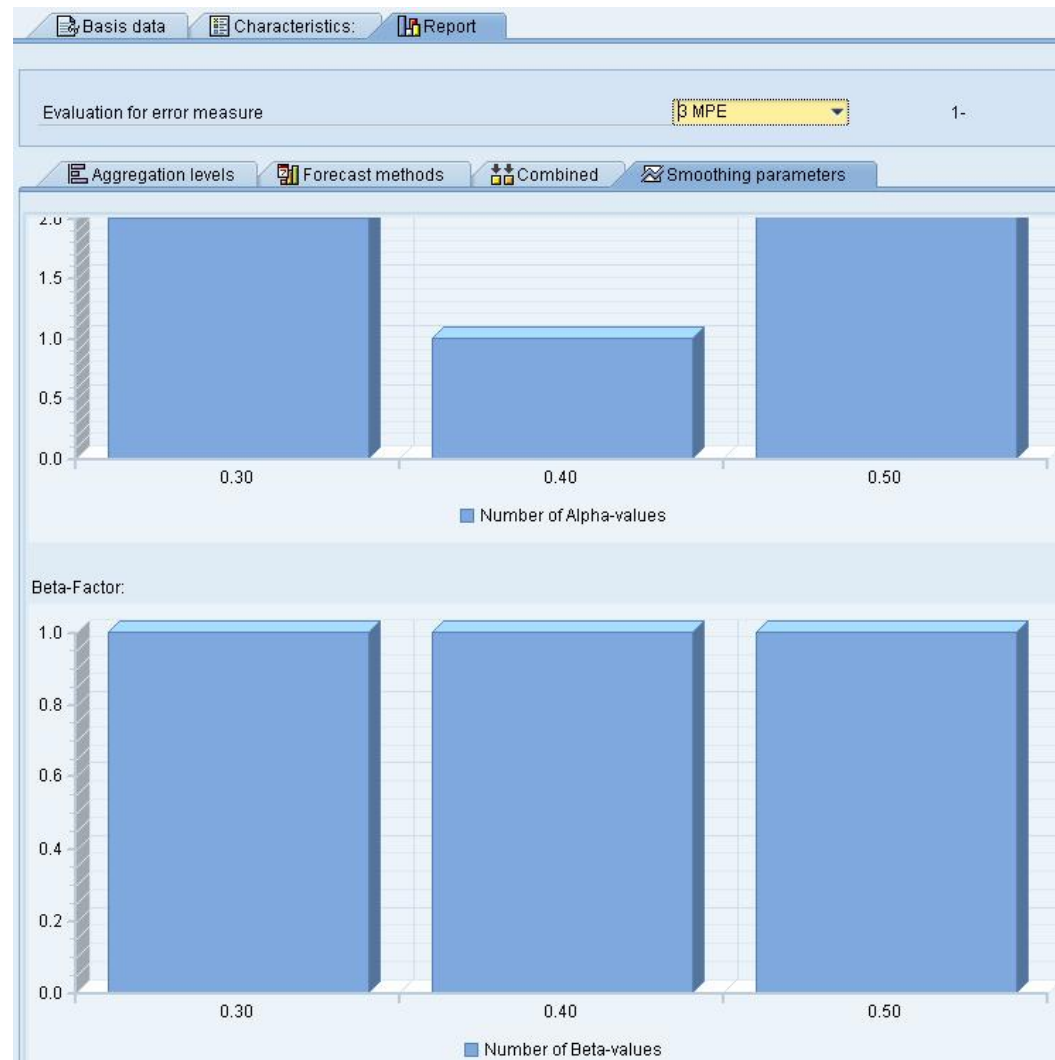


Details to SAP's forecastlevel optimizer

The final tab-strip in analysis shows the used smoothing parameters for the forecast methods.

It makes sense, to have a look on this view first only, if you are clear about the forecast method and the aggregation level.

The information provided here can be used for fine-tuning.





Thank You!

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