MATERIAL FORECAST WITH SAP - VV

HOW TO OPTIMIZE FORECAST PARAMETERS AND USE THE VV MRP TYPE TO ITS FULEST EXTENT

OCTOBER 1^{ST} , 2009

MATERIAL FORECAST WITH VV

OPTIMIZING FORECASTING PARAMETERS

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MATERIAL FORECAST IN SAP

MRP type VV allows for consumption driven MRP in SAP. The VV type uses historical consumption to calculate future forecasted requirements. This type of forecasting is called the 'material forecast' in SAP (as opposed to the 'external forecast' used in SAP's S&OP).

The **forecast** is carried out on a periodic basis and consists of the **following procedure**: after the MRP controller has determined feasibility on a given material for VV planning and set all the required data in the material master record the system then initializes the forecast using a number of initialization periods. It then looks at past consumption values and smoothing factors to see whether there is a model that can be determined or if the past consumption values do not show any regularity.



Consumption values that represent a trend model (up) after being initialized and smoothed

The forecast is then calculated and periodic forecast requirements are paced in the materials stock/requirements list. The MRP run will then determine net requirements and cover any shortages with order proposals.

-								
Σ	E	Date	MRP	A	MRP element data	Rec./reqd.qty		Available qty
B		11/09/2009	PurRqs		0001071482/00010	40,	000	43,384.710
		11/09/2009	ForReq	Q	W 46/2009	33,988.	696-	9,396.014
		11/16/2009	PurRqs	Q	0001001546/00010	40,	000	49,396.014
		11/16/2009	ForReq	Q	W 47/2009	34,133.	242-	15,262.772
		11/23/2009	PurRqs	Q	0001013714/00010	40,	000	55,262.772
		11/23/2009	ForReq	Q	W 48/2009	34,277.	788-	20,984.984
		11/30/2009	PurRqs	Q	0001008323/00010	40,	000	60,984.984
		11/30/2009	ForReq	Q	W 49/2009	34,422.	334-	26,562.650
		12/07/2009	PurRqs	Q	0001071483/00010	40,	000	66,562.650
		12/07/2009	ForReq	Q	W 50/2009	34,566	880-	31,995.770
		12/14/2009	PurRqs	Q	0001001548/00010	40,	000	71,995.770
		12/14/2009	ForReq	Q	W 51/2009	34,711.	426-	37,284.344
		12/21/2009	ForReq	Q	W 52/2009	34,855.	972-	2,428.372
		12/28/2009	PurRqs	Q	0001071484/00010	40,	000	42,428.372
		12/28/2009	ForReq	Q	W 53/2009	35,000	518-	7,427.854
		01/04/2010	PurRqs	Q	0000995380/00010	40,	000	47,427.854
		01/04/2010	ForReq		W 01/2010	35,145.	064-	12,282.790

Netted forecast requirements with their respective order proposals to cover future shortages

When using MRP type VV the material in question is controlled by SAP's consumption based planning. This means that deterministic demand – from a customer order or a forecast – is not considered in the systems net requirements calculation. This can be seen in the stock/requirements list where any dependent demand does NOT reduce the available quantity.

S	how Overview Tr	ee 🛛 🧟	🏹 🚭 🔟 🏭 Mu	Iti MRP	🕒 Single-item, singl	e-level planning 🔗 P	lanning file en	try 🎦 PReq SOP INVCO 🛛 🖋 On	
-	Material MRP area Plant	PD34582 UP01 UP01	Barber Foods MRP type	OST NW34	1582 type <u>ROH</u> Unit	LB	2		
$\mathbf{\Sigma}$	EDate	MRP A	MRP element data	Sto	Rec./reqd.qty	Available qty	Rescheduli		
6	10/09/2009	OrdRes	UBFMCN407S	INBD	247.617-				
	10/09/2009	OrdRes 🤇	UBFMCN459.2S	INBD	82.539-				-
-	10/09/2009	OrdRes 🦉	UBFMCN458S	INBD	41.270-				
	10/12/2009	OrdRes	UBSWD553.1S	INBD	1-				
	10/12/2009	ForReq 🦉	W 42/2009		6,158.795-	19,780.401			
	10/15/2009	OrdRes 🦉	UBRTSB803.1S	INBD	1-				
-	10/19/2009	ForReq 🦉	W 43/2009		4,416.786-	15,363.615			
-	10/22/2009	OrdRes 🦉	UBRTSB803.1S	INBD	1-				
-	10/22/2009	OrdRes 🦉	UBRTSB853S	INBD	1-				
-	10/22/2009	OrdRes 🦉	UBRTSB807S	INBD	1-				
	10/26/2009	ForReq 🧧	W 44/2009		2,674.777-	12,688.838			
	11/02/2009	ForReq	W 45/2009		932.768-	11,756.070			

Any dependent demand – like order reservations through the BOM – do NOT reduce the available quantity for the determination of net requirements and therefore do NOT trigger the creation of order proposals

Order proposals are only generated for forecasted requirements. Hence a consumption driven material like the VV is 'cut-off' from deterministic planning and therefore not susceptible to demand variation or incorrect forecasts.

VV panning is used primarily for materials which are:

- Showing a consumption pattern that is regular over a period of time
- Fairly low in value
- Require a long replenishment lead time (when a reorder procedure would require too high of a reorder level or a deterministic procedure would require too much safety stock)

Therefore, these planning procedures are used for planning both B- and C-parts and operating supplies. The type of order proposal which is automatically generated during materials planning depends on the procurement type of the material. For materials that are produced internally, a planned order is always created. For materials procured externally, the MRP controller has the choice between creating a planned order or a purchase requisition. If he decides to create a planned order, he must then convert it into a purchase requisition and make it available for the purchasing department.

SAP's material forecast is used to anticipate future demand independent of deterministic demand. Using information about past behavior ne assumes that the forecasted requirements will allow to maintain an economical inventory level for the future (not to much and not to little) for materials with long replenishment lead times and fairly regular consumption.

MAINTAINING FORECAST MASTER DATA

To set up an item (finished, good or raw material) for material forecasting the items material master record needs to be set up – particularly the MRP and forecasting screens. When setting the MRP type VV in the master record's MRP1 screen, a decision has been made to control the items planning by consumption driven methods.

Purchase	e order text	[™] MF	RP 1 💽 MF	RP 2 💽 MRP 3	J MRP 4	Fo
Material P	D34582		PREDST NW	34582		I
Plant U	P01		Barber Foods			
General data	/					
Base Unit of M	leasure	LB	pound, US	MRP group		
Purchasing gr	oup	002		ABC indicator		
Plant-sp.matl	status			Valid from		
MRP procedure	e / _	_				
MRP Type		w	Forecast-based	planning		
Reorder Point		Θ		Planning time fence	Θ	
Planning cycle	9			MRP controller	ING	
	,					
Lot size data						
Lot size		WB	Weekly lot size			
Minimum lot s	ize	2,000		Maximum lot size	20,000	
				Maximum stock level	0	
Assembly scra	ap (%)	0.00		Takt time	Θ	
Rounding prof	file			Rounding value	2,000	
Unit of measu	re grp					
L						

MRP1 tab in the material master record with MRP type 'VV'

Now that the material is driven by forecast driven planning we have to maintain initial settings so that the system is able to carry out a forecast. Those items are maintained in the forecast screen.

// 🍽 MR	P 4 👌 💽 Fo	recastin	g Work s	cheduling	Pla	nt data / stor. 1 🏼 🍟 Plant da	t]) €D
Material	PD34582		PREDST N	W34582			
Plant	UP01		Barber Foo	ds			
General data	1						
Base Unit of	f Measure	LB	Fore	cast model	Т	Period indicator	W
Last forecas	st	09/14/	2009			Fiscal Year Variant	
RefMatl: con	sumption					RefPlant.consumption	
Date to						Multiplier	
Number of p	eriods require	d /					
Hist. period:	S	52	Forecast perio	ods	26	Periods per season	52
Initialization	pds	13	Fixed periods				
		_					
Control data	/						
Initialization	/		Tracking limit		4.00	Reset automatically	
Model selec	tion	Α	Selection proc	edure	2	Param.optimization	
Optimization	n level	Μ	Weighting gro	up		Correction factors	
Alpha factor		0.22	Beta factor		0.90		
Gamma fac	tor		Delta factor		0.30		
Exec	cute forecast		Fore	cast values		Consumption va	als

Forecasting tab with forecast settings

In the **general data** section of the forecasting data one can see the date for the last forecast and maintain information about using a phase-out material to collect historical consumption. In the field

Forecast Model you can either determine that the system selects a model during initialization by way of smoothing historical values and performing some tests - or - set the model manually and therefore tell the system based on your own researching of past consumption values. The period indicator fixes the period buckets in which the system collects past consumption figures and calculates the forecast requirements.

Set the period indicator right the first time – because otherwise, in case of a change later, you loose your past consumption values and you will have to maintain those manually.

Number of periods required										
Hist. periods	52	Forecast periods	26	Periods per season	52					
Initialization pds	13	Fixed periods								

Looking at the tab **Numbers of Periods required** we can set the number of historical periods which the system uses for its calculations. When initialization takes place (either when forecasting for the first time or when the current model loses its validity) the system uses the number of periods in Initialization pds for initialization. If in the field Hist. periods there are more periods than in Initialization pds than an ex-post forecast is carried out using these excess values.



Ex-post forecast using excess historical values not used by initialization

The field Forecast Periods determines the number of periods for which forecast requirements are being calculated. In the field Fixed periods one can 'freeze' a number of periods so that its forecast values are no longer changed or re-calculated. Periods per season requires the number of periods for one season So if a product has a summer and a winter season the appropriate setting would be 6.

Fields in the tab Control data are better explained in the context of model selection, initialization and running the forecast.

THE FORECAST PROCEDURE

There are three distinct procedures when planning a VV driven material:

- 1. First time planning and forecasting
- 2. Planning and forecasting after a model is invalidated
- 3. Regular planning and forecasting on a periodic roll-over basis

In the case of first time planning and forecasting the system needs to determine a model, which can be selected manually by an analyst or determined automatically by the system carrying out some tests. Then initialization follows with a possible ex-post forecast to eventually run some parameter optimization and calculation of forecasted requirements

In the case of planning and forecasting after model invalidation the system first determines that the model is invalid (by use of tracking signal and comparison to the tracking limit), then performs tests and selects a new model and re-initializes (both of these things may be done automatically by the system, or manually set by a Controller). Parameter optimization and forecast calculation are then executed every following period.

During regular, periodic planning and forecasting, the system can be set that, besides calculating forecast values, it can perform parameter optimization and run thrug various test to confirm the validity of the model. It does so by performing a comparison between the tracking limit (set in the forecasting tab in the MMR) and a tracking signal (= forecast error / MAD). In the case where the model is invalidated an exception message is issued (visible either in MP33 Reprocess or in the forecast values screen)

After every forecast run – whether run individually or as a total – a results verification and evaluation of the forecast can be performed.

MODEL SELECTION

A model selection takes place either when a material is new and is to be forecasted for the first time or after an existing model is invalidated.

General data				_	
Base Unit of Measure	LB	Forecast mode	I T	Period indicator	W
Last forecast	09/14	/2009		Fiscal Year Variant	
RefMatl: consumption				RefPlant:consumption	
Date to				Multiplier	
Number of periods requi	red				
Hist. periods	52	Forecast periods	26	Periods per season	52
Initialization pds	13	Fixed periods			
Control data					
Initialization		Tracking limit	4.000	Reset automatically	
Model selection	Α	Selection procedure	2	Param.optimization	
Optimization level	M	Weighting group		Correction factors	
Alpha factor	0.22	Beta factor	0.90		
Gamma factor		Delta factor	0.30		

There is the option to select a model manually – to force a model by evaluating the past consumption. You set the field Forecast Model to the model you choose (anything but 'J').

There is also the option to have the system set the model automatically based on some tests and smoothing it performs. Set the Forecast Model to 'J'. When having the system perform the model selection automatically you will also have to decide and set the Model Selection Procedure. During **MSP '1'** the system carries out statistical tests and checks whether a trend or a seasonal requirements pattern applies. In the trend test, the system subjects the historical values to a regression analysis and checks to see whether there is a significant trend pattern. In the seasonal test, the system clears the historical values of any possible trends and carries out an autocorrelation test. During **MSP '2'** the system calculates the models to be tested using various combinations for alpha, beta and gamma. The smoothing factors are also varied between 0.2 to 0.8 in intervals of 0.2. The model which is then chosen is the model which displays the lowest mean absolute deviation (MAD). Procedure 2 is more precise than procedure 1 but takes considerably longer.

A third option is automatic model selection with additional system check. Set the Forecast Model to J' and pick a Model Selection (T trend examination, S for seasonal fluctuation or A to check for both).

CARRYING OUT MODEL INITIALIZATION

In model initialization the system calculates either the basic value for a constant model, the trend value for a trend model or seasonal indices for seasonal models. Initialization is only carried out during the first forecast for any given model – either in case of a new material or after an existing model is invalidated.

Model initialization can be carried out automatically by the system – if Param. Optization is checked - or manually. You set your choice in the field Initialization.



There must be a minimum number of historical values depending on the model, so that the system can initialize. For the constant model 1 past consumption period is needed; for trend we require 3 and for seasonal models 3 are required plus a season (which is defined by the number of historical values for one season. A seasonal trend model needs 3 plus 1 season, the 2nd order exp. Smoothing needs 3 and moving average and weighted moving average each need 1.

The system calculates the basic value on the basis of an average value, and the trend using the results of the regression analysis. The seasonal indices result from the quotient of the actual past value and the basic value which has been adjusted for the trend value.

RUNNING THE FORECAST

The forecast can be run as a total run using MP38, individually for any given material with MP30 or out of the MMR's forecast screen using the following buttons.



Buttons for executing forecast, examining the forecast result and evaluating past consumption values in the material master record.

🖙 Forecast Date	
Forecast date	
 × 	

Choose is the current week or next week for a run to calculate forecast values

Even though we chose to have the system calculate a forecast mdel automatically a screen is popping up where another choice may be made

Prorecast: Model Selection	×	🖻 Forecast: Trend Model Parameters 🛛 🖂
Periods Period intervals		Exponential smoothing
Forecast	From 41/2009 To 13/2010	,,
Historical data	From 51/2008 To 40/2009	First-order
○ No. of periods		Alpha factor 0.22
No. of forecast periods	26	Beta factor 0.90
No. of historical values	52	
Forecast execution		O Second-order
O Constant models	○ Seasonal models	Alpha factor 0.22
Trend models	○ Season. trend models	
O Aut. model selection	Historical	O Second-ordeer w/ constant alpha optimization
🕒 Forecasting 🔀		Difference Streng Stren

In case of a trend model chosen for the selection of a forecast model the system offers to change the smoothing factors alpha (to smooth basic value) and beta (to smooth the trend value

Forecast Model Selection Periods Period intervals Forecast Historical data No. of periods No. of forecast periods No. of historical values	From 41/2009 To 13/2010 From 51/2008 To 40/2009 26 52	PForecast: Seasonal Mode	I Parameters	
Forecast execution Constant models Trend models Aut. model selection	Seasonal models Season. trend models Historical	Winters procedure Alpha factor Gamma factor Periods per season	0.10 0.30 12	
🕒 Forecasting 🗙		🕀 Forecasting 🗙		

In case of a seasonal model being chosen, the system also offers the gamma factor (to smooth seasonal indeces) for changing

		🔄 Forecast: Parameters for Automatic Model Selection 🛛 🛛 🗌
		Exponential smoothing, first-order with test for
		C Trend Alpha factor 0.22 Beta factor 0.90
🗁 Forecast: Model Selection	×	○ Season
Periods		Alpha factor 0.22
Period intervals		Gamma factor 0.30
Forecast	From 41/2009 To 13/2010	Periods per season 52
Historical data	From 51/2008 To 40/2009	Trend and season
No. of periods No. of forecast periods No. of historical values	26 52	O Seasonal model and test for trend
		O Trend model and test fro season
Encount execution		Alpha factor 0.22
		Beta factor 0.90
Constant models	O Seasonal models	Gamma factor 0.30
O Trend models	 Season, trend models 	Periods per season 52
Aut. model selection	Historical	O Forecast model sel, using procedure 2
L		Periods per season 12
🕒 Forecasting 🗙		G Forecasting X

And it case we stay with the automatic model selection, the system offers to perform various tests

Now the forecast module performs all necessary calculations to arrive at forecasting values according to a selected model.

FORECAST EVALUATION AND REPROCESSING

The following screen shows the result f the forecast calculations A basic value was calculated which means that a constant model was selected.

However if one divides the error total by the MAD (to calculate the tracking signal) the result exceeds the tracking limit set in the forecasting tab. Therefore the model failed and the item is awaiting further optimization. What's happening is that the system determines the model; then calculates the tracking signal and compares it to the tracking limit.

🖻 Forecast: Res	ults							\boxtimes	
Basic value		19602.139	Trend v						
MAD		11151.304	Error tot	-51254.5	528		-		
Safety stock		7000.000	Reorde	r Point					
Forecast results									
Period	Orig. HV	Corr. HV	Ex-post FV	Orig. FV	Corr. FV	Season	FC		
W 41/2009				19483.787	19483.787	0.99			
W 42/2009				19584.402	19584.402	1.00			
W 43/2009				20100.987	20100.987	1.03			
W 44/2009				19451.284	19451.284	0.99			
W 45/2009				18955.849	18955.849	0.97			
W 46/2009				18566.084	18566.084	0.95			
W 47/2009				19963.339	19963.339	1.02			
Check the forecast error messages									
✓ № ×									

In our case the tracking limit was higher than 4.000 and therefore the Model was not selected (Model Selection stays blank) and the initialization was left at 'X' meaning that we can still perform

forecast calculations with different parameters until we arrive at a model that has a tracking signal which is lower than the tracing limit.

Next we will perform another forecast with Automatic model selection 'J' initialization 'X', model selection 'A' and selection procedure '2'

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Material PD34582	PREDST NW34582							
Plant UP01	Barber Foods							
General data								
Base Unit of Measure	.B Forecast model	J	Period indicator W					
Last forecast 1	0/05/2009		Fiscal Year Variant					
RefMatl: consumption			RefPlant.consumption					
Date to			Multiplier					
	7							
Number of periods required	/ 	00						
Hist periods	Porecast periods	20	Periods per season 12					
Initialization pds a	Fixed periods							
Control data								
Initialization	Tracking limit	4.000	 Reset automatically 					
Model selection	Selection procedure	2 🗗	Param.optimization					
Optimization level	Weighting group		Correction factors					
Alpha factor 6	.30 Beta factor	0.30						
Gamma factor 6	.10 Delta factor	0.30						
Execute forecast	Forecast value	;	Consumption vals					
					D MM02 🖭 sapqaa	appvs INS		

			🔄 Forecast: Parameters for Automatic Model Selection 🛛 🛛 🖂
			Exponential smoothing, first-order with test for
			○ Trend
			Alpha factor 0.30
			Beta factor 0.30
			○ Season
			Alpha factor 0.30
			Gamma factor 0.10
			Periods per season 12
🗁 Forecast: Model Selection			
Bariada			Trend and season
Period intervals			
Forecast	From 41/2009	To 13/2010	O Seasonal model and test for trend
Historical data	From 51/2008	To 40/2009	
No. of periods			O Trend model and test fro season
No. of forecast periods	26		Alpha factor 0.30
No. of historical values	52		Beta factor 0.30
			Gamma factor 0.10
Forecast execution			Periods per season 12
O Constant models	O Seasonal	models	
O Trend models	O Season. tr	end models	Forecast model sel. using procedure 2
• Aut. model selection	Historical		Periods per season 12
			(A) Exception
🐶 Forecasting 🗙			V Porecasung

Automatic model selection with test for trend and season

The result is a model selection (we're not sure yet which) with a tracking signal lower than the tracking limit.

🗁 Forecast: Res	ults								\boxtimes
Basicvalue		20509.324 Trend va			alue	- 494 .	-494.000		A
MAD		3165.003		Error to	tal	-5718.	-5718.610		Ě
Safety stock		7000.000	Reorder F		r Point				
Forecast results	,								
Period	Orig. HV	Corr. HV	Ex-p	ost FV	Orig. FV	Corr. FV	Season	FC	
W 41/2009					20223.318	20223.318			
W 42/2009					20741.321	20741.321			
W 43/2009					20892.939	20892.939			
W 44/2009					17663.500	17663.500			
W 45/2009					16471.527	16471.527			
W 46/2009					14399.012	14399.012			
W 47/2009					17303.553	17303.553			
Check the foreca	st error m	essages							
🖌 📊 🗶									

5718 / 3165 is lower than 4.000



Graphical representation of past consumption (yellow), ex-post forecast (red in past) and forecast (red in future) with corrected historical values (blue)

In the forecast tab we can now see that the model selected (X for trend/seasonal) - because the tracking signal was below the tracking limit. Initialization and selection procedure were reset and set to blank

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Change Material PD34582 (Raw material)								
→ Additional data 🔠 Organizational levels 🔂 Check screen data 🚇								
📝 💽 MRP 4	Forecasti	ng Work scheduling	Plar	nt data / stor. 1 🍟 Plant	dat (101		
Material PD34582		PREDST NW34582		[1			
Plant UP01		Barber Foods			_			
						_		
Base Unit of Measure	LB	Forecast model	x	Period indicator	W			
Last forecast	10/05	/2009		Fiscal Year Variant				
RefMatl: consumption				RefPlantconsumption				
Date to				Multiplier				
						_		
Number of periods requi	52	Forecast periods	26	Poriode por coacon	12			
Initialization pds	8	Fixed periods	20	r enous per season	12			
	_		-					
Control data						ר ו		
Initialization		Tracking limit	4.000	Reset automatica	ally			
Model selection		Selection procedure		Param.optimizati	on			
Optimization level	M 20	Weighting group	0.20	Correction factors	3			
Gamma factor	0.30	Delta factor	0.30					
Gamma lactor								
Execute forecas	t	Forecast values	;	🖆 Consumptio	n vals			

Now the forecast model is valid and the next time you attempt to run the forecast the system comes up the appropriate message:

Z Material Edit Goto Environment System Help	
🖉 🛛 🖉 🖉 🖉 🖄 🖓 😓 🖓 😓 🖓 🔛 🖉 🖉	
Change Material PD34582 (Raw material)	
🔿 Additional data 🔮 Organizational levels 🚰 Check screen data 🕚	
MRP 4 🖉 Forecasting Work scheduling Plant data / stor. 1 Plant dat	
Material PD34582 PREDST NW34582	
Plant UP01 Barber Foods	
General data	
Base Unit of Measure LB Forecast model X Period indicator W	
Last forecast 10/12/2009 Fiscal Year Variant	
Remati: consumption Remains Remain Remains Rem	
Date to Multiplier	
Number of periods required	
Hist periods 52 Forecast periods 26 Periods per season 12	
Initialization pds 8 Fixed periods	
Initialization Tracking limit 4,000	
Model selection Selection procedure	
Optimization level M Weighting group Correction factors	
Alpha factor 0.30 Beta factor 0.30	
Gamma factor 0.10 Delta factor 0.30	
Execute forecast Forecast values	
The forecast has already been carried out for this period	MM02 🖭 sapqaappvs INS

Only after a future forecast calculation results in a tracking signal higher than the tracking limit will the system replace the Forecast model 'X' with blank and reset the Initialization 'X' and selection procedure This is due to the setting **Reset Automatically**.

Now we can see all forecasted requirements in the stock / requirements list and the next MRP run will generate the appropriate order proposals.

	lelp	SAP						
🕑 🔲 🛯 🔛 🚱 🚱								
Stock/Requirements List as of 21:32 Hrs								
show Overview Tree 2 🛐 🐨 🖓 🕅 🗰 Multi MRP 🕒 Single-item, single-level planning 🔗 Planning file entry 📑 PReg. SOP INVCO								
Material PD34582 Ø PREDST NW34582								
Plant UP01 MRP type VV Mat	erialtyne ROH Linit I.B.							
EDate MRP AMRP element data	Sto Rec./reqd.qty Available qty Rescheduli							
10/09/2009 OrdRes 🕄 UBRTSB853S	[NBD 1-							
10/12/2009 ForReg 🕄 W 42/2009	20,195.100- 14,684.900							
10/19/2009 ForReg 🕄 W 43/2009	20,294.638- 5,609.738-							
10/26/2009 ForReg 🕄 W 44/2009	16,954.993- 22,564.731-							
11/02/2009 ForReg 🕄 W 45/2009	15,692.996- 38,257.727-							
11/09/2009 ForReg 🕄 W 46/2009	13,647.048- 51,904.775-							
11/16/2009 ForReg 🕄 W 47/2009	16,200.835- 68,105.610-							
11/23/2009 ForReg 🕄 W 48/2009	15,438.121- 83,543.731-							
11/30/2009 ForReg 🕄 W 49/2009	14,687.453- 98,231.184-							
12/07/2009 ForReg 🕄 W 50/2009	13,948.831- 112,180.015-							
12/14/2009 ForReg 🕄 W 51/2009	14,857.998- 127,038.013-							
12/21/2009 ForReg 🕄 W 52/2009	13,550.036- 140,588.049-							
12/28/2009 ForReg 🕄 W 53/2009	12,497.042- 153,085.091-							
01/04/2010 ForReg 🕄 W 01/2010	12,533.717- 165,618.808-							
01/11/2010 ForReg 🕄 W 02/2010	12,344.146- 177,962.954-							
01/18/2010 ForReg 🕄 W 03/2010	10,088.659- 188,051.613-							
01/25/2010 ForReg 🕄 W 04/2010	9,115.771- 197,167.384-							
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Stock requirements list with forecasted requirements before MRP netting

When running total forecasting (periodic run of the forecast for al materials), it is advisable to check the forecast result and to possibly rerun aterials with exceptional messages This can be done with transaction **MP33**



Transaction MP33 – Forecast Reprocessing

We want to look at al materials with exceptional messages in all message groups:

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Forecast Rep	processir	ıg			
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Material	MRP area	Plant Periods IND.	Error classes 1 2 3 4 5 6 7 8	Material descr.	
BA0052 BR0693.1 BRT0126.1 CSSPFRLGCN MSSTRICE PD34582 PD34582 SPCHBSRS2 SPCHBSRS2 SPGRPW SPSDPH TB40/48 TB40/48 TB40/48 TB40/48 TB7/100SP TB57LIJUMB0 WINGCT		UP01 k UP01 k	x x	BATR HEALTHY - KERRY G4254 BREAD KERRY G4729 HF BREAD KERRY G4729 HF DREAD W POTATO TOTE NEW WED A54277 PLTRY CAN CUTLET (LARGE) B S FOR PORTNG FLAV RICE STARCH A&B - REHYLINE AX-DR PREDST NOTE NEW WED B30278 FLAV NATURAL CHICKEN BASE RED SALT 1002 FLAV GALIC POWDER FLAV SODIUM PHOSPHATES PLTRY TENDER 40-48 PCS PLTRY SPLIT TENDER 40-48 PCS PLTRY SPLIT TENDER 40-48 PCS PLTRY SPLIT TENDER 50-60 PCS 38-45 GM PLTRY WNG 2PC CUT	
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Overview to al materials needing reprocessing



Analyzing exceptional messages for a given materials

PARAMETER OPTIMIZATION

If you set parameter optimization, the system will overwrite the originally set smoothing factors with those which have been newly calculated by the optimization process.

The following factors are used by the system, depending on the model, for exponential smoothing. Thus, for example, only the alpha and the delta factors are required for the constant model whereas all of the smoothing factors are required for the seasonal trend model.

Alpha factor

The system uses the alpha factor for smoothing the basic value. If you do not specify an alpha factor, the system will automatically use the alpha factor 0.2.

Beta factor

The system uses the beta factor for smoothing the trend value. If you do not specify a beta factor, the system will autimatically use the beta factor 0.1.

Gamma factor

The system uses the gamma factor for smoothing the seasonal index. If you do not specify a gamma factor, the system will automatically use the gamma factor 0.3.

Delta factor

The system uses the delta factor for smoothing the mean absolute deviation and the error total. If you do not specify a delta factor, the system will automatically use the delta factor 0.3.

EVALUATING FORECAST ACCURACY

The system provides some means of monitoring the accuracy of the forecast by means of exception messages (not to confuse with the exception monitor MD07 but rather MP33) and tracking signal and tracking imit.

EXCEPTION MESSAGES

Exception messages provide information about what the system did during the forecast calculation.

🔄 Forecast: Procedural and Error Messages 🛛 🛛 🖂
Forecast message Model choice process 2 accessed Parameter optimization accessed
Initialization started
Ex-post forecast carried out
Lime series characteristic changed

Exception messages may be accessed through MP33 or individually for every material from te forecast tab when looking at the forecast result.

TRACKING SIGNAL

A good indication of whether a selected model still has validity is the tracking signal's value. The tracking signal is calculated by dividing the total error by the MAD. The total error is the sum of all absolute deviations of the forecast value from the actual value and the MAD represents a median deviation of the forecast values from the actual values using exponential smoothing.

The ex-post forecast is an excellent basis for the calculation of these deviations.

Therefore the bigger the total error, the bigger is the resulting tracking signal which means that there are big deviations (spikes) in the consumption pattern. Those spikes invalidate the model if they exceed a certain limit That limit can be set in the forecasting tab – the tracking limit (4.000 as a recommendation)

After every forecast the system compares tracking signal with tracking limit and either confirms the model (in setting the indicator in the field 'Model Selection' and resetting Initialization) or it does not confirm the model and allows for a rerun and renewed model initialization until a valid model is found.

Following the formulas to calculate mode validity

ERROR TOTAL

(12) ET =
$$\sum_{t=1}^{n} \left[V(t) - P(t) \right]$$

MEAN ABSOLUTE DEVIATION FOR INITIALIZATION

(13) MAD =
$$\begin{array}{c} 1 & \sum_{n=1}^{n} |P(t) - V(t)| \\ n & t-1 \end{array}$$

n = Number of periods for initialization

MEAN ABSOLUTE DEVIATION FOR THE EX-POST FORECAST

(14) MAD(t) = (1.5) * MAD(t-1) +
$$\delta^*$$
 V(t) - P(t)

TRACKING SIGNAL

(15) TS =
$$\left| \frac{ET}{MAD} \right|$$

THEIL COEFFICIENT FOR THE EX-POST FORECAST

(16)
$$U = \sqrt{\frac{\sum_{t=1}^{T} (P(t) - V(t))^{2}}{\sum_{t=1}^{T} (V(t) - V(t-1))^{2}}}$$

After a model change or a forecast model initialization, the error total is automatically reset to zero and the MAD to its initial value.