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SAS[®] Forecasting 4.1 for SAP APO Reference Guide



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SAS[®] Forecasting 4.1 for SAP APO: Reference Guide

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Contents

Chapter 1 Introduction to the SAS Forecasting for SAP APO 1

Architecture Solution Topology 2

Conceptual Persona 3

Data Flow 4

Chapter 2 Components of the SAS Forecasting for SAP APO 5

SAP Menu for SAS Forecasting on SAP APO 5

SAP Proxy Object & Logical Port on SAP APO 6

SAS Forecasting Web Service on HPF Server 6

Technical Objects created on SAP SCM System 6

SAS Pull-down Menu 8

SAP Business Add-in Implementation 9

SAP Proxy 9

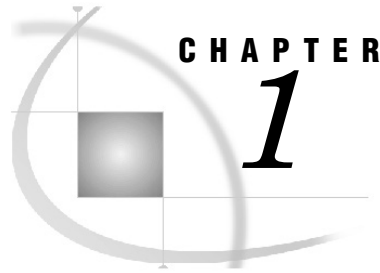
SAP Function Modules 10

Transparent tables 12

Technical Objects created on SAS Server 23

SAS Stored Process and Web Service 23

SAS Macro Catalog 24



Introduction to the SAS Forecasting for SAP APO

<i>Architecture Solution Topology</i>	2
<i>Conceptual Persona</i>	3
<i>Data Flow</i>	4

The SAS Forecasting for SAP APO offers a solution that leverages the best from SAP and SAS: Deep experience in analytics from SAS and from SAP, the integrated applications and work flow that support business processes. The best of both SAP and SAS are joined together through our technology utilizing SOA methods and interfaces that have been certified by SAP.

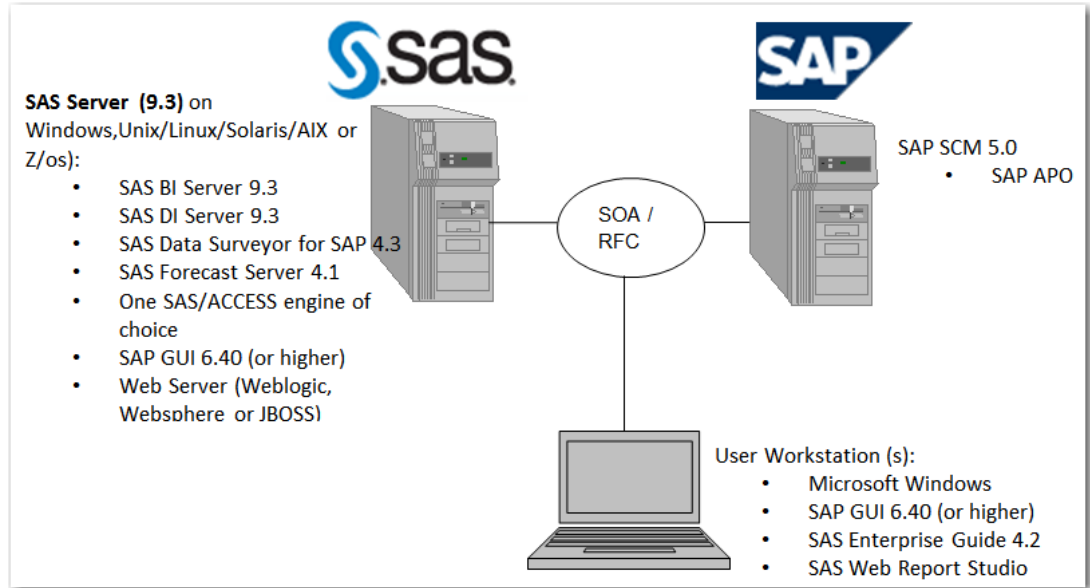
The SAS Forecasting for SAP APO seamlessly integrates with SAP-APO-DP providing businesses with a balance of forecasting functionality and integration with their planning components. SAS Forecasting for SAP APO reads the history data from SAP LiveCache and writes the SAS Forecast back to SAP so that the results are displayed on the SAP APO Interactive Demand Planning transaction.

The SAS Forecasting for SAP APO performs three primary functions:

- 1 Forecast Options:** Allows a user to create or modify a forecasting profile with parameters that are utilized by SAS High Performance Forecasting (HPF) when generating the statistical forecast.
- 2 Run Forecast:** Allows users to initiate creation of a statistical forecast using SAS. SAS Forecasting Web Service is triggered to initiate the Forecasting. History values are read from SAP APO using BAPI and the forecast results generated on the SAS Server are written back to SAP APO Live Cache so that the results are visible by the user in the appropriate SAP Planning Book.
- 3 Reports:** Allows users to view reports generated during the creation of the statistical forecast (HTML format) or allows users to view or create custom reports using SAS Web Report Studio.

Architecture Solution Topology

The Solution Topology of SAS Forecasting for SAP APO is as given below.

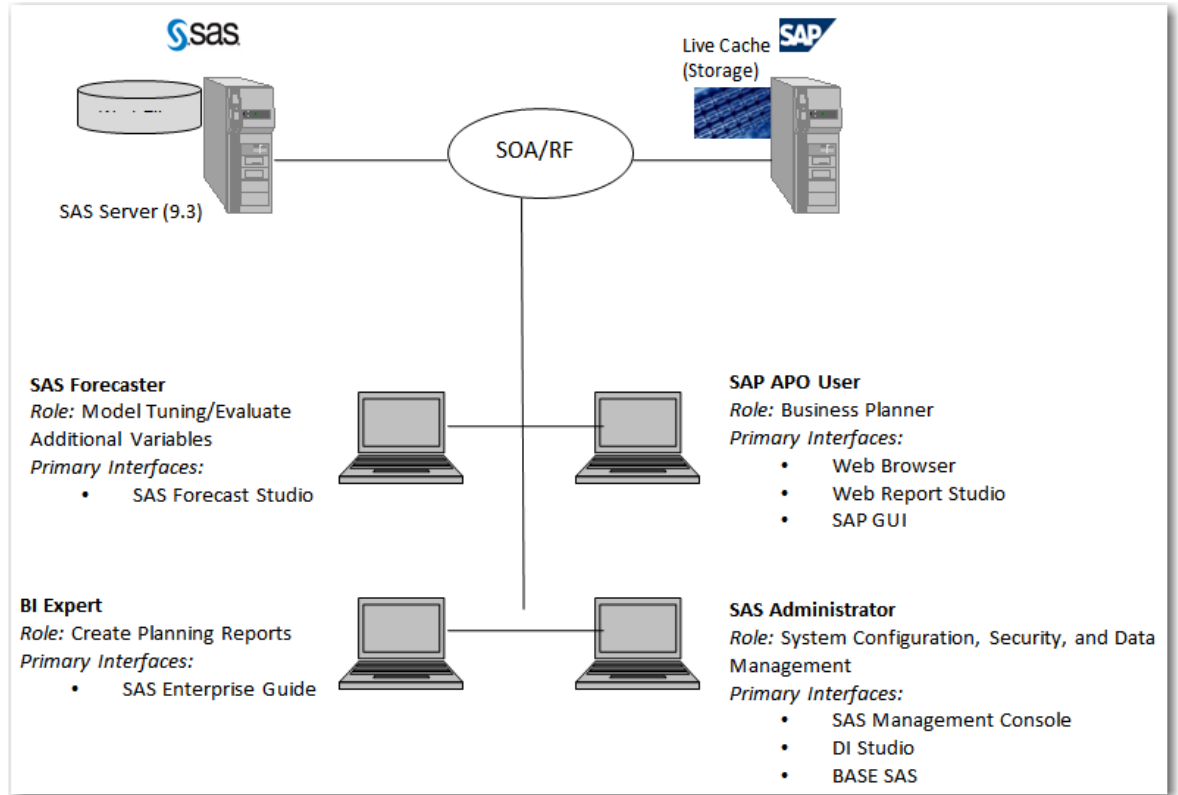


SAS Connects to SAP using both the methods SOA (Service Oriented Architecture) and RFC (Remote Function Call).

- ❑ Web Services: Initiates call to SAS from SAS Forecasting Add-in Menu
- ❑ Remote Function Calls (RFC): For reading data from SAP liveCache and writing forecast results into SAP liveCache

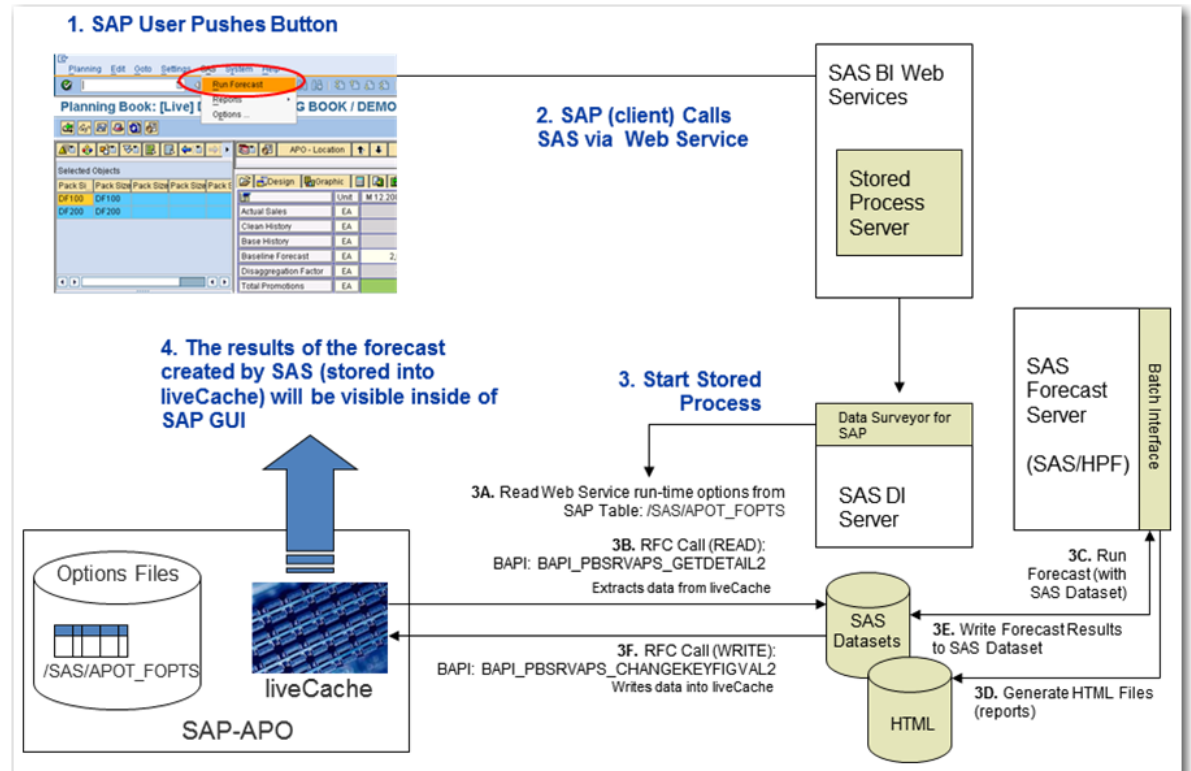
Conceptual Persona

The following personas are the users of the SAS Forecasting for SAP APO

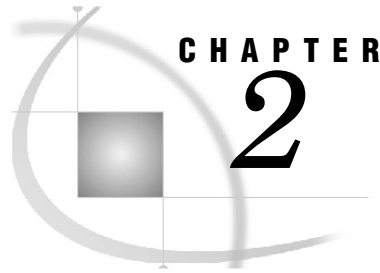


Data Flow

Data Flow from SAP APO to SAS Forecasting happens as shown below.



- 1 SAP APO User triggers the SAS Forecasting via SAS Web Service from the Add-in menu option, "Run Forecast"
- 2 SAS Web Service is implemented as a Stored Process on the SAS Server.
- 3 Stored Process executes the SAS Forecasting.
 - a Reads the SAS Forecasting options from the SAP Table /SAS/APOT_FOPTS
 - b RFC call is made to execute the BAPI, BAPI_PBSRVAPS_GETDETAIL2 which extracts the historical time series data
 - c The above extracted data is given as an input dataset to the SAS High Performance Forecasting (HPF) Server
 - d SAS HPF Server will generate the HTML files based upon the Statistical forecast generated.
 - e Forecasted results are written to the SAS Datasets
 - f RFC call is made to execute the BAPI, BAPI_PBSRVAPS_CHANGEKEYFIGVAL2 which writes back the statistical forecast into the SAP APO Live Cache.



Components of the SAS Forecasting for SAP APO

<i>SAP Menu for SAS Forecasting on SAP APO</i>	5
<i>SAP Proxy Object & Logical Port on SAP APO</i>	6
<i>SAS Forecasting Web Service on HPF Server</i>	6
<i>Technical Objects created on SAP SCM System</i>	6
<i>SAS Pull-down Menu</i>	8
<i>SAP Business Add-in Implementation</i>	9
<i>SAP Proxy</i>	9
<i>SAP Function Modules</i>	10
<i>Transparent tables</i>	12
<i>Technical Objects created on SAS Server</i>	23
<i>SAS Stored Process and Web Service</i>	23
<i>SAS Macro Catalog</i>	24

The components of SAS Forecasting for SAP APO are:

- SAP Menu for SAS Forecasting on SAP APO (under Demand Planning transaction)
- SAP Proxy Object & Logical Port on SAP APO
- SAS Forecasting Web Service on HPF Server

The SAS Forecasting Add-in triggers the HPF forecasting via the SAS Web service.

Note: The above components are part of SAS Forecasting for SAP APO and apart from this product; the following products are required as part of Solution bundle to run SAS Forecasting from SAP APO.

- SAS BI Server 9.3
- SAS Data Integration Server 9.3
- SAS Forecast Server 4.1
- SAS Data Surveyor for SAP 4.3
- One SAS/ACCESS engine of choice
- SAS Enterprise Guide (unlimited users within scope limitation)

SAP Menu for SAS Forecasting on SAP APO

The SAP Menu is the user interface is to trigger the SAS Forecasting Web Service from the Pull down menu under APO Interactive Demand Planning Transaction. This component is coded in SAP Standard Business Add-in (BAdI). This BAdI is used to manage the SAS Forecasting profile. This menu also initiates the Reports generated by HPF Server and SAS Web Report Studio.

SAP Proxy Object & Logical Port on SAP APO

The SAP Proxy Object is used to consume the Web Service deployed on SAS HPF Server. This Proxy object is being called in the BAdI. Logical Port is defined for the Proxy class which communicates with the SAS HPF Server on which the Web Service has been deployed.

SAS Forecasting Web Service on HPF Server

The SAS Forecasting Web Service extracts the Historical data using SAP Standard BAPI based on the parameters defined in the SAS Forecasting Profile in SAP APO. The Web Service transforms the SAP Historical data into time series format and writes back the forecasted results into SAP LiveCache.

Technical Objects created on SAP SCM System

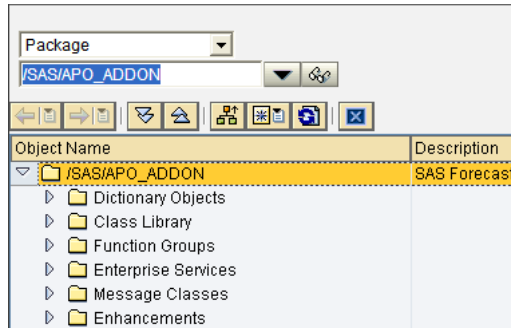
Please find the list of technical objects created on SAP SCM System as part of SAS Forecasting for SAP APO Installation.

S.No	Technical Object Type	Technical Object Name	Technical Object Description
1	Domain	/SAS/APODOM_FCST_DATE_INT	SAS Forecasting Add-on for SAP - Forecasting Date Interval
2	Domain	/SAS/APODOM_FCST_DATE_INT_TX	SAS Forecasting Add-on for SAP - Date Interval Description
3	Domain	/SAS/APODOM_FCST_OPTIONS	SAS Forecasting Add-on for SAP - Forecasting Options
4	Domain	/SAS/APODOM_FCST_OPTIONS_TX	SAS Forecasting Add-on for SAP - Forecasting Options Text
5	Domain	/SAS/APODOM_FCST_PERIODS	SAS Forecasting Periods
6	Domain	/SAS/APODOM_FCST_REPOS	SAS Forecasting Add-on for SAP - Forecast Repository
7	Domain	/SAS/APODOM_FCST_SAS_MACRO	SAS Forecasting Add-on for SAP - Forecast Macro Name
8	Domain	/SAS/APODOM_HPF_CRITERION	SAS Forecasting Add-on for SAP - HPF Criterion
9	Domain	/SAS/APODOM_HPF_CRITERION_TX	SAS Forecasting Add-on for SAP - HPF Criterion Description
10	Domain	/SAS/APODOM_HPFDIAG_PRNT	SAS Forecasting Add-on for SAP - HPF Diagnose Print Options
11	Domain	/SAS/APODOM_HPFDIAG_PRNT_TX	SAS Forecasting Add-on for SAP - HPF Diag Print Options Text
12	Domain	/SAS/APODOM_HPFENG_PLOT_OPT	SAS Forecasting Add-on for SAP - HPF Engine Plot Options
13	Domain	/SAS/APODOM_HPFENG_PLOT_OPT_TX	SAS Forecasting Add-on for SAP - HPF Engine Plot OptionsText
14	Domain	/SAS/APODOM_HPFENG_PRNT_OPT	SAS Forecasting Add-on for SAP - HPF Engine Print Option
15	Domain	/SAS/APODOM_HPFENG_PRNT_OPT_TX	SAS Forecasting Add-on for SAP - HPF Engine Prnt OptionsText
16	Domain	/SAS/APODOM_SASURL	SAS Forecasting Add-on for SAP - SAS BI Webservices URL
17	Data Element	/SAS/APODE_FCST_DATE_INT	SAS Forecasting Add-on for SAP - Forecasting Date Interval

S.No	Technical Object Type	Technical Object Name	Technical Object Description
18	Data Element	/SAS/APODE_FCST_DATE_INT_TX	SAS Forecasting Add-on for SAP - Date Interval Description
19	Data Element	/SAS/APODE_FCST_OPTIONS	SAS Forecasting Add-on for SAP - Forecasting Options
20	Data Element	/SAS/APODE_FCST_OPTIONS_TX	SAS Forecasting Add-on for SAP - Forecasting Options Text
21	Data Element	/SAS/APODE_FCST_PERIODS	SAS Forecasting Periods
22	Data Element	/SAS/APODE_FCST_REPOS	SAS Forecasting Add-on for SAP - Forecast Repository
23	Data Element	/SAS/APODE_FCST_SAS_MACRO	SAS Forecasting Add-on for SAP - Forecast Macro Name
24	Data Element	/SAS/APODE_HPF_CRITERION	SAS Forecasting Add-on for SAP - HPF Criterion
25	Data Element	/SAS/APODE_HPF_CRITERION_TX	SAS Forecasting Add-on for SAP - HPF Criterion Descripti
26	Data Element	/SAS/APODE_HPFDIAG_PRNT	SAS Forecasting Add-on for SAP - HPF Diagnose Print Options
27	Data Element	/SAS/APODE_HPFDIAG_PRNT_TX	SAS Forecasting Add-on for SAP - HPF Diag Print Options Text
28	Data Element	/SAS/APODE_HPFENG_PLOT_OPT	SAS Forecasting Add-on for SAP - HPF Engine Plot Options
29	Data Element	/SAS/APODE_HPFENG_PLOT_OPT_TX	SAS Forecasting Add-on for SAP - HPF Engine Plot Options Text
30	Data Element	/SAS/APODE_HPFENG_PRNT_OPT	SAS Forecasting Add-on for SAP - HPF Engine Print Option
31	Data Element	/SAS/APODE_HPFENG_PRNT_OPT_TX	SAS Forecasting Add-on for SAP - HPF Engine Prnt Options Text
32	Data Element	/SAS/APODE_SASURL	SAS Forecasting Add-on for SAP - SAS BI Webservices URL
33	Search Help	/SAS/APOSH_DATAVIEW	SAS Add-on for SAP APO - Search Help for Data View
34	Search Help	/SAS/APOSH_DATEINTERVAL	SAS Add-on for SAP APO - Search Help for Date Interval
35	Search Help	/SAS/APOSH_FCST_OPTIONS	SAS Add-on for SAP APO - Search Help for Forecasting Opts
36	Search Help	/SAS/APOSH_FCST_PROFILE	SAS Add-on for SAP APO - Search Help for Forecasting Profile
37	Search Help	/SAS/APOSH_FCSTLEVEL	SAS Add-on for SAP APO - Search Help for Forecasting Level
38	Search Help	/SAS/APOSH_HISTCHAR	SAS Add-on for SAP APO - Search Help for History Characteris
39	Search Help	/SAS/APOSH_HPFCRITERION	SAS Add-on for SAP APO - Search Help for HPF Criterion
40	Search Help	/SAS/APOSH_HPFDIAGPRINT	SAS Add-on for SAP APO - Search Help for HPF Diag Print Opts
41	Search Help	/SAS/APOSH_PLANNINGBOOK	SAS Add-on for SAP APO - Search Help for Planning Book
42	Search Help	/SAS/APOSH_PLOT_OPTIONS	SAS Add-on for SAP APO - Search Help for Plot Options
43	Search Help	/SAS/APOSH_PRNT_OPTIONS	SAS Add-on for SAP APO - Search Help for HPF Eng Print Opts
44	Search Help	/SAS/APOSH_SEL_PROFILE	SAS Add-on for SAP APO - Search Help for Selection Profile
45	Transparent Table	/SAS/APOT_CRITER	SAS Forecasting Add-on for SAP - Forecasting Criterion
46	Transparent Table	/SAS/APOT_FCHECK	SAS Forecasting Add-on for SAP - Forecasting Options check
47	Transparent Table	/SAS/APOT_FDATE	SAS Forecasting Add-on for SAP - Forecasting Date Interval
48	Transparent Table	/SAS/APOT_FOPTS	SAS Forecasting Add-on for SAP - Forecasting Profile Options

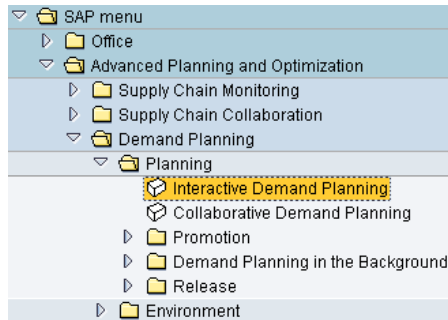
S.No	Technical Object Type	Technical Object Name	Technical Object Description
49	Transparent Table	/SAS/APOT_FPLOT	SAS Forecasting Add-on for SAP - Forecasting Engine Plot Ops
50	Transparent Table	/SAS/APOT_FPRINT	SAS Forecasting Add-on for SAP - Forecasting Engine Prnt Ops
51	Transparent Table	/SAS/APOT_HPFDP	SAS Forecasting Add-on for SAP - Forecasting Diag Prnt Ops
52	Package	/SAS/APO_ADDON	SAS Forecasting Add-on for SAP
53	Class Interface	/SAS/CL_IM_APO_ADDON_BADI	Imp. class for BAdI imp. /SAS/APO_ADDON_BADI
54	Proxy Name	/SAS/CO_APOFORECASTV1PORT_TYPE	apoforecastv1PortType
55	Message Class	/SAS/APO_ADDON	Message Class for SAS Add-on
56	BAdI Implementation	/SAS/APO_ADDON_BADI	BAdI Implementation for SAS Add-on for APO
57	Function Module	/SAS/APOFM_CALL_OPTIONS_SCREEN	SAS Add-on for APO - Forecasting Options Screen
58	Function Module	/SAS/APOSHE_HPFRCRITERION	Search Help Exit for SAS Forecast Criterion

Please find all the components created for SAS Forecasting Add-in on SAP SCM system using the Object Navigator Transaction (Tcode: SE80) as shown below. All the technical objects are created under the package “/SAS/APO_ADDON”

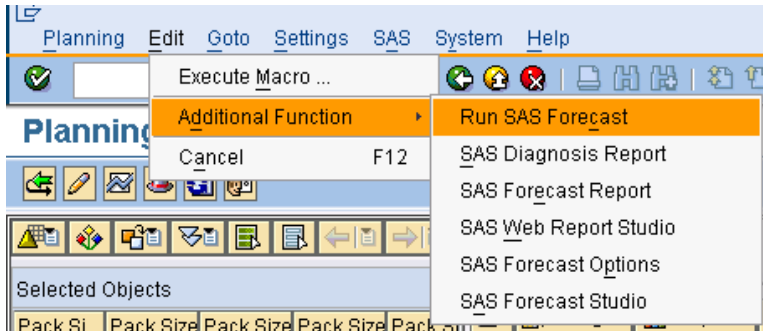


SAS Pull-down Menu

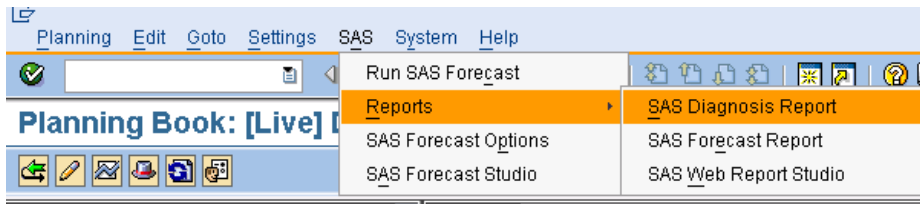
SAS Forecasting Add-in for SAP provides you a pull down for initiating the SAS Forecasting. This menu is available under the SAP APO Interactive Demand Planning Transaction.



As SAS Forecasting Add-in for SAP is using a User Exit, by default the SAS menu items appears as part of the menu “Additional Function” under the main menu “Edit”.



The SAS pull down menu also can appear after the “Settings” menu in the Interactive Demand Planning Transaction if the additional SAP transport is installed.



The above menu has been implemented in SAP SCM system as part of the classic BAdI “/SAPAPO/SDP_INTERACT”. SAP Menu Enhancement is possible within this BAdI.

SAP Business Add-in Implementation

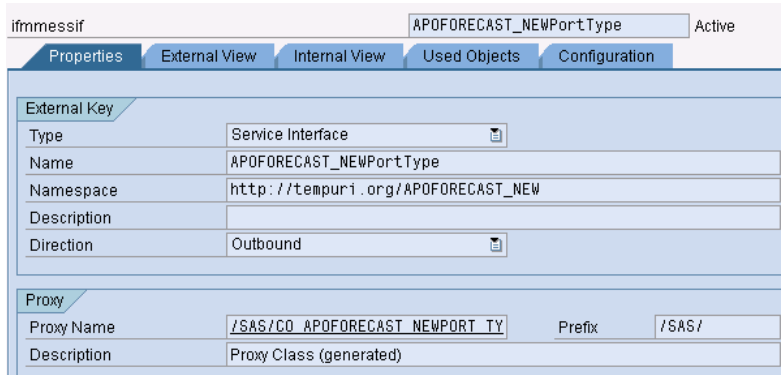
Classic BAdI “/SAPAPO/SDP_INTERACT” has been implemented so as to add the pull down menu to the Interactive Demand Planning screen.

Definition name	/SAPAPO/SDP_INTERACT																									
Definition short text	SDP: Interactive Planning																									
<div style="display: flex; justify-content: space-around; border-bottom: 1px solid black;"> Attributes Interface F-Codes Subscreens </div>																										
<table border="1"> <thead> <tr> <th>Program</th> <th>Function code</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>/SAPAPO/SAPMMSDP</td> <td>+CUS01</td> <td>Customer/Partner F Code 01</td> </tr> <tr> <td>/SAPAPO/SAPMMSDP</td> <td>+CUS02</td> <td>Customer/Partner F Code 02</td> </tr> <tr> <td>/SAPAPO/SAPMMSDP</td> <td>+CUS03</td> <td>Customer/Partner F Code 03</td> </tr> <tr> <td>/SAPAPO/SAPMMSDP</td> <td>+CUS04</td> <td>Customer/Partner F Code 04</td> </tr> <tr> <td>/SAPAPO/SAPMMSDP</td> <td>+CUS05</td> <td>Customer/Partner F Code 05</td> </tr> <tr> <td>/SAPAPO/SAPMMSDP</td> <td>+CUS06</td> <td>Customer/Partner F Code 06</td> </tr> <tr> <td>/SAPAPO/SAPMMSDP</td> <td>+CUS07</td> <td>Customer/Partner F Code 07</td> </tr> </tbody> </table>			Program	Function code	Description	/SAPAPO/SAPMMSDP	+CUS01	Customer/Partner F Code 01	/SAPAPO/SAPMMSDP	+CUS02	Customer/Partner F Code 02	/SAPAPO/SAPMMSDP	+CUS03	Customer/Partner F Code 03	/SAPAPO/SAPMMSDP	+CUS04	Customer/Partner F Code 04	/SAPAPO/SAPMMSDP	+CUS05	Customer/Partner F Code 05	/SAPAPO/SAPMMSDP	+CUS06	Customer/Partner F Code 06	/SAPAPO/SAPMMSDP	+CUS07	Customer/Partner F Code 07
Program	Function code	Description																								
/SAPAPO/SAPMMSDP	+CUS01	Customer/Partner F Code 01																								
/SAPAPO/SAPMMSDP	+CUS02	Customer/Partner F Code 02																								
/SAPAPO/SAPMMSDP	+CUS03	Customer/Partner F Code 03																								
/SAPAPO/SAPMMSDP	+CUS04	Customer/Partner F Code 04																								
/SAPAPO/SAPMMSDP	+CUS05	Customer/Partner F Code 05																								
/SAPAPO/SAPMMSDP	+CUS06	Customer/Partner F Code 06																								
/SAPAPO/SAPMMSDP	+CUS07	Customer/Partner F Code 07																								

Method “USER_FCODES_CALCULATIONS” is used to program the Menu functionality and to trigger the SAS Forecasting Webservice.

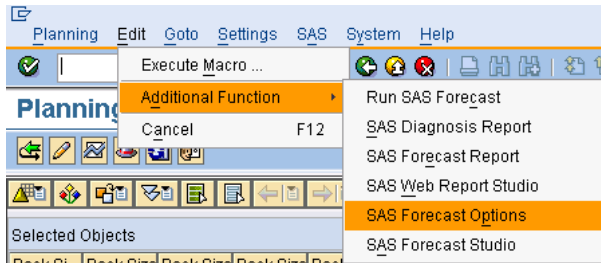
SAP Proxy

As part of this solution, a client proxy “/SAS/CO_APOFORECAST_NEWPORT_TY” is implemented in the SAP SCM system. This client proxy is being triggered in the SAS pull down menu and this proxy initiates the SAS Forecasting Web Service.



SAP Function Modules

SAS Forecasting Profile management functionality is implemented under the “Options” in the SAS Pull down menu. Function Module “/SAS/APOFM_CALL_OPS_TAB_SCREEN” is used to manage the Forecasting profile functionality



Planning Book: [Live] DEMO PLANNING BOOK / DEMO

Forecasting Profile: RTEST1

Active DMO BOOK-FORECASTING AT BRAND LEVEL

Forecasting Parameters:

History Start Date: 01.12.2005

History End Date: 30.11.2008

Forecast Horizon: 12

History Key Figure: DMO_BHIST

Forecasting Key Figure: DMO_BFCT Add Forecasting Level

Characteristic(Forecasting Level 1): DMO_BRAND

Characteristic(Forecasting Level 2): DMO_PKSZE

Create Forecasting Project:

Adv Forecasting Parameters | SAP APO Parameters | SAS Server Parameters

Forecasting Date Interval: MONTH

Criterion: MAPE

UCM (Yes or No): NO

ARIMAX: YES

Intermittency Sensitivity: 2

Run Diagnosis (Yes or No): YES

If No enter Repository: DEFAULTREP

HPFDIAG Print Options: SHORT

HPFENGINE Print Options: SUMMARY SELECT PERFOI

HPFENGINE Plot Options: FORECASTS

Override Options using SAS Code: NO

If yes, Enter SAS Macro Name: CUSTOM_FORECAST_CODE

Additional Key Figures: DMO_PROMO

Add Key Figures as Stochastic Vars: YES

New Copy Change/Display Save Activate Cancel Delete

Transparent tables

During the implementation of SAS Forecasting for SAP APO, the only components which might require some changes to suit the customer requirement are the transparent tables.

Please find the details of the transparent tables and their usage.

- 1 **/SAS/APOT_CRITER:** This table contains the Forecasting Criterion used by SAS Forecasting Engine. This table provides the search help for the field “Criterion” in the Options Screen.

The screenshot shows the SAP Forecasting configuration interface. The top window displays the 'Forecasting Profile' for 'RTEST1' with parameters like 'History Start Date' (01.12.2005) and 'Forecast Horizon' (12). Below this, the 'Adv Forecasting Parameters' tab is active, showing 'Forecasting Date Interval' as 'MONTH' and 'Criterion' as 'MAPE'. The 'Intermittency Sensitivity' is set to '2'. A second window, titled 'SAS Forecasting Add-on for SAP - HPF Criterion (1) 46 Entries found', displays a search help table for the 'HPF Criterion' field.

HPF Criter	SAS HPF Criterion Description
AADJRSQ	Amemiya's Adjusted R-square
ADJRSQ	Adjusted R-square
AIC	Akaike Information Criterion
AICC	Akaike Information Corrected Criterion
APC	Amemiya's Prediction Criterion
GMAPE	Geometric Mean Percent Error
GMAPES	Geometric Mean Absolute Error Percent of Standard Deviation
GMAPPE	Geometric Mean Predictive Percent Error
GMASPE	Geometric Mean Symmetric Percent Error
GMRAE	Geometric Mean Relative Absolute Error
MAE	Mean Absolute Error
MAPE	Mean Absolute Percent Error
MAPES	Mean Absolute Error Percent of Standard Deviation
MAPPE	Symmetric Mean Absolute Predictive Percent Error
MASE	Mean Absolute Scaled Error
MAXERR	Maximum Error
MAXPE	Maximum Percent Error
MAXPPE	Maximum Predictive Percent Error
MAXRE	Maximum Relative Error
MAXSPE	Maximum Symmetric Percent Error
MDAPE	Median Percent Error
MDAPES	Median Absolute Error Percent of Standard Deviation
MDAPPE	Median Predictive Percent Error
MDAPE	Median Symmetric Percent Error

This table has the following columns and the records in this table can be maintained using SM30 transaction.

Transp. Table	/SAS/APOT_CRITER	Active
Short Description	SAS Forecasting Add-on for SAP - Forecasting Criterion	

Field	Key	Initi...	Data element	Data Ty...	Length	Decim...	Short Description
HPFCRITERION	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	/SAS/APODE HPF CFCHAR		10	0	SAS Forecasting Add-on for SAP - HPF Criterion
HPFCRITERION_DES	<input type="checkbox"/>	<input type="checkbox"/>	/SAS/APODE HPF CFCHAR		60	0	SAS Forecasting Add-on for SAP - HPF Criterion Description

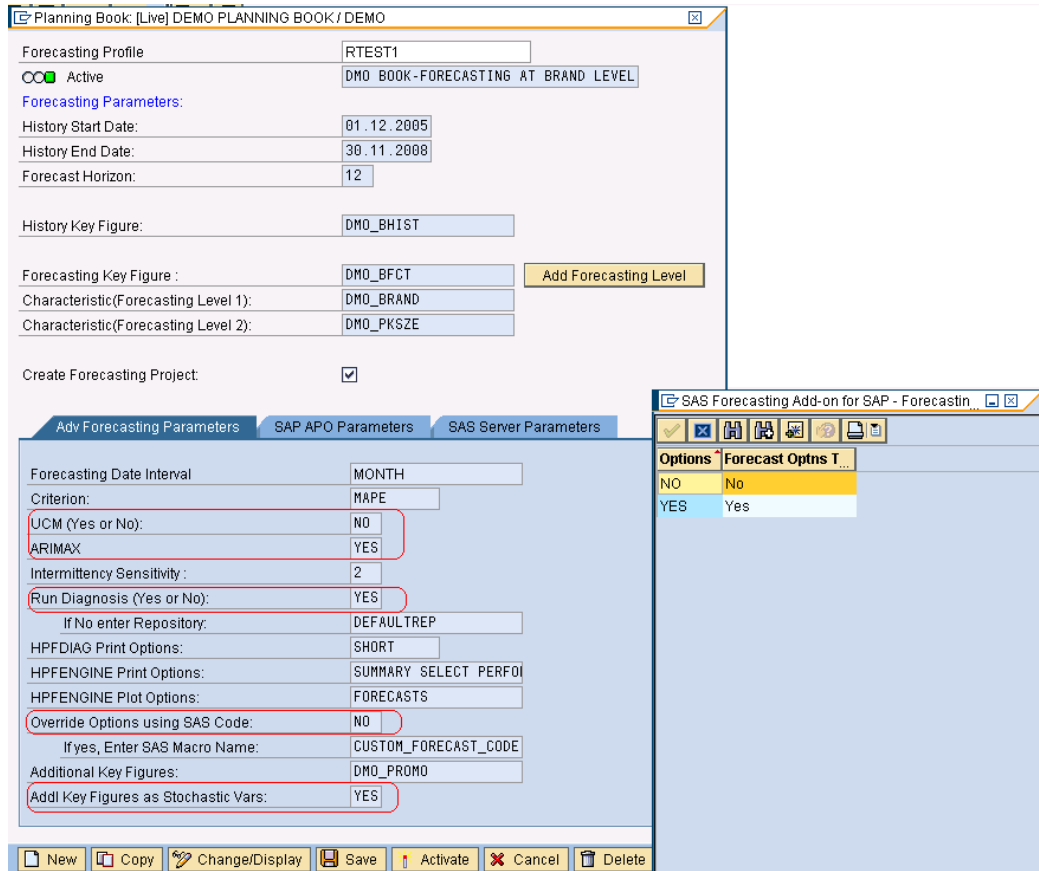
Table View Edit Goto Selection Utilities(M) System Help

Change View "SAS Forecasting Add-on for SAP - Forecastin

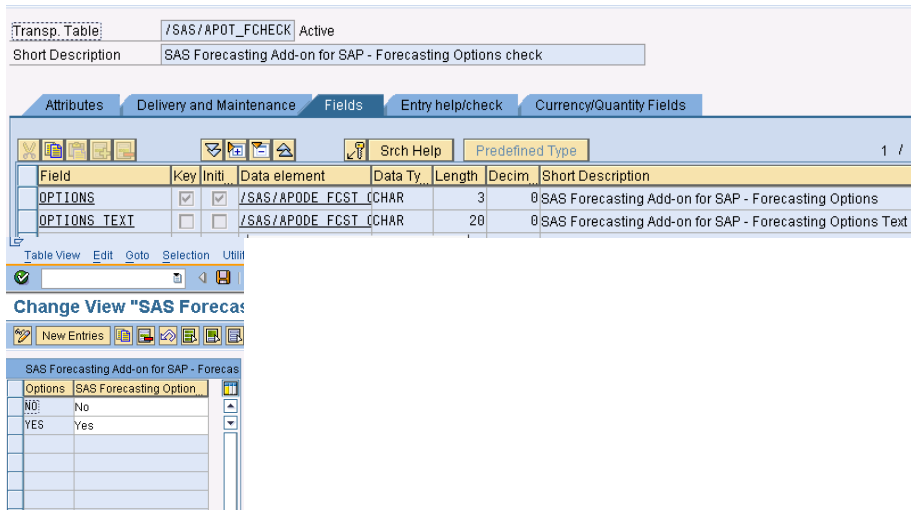
New Entries

HPF Criter	SAS HPF Criterion Description
ADJRSQ	Amemiya's Adjusted R-square
ADJRSQ	Adjusted R-square
AIC	Akaike Information Criterion
AICC	Akaike Information Corrected Criterion
APC	Amemiya's Prediction Criterion
GMAPE	Geometric Mean Percent Error
GMAPEs	Geometric Mean Absolute Error Percent of Standard Deviation
GMAPPE	Geometric Mean Predictive Percent Error
GMASPE	Geometric Mean Symmetric Percent Error
GMRAE	Geometric Mean Relative Absolute Error
MAE	Mean Absolute Error
MAPE	Mean Absolute Percent Error
MAPES	Mean Absolute Error Percent of Standard Deviation
MAPPE	Symmetric Mean Absolute Predictive Percent Error
MASE	Mean Absolute Scaled Error
MAXERR	Maximum Error
MAXPE	Maximum Percent Error
MAXPPE	Maximum Predictive Percent Error
MAXRE	Maximum Relative Error
MAXSPE	Maximum Symmetric Percent Error
MDAPE	Median Percent Error
MDAPES	Median Absolute Error Percent of Standard Deviation

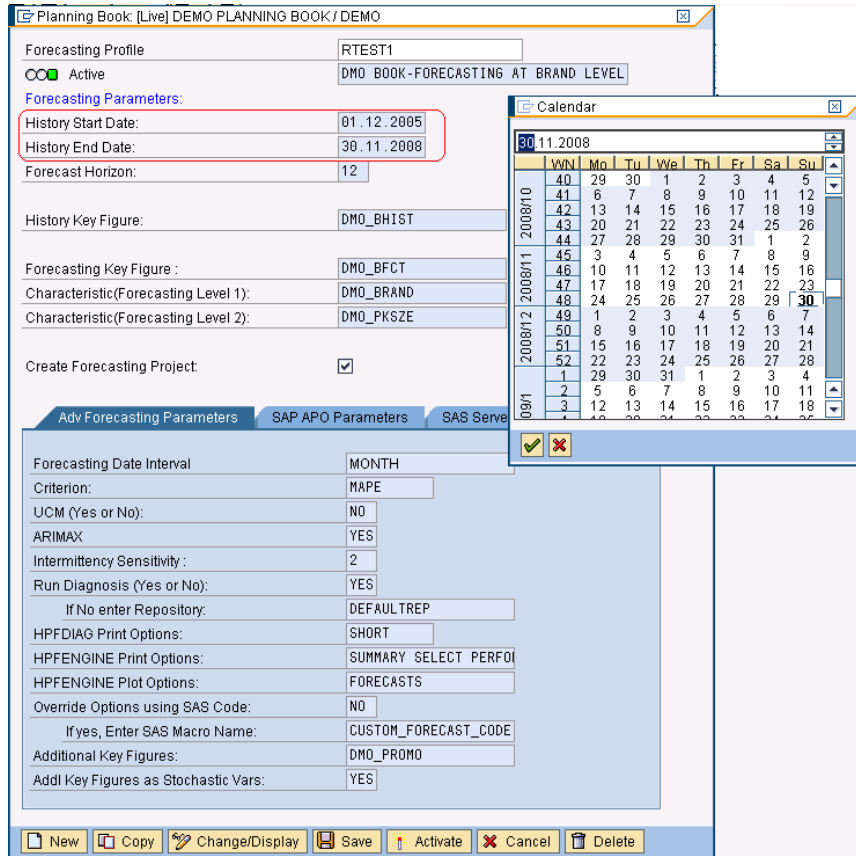
2 **/SAS/APOT_FCHECK:** This table contains the Check options used by SAS Forecasting Engine. This table provides the search help for the fields “UCM”, “ARIMAX”, “Run Diagnosis” and “Override Options” in the Options Screen.



This table has the following columns and the records in this table can be maintained using SM30 transaction.



- 3 /SAS/APOT_FDATE: This table contains the Date Interval options used by SAS Forecasting Engine. This table provides the search help for the fields “History Start Date” and “History Start Date” in the Options Screen.



This table has the following columns and the records in this table can be maintained using SM30 transaction.

Transp. Table:	/SAS/APOT_FDATE	Active					
Short Description	SAS Forecasting Add-on for SAP - Forecasting Date Interval						
<div style="display: flex; justify-content: space-between;"> Attributes Delivery and Maintenance Fields Entry help/check Currency/Quantity Fields </div>							
<div style="display: flex; justify-content: space-between;"> 1 / </div>							
Field	Key	Init.	Data element	Data Ty.	Length	Decim.	Short Description
DATE_INTERVAL	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	/SAS/APODE_FCST	CHAR	20	0	SAS Forecasting Add-on for SAP - Forecasting Date Interval
DATE_INTER_DESCR	<input type="checkbox"/>	<input type="checkbox"/>	/SAS/APODE_FCST	CHAR	60	0	SAS Forecasting Add-on for SAP - Date Interval Description

Table View Edit Goto Selection Utilities(M) System Help

Change View "SAS Forecasting Add-on for SAP - Forecasting D

New Entries

SAS Forecasting Date In	SAS Forecasting Date Interval Descriptio
DAY	Daily
HOUR	Hourly
MINUTE	Every Minute
MONTH	Monthly
NONE	None
QTR	Quarterly
SECOND	Every Second
SEMIMONTH	1st and 16th of each month
SEMIYEAR	Semi Annual
TENDAY	1st, 11th, and 21st of each month
WEEK	Weekly
WEEK3.	Test Data
WEEKDAY	Daily ignoring weekend days
WEEKV	Weekly - specifies ISO 8601 weekly intervals of seven days.
YEAR	Yearly
YEARV	Yearly - specifies ISO 8601 yearly intervals.

- 4 **/SAS/APOT_FOPTS:** This table contains the SAS Forecasting Profile parameters used by SAS Forecasting Engine. This table stores all the parameters entered on the Options Screen. Only one profile can be active at any point of time.

Planning Book: [Live] DEMO PLANNING BOOK / DEMO

Forecasting Profile	RTEST1	
<input checked="" type="checkbox"/> Active	DMO BOOK-FORECASTING AT BRAND LEVEL	
Forecasting Parameters:		
History Start Date:	01.12.2005	
History End Date:	30.11.2008	
Forecast Horizon:	12	
History Key Figure:	DMO_BHIST	
Forecasting Key Figure :	DMO_BFCT	<input type="button" value="Add Forecasting Level"/>
Characteristic(Forecasting Level 1):	DMO_BRAND	
Characteristic(Forecasting Level 2):	DMO_PKSZE	
Create Forecasting Project:	<input checked="" type="checkbox"/>	

Adv Forecasting Parameters
 SAP APO Parameters
 SAS Server Parameters

Forecasting Date Interval	MONTH
Criterion:	MAPE
UCM (Yes or No):	NO
ARIMAX	YES
Intermittency Sensitivity :	2
Run Diagnosis (Yes or No):	YES
If No enter Repository:	DEFAULTREP
HPFDIAG Print Options:	SHORT
HPFENGINE Print Options:	SUMMARY SELECT PERFO
HPFENGINE Plot Options:	FORECASTS
Override Options using SAS Code:	NO
If yes, Enter SAS Macro Name:	CUSTOM_FORECAST_CODE
Additional Key Figures:	DMO_PROMO
Addl Key Figures as Stochastic Vars:	YES

Search help for the Forecasting Profile field on the Options screen will list down the existing profiles created in the system as shown below.

Forecast Prof	Planning Book	Data View	Plng Versn	Selection Description	Author	F0007
TEST01	DMO_PB	DMO_PB	DP_01	DEMO PACKSIZE	DEVW01	
TEST02	DMO_PB	DMO_PB	DP_01	DEMO PACKSIZE	DEVW01	
DMO1	DMO_PLANNING BOOK	DEMO	DP_01	DEMO PACKSIZE	SASNCB	X
DMO2	DMO_PLANNING BOOK	DEMO	DP_01	DEMO PACKSIZE	SASNCB	
Test_CPG	CPG3_SNP	CAP PLAN	CPFR1_V1	CPG3: RESOURCE	SASNCB	
PepsiDrPepper	DMO_PB_PEPSI	DB_PEPSI_BRAND	000	PEPSIDR PEPPER	SASNCB	
PepsiALL	DMO_PB_PEPSI	DB_PEPSI_BRAND	000	PEPSI - ALL BRANDS	SASNCB	

This table has the following columns and the records in this table can be maintained using SM30 transaction.

Dictionary: Display Table

Transp. Table: /SAS/APOT_FOPTS

Short Description: SAS Forecasting Add-on for SAP - Forecasting Profile Options

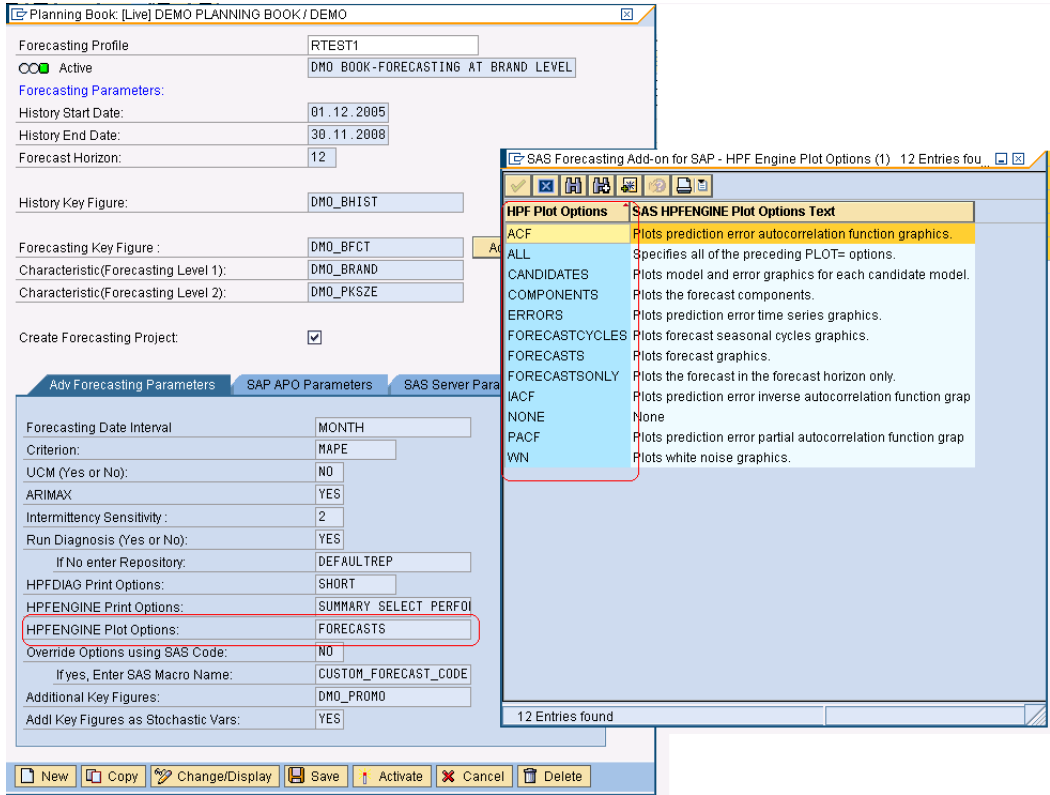
Field	Key	Initi	Data element	Data Ty.	Length	Decim.	Short Description
MANDT	<input checked="" type="checkbox"/>		/SAPAPO/CLNTAPO_KCLNT	CLNT	3		Client (APO Conversion to Client-Dependency)
PROFILE_NAME	<input checked="" type="checkbox"/>		/SAPAPO/PRPFL	CHAR	22		Master Forecast Profile
PROFILE_DESCR	<input type="checkbox"/>		/SAPAPO/PFITX	CHAR	60		Profile Description
HPFCRITERION	<input type="checkbox"/>		/SAS/APODE_HPF_CCHAR	CHAR	10		SAS Forecasting Add-on for SAP - HPF Criterion
DATE_INTERVAL	<input type="checkbox"/>		/SAS/APODE_FCST_CCHAR	CHAR	20		SAS Forecasting Add-on for SAP - Forecasting Date Interval
DIAG_OPTIONS	<input type="checkbox"/>		/SAS/APODE_HPFDI_CCHAR	CHAR	20		SAS Forecasting Add-on for SAP - HPF Diagnose Print Options
UDM	<input type="checkbox"/>		/SAS/APODE_FCST_CCHAR	CHAR	3		SAS Forecasting Add-on for SAP - Forecasting Options
ARIMAX	<input type="checkbox"/>		/SAS/APODE_FCST_CCHAR	CHAR	3		SAS Forecasting Add-on for SAP - Forecasting Options
IDM	<input type="checkbox"/>		/SAS/APODE_FCST_CCHAR	CHAR	3		SAS Forecasting Add-on for SAP - Forecasting Options
RUNDIAG	<input type="checkbox"/>		/SAS/APODE_FCST_CCHAR	CHAR	3		SAS Forecasting Add-on for SAP - Forecasting Options
REPOSITORY	<input type="checkbox"/>		/SAS/APODE_FCST_CCHAR	CHAR	20		SAS Forecasting Add-on for SAP - Forecast Repository
USER_MODEL	<input type="checkbox"/>		/SAS/APODE_FCST_CCHAR	CHAR	3		SAS Forecasting Add-on for SAP - Forecasting Options
PRINTOPTIONS	<input type="checkbox"/>		/SAS/APODE_HPFEN_CCHAR	CHAR	255		SAS Forecasting Add-on for SAP - HPF Engine Print Options
PLOTOPTIONS	<input type="checkbox"/>		/SAS/APODE_HPFEN_CCHAR	CHAR	20		SAS Forecasting Add-on for SAP - HPF Engine Plot Options
CODE_FILE_NAME	<input type="checkbox"/>		/SAS/APODE_FCST_SCHAR	SCHAR	30		SAS Forecasting Add-on for SAP - Forecast Macro Name
PLANNINGAREA	<input type="checkbox"/>		/SAPAPO/TS_PAREA_CCHAR	CHAR	40		Name of DP and SNP Planning Area

Change View "SAS Forecasting Add-on for SAP - Forecasting Profile Options"

Profile	Profile Description
DMO1	DMO BOOK-FORECASTING AT BRAND LEVEL
DMO2	DMO BOOK FOR BRAND AND PKSZE
PepsiALL	PEPSI ALL BRANDS AND SIZES
PepsiDrPepper	PEPSI / DR. PEPPER-- BRAND ONLY
TEST01	TEST01 DESCRIPTION
TEST02	TEST02 DESCRIPTION
Test_CPG	DMO BOOK FOR BRAND AND PKSZE

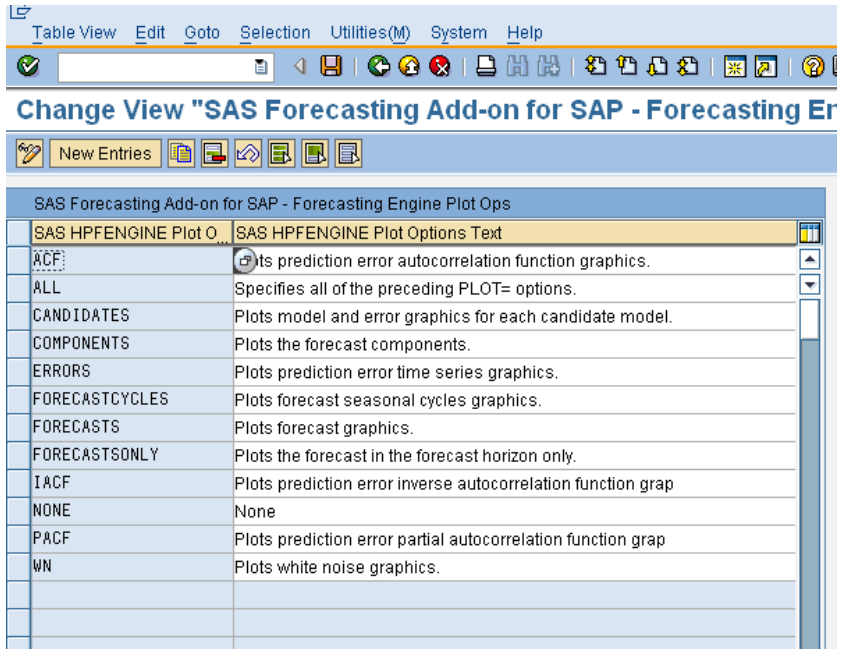
5 **/SAS/APOT_FPLOT:** This table contains the Plot options to be used by SAS Forecasting Engine for plotting the forecasting results. This table provides the search help for the field

“HPFENGINE Plot Options “on the Options Screen.



This table has the following columns and the records in this table can be maintained using SM30 transaction.

Field	Key	Initi.	Data element	Data Ty...	Length	Decim.	Short Description
HPF_PLOT_OPTION	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	/SAS/APODE_HPFENCHAR		20	0	SAS Forecasting Add-on for SAP - HPF Engine Plot Options
HPF_PLOT_OPT_IX	<input type="checkbox"/>	<input type="checkbox"/>	/SAS/APODE_HPFENCHAR		60	0	SAS Forecasting Add-on for SAP - HPF Engine Plot OptionsText

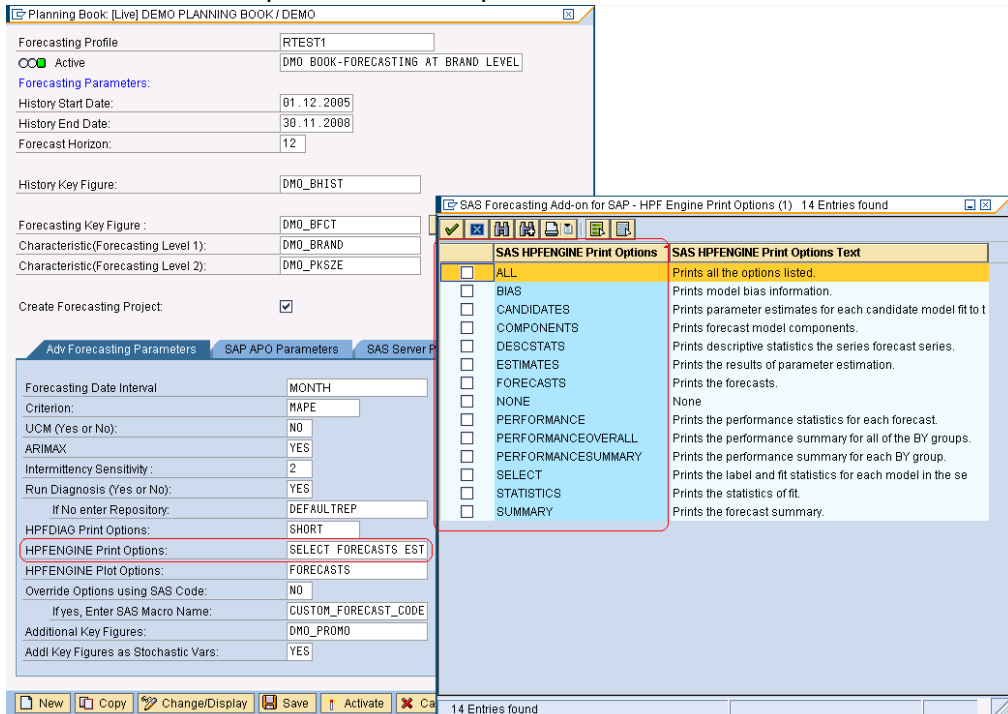


The screenshot shows a table titled "SAS HPFENGINE Plot Options" with two columns: the option name and its description. The table is displayed in a standard SAP list view with a menu bar at the top.

SAS HPFENGINE Plot O...	SAS HPFENGINE Plot Options Text
ACF:	Plots prediction error autocorrelation function graphics.
ALL	Specifies all of the preceding PLOT= options.
CANDIDATES	Plots model and error graphics for each candidate model.
COMPONENTS	Plots the forecast components.
ERRORS	Plots prediction error time series graphics.
FORECASTCYCLES	Plots forecast seasonal cycles graphics.
FORECASTS	Plots forecast graphics.
FORECASTSONLY	Plots the forecast in the forecast horizon only.
IACF	Plots prediction error inverse autocorrelation function grap
NONE	None
PACF	Plots prediction error partial autocorrelation function grap
WN	Plots white noise graphics.

6 /SAS/APOT_FPRINT: This table contains the Print options to be used by SAS Forecasting Engine for printing the forecasting results. This table provides the search help for the field

“HPFENGINE Print Options “on the Options Screen.



The screenshot shows the SAP Forecasting Options screen. The "HPFENGINE Print Options" field is highlighted with a red box and contains the value "SELECT FORECASTS EST". An inset window shows the search help for this field, listing various print options and their descriptions.

SAS HPFENGINE Print Options	SAS HPFENGINE Print Options Text
<input type="checkbox"/> ALL	Prints all the options listed.
<input type="checkbox"/> BIAS	Prints model bias information.
<input type="checkbox"/> CANDIDATES	Prints parameter estimates for each candidate model fit to t
<input type="checkbox"/> COMPONENTS	Prints forecast model components.
<input type="checkbox"/> DESCSTATS	Prints descriptive statistics the series forecast series.
<input type="checkbox"/> ESTIMATES	Prints the results of parameter estimation.
<input type="checkbox"/> FORECASTS	Prints the forecasts.
<input type="checkbox"/> NONE	None
<input type="checkbox"/> PERFORMANCE	Prints the performance statistics for each forecast.
<input type="checkbox"/> PERFORMANCEOVERALL	Prints the performance summary for all of the BY groups.
<input type="checkbox"/> PERFORMANCESUMMARY	Prints the performance summary for each BY group.
<input type="checkbox"/> SELECT	Prints the label and fit statistics for each model in the se
<input type="checkbox"/> STATISTICS	Prints the statistics of fit.
<input type="checkbox"/> SUMMARY	Prints the forecast summary.

This table has the following columns and the records in this table can be maintained using SM30 transaction.

Transp. Table		/SAS/APOT_FPRINT		Active			
Short Description		SAS Forecasting Add-on for SAP - Forecasting Engine Prnt Ops					
Attributes Delivery and Maintenance Fields Entry help/check Currency/Quantity Fields							
Srch Help Predefined Type 1 / 2							
Field	Key	Initi	Data element	Data Ty	Length	Decim	Short Description
HPF_PRINT_OPTION	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	/SAS/APODE_HPFENCHAR		255		Ø SAS Forecasting Add-on for SAP - HPF Engine Print Options
HPF_PRINT_OPT_TX	<input type="checkbox"/>	<input type="checkbox"/>	/SAS/APODE_HPFENCHAR		60		Ø SAS Forecasting Add-on for SAP - HPF Engine Prnt OptionsText

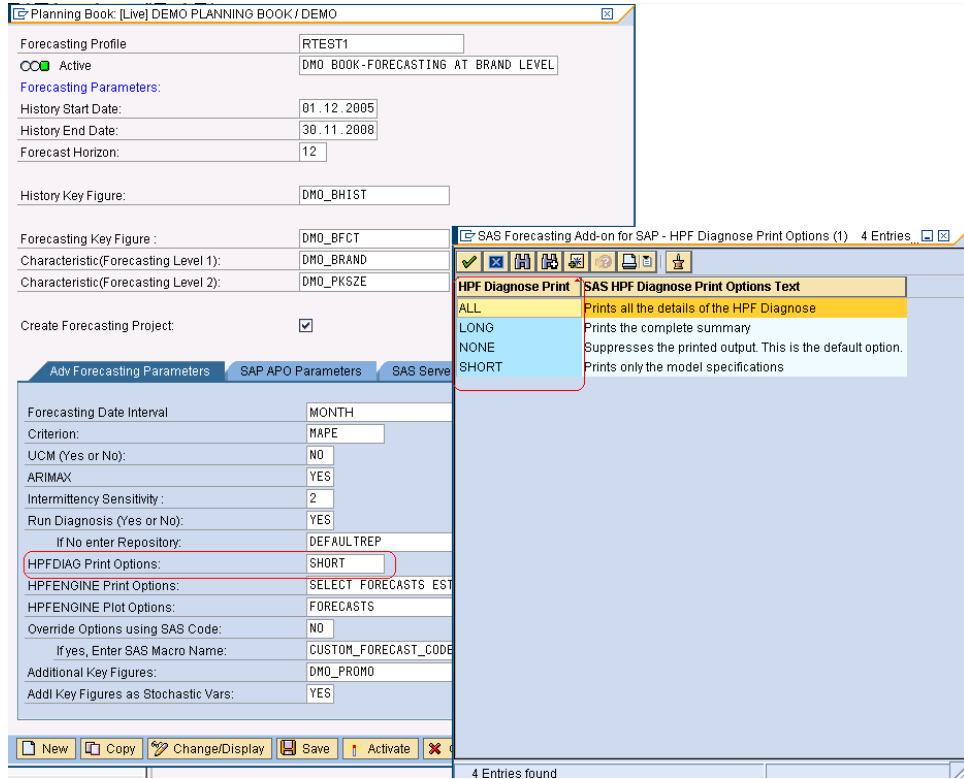
Table View Edit Goto Selection Utilities(M) System Help

Change View "SAS Forecasting Add-on for SAP - Forecasting Engine Prnt Ops"

New Entries

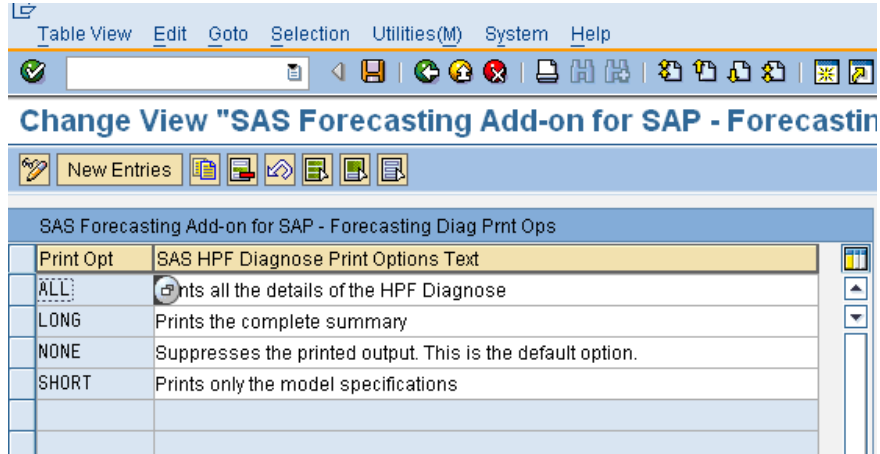
SAS Forecasting Add-on for SAP - Forecasting Engine Prnt Ops	
SAS HPFENGINE Print ...	SAS HPFENGINE Print Options Text
ALL	Prints all the options listed.
BIAS	Prints model bias information.
CANDIDATES	Prints parameter estimates for each candidate model fit to t
COMPONENTS	Prints forecast model components.
DESCSTATS	Prints descriptive statistics the series forecast series.
ESTIMATES	Prints the results of parameter estimation.
FORECASTS	Prints the forecasts.
NONE	None
PERFORMANCE	Prints the performance statistics for each forecast.
PERFORMANCEOVERALL	Prints the performance summary for all of the BY groups.
PERFORMANCESUMMARY	Prints the performance summary for each BY group.
SELECT	Prints the label and fit statistics for each model in the se
STATISTICS	Prints the statistics of fit.
SUMMARY	Prints the forecast summary.

7 **/SAS/APOT_HPFDP:** This table contains the Print options to be used by SAS Forecasting Diagnosis Engine for printing the diagnosis results. This table provides the search help for the field “HPFDIAG Print Options “on the Options Screen.



This table has the following columns and the records in this table can be maintained using SM30 transaction.

Transp. Table:	/SAS/APOT_HPFDP	Active				
Short Description	SAS Forecasting Add-on for SAP - Forecasting Diag Prnt Ops					
<p>Attributes Delivery and Maintenance Fields Entry help/check Currency/Quantity Fields</p>						
<p>Expand All Srch Help Predefined Type 1 / 2</p>						
Field	Key	Element	Data Ty	Length	Decim	Short Description
HPFDIAG_PRINT	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	/SAS/APODE_HPFDIAGCHAR	20	0	SAS Forecasting Add-on for SAP - HPF Diagnose Print Options
HPFDIAG_PRINT_TX	<input type="checkbox"/>	<input type="checkbox"/>	/SAS/APODE_HPFDIAGCHAR	60	0	SAS Forecasting Add-on for SAP - HPF Diag Print Options Text

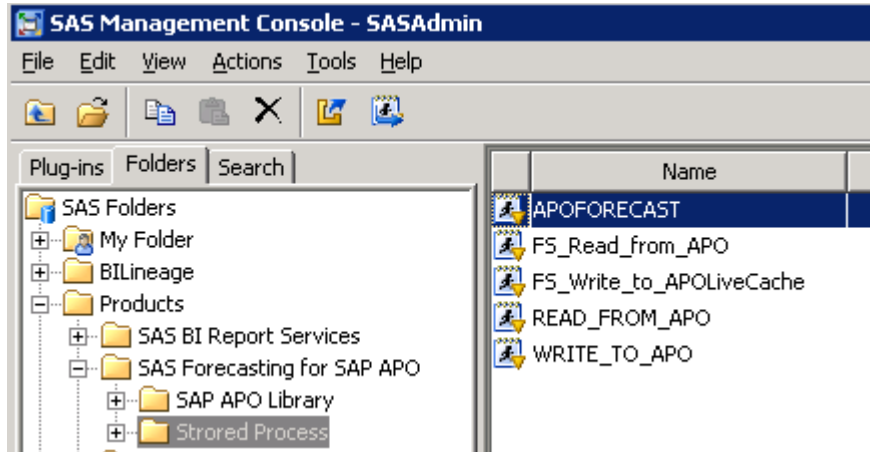


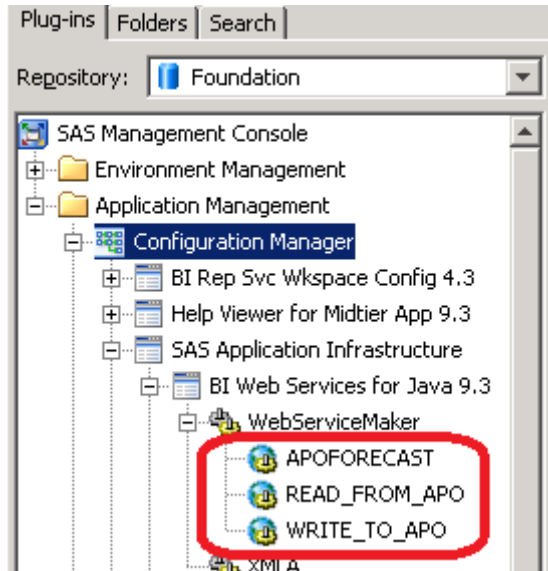
Technical Objects created on SAS Server

Please find the list of technical objects created on SAS Server as part of SAS Forecasting for SAP APO Installation.

SAS Stored Process and Web Service

Following Stored Processes are created during installation of SAS Forecasting for SAP APO: APOFORECAST, READ_FROM_APO, and WRITE_TO_APO. These Stored Process executes the SAS code which calls the appropriate macros for generating the statistical forecasting from SAS HPF server.





As shown above, APOFORECAST, READ_FROM_APO and WRITE_TO_APO Stored Process are deployed as Web service so they can be invoked from SAP system.

SAS Macro Catalog

SAS Macros are used in the Stored Process to generate the Forecasting results from the SAP Data and they are provided to the customer in the form of Catalog. The location of the Macro catalog is as below:

[<SASHome>\SASFoundation\9.3\forcstsapmva\cmacros](file://<SASHome>\SASFoundation\9.3\forcstsapmva\cmacros)

