

Chapter 1

What's New in SAS High-Performance Forecasting 3.1

Overview

SAS High-Performance Forecasting has implemented a new release numbering scheme. Both SAS High-Performance Forecasting 2.3 and SAS High-Performance Forecasting 3.1 have been released since SAS 9.1.3. Each release provides new features while maintaining all the capabilities of previous releases.

In SAS High-Performance Forecasting 3.1, new features have been added to the following procedures:

- [HPFDIAGNOSE](#) procedure enhancements enable you to better control model generation.
- [HPFRECONCILE](#) procedure enhancements enable you to better reconcile forecast generation.

In SAS High-Performance Forecasting 2.3, new features were added to the following procedures:

- [HPF](#) procedure enhancements provide statistics of fit that are related to scaled and relative errors and enable you to specify an output data set.
- [HPFDIAGNOSE](#) procedure enhancements enable you to better control model generation.
- [HPFENGINE](#) procedure enhancements provide statistics of fit that are related to scaled and relative errors and enable you to specify an output data set.
- [HPFEVENTS](#) procedure enhancements add new predefined date keywords.
- [HPFRECONCILE](#) procedure enhancements enable you to better reconcile forecast generation.

HPF Procedure Enhancements

New features related to the forecast model selection enable you to better monitor forecast generation.

SAS High-Performance Forecasting 2.3 introduced the following new features:

- The **OUTPROCINFO=** option specifies the output data set to contain the summary information of the processing done by HPF Procedure. This option is particularly useful for easy programmatic assessment of the status of the procedure's execution via a data set instead of looking at or parsing the SAS log.
- **statistics of fit** related to scaled and relative errors.

HPFDIAGNOSE Procedure Enhancements

New features have been added to each release to enable you to better control model generation.

SAS High-Performance Forecasting 2.3 introduced the following new features:

- The **DELAYEVENT=** option specifies the delay lag for the events. If the option is not specified, the delay lag for the events is set to zero by default.
- The **DELAYINPUT=** option specifies the delay lag for the inputs. If the option is not specified, the delay lag for the inputs is chosen appropriately by the procedure.
- The **ENTRYPCT=** option specifies a threshold to check the percentage increment of the criterion between two candidate models. The **ENTRYPCT=**value should be in the range (0,100); the default is **ENTRYPCT=0.1** (0.1%).
- The **NODIAGNOSE** option specifies that the series is not to be diagnosed. If the **INSELECT-NAME=** option and **OUTEST=** option are specified, the existing model specification files are written to the **OUTEST** data set.
- The **OUTPROCINFO=** option specifies the output data set to contain the summary information of the processing done by the HPFDIAGNOSE procedure. This option is particularly useful for easy programmatic assessment of the status of the procedure's execution via a data set instead of looking at or parsing the SAS log.
- The **OUTLIER=(ENTRYPCT=)** option specifies a threshold to check the percentage increment of the criterion between two candidate models. The **ENTRYPCT=**value should be in the range (0,100); the default is **ENTRYPCT=0.1** (0.1%). The value of the **OUTLIER=(ENTRYPCT=)** option overrides the value of the **ENTRYPCT=** option in the HPFDIAGNOSE statement.
- The **REFINEPARMS=** option specifies that insignificant parameters of the final model are to be refined, identifies the factors to refine, and identifies the order of factors.
- The **RETAINCHOOSE** option specifies that the PROC HPFSELECT **CHOOSE=** option is respected when re-diagnosing series.

- The **POSITIVE** or **NEGATIVE** option is specified in the **INPUT** statement followed by the **REQUIRED=** option such as **REQUIRED=YES(POSITIVE)** and **REQUIRED=MAYBE(NEGATIVE)**. When the **REQUIRED=YES(POSITIVE)** option is specified, if its coefficient is negative, then the input variable drops out from the model.

SAS High-Performance Forecasting 3.1 introduces the following new features:

- The **NOINT** option in the **ARIMAX** statement suppresses the intercept (constant) term in the ARIMA model.
- The **INPUTMISSINGPCT** option in the **PROC HPFDIAGNOSE** statement specifies the size of the missing observation as a percentage of the length of the input time series.
- The **TYPE=TLS** option in the **OUTLIER** option specifies temporary level shift outliers in the ARIMA model.
- The **RETAINCHOOSE=YES|NO** option in the **PROC HPFDIAGNOSE** statement specifies that the **CHOOSE=** option in the **HPFSELECT** procedure be respected when rediagnosing series.

HPFENGINE Procedure Enhancements

New features related to the forecasting engine enable you to better monitor forecast generation.

SAS High-Performance Forecasting 2.3 introduced the following new features:

- The **OUTPROCINFO=** option specifies the output data set to contain the summary information of the processing done by the **HPFENGINE** procedure. This option is particularly useful for easy programmatic assessment of the status of the procedure's execution via a data set instead of looking at or parsing the SAS log.
- **statistics of fit** related to scaled and relative errors.

HPFEVENTS Procedure Enhancements

SAS High-Performance Forecasting 2.3 added new predefined date keywords to the HPFEVENTS procedure:

Table 1.1 New Holiday Date Keywords and Definitions

Date Keyword	Definition
COLUMBUS	2nd Monday in October
MLK	3rd Monday in January
USPRESIDENTS	3rd Monday in February (since 1971)
VETERANS	November 11
VETERANSUSG	date observed by U.S. government for Monday-Friday schedule
VETERANSUSPS	date observed by U.S. government for Monday-Saturday schedule (U.S. Post Office)

HPFRECONCILE Procedure Enhancements

New options have been added in each release.

SAS High-Performance Forecasting 2.3 introduced the following new options:

- The **FORCECONSTRAINT** option specifies whether the user-specified constraints should be forced on the PREDICT variable in the OUTFOR= data set when the problem is infeasible because the constraints are incompatible with the aggregation constraint. The default is to leave the input unmodified.
- The **OUTPROCINFO= SAS-data-set** specifies the output data set to contain the summary information of the processing done by PROC HPFRECONCILE. This option is particularly useful for easy programmatic assessment of the status of the procedure's execution via a data set instead of looking at or parsing the SAS log.
- The **WEIGHTED** option specifies that the loss function for top-down reconciliation be weighted by the inverse of the variance of the input forecasts.
- The **OUTINFEASIBLE= data set** specifies the output data set that contains summary information.
- The **ALIGN=** option controls the alignment of SAS dates used to identify output observations. Internal processing uses aligned versions of the values of START= and END= options (if specified) and values of ID variable in input observations. The ALIGN= option accepts the following values: BEGIN, MIDDLE, and END. BEGIN is the default.

SAS High-Performance Forecasting 3.1 introduces the following new options:

- The **IGNOREMISSF** option in the PROC HPFRECONCILE statement specifies that '.F' missing values in the PREDICT variable be treated as regular '.' missing values. If the IGNOREMISSF option is not specified, a '.F' missing value is interpreted as a failed forecast, and PROC HPFRECONCILE generates '.F' missing values for all forecasting variables in the OUTFOR= data set if that value is needed for computing the reconciled forecasts. If the IGNOREMISSF option is specified, observations that correspond to '.F' missing values are considered to belong to inactive series and therefore are not included in the reconciliation process.
- The **LOCKZERO** option in the PROC HPFRECONCILE statement specifies that zero values of the PREDICT variable in the DISAGGDATA= data be considered locked equalities. This option is available only when DIRECTION=TD. When the LOCKZERO option is active, a zero value for PREDICT in the DISAGGDATA= set implies a zero value for the corresponding observation in the OUTFOR= data set. However, if constraints are specified in the CONSTRAINT= data set for that observation, these constraints have precedence over the LOCKZERO option. Note that an unlocked equality constraint in the CONSTRAINT= data also has precedence over the LOCKZERO option. Similarly, an unlocked equality whose value is zero is not converted to a locked equality, even though the LOCKZERO option is specified.
- The **MAXITER=*k*** option in the PROC HPFRECONCILE statement specifies the maximum number of predictor-corrector iterations performed by the interior point algorithm. The value *k* is an integer between 1 and the largest four-byte, signed integer, $2^{31} - 1$. The default value is MAXITER=100.
- The **BYVARSSORTED** option in the DISAGGDATA statement specifies that the DISAGGDATA= data set be sorted by the BY variables. This option improves input/output performance when there is an index defined on the BY variables. Use of an index degrades the performance as compared to processing a sorted data set. If the BYVARSSORTED option is not specified, PROC HPFRECONCILE uses only the index for processing and disregards the sorting order. If you specify the BYVARSSORTED option in the DISAGGDATA statement, PROC HPFRECONCILE exploits the sorting order to achieve better performance and uses the index minimally.

