Chapter 28
Command Reference

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TSVIEW command

The TSVIEW command invokes the Time Series Viewer. This is a component of the Time Series Forecasting System that can also be used as a stand-alone graphical viewer for any time series data set or view. See *Time Series Viewer Window* in Chapter 29, "Window Reference," for more information.

The command syntax is

TSVIEW DATA= *data set name*
    VAR= *time series variable name*
    ID= *time id variable name*
    INTERVAL= *interval name*

If the TSVIEW command is issued without arguments, the `Series Selection` window appears to allow you to select an input data set and series. This is equivalent to selecting `Time Series Viewer` from the `Analysis` submenu of the `Solutions` pull-down menu. By specifying the DATA= and VAR= arguments, you can bring up the `Time Series Viewer` window directly. The ID= and INTERVAL= arguments are useful when the system cannot determine them automatically from the data.

Examples

```
tsview data=sashelp.air var=air
tsview data=dept.prod var=units id=period interval=qtr
```

FORECAST command

The FORECAST command invokes the Time Series Forecasting System. The syntax is

FORECAST PROJECT= *project name*
    DATA= *data set name*
    VAR= *time series variable name*
    ID= *time id variable name*
    INTERVAL= *interval name*
    STAT= *statistic*
    CLIMIT= *integer*
    HORIZON= *integer*
    ENTRY= *name*

> **OUT=** *data set name*
> **KEEP=** *argument*
> **DIAG= YES|NO**
> **REFIT**
> **REEVAL**

If the FORECAST command is issued without arguments, the `Time Series Forecasting` window appears. This is equivalent to selecting `Time Series Forecasting System` from the `Analysis` submenu of the `Solutions` pull-down menu.

Using the arguments, it is possible to do the following:

- Bring up the system with information already filled into some of the fields

- Bring up the system starting at a different window than the default Time Series Forecasting window

- Run the system in unattended mode so that a task such as creating a fore-cast data set is accomplished without any user interaction. By submitting such commands repeatedly from a SAS/AF or SAS/EIS application, it is possible to do simulated "batch" processing for many data sets or by-group process-ing for many subsets of a data set. You can create a project in unattended mode and later open it for inspection interactively. You can also create a project interactively in order to set options, fit a model, or edit the list of models, and then use this project later in unattended mode. A demo SAS/AF application is available. It is useful for running a batch of unattended fore-casts using different series and/or data sets. To run it, issue the command `AF C=SASHELP.FORCAST.FORCCMD.FRAME`. Another interface to the FORECAST command is available using the `Univariate Forecasting` object in SAS/EIS software.

PROJECT= *project name*
> Specifies the name of the SAS catalog entry in which forecasting models and other results will be stored and from which previously stored results are loaded into the forecasting system.

DATA= *data set name*
> Specifies the name of the SAS data set containing the input data.

VAR= *time series variable name*
> Specifies the series variable name. It must be a numeric variable contained in the data set.

ID= *time id variable name*
> Specifies the time ID variable name for the data set. If the ID= option is not specified, the system will attempt to locate the variables named DATE, DATETIME, and TIME in the data set specified by the DATA= option. However, it is recommended that you specify the time ID variable whenever you are using the ENTRY= argument.

INTERVAL= *interval name*

Specifies the time ID interval between observations in the data set. Commonly used intervals are `year`, `semiyear`, `qtr`, `month`, `semimonth`, `week`, `weekday`, `day`, `hour`, `minute`, and `second`. See Chapter 3, "Date Intervals, Formats, and Functions," for information on more complex interval specifications. If the INTERVAL= option is not specified, the system will attempt to determine the interval based on the time ID variable. However, it is recommended that you specify the interval whenever you are using the ENTRY= argument.

STAT= *statistic*

Specifies the name of the goodness-of-fit statistic to be used as the model selection criterion. The default is RMSE. Valid names are

`sse`	Sum of Square Error
`mse`	Mean Square Error
`rmse`	Root Mean Square Error
`mae`	Mean Absolute Error
`mape`	Mean Absolute Percent Error
`aic`	Akaike Information Criterion
`sbc`	Schwarz Bayesian Information Criterion
`rsquare`	R-Square
`adjrsq`	Adjusted R-Square
`rwrsq`	Random Walk R-Square
`arsq`	Amemiya's Adjusted R-Square
`apc`	Amemiya's Prediction Criterion

CLIMIT= *integer*

An integer specifying the level of the confidence limits to be computed for the forecast. This integer represents a percentage; for example, 925 indicates 92.5% confidence limits. The default is 95, that is, 95% confidence limits.

HORIZON= *integer*

Specifies the number of periods into the future for which forecasts will be computed. The default is 12 periods. The maximum is 9999.

ENTRY= *name*

The name of an entry point into the system. Valid names are

`main`	Starts the system at the Time Series Forecasting window (default).
`devmod`	Starts the system at the Develop Models window.
`viewmod`	Starts the system at the Model Viewer window. Specify a project containing a forecasting model using the PROJECT= option. If a project containing a model is not specified, the message "No forecasting model to view" appears.

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`viewser`	Starts the system at the Time Series Viewer window.
`autofit`	Runs the system in unattended mode, fitting a forecasting model automatically and saving it in a project. If PROJECT= is not specified, the default project name SASUSER.FMSPROJ.PROJ is used.
`forecast`	Runs the system in unattended mode to generate a forecast data set. The name of this data set is specified by the OUT= parameter. If OUT= is not specified, a window appears to prompt for the name and label of the output data set. If PROJECT= is not specified, the default project name SASUSER.FMSPROJ.PROJ is used. If the project does not exist or does not contain a forecasting model for the specified series, automatic model fitting is performed and the forecast is computed using the automatically selected model. If the project exists and contains a forecasting model for the specified series, the forecast is computed using this model. If the series covers a different time range than it did when the project was created, use the REFIT or REEVAL keyword to reset the time ranges.

OUT= *argument*

The one or two-level name of a SAS data set in which forecasts will be saved. Use in conjunction with ENTRY=FORECAST. If omitted, the system prompts for the name of the forecast data set.

KEEP= *argument*

Specifies the number of models to keep in the project when automatic model fitting is performed. This corresponds to `Models to Keep` in the Automatic Model Selection Options window. A value greater than 9 indicates that all models will be kept. The default is 1.

DIAG= YES|NO

DIAG= YES causes the automatic model selection process to search only over those models that are consistent with the series diagnostics. DIAG= NO causes the automatic model selection process to search over all models in the selection list, without regard for the series diagnostics. This corresponds to `Models to Fit` in the Automatic Model Selection Options window. The default is YES.

REFIT *keyword*

Refits a previously saved forecasting model using the current fit range; the is, it re-estimates the model parameters. Refitting also causes the model to be reevaluated (statistics of fit recomputed), and it causes the time ranges to be reset if the data range has changed (for example, if new observations have been added to the series). This keyword has no effect if you do not use the PROJECT= argument to reference an existing project containing a forecasting model. Use the REFIT keyword if you have added new data to the input series and you want to refit the forecasting model and update the forecast using the new time ranges. Be sure to use the same project, data set, and series names that you used previously.

REEVAL *keyword*

Re-evaluates a previously saved forecasting model using the current evaluation range; that is, it recomputes the statistics of fit. Re-evaluating also causes the time ranges

to be reset if the data range has changed (for example, if new observations have been added to the series). It does not refit the model parameters. This keyword has no effect if you also specify REFIT, or if you do not use the PROJECT= argument to reference an existing project containing a forecasting model. Use the REEVAL keyword if you have added new data to the input series and want to update your forecast using a previously fit forecasting model and the same project, data set, and series names that you used previously.

Examples

The following command brings up the Time Series Forecasting window with the data set name and series name filled in. The time ID variable is also filled in since the data set contains the variable DATE. The interval is filled in because the system recognizes that the observations are monthly.

```
forecast data=sashelp.air var=air
```

The following command brings up the Time Series Forecasting window with the project, data set name, series, time ID, and interval fields filled in, assuming that the project SAMPROJ was previously saved either interactively or using unattended mode as depicted below. Previously fit models will appear when the Develop Models or Manage Projects window is opened.

```
forecast project=samproj
```

The following command runs the system in unattended mode, fitting a model automatically, storing it in the project SAMPROJ in the default catalog SASUSER.FMSPROJ, and placing the forecasts in the data set WORK.SAMPOUT.

```
forecast data=sashelp.workers var=electric id=date interval=month
project=samproj entry=forecast out=sampout
```

The following command assumes that a new month's data have been added to the data set from the previous example and that an updated forecast is needed using the previously fit model. Time ranges are automatically updated to include the new data since the REEVAL keyword is included. Substitute REFIT for REEVAL if you want the system to re-estimate the model parameters.

```
forecast data=sashelp.workers var=electric id=date interval=month
project=samproj entry=forecast out=sampout reeval
```

The following command brings up the model viewer using the project created in the previous example and using 99 percent confidence limits in the forecast graph.

```
forecast data=sashelp.workers var=electric id=date interval=month
project=samproj entry=viewmod climit=99
```

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The final example illustrates using unattended mode with an existing project that has been defined interactively. In this example, the goal is to add a model to the model selection list, and to specify that all models in that list be fit and that all models which are fit successfully be retained.

First bring up the Time Series Forecasting window and specify a new project name, WORKPROJ. Then select `Develop Models`, choosing SASHELP.WORKERS as the data set and MASONRY as the series. Now select `Model Selection List` from the `Options` pull-down menu. In the Model Selection List window, click `Actions`, then `Add`, and then `ARIMA Model`. Define the model `ARIMA(0,1,0)(0,1,0)s NOINT` by setting the differencing value to 1 under both `ARIMA Options` and `Seasonal ARIMA Options`. Select `OK` to save the model and `OK` to close the Model Selection List window. Now select `Automatic Fit` from the `Options` pull-down menu. In the `Automatic Model Selection Options` window, select `All autofit models in selection list` in the `Models to fit` radio box, select `All models` from the `Models to keep` combo box, and then click `OK` to close the window. Select `Save Project` from the `File` pull-down menu, and then close the Develop Models window and the Time Series Forecasting window. You now have a project with a new model added to the selection list, options set for automatic model fitting, and one series selected but no models fit.

Now enter the command:

```
forecast data=sashelp.workers var=electric id=date interval=month
project=workproj entry=forecast out=workforc
```

The system runs in unattended mode to update the project and create the forecast data set WORKFORC. Check the messages in the `Log` window to find out if the run was successful and which model was selected for forecasting. To see the forecast data set, issue the command `viewtable WORKFORC`. To see the contents of the project, bring up the Time Series Forecasting window, open the project WORKPROJ, and select `Manage Projects`. You will see that the variable ELECTRIC was added to the project and has a forecasting model. Select this row in the table and then select `List Models` from the `Tools` pull-down menu. You will see that all of the models in the selection list which fit successfully are there, including the new model you added to the selection list.

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