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Projects

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### Create a Forecasting Project

Use Model Studio to create a project for SAS Visual Forecasting.

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### Using The Exchange

The Exchange in Model Studio provides a list of templates used for project pipelines and modeling nodes. Each template listed includes a description, the product type for the project, the name of the owner who created the template, and the date on which it was last modified.

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The templates that you use are specific to the type of project you are working on: Forecasting, Text Analytics, or Data Mining and Machine Learning.

### Create Reusable Project Templates

Use The Exchange in Model Studio to share template pipelines and modeling nodes for use in other projects.

For more information about templates, see “Using The Exchange” on page 1.

**View the slideshow in SAS Help Center.**
Migrate Projects from SAS Forecast Studio

Users in the SAS Administrators group can migrate projects from SAS Forecast Studio.

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Segment Project Data

Segmentation is a process of dividing the time series data into mutually exclusive sets of similar characteristics or patterns. You can then apply and fine-tune different modeling strategies to each of the segments within a pipeline. SAS Visual Forecasting 8.3 introduces segmentation by providing users the ability to import a specific attribute that contains a segmentation value.

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Add Predefined and Custom Events to Your Project

You can improve the accuracy of your forecasting models by adding events. Examples of events are holidays, retail promotions, and natural disasters. Defining an event enables you to model the effect that special events have on the dependent variable.

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Using the Pipelines Tab

Initial Pipeline for a New Project

Pipelines consist of a series of nodes that are run in a sequence to produce forecasts based on the models and settings that you choose for the project. After you first create a project, the pipeline is set up in the Pipelines tab. The pipeline is labeled Pipeline 1. For time series projects, the Auto-forecasting node is selected for the modeling strategy.

The pipeline cannot be run until you assign the required variable roles as described in “Assigning Variable Roles” in SAS Visual Forecasting: User’s Guide.

For a general description of the nodes in a pipeline, see “Pipelines” in SAS Visual Forecasting: Overview.
**Creating a New Pipeline**

1. Click the plus (+) to create a new pipeline. The New Pipeline dialog box is displayed.
   - If this is the first pipeline that you are creating for the project, it is named **Pipeline 2**.
2. You can change the name to any meaningful string. After the pipeline is created, you can change the pipeline name by double-clicking it the name in the tab.
3. Select a template and click **Save**.

**Node Status**

Hold your pointer over each node to see its status.
- When you first create the pipeline, all nodes have a status of **Initialized**.
- After a node in the pipeline has successfully finished execution, the node shows a status of **Successful**.
- A node with a status of **Pending** is waiting for other nodes in the pipeline to complete before starting.
- If a pipeline run fails, check to see which node has a **Failed** status.
- If you make any changes to the project settings or variable assignments, the nodes will change to **Out-of-date** status and the pipeline needs to be run again.
- When running a pipeline, if a node fails for any reason, the status of the subsequent nodes in the pipeline show **Canceled**.

**Pipeline Details**

Right-click any node in a pipeline to open a menu of actions.
- Select **Run** to run the node. Any preceding nodes in the pipeline that do not have a status of **Successful** are run first. After the preceding nodes complete successfully, the selected node runs.
- Select **Rename** to rename a node. The new name applies only to the node on this pipeline.

Right-click the data node to open these actions in the menu.
- Select **Add below** to add a forecasting modeling node to the pipeline. If the pipeline is segmented, this action is available only from each segment.
- After the data node has completed a run, select **Explore time series** to open a plot of the historical data.

If the pipeline is segmented, right-click the External Segmentation node and select **Manage Segments** to change the number of segments in the pipeline. See “Changing the Number of Segments” in SAS Visual Forecasting: User’s Guide for more information.

Right-click any modeling node to get these actions in the menu.
- Select **Delete** to remove the node from the pipeline. If it is the only modeling node in the pipeline, then the Model Comparison and Output nodes are also removed.
- Select **Open** to open the code editor for the node. This option is not available for all modeling strategy nodes.
- Select **Modify Event Usage** to change the settings for events for the node in this pipeline or segment. See “Changing Event Usage in Modeling Strategies” in SAS Visual Forecasting: User’s Guide for more information.
- Select **Save as** to save the node, with any settings you have made in the Options panel on the right, to The Exchange. This makes the saved node available for other projects.
Select **Results** to view the results of the modeling strategy, including an execution summary, MAPE distribution, and other relevant data. For more information, see “Viewing the Results for a Modeling Strategy Node” in SAS Visual Forecasting: User’s Guide.

Select **Log** to view a log of the node’s processing.

Select **View code** to get a read-only view of the code for the modeling strategy.

Right-click the **Model Comparison** node to get these actions in the menu.

Select **Results** to view the MAPE distribution and summary statistics for each modeling node along with the selected champion model in the pipeline.

Select **Select champion model** to choose a champion model other than the one selected by the Model Comparison. If you choose a different champion model, you need to rerun the Model Comparison and Output nodes.

Use the following icons on the right side of the pipeline content area to manage your pipelines.

- Saves the pipeline as a template to The Exchange for use with other forecasting projects. External Forecasts should not be saved as a template because the new template cannot be used in any project.

- Displays a smaller scale view of the pipeline in the upper left corner. Hold your mouse down on this view and move it around to change the area of the pipeline that is displayed.

- Runs the pipeline.

- Stops a running pipeline.

- Deletes a pipeline. This is disabled if you have only one pipeline.

### Nodes Panel

On the left side of the pipeline is the **Nodes** panel. This panel lists the modeling strategy nodes that you can add to any pipeline.

If the **Nodes** panel is not displayed, click ▶️ on the left side of the pipeline to open it. You can collapse the panel again by clicking ◄.

You can drag a modeling node over the Data node in the pipeline to add it. To remove a modeling node, right-click the node and select **Delete**. Each pipeline requires at least one modeling node.

### Options Panel

The **Options** panel on the right side of the pipeline displays options that you can set for a selected node in the pipeline.

If the **Options** panel is not displayed, click ◄ to open it. You can collapse the panel again by clicking ▶️.

- All nodes in the pipeline have a **Description** option that you can update. Any description you provide is saved for the node only in the pipeline. The description for the node template in The Exchange is not affected by any updates that you make in the pipeline.

- Many modeling nodes in the pipeline have an **Open** button that you can use to view and edit the code inline. Use *SAS Visual Forecasting: Programming Guide* as a reference when you are working with this code. You cannot edit code for the following nodes:
After running a pipeline, any subsequent changes to the options for a modeling node move the pipeline back to out-of-date state. This is also true if you make a change and then change the setting back to the original value.

When a pipeline is running, the options for each modeling node in the pipeline cannot be changed until the pipeline completes. If you need to make further updates to a modeling node after starting the pipeline, click ■ and wait for the pipeline to stop operation before you make any changes.

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**Compare Modeling Nodes in a Pipeline**

Each pipeline must have one or more modeling nodes. The Model Comparison node shows the best model based on the selection criteria that you choose. If only one modeling node is present in the pipeline, it still provides an assessment of the accuracy of the model.

View the slideshow in SAS Help Center.

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**Create a Segmented Pipeline**

You can run different modeling strategies for different segments of your data. Before starting this exercise, make sure you have created the segmented attributes data set as described in “Segment Project Data” on page 2.

View the slideshow in SAS Help Center.
Creating Overrides

Before you can add any overrides, you must first run one or more pipelines and a champion pipeline must be selected. Any changes you make to the project settings can invalidate the selected champion pipeline. In this case, the pipelines must be run again and a new champion must be selected. When you are certain that the final champion pipeline is selected, you are ready to start working on applying overrides to the statistical forecasts from that pipeline. See “Running the Forecast Pipeline” in SAS Visual Forecasting: User’s Guide for more information.

When you are specifying overrides, it is important to remember the following:

- You can enter overrides only for the time periods in the forecast horizon. The forecast horizon is the period of time for which forecasts are computed. It starts after the end of the historical data and continues for the number of periods specified by the Number of forecast periods (horizon) option in the Project Settings dialog box. The end date for the series is the largest time ID value with a nonmissing value for the dependent variable.

- You cannot add a negative override if negative forecasts are not allowed in the project. To allow negative forecasts, you must select the Allow negative values for forecasts and overrides check box in the Overrides panel of the Project Settings dialog box. Changes to this setting require you to rerun the pipelines.

- If you create one or more overrides for one filter, you must submit those overrides before you can create overrides on another filter.

- Forecast values of 0 cannot be overridden.

- Override values cannot be pasted from the clipboard into the override cell. You can paste the value into the Set to a value field in the Override Calculator.

Follow these steps to add overrides:

1. In SAS Visual Forecasting, select the Overrides tab for the project.

2. Select one or more filters from the Attributes section. For example, you could select a single product name if you want to review the forecasts and submit any overrides for that product. Or you might select several store locations within a focused geographical location that often have similar results. Typically, you want to have some filter specifications already bookmarked. See “Creating Filters” in SAS Visual Forecasting: User’s Guide for more information.

3. To add an override for any forecasted time series, right-click the Override row for that time series and select Override Calculator. For more information about using this tool to create overrides, see “Override Calculator” in SAS Visual Forecasting: User’s Guide. You also have the option of entering a specific value directly in that table cell.
For each override, you can specify whether the override is locked or unlocked. This locking determines how SAS Visual Forecasting treats the override during the reconciliation process. For more information, see “Lock and Unlock Overrides” in SAS Visual Forecasting: User’s Guide.

4 When you have finished specifying overrides for a filter, click ‹ and select Submit All.

When you submit a pending override, SAS Visual Forecasting reconciles the override value with other overrides and constraints imposed on that time period. If no conflicts are found, the override’s status is applied and the final forecast shows the reconciled value. If conflicts are found, you must resolve them as described in “Working with Override Conflicts” in SAS Visual Forecasting: User’s Guide.
Collaborating

Share Projects to Other Groups

This exercise demonstrates how to share your forecasting projects with other users.

View the slideshow in SAS Help Center.
Reference

**Code Samples**
This section provides code samples that can be copied and pasted into SAS Studio for some of the exercises.

**Start a CAS Session**
These three statements can start a CAS session in SAS Studio with Public as the active library.

```sas
cas casauto;
libname mycas cas;
options cassessopts=(caslib="Public");
```

**Add a Segment Variable to an Attributes Data Set**
The following code provides a simple example for adding a _SEG_ variable to the SKINPRODUCT_ATTRIBUTES data set. This data set is available in the sample data sets for SAS Visual Forecasting.

```sas
data mycas.segment_attr (promote=yes); /* Specify the new data set */
  set public.skinproduct_attributes; /* Read in the attributes table */
  if Venue = 'Catalog' then _seg_ = 1; /* Assign Segments */
  if Venue = 'Grocery Store' then _seg_ = 2;
  if Venue = 'Internet' then _seg_ = 3;
  if Venue = 'Outlet Store' then _seg_ = 4;
  if Venue = 'Third Party Vendor' then _seg_ = 5;
run;
```