IBM SPSS Modeler 17 Python Scripting and Automation Guide

Note
Before using this information and the product it supports, read the information in "Notices" on page 307.

Product Information

This edition applies to version 17, release 0, modification 0 of IBM(r) SPSS(r) Modeler and to all subsequent releases and modifications until otherwise indicated in new editions.

Contents

Chapter 1. Scripting and the Scripting Language

Scripting Overview

Scripting in IBM® SPSS® Modeler is a powerful tool for automating processes in the user interface. Scripts can perform the same types of actions that you perform with a mouse or a keyboard, and you can use them to automate tasks that would be highly repetitive or time consuming to perform manually.

You can use scripts to:

- Impose a specific order for node executions in a stream.
- Set properties for a node as well as perform derivations using a subset of CLEM (Control Language for Expression Manipulation).
- Specify an automatic sequence of actions that normally involves user interaction--for example, you can build a model and then test it.
- Set up complex processes that require substantial user interaction--for example, cross-validation procedures that require repeated model generation and testing.
- Set up processes that manipulate streams—for example, you can take a model training stream, run it, and produce the corresponding model-testing stream automatically.

This chapter provides high-level descriptions and examples of stream-level scripts, standalone scripts, and scripts within SuperNodes in the IBM SPSS Modeler interface. More information on scripting language, syntax, and commands is provided in the chapters that follow.

Note: You cannot import and run scripts created in IBM SPSS Statistics within IBM SPSS Modeler.

Types of Scripts

IBM SPSS Modeler uses three types of scripts:

- **Stream scripts** are stored as a stream property and are therefore saved and loaded with a specific stream. For example, you can write a stream script that automates the process of training and applying a model nugget. You can also specify that whenever a particular stream is executed, the script should be run instead of the stream's canvas content.
- **Standalone scripts** are not associated with any particular stream and are saved in external text files. You might use a standalone script, for example, to manipulate multiple streams together.
- **SuperNode scripts** are stored as a SuperNode stream property. SuperNode scripts are only available in terminal SuperNodes. You might use a SuperNode script to control the execution sequence of the SuperNode contents. For nonterminal (source or process) SuperNodes, you can define properties for the SuperNode or the nodes it contains in your stream script directly.

Stream Scripts

Scripts can be used to customize operations within a particular stream, and they are saved with that stream. Stream scripts can be used to specify a particular execution order for the terminal nodes within a stream. You use the stream script dialog box to edit the script that is saved with the current stream.

To access the stream script tab in the Stream Properties dialog box:

1. From the Tools menu, choose:

   Stream Properties > **Execution**
2. Click the **Execution** tab to work with scripts for the current stream.

The toolbar icons at the top of the stream script dialog box let you perform the following operations:

- Import the contents of a preexisting standalone script into the window.
- Save a script as a text file.
- Print a script.
- Append default script.
- Edit a script (undo, cut, copy, paste, and other common edit functions).
- Execute the entire current script.
- Execute selected lines from a script.
- Stop a script during execution. (This icon is only enabled when a script is running.)
- Check the syntax of the script and, if any errors are found, display them for review in the lower panel of the dialog box.

From version 16.0 onwards, SPSS Modeler uses the Python scripting language. All versions before this used a scripting language unique to SPSS Modeler, now referred to as Legacy scripting. Depending on the type of script you are working with, on the **Execution** tab select the**Default (optional script)** execution mode and then select either **Python** or **Legacy**.

Additionally, you can specify whether this script should or should not be run when the stream is executed. You can select **Run this script** to run the script each time the stream is executed, respecting the execution order of the script. This setting provides automation at the stream level for quicker model building. However, the default setting is to ignore this script during stream execution. Even if you select the option **Ignore this script**, you can always run the script directly from this dialog box.

The script editor includes the following features that help with script authoring:

- Syntax highlighting; keywords, literal values (such as strings and numbers), and comments are highlighted.
- Line numbering.
- Block matching; when the cursor is placed by the start of a program block, the corresponding end block is also highlighted.
- Suggested auto-completion.

The colors and text styles used by the syntax highlighter can be customized using the IBM SPSS Modeler display preferences. You can access the display preferences by choosing **Tools** > **Options** > **User Options** and clicking the **Syntax** tab.

A list of suggested syntax completions can be accessed by selecting **Auto-Suggest** from the context menu, or pressing Ctrl + Space. Use the cursor keys to move up and down the list, then press Enter to insert the selected text. Press Esc to exit from auto-suggest mode without modifying the existing text.

The **Debug** tab displays debugging messages and can be used to evaluate script state once the script has been executed. The **Debug** tab consists of a read-only text area and a single line input text field. The text area displays text that is sent to either standard output or standard error by the scripts, for example through error message text. The input text field takes input from the user. This input is then evaluated within the context of the script that was most recently executed within the dialog (known as the *scripting context*). The text area contains the command and resulting output so that the user can see a trace of commands. The input text field always contains the command prompt (**-->** for legacy scripting).

A new scripting context is created in the following circumstances:

- A script is executed using the “Run this script” button or the “Run selected lines” button.
- The scripting language is changed.

If a new scripting context is created, the text area is cleared.

Note: Executing a stream outside of the script panel will not modify the script context of the script panel. The values of any variables created as part of that execution will not be visible within the script dialog.

Stream Script Example: Training a Neural Net

A stream can be used to train a neural network model when executed. Normally, to test the model, you might run the modeling node to add the model to the stream, make the appropriate connections, and execute an Analysis node.

Using an IBM SPSS Modeler script, you can automate the process of testing the model nugget after you have created it. For example, the following stream script to test the demo stream *druglearn.str* (available in the */Demos/streams/* folder under your IBM SPSS Modeler installation) could be run from the Stream Properties dialog (**Tools > Stream Properties > Script**):

```
stream = modeler.script.stream()
neuralnetnode = stream.findByType("neuralnetwork", None)
results = []
neuralnetnode.run(results)
appliernode = stream.createModelApplierAt(results[0], "Drug", 594, 187)
analysisnode = stream.createAt("analysis", "Drug", 688, 187)
typenode = stream.findByType("type", None)
stream.linkBetween(appliernode, typenode, analysisnode)
analysisnode.run([])
```

The following bullets describe each line in this script example.

- The first line defines a variable that points to the current stream.
- In line 2, the script finds the Neural Net builder node.
- In line 3, the script creates a list where the execution results can be stored.
- In line 4, the Neural Net model nugget is created. This is stored in the list defined on line 3.
- In line 5, a model apply node is created for the model nugget and placed on the stream canvas.
- In line 6, an analysis node called `Drug` is created.
- In line 7, the script finds the Type node.
- In line 8, the script connects the model apply node created in line 5 between the Type node and the Analysis node.
- Finally, the Analysis node is executed to produce the Analysis report.

It is possible to use a script to build and run a stream from scratch, starting with a blank canvas. To learn more about scripting language in general, see Scripting Language Overview.

Standalone Scripts

The Standalone Script dialog box is used to create or edit a script that is saved as a text file. It displays the name of the file and provides facilities for loading, saving, importing, and executing scripts.

To access the standalone script dialog box:

From the main menu, choose:

Tools > **Standalone Script**

The same toolbar and script syntax-checking options are available for standalone scripts as for stream scripts. See the topic "Stream Scripts" on page 1 for more information.

Standalone Script Example: Saving and Loading a Model

Standalone scripts are useful for stream manipulation. Suppose that you have two streams—one that creates a model and another that uses graphs to explore the generated rule set from the first stream with existing data fields. A standalone script for this scenario might look something like this:

```
taskrunner = modeler.script.session().getTaskRunner()

# Modify this to the correct Modeler installation Demos folder.
# Note use of forward slash and trailing slash.
installation = "C:/Program Files/IBM/SPSS/Modeler/16/Demos/"

# First load the model builder stream from file and build a model
druglearn_stream = taskrunner.openStreamFromFile(installation + "streams/druglearn.str", True)
results = []
druglearn_stream.findByType("c50", None).run(results)

# Save the model to file
taskrunner.saveModelToFile(results[0], "rule.gm")

# Now load the plot stream, read the model from file and insert it into the stream
drugplot_stream = taskrunner.openStreamFromFile(installation + "streams/drugplot.str", True)
model = taskrunner.openModelFromFile("rule.gm", True)
modelapplier = drugplot_stream.createModelApplier(model, "Drug")

# Now find the plot node, disconnect it and connect the
# model applier node between the derive node and the plot node
derivenode = drugplot_stream.findByType("derive", None)
plotnode = drugplot_stream.findByType("plot", None)
drugplot_stream.disconnect(plotnode)
modelapplier.setPositionBetween(derivenode, plotnode)
drugplot_stream.linkBetween(modelapplier, derivenode, plotnode)
plotnode.setPropertyValue("color_field", "$C-Drug")
plotnode.run([])
```

Note: To learn more about scripting language in general, see Scripting Language Overview.

Standalone Script Example: Generating a Feature Selection Model

Starting with a blank canvas, this example builds a stream that generates a Feature Selection model, applies the model, and creates a table that lists the 15 most important fields relative to the specified target.

```
stream = modeler.script.session().createProcessorStream("featureselection", True)

statisticsimportnode = stream.createAt("statisticsimport", "Statistics File", 150, 97)
statisticsimportnode.setPropertyValue("full_filename", "$CLEO_DEMOS/customer_dbase.sav")

typenode = stream.createAt("type", "Type", 258, 97)
typenode.setKeyedPropertyValue("direction", "response_01", "Target")

featureselectionnode = stream.createAt("featureselection", "Feature Selection", 366, 97)
featureselectionnode.setPropertyValue("top_n", 15)
featureselectionnode.setPropertyValue("max_missing_values", 80.0)
featureselectionnode.setPropertyValue("selection_mode", "TopN")
featureselectionnode.setPropertyValue("important_label", "Check Me Out!")
featureselectionnode.setPropertyValue("criteria", "Likelihood")

stream.link(statisticsimportnode, typenode)
stream.link(typenode, featureselectionnode)
models = []
featureselectionnode.run(models)

# Assumes the stream automatically places model apply nodes in the stream
```

```
applynode = stream.findByType("applyfeatureselection", None)
tablenode = stream.createAt("table", "Table", applynode.getXPosition() + 96, applynode.getYPosition())
stream.link(applynode, tablenode)
tablenode.run([])
```

The script creates a source node to read in the data, uses a Type node to set the role (direction) for the `response_01` field to `Target`, and then creates and executes a Feature Selection node. The script also connects the nodes and positions each on the stream canvas to produce a readable layout. The resulting model nugget is then connected to a Table node, which lists the 15 most important fields as determined by the `selection_mode` and `top_n` properties. See the topic "featureselectionnode Properties" on page 179 for more information.

SuperNode Scripts

You can create and save scripts within any terminal SuperNodes using IBM SPSS Modeler's scripting language. These scripts are only available for terminal SuperNodes and are often used when creating template streams or to impose a special execution order for the SuperNode contents. SuperNode scripts also enable you to have more than one script running within a stream.

For example, let's say you needed to specify the order of execution for a complex stream, and your SuperNode contains several nodes including a SetGlobals node, which needs to be executed before deriving a new field used in a Plot node. In this case, you can create a SuperNode script that executes the SetGlobals node first. Values calculated by this node, such as the average or standard deviation, can then be used when the Plot node is executed.

Within a SuperNode script, you can specify node properties in the same manner as other scripts. Alternatively, you can change and define the properties for any SuperNode or its encapsulated nodes directly from a stream script. See the topic Chapter 19, "SuperNode Properties," on page 291 for more information. This method works for source and process SuperNodes as well as terminal SuperNodes.

Note: Since only terminal SuperNodes can execute their own scripts, the Scripts tab of the SuperNode dialog box is available only for terminal SuperNodes.

To open the SuperNode script dialog box from the main canvas:

Select a terminal SuperNode on the stream canvas and, from the SuperNode menu, choose:

SuperNode Script...

To open the SuperNode script dialog box from the zoomed-in SuperNode canvas:

Right-click on the SuperNode canvas, and from the context menu, choose:

SuperNode Script...

SuperNode Script Example

The following SuperNode script declares the order in which the terminal nodes inside the SuperNode should be executed. This order ensures that the Set Globals node is executed first so that the values calculated by this node can then be used when another node is executed.

```
execute 'Set Globals'
execute 'gains'
execute 'profit'
execute 'age v. $CC-pep'
execute 'Table'
```

Looping and conditional execution in streams

From version 16.0 onwards, SPSS Modeler enables you to create some basic scripts from within a stream by selecting values within various dialog boxes instead of having to write instructions directly in the scripting language. The two main types of scripts you can create in this way are simple loops and a way to execute nodes if a condition has been met.

You can combine both looping and conditional execution rules within a stream. For example, you may have data relating to sales of cars from manufacturers worldwide. You could set up a loop to process the data in a stream, identifying details by the country of manufacture, and output the data to different graphs showing details such as sales volume by model, emissions levels by both manufacturer and engine size, and so on. If you were interested in analyzing European information only, you could also add conditions to the looping that prevented graphs being created for manufacturers based in America and Asia.

Note: Because both looping and conditional execution are based on background scripts they are only applied to a whole stream when it is run.

- **Looping** You can use looping to automate repetitive tasks. For example, this might mean adding a given number of nodes to a stream and changing one node parameter each time. Alternatively, you could control the running of a stream or branch again and again for a given number of times, as in the following examples:
  - Run the stream a given number of times and change the source each time.
  - Run the stream a given number of times, changing the value of a variable each time.
  - Run the stream a given number of times, entering one extra field on each execution.
  - Build a model a given number of times and change a model setting each time.
- **Conditional Execution** You can use this to control how terminal nodes are run, based on conditions that you predefine, examples may include the following:
  - Based on whether a given value is true or false, control if a node will be run.
  - Define whether looping of nodes will be run in parallel or sequentially.

Both looping and conditional execution are set up on the Execution tab within the Stream Properties dialog box. Any nodes that are used in conditional or looping requirements are shown with an additional symbol attached to them on the stream canvas to indicate that they are taking part in looping and conditional execution.

You can access the Execution tab in one of 3 ways:

- Using the menus at the top of the main dialog box:
  1. From the Tools menu, choose:

     Stream Properties > **Execution**
  2. Click the Execution tab to work with scripts for the current stream.
- From within a stream:
  1. Right-click on a node and choose **Looping/Conditional Execution**.
  2. Select the relevant submenu option.
- From the graphic toolbar at the top of the main dialog box, click the stream properties icon.

If this is the first time you have set up either looping or conditional execution details, on the Execution tab select the **Looping/Conditional Execution** execution mode and then select either the **Conditional** or **Looping** subtab.

Looping in streams

With looping you can automate repetitive tasks in streams; examples may include the following:

- Run the stream a given number of times and change the source each time.
- Run the stream a given number of times, changing the value of a variable each time.
- Run the stream a given number of times, entering one extra field on each execution.
- Build a model a given number of times and change a model setting each time.

You set up the conditions to be met on the **Looping** subtab of the stream Execution tab. To display the subtab, select the **Looping/Conditional Execution** execution mode.

Any looping requirements that you define will take effect when you run the stream, if the **Looping/Conditional Execution** execution mode has been set. Optionally, you can generate the script code for your looping requirements and paste it into the script editor by clicking **Paste...** in the bottom right corner of the Looping subtab; the main Execution tab display changes to show the **Default (optional script)** execution mode with the script in the top part of the tab. This means that you can define a looping structure using the various looping dialog box options before generating a script that you can customize further in the script editor. Note that when you click **Paste...** any conditional execution requirements you have defined will also be displayed in the generated script.

Important: The looping variables that you set in a SPSS Modeler stream may be overridden if you run the stream in a IBM SPSS Collaboration and Deployment Services job. This is because the IBM SPSS Collaboration and Deployment Services job editor entry overrides the SPSS Modeler entry. For example, if you set a looping variable in the stream to create a different output file name for each loop, the files are correctly named in SPSS Modeler but are overridden by the fixed entry entered on the Result tab of the IBM SPSS Collaboration and Deployment Services Deployment Manager.

To set up a loop

1. Create an iteration key to define the main looping structure to be carried out in a stream. See Create an iteration key for more information.
2. Where needed, define one or more iteration variables. See Create an iteration variable for more information.
3. The iterations and any variables you created are shown in the main body of the subtab. By default, iterations are executed in the order they appear; to move an iteration up or down the list, click on it to select it then use the up or down arrow in the right hand column of the subtab to change the order.

Creating an iteration key for looping in streams

You use an iteration key to define the main looping structure to be carried out in a stream. For example, if you are analyzing car sales, you could create a stream parameter *Country of manufacture* and use this as the iteration key; when the stream is run this key is set to each different country value in your data during each iteration. Use the Define Iteration Key dialog box to set up the key.

To open the dialog box, either select the **Iteration Key...** button in the bottom left corner of the Looping subtab, or right click on any node in the stream and select either **Looping/Conditional Execution** > **Define Iteration Key (Fields)** or **Looping/Conditional Execution** > **Define Iteration Key (Values)**. If you open the dialog box from the stream, some of the fields may be completed automatically for you, such as the name of the node.

To set up an iteration key, complete the following fields:

Iterate on. You can select from one of the following options:

- **Stream Parameter - Fields**. Use this option to create a loop that sets the value of an existing stream parameter to each specified field in turn.

- **Stream Parameter - Values**. Use this option to create a loop that sets the value of an existing stream parameter to each specified value in turn.
- **Node Property - Fields**. Use this option to create a loop that sets the value of a node property to each specified field in turn.
- **Node Property - Values**. Use this option to create a loop that sets the value of a node property to each specified value in turn.

What to Set. Choose the item that will have its value set each time the loop is executed. You can select from one of the following options:

- **Parameter**. Only available if you select either **Stream Parameter - Fields** or **Stream Parameter - Values**. Select the required parameter from the available list.
- **Node**. Only available if you select either **Node Property - Fields** or **Node Property - Values**. Select the node for which you want to set up a loop. Click the browse button to open the Select Node dialog and choose the node you want; if there are too many nodes listed you can filter the display to only show certain types of nodes by selecting one of the following categories: Source, Process, Graph, Modeling, Output, Export, or Apply Model nodes.
- **Property**. Only available if you select either **Node Property - Fields** or **Node Property - Values**. Select the property of the node from the available list.

Fields to Use. Only available if you select either **Stream Parameter - Fields** or **Node Property - Fields**. Choose the field, or fields, within a node to use to provide the iteration values. You can select from one of the following options:

- **Node**. Only available if you select **Stream Parameter - Fields**. Select the node that contains the details for which you want to set up a loop. Click the browse button to open the Select Node dialog and choose the node you want; if there are too many nodes listed you can filter the display to only show certain types of nodes by selecting one of the following categories: Source, Process, Graph, Modeling, Output, Export, or Apply Model nodes.
- **Field List**. Click the list button in the right column to display the Select Fields dialog box, within which you select the fields in the node to provide the iteration data. See "Selecting fields for iterations" on page 9 for more information.

Values to Use. Only available if you select either **Stream Parameter - Values** or **Node Property - Values**. Choose the value, or values, within the selected field to use as iteration values. You can select from one of the following options:

- **Node**. Only available if you select **Stream Parameter - Values**. Select the node that contains the details for which you want to set up a loop. Click the browse button to open the Select Node dialog and choose the node you want; if there are too many nodes listed you can filter the display to only show certain types of nodes by selecting one of the following categories: Source, Process, Graph, Modeling, Output, Export, or Apply Model nodes.
- **Field List**. Select the field in the node to provide the iteration data.
- **Value List**. Click the list button in the right column to display the Select Values dialog box, within which you select the values in the field to provide the iteration data.

Creating an iteration variable for looping in streams

You can use iteration variables to change the values of stream parameters or properties of selected nodes within a stream each time a loop is executed. For example, if your stream loop is analyzing car sales data and using *Country of manufacture* as the iteration key, you may have one graph output showing sales by model and another graph output showing exhaust emissions information. In these cases you could create iteration variables that create new titles for the resultant graphs, such as *Swedish vehicle emissions* and *Japanese car sales by model*. Use the Define Iteration Variable dialog box to set up any variables that you require.

To open the dialog box, either select the **Add Variable...** button in the bottom left corner of the Looping subtab, or right click on any node in the stream and select:**Looping/Conditional Execution** > **Define Iteration Variable**.

To set up an iteration variable, complete the following fields:

Change. Select the type of attribute that you want to amend. You can choose from either **Stream Parameter** or **Node Property**.

- If you select **Stream Parameter**, choose the required parameter and then, by using one of the following options, if available in your stream, define what the value of that parameter should be set to with each iteration of the loop:
  - **Global variable**. Select the global variable that the stream parameter should be set to.
  - **Table output cell**. To set a stream parameter to be the value in a table output cell, select the table from the list and enter the **Row** and **Column** to be used.
  - **Enter manually**. Select this if you want to manually enter a value for this parameter to take in each iteration. When you return to the Looping subtab a new column is created into which you enter the required text.
- If you select **Node Property**, choose the required node and one of its properties and then set the value you want to use for that property. Set the new property value by using one of the following options:
  - **Alone**. The property value will use the iteration key value. See "Creating an iteration key for looping in streams" on page 7 for more information.
  - **As prefix to stem**. Uses the iteration key value as a prefix to what you enter in the **Stem** field.
  - **As suffix to stem**. Uses the iteration key value as a suffix to what you enter in the **Stem** field

  If you select either the prefix or suffix option you are prompted to add the additional text to the **Stem** field. For example, if your iteration key value is *Country of manufacture*, and you select **As prefix to stem**, you might enter - *sales by model* in this field.

Selecting fields for iterations

When creating iterations you can select one or more fields using the Select Fields dialog box.

Sort by You can sort available fields for viewing by selecting one of the following options:

- **Natural** View the order of fields as they have been passed down the data stream into the current node.
- **Name** Use alphabetical order to sort fields for viewing.
- **Type** View fields sorted by their measurement level. This option is useful when selecting fields with a particular measurement level.

Select fields from the list one at a time or use the Shift-click and Ctrl-click methods to select multiple fields. You can also use the buttons below the list to select groups of fields based on their measurement level, or to select or deselect all fields in the table.

Note that the fields available for selection are filtered to show only the fields that are appropriate for the stream parameter or node property you are using. For example, if you are using a stream parameter that has a storage type of String, only fields that have a storage type of String are shown.

Conditional execution in streams

With conditional execution you can control how terminal nodes are run, based on the stream contents matching conditions that you define; examples may include the following:

- Based on whether a given value is true or false, control if a node will be run.
- Define whether looping of nodes will be run in parallel or sequentially.

You set up the conditions to be met on the **Conditional** subtab of the stream Execution tab. To display the subtab, select the **Looping/Conditional Execution** execution mode.

Any conditional execution requirements that you define will take effect when you run the stream, if the **Looping/Conditional Execution** execution mode has been set. Optionally, you can generate the script code for your conditional execution requirements and paste it into the script editor by clicking **Paste...** in the bottom right corner of the Conditional subtab; the main Execution tab display changes to show the **Default (optional script)** execution mode with the script in the top part of the tab. This means that you can define conditions using the various looping dialog box options before generating a script that you can customize further in the script editor. Note that when you click **Paste...** any looping requirements you have defined will also be displayed in the generated script.

To set up a condition:

1. In the right hand column of the Conditional subtab, click the Add New Condition button  to open the Add Conditional Execution Statement dialog box. In this dialog you specify the condition that must be met in order for the node to be executed.
2. In the Add Conditional Execution Statement dialog box, specify the following:
   a. **Node**. Select the node for which you want to set up conditional execution. Click the browse button to open the Select Node dialog and choose the node you want; if there are too many nodes listed you can filter the display to show nodes by one of the following categories: Export, Graph, Modeling, or Output node.
   b. **Condition based on**. Specify the condition that must be met for the node to be executed. You can choose from one of four options: **Stream parameter**, **Global variable**, **Table output cell**, or **Always true**. The details you enter in the bottom half of the dialog box are controlled by the condition you choose.
      - **Stream parameter**. Select the parameter from the list available and then choose the **Operator** for that parameter; for example, the operator may be More than, Equals, Less than, Between, and so on. You then enter the **Value**, or minimum and maximum values, depending on the operator.
      - **Global variable**. Select the variable from the list available; for example, this might include: Mean, Sum, Minimum value, Maximum value, or Standard deviation. You then select the **Operator** and values required.
      - **Table output cell**. Select the table node from the list available and then choose the **Row** and **Column** in the table. You then select the **Operator** and values required.
      - **Always true**. Select this option if the node must always be executed. If you select this option, there are no further parameters to select.
3. Repeat steps 1 and 2 as often as required until you have set up all the conditions you require. The node you selected and the condition to be met before that node is executed are shown in the main body of the subtab in the **Execute Node** and **If this condition is true** columns respectively.
4. By default, nodes and conditions are executed in the order they appear; to move a node and condition up or down the list, click on it to select it then use the up or down arrow in the right hand column of the subtab to change the order.

In addition, you can set the following options at the bottom of the Conditional subtab:

- **Evaluate all in order**. Select this option to evaluate each condition in the order in which they are shown on the subtab. The nodes for which conditions have been found to be "True" will all be executed once all the conditions have been evaluated.
- **Execute one at a time**. Only available if **Evaluate all in order** is selected. Selecting this means that if a condition is evaluated as "True", the node associated with that condition is executed before the next condition is evaluated.
- **Evaluate until first hit**. Selecting this means that only the first node that returns a "True" evaluation from the conditions you specified will be run.

Executing and Interrupting Scripts

A number of ways of executing scripts are available. For example, on the stream script or standalone script dialog, the "Run this script" button executes the complete script:

Figure 1. Run This Script button

The "Run selected lines" button executes a single line, or a block of adjacent lines, that you have selected in the script:

Figure 2. Run Selected Lines button

You can execute a script using any of the following methods:

- Click the "Run this script" or "Run selected lines" button within a stream script or standalone script dialog box.
- Run a stream where **Run this script** is set as the default execution method.
- Use the `-execute` flag on startup in interactive mode. See the topic “Using Command Line Arguments” on page 61 for more information.

Note: A SuperNode script is executed when the SuperNode is executed as long as you have selected **Run this script** within the SuperNode script dialog box.

Interrupting Script Execution

Within the stream script dialog box, the red stop button is activated during script execution. Using this button, you can abandon the execution of the script and any current stream.

Find and Replace

The Find/Replace dialog box is available in places where you edit script or expression text, including the script editor, CLEM expression builder, or when defining a template in the Report node. When editing text in any of these areas, press `Ctrl+F` to access the dialog box, making sure cursor has focus in a text area. If working in a Filler node, for example, you can access the dialog box from any of the text areas on the Settings tab, or from the text field in the Expression Builder.

1. With the cursor in a text area, press Ctrl+F to access the Find/Replace dialog box.
2. Enter the text you want to search for, or choose from the drop-down list of recently searched items.
3. Enter the replacement text, if any.
4. Click **Find Next** to start the search.
5. Click **Replace** to replace the current selection, or **Replace All** to update all or selected instances.
6. The dialog box closes after each operation. Press F3 from any text area to repeat the last find operation, or press Ctrl+F to access the dialog box again.

Search Options

Match case. Specifies whether the find operation is case-sensitive; for example, whether *myvar* matches *myVar*. Replacement text is always inserted exactly as entered, regardless of this setting.

Whole words only. Specifies whether the find operation matches text embedded within words. If selected, for example, a search on *spider* will not match *spiderman* or *spider-man*.

Regular expressions. Specifies whether regular expression syntax is used (see next section). When selected, the **Whole words only** option is disabled and its value is ignored.

Selected text only. Controls the scope of the search when using the **Replace All** option.

Regular Expression Syntax

Regular expressions allow you to search on special characters such as tabs or newline characters, classes or ranges of characters such as *a* through *d*, any digit or non-digit, and boundaries such as the beginning or end of a line. The following types of expressions are supported.

Table 1. Character matches.

Characters	Matches
x	The character x
\\	The backslash character
\0n	The character with octal value 0n (0 <= n <= 7)
\0nn	The character with octal value 0nn (0 <= n <= 7)
\0mnn	The character with octal value 0mnn (0 <= m <= 3, 0 <= n <= 7)
\xhh	The character with hexadecimal value 0xhh
\uhhhh	The character with hexadecimal value 0xhhhh
\t	The tab character ('\u0009')
\n	The newline (line feed) character ('\u000A')
\r	The carriage-return character ('\u000D')
\f	The form-feed character ('\u000C')
\a	The alert (bell) character ('\u0007')
\e	The escape character ('\u001B')
\cx	The control character corresponding to x

Table 2. Matching character classes.

Character classes	Matches
[abc]	a, b, or c (simple class)
[^abc]	Any character except a, b, or c (subtraction)
[a-zA-Z]	a through z or A through Z, inclusive (range)
[a-d[m-p]]	a through d, or m through p (union). Alternatively this could be specified as [a-dm-p]
[a-z&&[def]]	a through z, and d, e, or f (intersection)
[a-z&&[^bc]]	a through z, except for b and c (subtraction). Alternatively this could be specified as [ad-z]
[a-z&&[^m-p]]	a through z, and not m through p (subtraction). Alternatively this could be specified as [a-lq-z]

Table 3. Predefined character classes.

Predefined character classes	Matches
.	Any character (may or may not match line terminators)

Table 3. Predefined character classes (continued).

Predefined character classes	Matches
\d	Any digit: [0-9]
\D	A non-digit: [^0-9]
\s	A white space character: [\t\n\x0B\f\r]
\S	A non-white space character: [^\s]
\w	A word character: [a-zA-Z_0-9]
\W	A non-word character: [^\w]

Table 4. Boundary matches.

Boundary matchers	Matches
^	The beginning of a line
$	The end of a line
\b	A word boundary
\B	A non-word boundary
\A	The beginning of the input
\Z	The end of the input but for the final terminator, if any
\z	The end of the input

Chapter 2. The Scripting Language

Scripting Language Overview

The scripting facility for IBM SPSS Modeler enables you to create scripts that operate on the SPSS Modeler user interface, manipulate output objects, and run command syntax. You can run scripts directly from within SPSS Modeler.

Scripts in IBM SPSS Modeler are written in the scripting language Python. The Java-based implementation of Python that is used by IBM SPSS Modeler is called Jython. The scripting language consists of the following features:

- A format for referencing nodes, streams, projects, output, and other IBM SPSS Modeler objects.
- A set of scripting statements or commands that can be used to manipulate these objects.
- A scripting expression language for setting the values of variables, parameters, and other objects.
- Support for comments, continuations, and blocks of literal text.

The following sections describe the Python scripting language, the Jython implementation of Python, and the basic syntax for getting started with scripting within IBM SPSS Modeler. Information about specific properties and commands is provided in the sections that follow.

Python and Jython

Jython is an implementation of the Python scripting language, which is written in the Java language and integrated with the Java platform. Python is a powerful object-oriented scripting language. Jython is useful because it provides the productivity features of a mature scripting language and, unlike Python, runs in any environment that supports a Java virtual machine (JVM). This means that the Java libraries on the JVM are available to use when you are writing programs. With Jython, you can take advantage of this difference, and use the syntax and most of the features of the Python language

As a scripting language, Python (and its Jython implementation) is easy to learn and efficient to code, and has minimal required structure to create a running program. Code can be entered interactively, that is, one line at a time. Python is an interpreted scripting language; there is no precompile step, as there is in Java. Python programs are simply text files that are interpreted as they are input (after parsing for syntax errors). Simple expressions, like defined values, as well as more complex actions, such as function definitions, are immediately executed and available for use. Any changes that are made to the code can be tested quickly. Script interpretation does, however, have some disadvantages. For example, use of an undefined variable is not a compiler error, so it is detected only if (and when) the statement in which the variable is used is executed. In this case, the program can be edited and run to debug the error.

Python sees everything, including all data and code, as an object. You can, therefore, manipulate these objects with lines of code. Some select types, such as numbers and strings, are more conveniently considered as values, not objects; this is supported by Python. There is one null value that is supported. This null value has the reserved name `None`.

For a more in-depth introduction to Python and Jython scripting, and for some example scripts, see http://www.ibm.com/developerworks/java/tutorials/j-jython1/j-jython1.html and http://www.ibm.com/developerworks/java/tutorials/j-jython2/j-jython2.html .

Python Scripting

This guide to the Python scripting language is an introduction to the components that are most likely to be used when scripting in IBM SPSS Modeler, including concepts and programming basics. This will provide you with enough knowledge to start developing your own Python scripts to use within IBM SPSS Modeler.

Operations

Assignment is done using an equals sign (=). For example, to assign the value "3" to a variable called "x" you would use the following statement:

```
x = 3
```

The equals sign is also used to assign string type data to a variable. For example, to assign the value "a string value" to the variable "y" you would use the following statement:

```
y = "a string value"
```

The following table lists some commonly used comparison and numeric operations, and their descriptions.

Table 5. Common comparison and numeric operations

Operation	Description
`x < y`	Is x less than y?
`x > y`	Is x greater than y?
`x <= y`	Is x less than or equal to y?
`x >= y`	Is x greater than or equal to y?
`x == y`	Is x equal to y?
`x != y`	Is x not equal to y?
`x <> y`	Is x not equal to y?
`x + y`	Add y to x
`x - y`	Subtract y from x
`x * y`	Multiply x by y
`x / y`	Divide x by y
`x ** y`	Raise x to the y power

Lists

Lists are sequences of elements. A list can contain any number of elements, and the elements of the list can be any type of object. Lists can also be thought of as arrays. The number of elements in a list can increase or decrease as elements are added, removed, or replaced.

Examples

`[]`	Any empty list.
`[1]`	A list with a single element, an integer.
`["Mike", 10, "Don", 20]`	A list with four elements, two string elements and two integer elements.
`[[],[7],[8,9]]`	A list of lists. Each sub-list is either an empty list or a list of integer elements.

```
x = 7; y = 2; z = 3;
[1, x, y, x + y]
```

A list of integers. This example demonstrates the use of variables and expressions.

You can assign a list to a variable, for example:

```
mylist1 = ["one", "two", "three"]
```

You can then access specific elements of the list, for example:

```
mylist[0]
```

This will result in the following output:

```
one
```

The number in the brackets ([]) is known as an *index* and refers to a particular element of the list. The elements of a list are indexed starting from 0.

You can also select a range of elements of a list; this is called *slicing*. For example, `x[1:3]` selects the second and third elements of `x`. The end index is one past the selection.

Strings

A *string* is an immutable sequence of characters that is treated as a value. Strings support all of the immutable sequence functions and operators that result in a new string. For example, `"abcdef"[1:4]` results in the output `"bcd"`.

In Python, characters are represented by strings of length one.

Strings literals are defined by the use of single or triple quoting. Strings that are defined using single quotes cannot span lines, while strings that are defined using triple quotes can. A string can be enclosed in single quotes (') or double quotes ("). A quoting character may contain the other quoting character un-escaped or the quoting character escaped, that is preceded by the backslash (\) character.

Examples

```
"This is a string"
'This is also a string'
"It's a string"
'This book is called "Python Scripting and Automation Guide".'
"This is an escape quote (\") in a quoted string"
```

Multiple strings separated by white space are automatically concatenated by the Python parser. This makes it easier to enter long strings and to mix quote types in a single string, for example:

```
"This string uses ' and " 'that string uses ".'
```

This results in the following output:

```
This string uses ' and that string uses ".
```

Strings support several useful methods. Some of these methods are given in the following table.

Table 6. String methods

Method	Usage
`s.capitalize()`	Initial capitalize `s`
`s.count(ss {,start {,end}})`	Count the occurrences of `ss` in `s[start:end]`
`s.startswith(str {, start {, end}})` `s.endswith(str {, start {, end}})`	Test to see if `s` starts with `str` Test to see if `s` ends with `str`

Table 6. String methods (continued)

Method	Usage
`s.expandtabs({size})`	Replace tabs with spaces, default `size` is 8
`s.find(str {, start {, end}})` `s.rfind(str {, start {, end}})`	Finds first index of `str` in `s`; if not found, the result is -1. `rfind` searches right to left.
`s.index(str {, start {, end}})` `s.rindex(str {, start {, end}})`	Finds first index of `str` in `s`; if not found: raise `ValueError`. `rindex` searches right to left.
`s.isalnum`	Test to see if the string is alphanumeric
`s.isalpha`	Test to see if the string is alphabetic
`s.isnum`	Test to see if the string is numeric
`s.isupper`	Test to see if the string is all uppercase
`s.islower`	Test to see if the string is all lowercase
`s.isspace`	Test to see if the string is all whitespace
`s.istitle`	Test to see if the string is a sequence of initial cap alphanumeric strings

`s.lower()`
`s.upper()`
`s.swapcase()`
`s.title()`
	Convert to all lower case
	Convert to all upper case
	Convert to all opposite case
	Convert to all title case

`s.join(seq)`	Join the strings in `seq` with `s` as the separator
`s.splitlines({keep})`	Split `s` into lines, if keep is `true`, keep the new lines
`s.split({sep {, max}})`	Split `s` into "words" using `sep` (default `sep` is a white space) for up to `max` times

`s.ljust(width)`
`s.rjust(width)`
`s.center(width)`
`s.zfill(width)`
	Left justify the string in a field `width` wide
	Right justify the string in a field `width` wide
	center justify the string in a field `width` wide
	Fill with 0.

`s.lstrip()`
`s.rstrip()`
`s.strip()`
	Remove leading white space
	Remove trailing white space
	Remove leading and trailing white space

`s.translate(str {,delc})`	Translate `s` using table, after removing any characters in `delc`. `str` should be a string with length `== 256`.
`s.replace(old, new {, max})`	Replaces all or `max` occurrences of string `old` with string `new`

Remarks

Remarks are comments that are introduced by the pound (or hash) sign (#). All text that follows the pound sign on the same line is considered part of the remark and is ignored. A remark can start in any column. The following example demonstrates the use of remarks:

```
#The HelloWorld application is one of the most simple
print 'Hello World' # print the Hello World line
```

Statement Syntax

The statement syntax for Python is very simple. In general, each source line is a single statement. Except for `expression` and `assignment` statements, each statement is introduced by a keyword name, such as `if` or `for`. Blank lines or remark lines can be inserted anywhere between any statements in the code. If there is more than one statement on a line, each statement must be separated by a semicolon (`;`).

Very long statements can continue on more than one line. In this case the statement that is to continue on to the next line must end with a backslash (\), for example:

```
x = "A looooooooooooooooooong string" + \
     "another looooooooooooooooooong string"
```

When a structure is enclosed by parentheses (()), brackets ([]), or curly braces ({}), the statement can be continued on to a new line after any comma, without having to insert a backslash, for example:

```
x = (1, 2, 3, "hello",
      "goodbye", 4, 5, 6)
```

Identifiers

Identifiers are used to name variables, functions, classes and keywords. Identifiers can be any length, but must start with either an alphabetical character of upper or lower case, or the underscore character (_). Names that start with an underscore are generally reserved for internal or private names. After the first character, the identifier can contain any number and combination of alphabetical characters, numbers from 0-9, and the underscore character.

There are some reserved words in Jython that cannot be used to name variables, functions, or classes. They fall under the following categories:

- **Statement introducers:** `assert`, `break`, `class`, `continue`, `def`, `del`, `elif`, `else`, `except`, `exec`, `finally`, `for`, `from`, `global`, `if`, `import`, `pass`, `print`, `raise`, `return`, `try`, and `while`
- **Parameter introducers:** `as`, `import`, and `in`
- **Operators:** `and`, `in`, `is`, `lambda`, `not`, and `or`

Improper keyword use generally results in a `SyntaxError`.

Blocks of Code

Blocks of code are groups of statements that are used where single statements are expected. Blocks of code can follow any of the following statements: `if`, `elif`, `else`, `for`, `while`, `try`, `except`, `def`, and `class`. These statements introduce the block of code with the colon character (`:`), for example:

```
if x == 1:
    y = 2
    z = 3
elif:
    y = 4
    z = 5
```

Indentation is used to delimit code blocks (rather than the curly braces that are used in Java). All lines in a block must be indented to the same position. This is because a change in the indentation indicates the end of a code block. It is usual to indent by four spaces per level. It is recommended that spaces are used to indent the lines, rather than tabs. Spaces and tabs must not be mixed. The lines in the outermost block of a module must start at column one, else a `SyntaxError` will occur.

The statements that make up a code block (and follow the colon) can also be on a single line, separated by semicolons, for example:

```
if x == 1: y = 2; z = 3;
```

Passing Arguments to a Script

Passing arguments to a script is useful as it means a script can be used repeatedly without modification. The arguments that are passed on the command line are passed as values in the list `sys.argv`. The number of values passed can be obtained by using the command `len(sys.argv)`. For example:

```
import sys
print "test1"
print sys.argv[0]
print sys.argv[1]
print len(sys.argv)
```

In this example, the `import` command imports the entire `sys` class so that the methods that exist for this class, such as `argv`, can be used.

The script in this example can be invoked using the following line:

```
/u/mjloos/test1 mike don
```

The result is the following output:

```
/u/mjloos/test1 mike don
test1
mike
don
3
```

Examples

The `print` keyword prints the arguments immediately following it. If the statement is followed by a comma, a new line is not included in the output. For example:

```
print "This demonstrates the use of a",
print " comma at the end of a print statement."
```

This will result in the following output:

```
This demonstrates the use of a comma at the end of a print statement.
```

The `for` statement is used to iterate through a block of code. For example:

```
mylist1 = ["one", "two", "three"]
for lv in mylist1:
    print lv
    continue
```

In this example, three strings are assigned to the list `mylist1`. The elements of the list are then printed, with one element of each line. This will result in the following output:

```
one
two
three
```

In this example, the iterator `lv` takes the value of each element in the list `mylist1` in turn as the for loop implements the code block for each element. An iterator can be any valid identifier of any length.

The `if` statement is a conditional statement. It evaluates the condition and returns either true or false, depending on the result of the evaluation. For example:

```
mylist1 = ["one", "two", "three"]
for lv in mylist1:
    if lv == "two"
        print "The value of lv is ", lv
    else
        print "The value of lv is not two, but ", lv
    continue
```

In this example, the value of the iterator `lv` is evaluated. If the value of `lv` is `two` a different string is returned to the string that is returned if the value of `lv` is not `two`. This results in the following output:

```
The value of lv is not two, but one
The value of lv is two
The value of lv is not two, but three
```

Mathematical Methods

From the `math` module you can access useful mathematical methods. Some of these methods are given in the following table. Unless specified otherwise, all values are returned as floats.

Table 7. Mathematical methods

Method	Usage
`math.ceil(x)`	Return the ceiling of `x` as a float, that is the smallest integer greater than or equal to `x`
`math.copysign(x, y)`	Return `x` with the sign of `y`. `copysign(1, -0.0)` returns `-1`
`math.fabs(x)`	Return the absolute value of `x`
`math.factorial(x)`	Return `x` factorial. If `x` is negative or not an integer, a `ValueError` is raised.
`math.floor(x)`	Return the floor of `x` as a float, that is the largest integer less than or equal to `x`
`math.frexp(x)`	Return the mantissa (`m`) and exponent (`e`) of `x` as the pair `(m, e)`. `m` is a float and `e` is an integer, such that `x == m * 2**e` exactly. If `x` is zero, returns `(0.0, 0)`, otherwise `0.5 <= abs(m) < 1`.
`math.fsum(iterable)`	Return an accurate floating point sum of values in `iterable`
`math.isinf(x)`	Check if the float `x` is positive or negative infinitive
`math.isnan(x)`	Check if the float `x` is `NaN` (not a number)
`math.ldexp(x, i)`	Return `x * (2**i)`. This is essentially the inverse of the function `frexp`.
`math.modf(x)`	Return the fractional and integer parts of `x`. Both results carry the sign of `x` and are floats.
`math.trunc(x)`	Return the `Real` value `x`, that has been truncated to an `Integral`.
`math.exp(x)`	Return `e**x`
`math.log(x[, base])`	Return the logarithm of `x` to the given value of `base`. If `base` is not specified, the natural logarithm of `x` is returned.
`math.log1p(x)`	Return the natural logarithm of `1+x` (`base e`)
`math.log10(x)`	Return the base-10 logarithm of `x`
`math.pow(x, y)`	Return `x` raised to the power `y`. `pow(1.0, x)` and `pow(x, 0.0)` always return 1, even when `x` is zero or NaN.
`math.sqrt(x)`	Return the square root of `x`

In addition to the mathematical functions, there are some useful trigonometric methods. These methods are shown in the following table.

Table 8. Trigonometric methods

Method	Usage
`math.acos(x)`	Return the arc cosine of `x` in radians
`math.asin(x)`	Return the arc sine of `x` in radians
`math.atan(x)`	Return the arc tangent of `x` in radians
`math.atan2(y, x)`	Return `atan(y / x)` in radians.

Table 8. Trigonometric methods (continued)

Method	Usage
`math.cos(x)`	Return the cosine of `x` in radians.
`math.hypot(x, y)`	Return the Euclidean norm `sqrt(x*x + y*y)`. This is the length of the vector from the origin to the point `(x, y)`.
`math.sin(x)`	Return the sine of `x` in radians
`math.tan(x)`	Return the tangent of `x` in radians
`math.degrees(x)`	Convert angle `x` from radians to degrees
`math.radians(x)`	Convert angle `x` from degrees to radians
`math.acosh(x)`	Return the inverse hyperbolic cosine of `x`
`math.asinh(x)`	Return the inverse hyperbolic sine of `x`
`math.atanh(x)`	Return the inverse hyperbolic tangent of `x`
`math.cosh(x)`	Return the hyperbolic cosine of `x`
`math.sinh(x)`	Return the hyperbolic cosine of `x`
`math.tanh(x)`	Return the hyperbolic tangent of `x`

There are also two mathematical constants. The value of `math.pi` is the mathematical constant pi. The value of `math.e` is the mathematical constant e.

Using Non-ASCII characters

In order to use non-ASCII characters, Python requires explicit encoding and decoding of strings into Unicode. In IBM SPSS Modeler, Python scripts are assumed to be encoded in UTF-8, which is a standard Unicode encoding that supports non-ASCII characters. The following script will compile because the Python compiler has been set to UTF-8 by SPSS Modeler.

```
stream = modeler.script.stream()
filenode = stream.createAt("variablefile", "テストノード", 96, 64)
```

However, the resulting node will have an incorrect label.

Figure 3. Node label containing non-ASCII characters, displayed incorrectly

The label is incorrect because the string literal itself has been converted to an ASCII string by Python.

Python allows Unicode string literals to be specified by adding a `u` character prefix before the string literal:

```
stream = modeler.script.stream()
filenode = stream.createAt("variablefile", u"テストノード", 96, 64)
```

This will create a Unicode string and the label will be appear correctly.

Figure 4. Node label containing non-ASCII characters, displayed correctly

Using Python and Unicode is a large topic which is beyond the scope of this document. Many books and online resources are available that cover this topic in great detail.

Object-Oriented Programming

Object-oriented programming is based on the notion of creating a model of the target problem in your programs. Object-oriented programming reduces programming errors and promotes the reuse of code. Python is an object-oriented language. Objects defined in Python have the following features:

- **Identity.** Each object must be distinct, and this must be testable. The `is` and `is not` tests exist for this purpose.
- **State.** Each object must be able to store state. Attributes, such as fields and instance variables, exist for this purpose.
- **Behavior.** Each object must be able to manipulate its state. Methods exist for this purpose.

Python includes the following features for supporting object-oriented programming:

- **Class-based object creation.** Classes are templates for the creation of objects. Objects are data structures with associated behavior.
- **Inheritance with polymorphism.** Python supports single and multiple inheritance. All Python instance methods are polymorphic and can be overridden by subclasses.
- **Encapsulation with data hiding.** Python allows attributes to be hidden. When hidden, attributes can be accessed from outside the class only through methods of the class. Classes implement methods to modify the data.

Defining a Class

Within a Python class, both variables and methods can be defined. Unlike in Java, in Python you can define any number of public classes per source file (or *module*). Therefore, a module in Python can be thought of similar to a package in Java.

In Python, classes are defined using the `class` statement. The `class` statement has the following form:

```
class name (superclasses): statement
```

or

```
class name (superclasses):
    assignment
    .
    .
    function
    .
    .
```

When you define a class, you have the option to provide zero or more *assignment* statements. These create class attributes that are shared by all instances of the class. You can also provide zero or more *function* definitions. These function definitions create methods. The superclasses list is optional.

The class name should be unique in the same scope, that is within a module, function or class. You can define multiple variables to reference the same class.

Creating a Class Instance

Classes are used to hold class (or shared) attributes or to create class instances. To create an instance of a class, you call the class as if it were a function. For example, consider the following class:

```
class MyClass:
    pass
```

Here, the `pass` statement is used because a statement is required to complete the class, but no action is required programmatically.

The following statement creates an instance of the class `MyClass`:

```
x = MyClass()
```

Adding Attributes to a Class Instance

Unlike in Java, in Python clients can add attributes to an instance of a class. Only the one instance is changed. For example, to add attributes to an instance `x`, set new values on that instance:

```
x.attr1 = 1
x.attr2 = 2
    .
    .
x.attrN = n
```

Defining Class Attributes and Methods

Any variable that is bound in a class is a *class attribute*. Any function defined within a class is a *method*. Methods receive an instance of the class, conventionally called `self`, as the first argument. For example, to define some class attributes and methods, you might enter the following code:

```
class MyClass
    attr1 = 10        #class attributes
    attr2 = "hello"

    def method1(self):
        print MyClass.attr1   #reference the class attribute

    def method2(self):
        print MyClass.attr2   #reference the class attribute

    def method3(self, text):
        self.text = text        #instance attribute
        print text, self.text   #print my argument and my attribute

    method4 = method3   #make an alias for method3
```

Inside a class, you should qualify all references to class attributes with the class name; for example, `MyClass.attr1`. All references to instance attributes should be qualified with the `self` variable; for example, `self.text`. Outside the class, you should qualify all references to class attributes with the class name (for example `MyClass.attr1`) or with an instance of the class (for example `x.attr1`, where `x` is an instance of the class). Outside the class, all references to instance variables should be qualified with an instance of the class; for example, `x.text`.

Hidden Variables

Data can be hidden by creating *Private* variables. Private variables can be accessed only by the class itself. If you declare names of the form `__xxx` or `__xxx_yyy`, that is with two preceding underscores, the Python parser will automatically add the class name to the declared name, creating hidden variables, for example:

```
class MyClass:
    __attr = 10   #private class attribute

    def method1(self):
```

```
        pass

    def method2(self, p1, p2):
        pass

    def __privateMethod(self, text):
        self.__text = text    #private attribute
```

Unlike in Java, in Python all references to instance variables must be qualified with `self`; there is no implied use of `this`.

Inheritance

The ability to inherit from classes is fundamental to object-oriented programming. Python supports both single and multiple inheritance. *Single inheritance* means that there can be only one superclass. *Multiple inheritance* means that there can be more than one superclass.

Inheritance is implemented by subclassing other classes. Any number of Python classes can be superclasses. In the Jython implementation of Python, only one Java class can be directly or indirectly inherited from. It is not required for a superclass to be supplied.

Any attribute or method in a superclass is also in any subclass and can be used by the class itself, or by any client as long as the attribute or method is not hidden. Any instance of a subclass can be used wherever and instance of a superclass can be used; this is an example of *polymorphism*. These features enable reuse and ease of extension.

Example

```
class Class1: pass    #no inheritance

class Class2: pass

class Class3(Class1): pass     #single inheritance

class Class4(Class3, Class2): pass     #multiple inheritance
```

Chapter 3. Scripting in IBM SPSS Modeler

Types of scripts

In IBM SPSS Modeler there are three types of script:

- *Stream scripts* are used to control execution of a single stream and are stored within the stream.
- *SuperNode scripts* are used to control the behavior of SuperNodes.
- *Stand-alone or session scripts* can be used to coordinate execution across a number of different streams.

Various methods are available to be used in scripts in IBM SPSS Modeler with which you can access a wide range of SPSS Modeler functionality. These methods are also used in Chapter 4, "The Scripting API," on page 37 to create more advanced functions.

Streams, SuperNode streams, and diagrams

Most of the time, the term *stream* means the same thing, regardless of whether it is a stream that is loaded from a file or used within a SuperNode. It generally means a collection of nodes that are connected together and can be executed. In scripting, however, not all operations are supported in all places, meaning a script author should be aware of which stream variant they are using.

Streams

A stream is the main IBM SPSS Modeler document type. It can be saved, loaded, edited and executed. Streams can also have parameters, global values, a script, and other information associated with them.

SuperNode streams

A *SuperNode stream* is the type of stream used within a SuperNode. Like a normal stream, it contains nodes which are linked together. SuperNode streams have a number of differences from a normal stream:

- Parameters and any scripts are associated with the SuperNode that owns the SuperNode stream, rather than with the SuperNode stream itself.
- SuperNode streams have additional input and output connector nodes, depending on the type of SuperNode. These connector nodes are used to flow information into and out of the SuperNode stream, and are created automatically when the SuperNode is created.

Diagrams

The term *diagram* covers the functions that are supported by both normal streams and SuperNode streams, such as adding and removing nodes, and modifying connections between the nodes.

Executing a stream

The following example runs all executable nodes in the stream, and is the simplest type of stream script:

```
modeler.script.stream().runAll(None)
```

The following example also runs all executable nodes in the stream:

```
stream = modeler.script.stream()
stream.runAll(None)
```

In this example, the stream is stored in a variable called `stream`. Storing the stream in a variable is useful because a script is typically used to modify either the stream or the nodes within a stream. Creating a variable that stores the stream results in a more concise script.

The scripting context

The `modeler.script` module provides the context in which a script is executed. The module is automatically imported into a SPSS Modeler script at run time. The module defines four functions that provide a script with access to its execution environment:

- The `session()` function returns the session for the script. The session defines information such as the locale and the SPSS Modeler backend (either a local process or a networked SPSS Modeler Server) that is being used to run any streams.
- The `stream()` function can be used with stream and SuperNode scripts. This function returns the stream that owns either the stream script or the SuperNode script that is being run.
- The `diagram()` function can be used with SuperNode scripts. This function returns the diagram within the SuperNode. For other script types, this function returns the same as the `stream()` function.
- The `supernode()` function can be used with SuperNode scripts. This function returns the SuperNode that owns the script that is being run.

The four functions and their outputs are summarized in the following table.

Table 9. Summary of `modeler.script` functions

Script type	`session()`	`stream()`	`diagram()`	`supernode()`
Standalone	Returns a session	Returns the current managed stream at the time the script was invoked (for example, the stream passed via the batch mode `-stream` option), or `None`.	Same as for `stream()`	Not applicable
Stream	Returns a session	Returns a stream	Same as for `stream()`	Not applicable
SuperNode	Returns a session	Returns a stream	Returns a SuperNode stream	Returns a SuperNode

The `modeler.script` module also defines a way of terminating the script with an exit code. The `exit(exit-code)` function stops the script from executing and returns the supplied integer exit code.

One of the methods that is defined for a stream is `runAll(List)`. This method runs all executable nodes. Any models or outputs that are generated by executing the nodes are added to the supplied list.

It is common for a stream execution to generate outputs such as models, graphs, and other output. To capture this output, a script can supply a variable that is initialized to a list, for example:

```
stream = modeler.script.stream()
results = []
stream.runAll(results)
```

When execution is complete, any objects that are generated by the execution can be accessed from the `results` list.

Referencing existing nodes

A stream is often pre-built with some parameters that must be modified before the stream is executed. Modifying these parameters involves the following tasks:

1. Locating the nodes in the relevant stream.
2. Changing the node or stream settings (or both).

Finding nodes

Streams provide a number of ways of locating an existing node. These methods are summarized in the following table.

Table 10. Methods for locating an existing node

Method	Return type	Description
`s.findAll(type, label)`	Collection	Returns a list of all nodes with the specified type and label. Either the type or label can be `None`, in which case the other parameter is used.
`s.findAll(filter, recursive)`	Collection	Returns a collection of all nodes that are accepted by the specified filter. If the recursive flag is `True`, any SuperNodes within the specified stream are also searched.
`s.findByID(id)`	Node	Returns the node with the supplied ID or `None` if no such node exists. The search is limited to the current stream.
`s.findByType(type, label)`	Node	Returns the node with the supplied type, label, or both. Either the type or name can be `None`, in which case the other parameter is used. If multiple nodes result in a match, then an arbitrary one is chosen and returned. If no nodes result in a match, then the return value is `None`.
`s.findDownstream(fromNodes)`	Collection	Searches from the supplied list of nodes and returns the set of nodes downstream of the supplied nodes. The returned list includes the originally supplied nodes.
`s.findUpstream(fromNodes)`	Collection	Searches from the supplied list of nodes and returns the set of nodes upstream of the supplied nodes. The returned list includes the originally supplied nodes.

As an example, if a stream contained a single Filter node that the script needed to access, the Filter node can be found by using the following script:

```
stream = modeler.script.stream()
node = stream.findByType("filter", None)
...
```

Alternatively, if the ID of the node (as shown on the Annotations tab of the node dialog box) is known, the ID can be used to find the node, for example:

```
stream = modeler.script.stream()
node = stream.findByID("id32FJT71G2")  # the filter node ID
...
```

Setting properties

Nodes, streams, models, and outputs all have properties that can be accessed and, in most cases, set. Properties are typically used to modify the behavior or appearance of the object. The methods that are available for accessing and setting object properties are summarized in the following table.

Table 11. Methods for accessing and setting object properties

Method	Return type	Description
`p.getPropertyValue(propertyName)`	Object	Returns the value of the named property or `None` if no such property exists.
`p.setPropertyValue(propertyName, value)`	Not applicable	Sets the value of the named property.
`p.setPropertyValues(properties)`	Not applicable	Sets the values of the named properties. Each entry in the properties map consists of a key that represents the property name and the value that should be assigned to that property.
`p.getKeyedPropertyValue( propertyName, keyName)`	Object	Returns the value of the named property and associated key or `None` if no such property or key exists.
`p.setKeyedPropertyValue( propertyName, keyName, value)`	Not applicable	Sets the value of the named property and key.

For example, if you wanted to set the value of a Variable File node at the start of a stream, you can use the following script:

```
stream = modeler.script.stream()
node = stream.findByType("variablefile", None)
node.setPropertyValue("full_filename", "$CLEO/DEMOS/DRUG1n")
...
```

Alternatively, you might want to filter a field from a Filter node. In this case, the value is also keyed on the field name, for example:

```
stream = modeler.script.stream()
# Locate the filter node ...
node = stream.findByType("filter", None)
# ... and filter out the "Na" field
node.setKeyedPropertyValue("include", "Na", False)
```

Creating nodes and modifying streams

In some situations, you might want to add new nodes to existing streams. Adding nodes to existing streams typically involves the following tasks:

1. Creating the nodes.
2. Linking the nodes into the existing stream flow.

Creating nodes

Streams provide a number of ways of creating nodes. These methods are summarized in the following table.

Table 12. Methods for creating nodes

Method	Return type	Description
`s.create(nodeType, name)`	Node	Creates a node of the specified type and adds it to the specified stream.
`s.createAt(nodeType, name, x, y)`	Node	Creates a node of the specified type and adds it to the specified stream at the specified location. If either x < 0 or y < 0, the location is not set.

Table 12. Methods for creating nodes (continued)

Method	Return type	Description
`s.createModelApplier(modelOutput, name)`	Node	Creates a model applier node that is derived from the supplied model output object.

For example, to create a new Type node in a stream you can use the following script:

```
stream = modeler.script.stream()
# Create a new type node
node = stream.create("type", "My Type")
```

Linking and unlinking nodes

When a new node is created within a stream, it must be connected into a sequence of nodes before it can be used. Streams provide a number of methods for linking and unlinking nodes. These methods are summarized in the following table.

Table 13. Methods for linking and unlinking nodes

Method	Return type	Description
`s.link(source, target)`	Not applicable	Creates a new link between the source and the target nodes.
`s.link(source, targets)`	Not applicable	Creates new links between the source node and each target node in the supplied list.
`s.linkBetween(inserted, source, target)`	Not applicable	Connects a node between two other node instances (the source and target nodes) and sets the position of the inserted node to be between them. Any direct link between the source and target nodes is removed first.
`s.linkPath(path)`	Not applicable	Creates a new path between node instances. The first node is linked to the second, the second is linked to the third, and so on.
`s.unlink(source, target)`	Not applicable	Removes any direct link between the source and the target nodes.
`s.unlink(source, targets)`	Not applicable	Removes any direct links between the source node and each object in the targets list.
`s.unlinkPath(path)`	Not applicable	Removes any path that exists between node instances.
`s.disconnect(node)`	Not applicable	Removes any links between the supplied node and any other nodes in the specified stream.
`s.isValidLink(source, target)`	*boolean*	Returns `True` if it would be valid to create a link between the specified source and target nodes. This method checks that both objects belong to the specified stream, that the source node can supply a link and the target node can receive a link, and that creating such a link will not cause a circularity in the stream.

The example script that follows performs these five tasks:

1. Creates a Variable File input node, a Filter node, and a Table output node.
2. Connects the nodes together.
3. Sets the file name on the Variable File input node.
4. Filters the field "Drug" from the resulting output.
5. Executes the Table node.

```
stream = modeler.script.stream()
filenode = stream.createAt("variablefile", "My File Input ", 96, 64)
filternode = stream.createAt("filter", "Filter", 192, 64)
tablenode = stream.createAt("table", "Table", 288, 64)
stream.link(filenode, filternode)
stream.link(filternode, tablenode)
filenode.setPropertyValue("full_filename", "$CLEO_DEMOS/DRUG1n")
filternode.setKeyedPropertyValue("include", "Drug", False)
results = []
tablenode.run(results)
```

Importing, replacing, and deleting nodes

As well as creating and connecting nodes, it is often necessary to replace and delete nodes from the stream. The methods that are available for importing, replacing and deleting nodes are summarized in the following table.

Table 14. Methods for importing, replacing, and deleting nodes

Method	Return type	Description
`s.replace(originalNode, replacementNode, discardOriginal)`	Not applicable	Replaces the specified node from the specified stream. Both the original node and replacement node must be owned by the specified stream.
`s.insert(source, nodes, newIDs)`	List	Inserts copies of the nodes in the supplied list. It is assumed that all nodes in the supplied list are contained within the specified stream. The `newIDs` flag indicates whether new IDs should be generated for each node, or whether the existing ID should be copied and used. It is assumed that all nodes in a stream have a unique ID, so this flag must be set to `True` if the source stream is the same as the specified stream. The method returns the list of newly inserted nodes, where the order of the nodes is undefined (that is, the ordering is not necessarily the same as the order of the nodes in the input list).
`s.delete(node)`	Not applicable	Deletes the specified node from the specified stream. The node must be owned by the specified stream.
`s.deleteAll(nodes)`	Not applicable	Deletes all the specified nodes from the specified stream. All nodes in the collection must belong to the specified stream.
`s.clear()`	Not applicable	Deletes all nodes from the specified stream.

Traversing through nodes in a stream

A common requirement is to identify nodes that are either upstream or downstream of a particular node. The stream provides a number of methods that can be used to identify these nodes. These methods are summarized in the following table.

Table 15. Methods to identify upstream and downstream nodes

Method	Return type	Description
`s.iterator()`	Iterator	Returns an iterator over the node objects that are contained in the specified stream. If the stream is modified between calls of the `next()` function, the behavior of the iterator is undefined.
`s.predecessorAt(node, index)`	Node	Returns the specified immediate predecessor of the supplied node or `None` if the index is out of bounds.
`s.predecessorCount(node)`	*int*	Returns the number of immediate predecessors of the supplied node.
`s.predecessors(node)`	List	Returns the immediate predecessors of the supplied node.
`s.successorAt(node, index)`	Node	Returns the specified immediate successor of the supplied node or `None` if the index is out of bounds.
`s.successorCount(node)`	*int*	Returns the number of immediate successors of the supplied node.
`s.successors(node)`	List	Returns the immediate successors of the supplied node.

Clearing, or removing, items

Legacy scripting supports various uses of the `clear` command, for example:

- `clear outputs` To delete all output items from the manager palette.
- `clear generated palette` To clear all model nuggets from the Models palette.
- `clear stream` To remove the contents of a stream.

Python scripting supports a similar set of functions; the `removeAll()` command is used to clear the Streams, Outputs, and Models managers For example:

- To clear the Streams manager:

```
session = modeler.script.session()
session.getStreamManager.removeAll()
```

- To clear the Outputs manager:

```
session = modeler.script.session()
session.getDocumentOutputManager().removeAll()
```

- To clear the Models manager:

```
session = modeler.script.session()
session.getModelOutputManager().removeAll()
```

Getting information about nodes

Nodes fall into a number of different categories such as data import and export nodes, model building nodes, and other types of nodes. Every node provides a number of methods that can be used to find out information about the node.

The methods that can be used to obtain the ID, name, and label of a node are summarized in the following table.

Table 16. Methods to obtain the ID, name, and label of a node

Method	Return type	Description
`n.getLabel()`	*string*	Returns the display label of the specified node. The label is the value of the property `custom_name` only if that property is a non-empty string and the `use_custom_name` property is not set; otherwise, the label is the value of `getName()`.
`n.setLabel(label)`	Not applicable	Sets the display label of the specified node. If the new label is a non-empty string it is assigned to the property `custom_name`, and `False` is assigned to the property `use_custom_name` so that the specified label takes precedence; otherwise, an empty string is assigned to the property `custom_name` and `True` is assigned to the property `use_custom_name`.
`n.getName()`	*string*	Returns the name of the specified node.
`n.getID()`	*string*	Returns the ID of the specified node. A new ID is created each time a new node is created. The ID is persisted with the node when it is saved as part of a stream so that when the stream is opened, the node IDs are preserved. However, if a saved node is inserted into a stream, the inserted node is considered to be a new object and will be allocated a new ID.

Methods that can be used to obtain other information about a node are summarized in the following table.

Table 17. Methods for obtaining information about a node

Method	Return type	Description
`n.getTypeName()`	*string*	Returns the scripting name of this node. This is the same name that could be used to create a new instance of this node.
`n.isInitial()`	*Boolean*	Returns `True` if this is an *initial* node, that is one that occurs at the start of a stream.
`n.isInline()`	*Boolean*	Returns `True` if this is an *in-line* node, that is one that occurs mid-stream.
`n.isTerminal()`	*Boolean*	Returns `True` if this is a *terminal* node, that is one that occurs at the end of a stream.
`n.getXPosition()`	*int*	Returns the x position offset of the node in the stream.

Table 17. Methods for obtaining information about a node (continued)

Method	Return type	Description
`n.getYPosition()`	*int*	Returns the y position offset of the node in the stream.
`n.setXYPosition(x, y)`	Not applicable	Sets the position of the node in the stream.
`n.setPositionBetween(source, target)`	Not applicable	Sets the position of the node in the stream so that it is positioned between the supplied nodes.
`n.isCacheEnabled()`	*Boolean*	Returns `True` if the cache is enabled; returns `False` otherwise.
`n.setCacheEnabled(val)`	Not applicable	Enables or disables the cache for this object. If the cache is full and the caching becomes disabled, the cache is flushed.
`n.isCacheFull()`	*Boolean*	Returns `True` if the cache is full; returns `False` otherwise.
`n.flushCache()`	Not applicable	Flushes the cache of this node. Has no affect if the cache is not enabled or is not full.

Chapter 4. The Scripting API

Introduction to the Scripting API

The Scripting API provides access to a wide range of SPSS Modeler functionality. All the methods described so far are part of the API and can be accessed implicitly within the script without further imports. However, if you want to reference the API classes, you must import the API explicitly with the following statement:

```
import modeler.api
```

This import statement is required by many of the Scripting API examples.

A full guide to the classes, methods, and parameters that are available through the scripting API can be found in the document *IBM SPSS Modeler 17 Python Scripting API Reference Guide*.

Example: searching for nodes using a custom filter

The section "Finding nodes" on page 29 included an example of searching for a node in a stream using the type name of the node as the search criterion. In some situations, a more generic search is required and this can be implemented using the `NodeFilter` class and the stream `findAll()` method. This kind of search involves the following two steps:

1. Creating a new class that extends `NodeFilter` and that implements a custom version of the `accept()` method.
2. Calling the stream `findAll()` method with an instance of this new class. This returns all nodes that meet the criteria defined in the `accept()` method.

The following example shows how to search for nodes in a stream that have the node cache enabled. The returned list of nodes could be used to either flush or disable the caches of these nodes.

```
import modeler.api

class CacheFilter(modeler.api.NodeFilter):
 """A node filter for nodes with caching enabled"""
 def accept(this, node):
  return node.isCacheEnabled()

cachingnodes = modeler.script.stream().findAll(CacheFilter(), False)
```

Metadata: Information about data

Because nodes are connected together in a stream, information about the columns or fields that are available at each node is available. For example, in the Modeler UI, this allows you to select which fields to sort or aggregate by. This information is called the data model.

Scripts can also access the data model by looking at the fields coming into or out of a node. For some nodes, the input and output data models are the same, for example a Sort node simply reorders the records but doesn't change the data model. Some, such as the Derive node, can add new fields. Others, such as the Filter node can rename or remove fields.

In the following example, the script takes the standard IBM SPSS Modeler `druglearn.str` stream, and for each field, builds a model with one of the input fields dropped. It does this by:

1. Accessing the output data model from the Type node.
2. Looping through each field in the output data model.

3. Modifying the Filter node for each input field.
4. Changing the name of the model being built.
5. Running the model build node.

Note: Before running the script in the `druglean.str` stream, remember to set the scripting language to Python (the stream was created in a previous version of IBM SPSS Modeler so the stream scripting language is set to Legacy).

```
import modeler.api

stream = modeler.script.stream()
filternode = stream.findByType("filter", None)
typenode = stream.findByType("type", None)
c50node = stream.findByType("c50", None)
# Always use a custom model name
c50node.setPropertyValue("use_model_name", True)

lastRemoved = None
fields = typenode.getOutputDataModel()
for field in fields:
    # If this is the target field then ignore it
    if field.getModelingRole() == modeler.api.ModelingRole.OUT:
        continue

    # Re-enable the field that was most recently removed
    if lastRemoved != None:
        filternode.setKeyedPropertyValue("include", lastRemoved, True)

    # Remove the field
    lastRemoved = field.getColumnName()
    filternode.setKeyedPropertyValue("include", lastRemoved, False)

    # Set the name of the new model then run the build
    c50node.setPropertyValue("model_name", "Exclude " + lastRemoved)
    c50node.run([])
```

The DataModel object provides a number of methods for accessing information about the fields or columns within the data model. These methods are summarized in the following table.

Table 18. DataModel object methods for accessing information about fields or columns

Method	Return type	Description
`d.getColumnCount()`	*int*	Returns the number of columns in the data model.
`d.columnIterator()`	Iterator	Returns an iterator that returns each column in the "natural" insert order. The iterator returns instances of Column.
`d.nameIterator()`	Iterator	Returns an iterator that returns the name of each column in the "natural" insert order.
`d.contains(name)`	*Boolean*	Returns `True` if a column with the supplied name exists in this DataModel, `False` otherwise.
`d.getColumn(name)`	Column	Returns the column with the specified name.
`d.getColumnGroup(name)`	ColumnGroup	Returns the named column group or `None` if no such column group exists.
`d.getColumnGroupCount()`	*int*	Returns the number of column groups in this data model.

Table 18. DataModel object methods for accessing information about fields or columns (continued)

Method	Return type	Description
`d.columnGroupIterator()`	Iterator	Returns an iterator that returns each column group in turn.
`d.toArray()`	Column[]	Returns the data model as an array of columns. The columns are ordered in their "natural" insert order.

Each field (Column object) includes a number of methods for accessing information about the column. The table below shows a selection of these.

Table 19. Column object methods for accessing information about the column

Method	Return type	Description
`c.getColumnName()`	*string*	Returns the name of the column.
`c.getColumnLabel()`	*string*	Returns the label of the column or an empty string if there is no label associated with the column.
`c.getMeasureType()`	MeasureType	Returns the measure type for the column.
`c.getStorageType()`	StorageType	Returns the storage type for the column.
`c.isMeasureDiscrete()`	*Boolean*	Returns `True` if the column is discrete. Columns that are either a set or a flag are considered discrete.
`c.isModelOutputColumn()`	*Boolean*	Returns `True` if the column is a model output column.
`c.isStorageDatetime()`	*Boolean*	Returns `True` if the column's storage is a time, date or timestamp value.
`c.isStorageNumeric()`	*Boolean*	Returns `True` if the column's storage is an integer or a real number.
`c.isValidValue(value)`	*Boolean*	Returns `True` if the specified value is valid for this storage, and `valid` when the valid column values are known.
`c.getModelingRole()`	ModelingRole	Returns the modeling role for the column.
`c.getSetValues()`	Object[]	Returns an array of valid values for the column, or `None` if either the values are not known or the column is not a set.
`c.getValueLabel(value)`	*string*	Returns the label for the value in the column, or an empty string if there is no label associated with the value.
`c.getFalseFlag()`	Object	Returns the "false" indicator value for the column, or `None` if either the value is not known or the column is not a flag.
`c.getTrueFlag()`	Object	Returns the "true" indicator value for the column, or `None` if either the value is not known or the column is not a flag.

Table 19. Column object methods for accessing information about the column (continued)

Method	Return type	Description
`c.getLowerBound()`	Object	Returns the lower bound value for the values in the column, or `None` if either the value is not known or the column is not continuous.
`c.getUpperBound()`	Object	Returns the upper bound value for the values in the column, or `None` if either the value is not known or the column is not continuous.

Note that most of the methods that access information about a column have equivalent methods defined on the DataModel object itself. For example the two following statements are equivalent:

```
dataModel.getColumn("someName").getModelingRole()
dataModel.getModelingRole("someName")
```

Accessing Generated Objects

Executing a stream typically involves producing additional output objects. These additional objects might be a new model, or a piece of output that provides information to be used in subsequent executions.

In the example below, the `druglearn.str` stream is used again as the starting point for the stream. In this example, all nodes in the stream are executed and the results are stored in a list. The script then loops through the results, and any model outputs that result from the execution are saved as an IBM SPSS Modeler model (`.gm`) file, and the model is PMML exported.

```
import modeler.api

stream = modeler.script.stream()

# Set this to an existing folder on your system.
# Include a trailing directory separator
modelFolder = "C:/temp/models/"

# Execute the stream
models = []
stream.runAll(models)

# Save any models that were created
taskrunner = modeler.script.session().getTaskRunner()
for model in models:
    # If the stream execution built other outputs then ignore them
    if not(isinstance(model, modeler.api.ModelOutput)):
        continue

    label = model.getLabel()
    algorithm = model.getModelDetail().getAlgorithmName()

    # save each model...
    modelFile = modelFolder + label + algorithm + ".gm"
    taskrunner.saveModelToFile(model, modelFile)

    # ...and export each model PMML...
    modelFile = modelFolder + label + algorithm + ".xml"
    taskrunner.exportModelToFile(model, modelFile, modeler.api.FileFormat.XML)
```

The task runner class provides a convenient way running various common tasks. The methods that are available in this class are summarized in the following table.

Table 20. Methods of the task runner class for performing common tasks

Method	Return type	Description
`t.createStream(name, autoConnect, autoManage)`	Stream	Creates and returns a new stream. Note that code that must create streams privately without making them visible to the user should set the `autoManage` flag to `False`.
`t.exportDocumentToFile( documentOutput, filename, fileFormat)`	Not applicable	Exports the stream description to a file using the specified file format.
`t.exportModelToFile(modelOutput, filename, fileFormat)`	Not applicable	Exports the model to a file using the specified file format.
`t.exportStreamToFile(stream, filename, fileFormat)`	Not applicable	Exports the stream to a file using the specified file format.
`t.insertNodeFromFile(filename, diagram)`	Node	Reads and returns a node from the specified file, inserting it into the supplied diagram. Note that this can be used to read both Node and SuperNode objects.
`t.openDocumentFromFile(filename, autoManage)`	DocumentOutput	Reads and returns a document from the specified file.
`t.openModelFromFile(filename, autoManage)`	ModelOutput	Reads and returns a model from the specified file.
`t.openStreamFromFile(filename, autoManage)`	Stream	Reads and returns a stream from the specified file.
`t.saveDocumentToFile( documentOutput, filename)`	Not applicable	Saves the document to the specified file location.
`t.saveModelToFile(modelOutput, filename)`	Not applicable	Saves the model to the specified file location.
`t.saveStreamToFile(stream, filename)`	Not applicable	Saves the stream to the specified file location.

Handling Errors

The Python language provides error handling via the `try...except` code block. This can be used within scripts to trap exceptions and handle problems that would otherwise cause the script to terminate.

In the example script below, an attempt is made to retrieve a model from a IBM SPSS Collaboration and Deployment Services Repository. This operation can cause an exception to be thrown, for example, the repository login credentials might not have been set up correctly, or the repository path is wrong. In the script, this may cause a `ModelerException` to be thrown (all exceptions that are generated by IBM SPSS Modeler are derived from `modeler.api.ModelerException`).

```
import modeler.api

session = modeler.script.session()
try:
    repo = session.getRepository()
    m = repo.retrieveModel("/some-non-existent-path", None, None, True)
    # print goes to the Modeler UI script panel Debug tab
    print "Everything OK"
except modeler.api.ModelerException, e:
    print "An error occurred:", e.getMessage()
```

Note: Some scripting operations may cause standard Java exceptions to be thrown; these are not derived from `ModelerException`. In order to catch these exceptions, an additional except block can be used to catch all Java exceptions, for example:

```
import modeler.api

session = modeler.script.session()
try:
    repo = session.getRepository()
    m = repo.retrieveModel("/some-non-existent-path", None, None, True)
    # print goes to the Modeler UI script panel Debug tab
    print "Everything OK"
except modeler.api.ModelerException, e:
    print "An error occurred:", e.getMessage()
except java.lang.Exception, e:
    print "A Java exception occurred:", e.getMessage()
```

Stream, Session, and SuperNode Parameters

Parameters provide a useful way of passing values at runtime, rather than hard coding them directly in a script. Parameters and their values are defined in the same as way for streams, that is, as entries in the parameters table of a stream or SuperNode, or as parameters on the command line. The Stream and SuperNode classes implement a set of functions defined by the ParameterProvider object as shown in the following table. Session provides a `getParameters()` call which returns an object that defines those functions.

Table 21. Functions defined by the ParameterProvider object

Method	Return type	Description
`p.parameterIterator()`	Iterator	Returns an iterator of parameter names for this object.
`p.getParameterDefinition( parameterName)`	ParameterDefinition	Returns the parameter definition for the parameter with the specified name, or `None` if no such parameter exists in this provider. The result may be a snapshot of the definition at the time the method was called and need not reflect any subsequent modifications made to the parameter through this provider.
`p.getParameterLabel(parameterName)`	*string*	Returns the label of the named parameter, or `None` if no such parameter exists.
`p.setParameterLabel(parameterName, label)`	Not applicable	Sets the label of the named parameter.
`p.getParameterStorage( parameterName)`	ParameterStorage	Returns the storage of the named parameter, or `None` if no such parameter exists.
`p.setParameterStorage( parameterName, storage)`	Not applicable	Sets the storage of the named parameter.
`p.getParameterType(parameterName)`	ParameterType	Returns the type of the named parameter, or `None` if no such parameter exists.
`p.setParameterType(parameterName, type)`	Not applicable	Sets the type of the named parameter.
`p.getParameterValue(parameterName)`	Object	Returns the value of the named parameter, or `None` if no such parameter exists.

Table 21. Functions defined by the ParameterProvider object (continued)

Method	Return type	Description
`p.setParameterValue(parameterName, value)`	Not applicable	Sets the value of the named parameter.

In the following example, the script aggregates some Telco data to find which region has the lowest average income data. A stream parameter is then set with this region. That stream parameter is then used in a Select node to exclude that region from the data, before a churn model is built on the remainder.

The example is artificial because the script generates the Select node itself and could therefore have generated the correct value directly into the Select node expression. However, streams are typically pre-built, so setting parameters in this way provides a useful example.

The first part of the example script creates the stream parameter that will contain the region with the lowest average income. The script also creates the nodes in the aggregation branch and the model building branch, and connects them together.

```
import modeler.api

stream = modeler.script.stream()

# Initialize a stream parameter
stream.setParameterStorage("LowestRegion", modeler.api.ParameterStorage.INTEGER)

# First create the aggregation branch to compute the average income per region
statisticsimportnode = stream.createAt("statisticsimport", "SPSS File", 114, 142)
statisticsimportnode.setPropertyValue("full_filename", "$CLEO_DEMOS/telco.sav")
statisticsimportnode.setPropertyValue("use_field_format_for_storage", True)

aggregatenode = modeler.script.stream().createAt("aggregate", "Aggregate", 294, 142)
aggregatenode.setPropertyValue("keys", ["region"])
aggregatenode.setKeyedPropertyValue("aggregates", "income", ["Mean"])

tablenode = modeler.script.stream().createAt("table", "Table", 462, 142)

stream.link(statisticsimportnode, aggregatenode)
stream.link(aggregatenode, tablenode)

selectnode = stream.createAt("select", "Select", 210, 232)
selectnode.setPropertyValue("mode", "Discard")
# Reference the stream parameter in the selection
selectnode.setPropertyValue("condition", "'region' = '$P-LowestRegion'")

typenode = stream.createAt("type", "Type", 366, 232)
typenode.setKeyedPropertyValue("direction", "churn", "Target")

c50node = stream.createAt("c50", "C5.0", 534, 232)

stream.link(statisticsimportnode, selectnode)
stream.link(selectnode, typenode)
stream.link(typenode, c50node)
```

The example script creates the following stream.

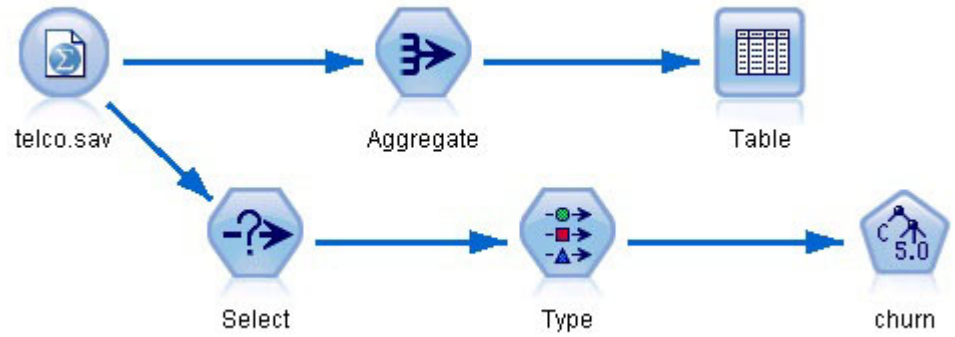


Figure 5. Stream that results from the example script

The following part of the example script executes the Table node at the end of the aggregation branch.

```
# First execute the table node
results = []
tablenode.run(results)
```

The following part of the example script accesses the table output that was generated by the execution of the Table node. The script then iterates through rows in the table, looking for the region with the lowest average income.

```
# Running the table node should produce a single table as output
table = results[0]

# table output contains a RowSet so we can access values as rows and columns
rowset = table.getRowSet()
min_income = 1000000.0
min_region = None

# From the way the aggregate node is defined, the first column
# contains the region and the second contains the average income
row = 0
rowcount = rowset.getRowCount()
while row < rowcount:
    if rowset.getValueAt(row, 1) < min_income:
        min_income = rowset.getValueAt(row, 1)
        min_region = rowset.getValueAt(row, 0)
    row += 1
```

The following part of the script uses the region with the lowest average income to set the "LowestRegion" stream parameter that was created earlier. The script then runs the model builder with the specified region excluded from the training data.

```
# Check that a value was assigned
if min_region != None:
    stream.setParameterValue("LowestRegion", min_region)
else:
    stream.setParameterValue("LowestRegion", -1)

# Finally run the model builder with the selection criteria
c50node.run([])
```

The complete example script is shown below.

```
import modeler.api

stream = modeler.script.stream()

# Create a stream parameter
stream.setParameterStorage("LowestRegion", modeler.api.ParameterStorage.INTEGER)
```

```
# First create the aggregation branch to compute the average income per region
statisticsimportnode = stream.createAt("statisticsimport", "SPSS File", 114, 142)
statisticsimportnode.setPropertyValue("full_filename", "$CLEO_DEMOS/telco.sav")
statisticsimportnode.setPropertyValue("use_field_format_for_storage", True)

aggregatenode = modeler.script.stream().createAt("aggregate", "Aggregate", 294, 142)
aggregatenode.setPropertyValue("keys", ["region"])
aggregatenode.setKeyedPropertyValue("aggregates", "income", ["Mean"])

tablenode = modeler.script.stream().createAt("table", "Table", 462, 142)

stream.link(statisticsimportnode, aggregatenode)
stream.link(aggregatenode, tablenode)

selectnode = stream.createAt("select", "Select", 210, 232)
selectnode.setPropertyValue("mode", "Discard")
# Reference the stream parameter in the selection
selectnode.setPropertyValue("condition", "'region' = '$P-LowestRegion'")

typenode = stream.createAt("type", "Type", 366, 232)
typenode.setKeyedPropertyValue("direction", "churn", "Target")

c50node = stream.createAt("c50", "C5.0", 534, 232)

stream.link(statisticsimportnode, selectnode)
stream.link(selectnode, typenode)
stream.link(typenode, c50node)


# First execute the table node
results = []
tablenode.run(results)

# Running the table node should produce a single table as output
table = results[0]

# table output contains a RowSet so we can access values as rows and columns
rowset = table.getRowSet()
min_income = 1000000.0
min_region = None

# From the way the aggregate node is defined, the first column
# contains the region and the second contains the average income
row = 0
rowcount = rowset.getRowCount()
while row < rowcount:
    if rowset.getValueAt(row, 1) < min_income:
        min_income = rowset.getValueAt(row, 1)
        min_region = rowset.getValueAt(row, 0)
    row += 1

# Check that a value was assigned
if min_region != None:
    stream.setParameterValue("LowestRegion", min_region)
else:
    stream.setParameterValue("LowestRegion", -1)

# Finally run the model builder with the selection criteria
c50node.run([])
```

Global Values

Global values are used to compute various summary statistics for specified fields. These summary values can be accessed anywhere within the stream. Global values are similar to stream parameters in that they are accessed by name through the stream. They are different from stream parameters in that the associated values are updated automatically when a Set Globals node is run, rather than being assigned by scripting or from the command line. The global values for a stream are accessed by calling the stream's `getGlobalValues()` method.

The GlobalValues object defines the functions that are shown in the following table.

Table 22. Functions that are defined by the GlobalValues object

Method	Return type	Description
`g.fieldNameIterator()`	Iterator	Returns an iterator for each field name with at least one global value.
`g.getValue(type, fieldName)`	Object	Returns the global value for the specified type and field name, or `None` if no value can be located. The returned value is generally expected to be a number, although future functionality may return different value types.
`g.getValues(fieldName)`	Map	Returns a map containing the known entries for the specified field name, or `None` if there are no existing entries for the field.

`GlobalValues.Type` defines the type of summary statistics that are available. The following summary statistics are available:

- `MAX`: the maximum value of the field.
- `MEAN`: the mean value of the field.
- `MIN`: the minimum value of the field.
- `STDDEV`: the standard deviation of the field.
- `SUM`: the sum of the values in the field.

For example, the following script accesses the mean value of the "income" field, which is computed by a Set Globals node:

```
import modeler.api

globals = modeler.script.stream().getGlobalValues()
mean_income = globals.getValue(modeler.api.GlobalValues.Type.MEAN, "income")
```

Working with Multiple Streams: Standalone Scripts

To work with multiple streams, a standalone script must be used. The standalone script can be edited and run within the IBM SPSS Modeler UI or passed as a command line parameter in batch mode.

The following standalone script opens two streams. One of these streams builds a model, while the second stream plots the distribution of the predicted values.

```
# Change to the appropriate location for your system
demosDir = "C:/Program Files/IBM/SPSS/Modeler/17/DEMOS/streams/"

session = modeler.script.session()
tasks = session.getTaskRunner()
```

```
# Open the model build stream, locate the C5.0 node and run it
buildstream = tasks.openStreamFromFile(demosDir + "druglearn.str", True)
c50node = buildstream.findByType("c50", None)
results = []
c50node.run(results)

# Now open the plot stream, find the Na_to_K derive and the histogram
plotstream = tasks.openStreamFromFile(demosDir + "drugplot.str", True)
derivenode = plotstream.findByType("derive", None)
histogramnode = plotstream.findByType("histogram", None)

# Create a model applier node, insert it between the derive and histogram nodes
# then run the histgram
applyc50 = plotstream.createModelApplier(results[0], results[0].getName())
applyc50.setPositionBetween(derivenode, histogramnode)
plotstream.linkBetween(applyc50, derivenode, histogramnode)
histogramnode.setPropertyValue("color_field", "$C-Drug")
histogramnode.run([])

# Finally, tidy up the streams
buildstream.close()
plotstream.close()
```

Chapter 5. Scripting Tips

This section provides an overview of tips and techniques for using scripts, including modifying stream execution, using an encoded password in a script, and accessing objects in the IBM SPSS Collaboration and Deployment Services Repository.

Modifying Stream Execution

When a stream is run, its terminal nodes are executed in an order optimized for the default situation. In some cases, you may prefer a different execution order. To modify the execution order of a stream, complete the following steps from the Execution tab of the stream properties dialog box:

1. Begin with an empty script.
2. Click the **Append default script** button on the toolbar to add the default stream script.
3. Change the order of statements in the default stream script to the order in which you want statements to be executed.

Looping through Nodes

You can use a `for` loop to loop through all of the nodes in a stream. For example, the following two script examples loop through all nodes and changes field names in any Filter nodes to upper case.

This scripts can be used in any stream that has a Filter node, even if no fields are actually filtered. Simply add a Filter node that passes all fields in order to change field names to upper case across the board.

```
# Alternative 1: using the data model nameIterator() function
stream = modeler.script.stream()
for node in stream.iterator():
    if (node.getTypeName() == "filter"):
        # nameIterator() returns the field names
        for field in node.getInputDataModel().nameIterator():
            newname = field.upper()
            node.setKeyedPropertyValue("new_name", field, newname)
```

```
# Alternative 2: using the data model iterator() function
stream = modeler.script.stream()
for node in stream.iterator():
    if (node.getTypeName() == "filter"):
        # iterator() returns the field objects so we need
        # to call getColumnName() to get the name
        for field in node.getInputDataModel().iterator():
            newname = field.getColumnName().upper()
            node.setKeyedPropertyValue("new_name", field.getColumnName(), newname)
```

The script loops through all nodes in the current stream, and checks whether each node is a Filter. If so, the script loops through each field in the node and uses either the `field.upper()` or `field.getColumnName().upper()` function to change the name to upper case.

Accessing Objects in the IBM SPSS Collaboration and Deployment Services Repository

If you have licensed the IBM SPSS Collaboration and Deployment Services Repository, you can store, retrieve, lock and unlock objects from the repository using script commands. The repository allows you to manage the life cycle of data mining models and related predictive objects in the context of enterprise applications, tools, and solutions.

Connecting to the IBM SPSS Collaboration and Deployment Services Repository

In order to access the repository, you must first set up a valid connection to it, either through the Tools menu of the IBM SPSS Modeler user interface or through the command line. (See the topic "IBM SPSS Collaboration and Deployment Services Repository Connection Arguments" on page 64 for more information.)

Storing and Retrieving Objects

Within a script, the `retrieve` and `store` commands allow you to access various objects, including streams, models, output, nodes, and projects. The syntax is as follows:

```
store object as REPOSITORY_PATH {label LABEL}
store object as URI [#l.label]

retrieve object REPOSITORY_PATH {label LABEL | version VERSION}
retrieve object URI [(#m.marker | #l.label)]
```

The `REPOSITORY_PATH` gives the location of the object in the repository. The path must be enclosed in quotation marks and use forward slashes as delimiters. It is not case sensitive.

```
store stream as "/folder_1/folder_2/mystream.str"
store model Drug as "/myfolder/drugmodel"
store model Drug as "/myfolder/drugmodel.gm" label "final"
store node DRUG1n as "/samples/drug1ntypenode"
store project as "/CRISPDM/DrugExample.cpj"
store output "Data Audit of [6 fields]" as "/my folder/My Audit"
```

Optionally, an extension such as *.str* or *.gm* can be included in the object name, but this is not required as long as the name is consistent. For example, if a model is stored without an extension, it must be retrieved by the same name:

```
store model "/myfolder/drugmodel"
retrieve model "/myfolder/drugmodel"
```

versus:

```
store model "/myfolder/drugmodel.gm"
retrieve model "/myfolder/drugmodel.gm" version "0:2005-10-12 14:15:41.281"
```

Note that when you are retrieving objects, the most recent version of the object is always returned unless you specify a version or label. When retrieving a node object, the node is automatically inserted into the current stream. When retrieving a stream object, you must use a standalone script. You cannot retrieve a stream object from within a stream script.

Locking and Unlocking Objects

From a script, you can lock an object to prevent other users from updating any of its existing versions or creating new versions. You can also unlock an object that you have locked.

The syntax to lock and unlock an object is:

```
lock REPOSITORY_PATH
lock URI

unlock REPOSITORY_PATH
unlock URI
```

As with storing and retrieving objects, the `REPOSITORY_PATH` gives the location of the object in the repository. The path must be enclosed in quotation marks and use forward slashes as delimiters. It is not case sensitive.

```
lock "/myfolder/Stream1.str"

unlock "/myfolder/Stream1.str"
```

Alternatively, you can use a Uniform Resource Identifier (URI) rather than a repository path to give the location of the object. The URI must include the prefix `spsscr:` and must be fully enclosed in quotation marks. Only forward slashes are allowed as path delimiters, and spaces must be encoded. That is, use `%20` instead of a space in the path. The URI is not case sensitive. Here are some examples:

```
lock "spsscr:///myfolder/Stream1.str"

unlock "spsscr:///myfolder/Stream1.str"
```

Note that object locking applies to all versions of an object - you cannot lock or unlock individual versions.

Generating an Encoded Password

In certain cases, you may need to include a password in a script; for example, you may want to access a password-protected data source. Encoded passwords can be used in:

- Node properties for Database Source and Output nodes
- Command line arguments for logging into the server
- Database connection properties stored in a *.par* file (the parameter file generated from the Publish tab of an export node)

Through the user interface, a tool is available to generate encoded passwords based on the Blowfish algorithm (see *http://www.schneier.com/blowfish.html* for more information). Once encoded, you can copy and store the password to script files and command line arguments. The node property `epassword` used for `databasenode` and `databaseexportnode` stores the encoded password.

1. To generate an encoded password, from the Tools menu choose:

   Encode Password...
2. Specify a password in the Password text box.
3. Click **Encode** to generate a random encoding of your password.
4. Click the Copy button to copy the encoded password to the Clipboard.
5. Paste the password to the desired script or parameter.

Script Checking

You can quickly check the syntax of all types of scripts by clicking the red check button on the toolbar of the Standalone Script dialog box.

Figure 6. Stream script toolbar icons

Script checking alerts you to any errors in your code and makes recommendations for improvement. To view the line with errors, click on the feedback in the lower half of the dialog box. This highlights the error in red.

Scripting from the Command Line

Scripting enables you to run operations typically performed in the user interface. Simply specify and run a standalone stream on the command line when launching IBM SPSS Modeler. For example:

```
client -script scores.txt -execute
```

The `-script` flag loads the specified script, while the `-execute` flag executes all commands in the script file.

Compatibility with Previous Releases

Scripts created in previous releases of IBM SPSS Modeler should generally work unchanged in the current release. However, model nuggets may now be inserted in the stream automatically (this is the default setting), and may either replace or supplement an existing nugget of that type in the stream. Whether this actually happens depends on the settings of the **Add model to stream** and **Replace previous model** options (**Tools > Options > User Options > Notifications**). You may, for example, need to modify a script from a previous release in which nugget replacement is handled by deleting the existing nugget and inserting the new one.

Scripts created in the current release may not work in earlier releases.

If a script created in an older release uses a command that has since been replaced (or deprecated), the old form will still be supported, but a warning message will be displayed. For example, the old `generated` keyword has been replaced by `model`, and `clear generated` has been replaced by `clear generated palette`. Scripts that use the old forms will still run, but a warning will be displayed.

Accessing Stream Execution Results

Many IBM SPSS Modeler nodes produce output objects such as models, charts, and tabular data. Many of these outputs contain useful values that can be used by scripts to guide subsequent execution. These values are grouped into content containers (referred to as simply containers) which can be accessed using tags or IDs that identify each container. The way these values are accessed depends on the format or "content model" used by that container.

For example, many predictive model outputs use a variant of XML called PMML to represent information about the model such as which fields a decision tree uses at each split, or how the neurones in a neural network are connected and with what strengths. Model outputs that use PMML provide an XML Content Model that can be used to access that information. For example:

```
stream = modeler.script.stream()
# Assume the stream contains a single C5.0 model builder node
# and that the datasource, predictors and targets have already been
# set up
modelbuilder = stream.findByType("c50", None)
results = []
modelbuilder.run(results)
modeloutput = results[0]

# Now that we have the C5.0 model output object, access the
# relevant content model
cm = modeloutput.getContentModel("PMML")

# The PMML content model is a generic XML-based content model that
# uses XPath syntax. Use that to find the names of the data fields.
# The call returns a list of strings match the XPath values
dataFieldNames = cm.getStringValues("/PMML/DataDictionary/DataField", "name")
```

IBM SPSS Modeler supports the following content models in scripting:

- **Table content model** provides access to the simple tabular data represented as rows and columns
- **XML content model** provides access to content stored in XML format
- **JSON content model** provides access to content stored in JSON format
- **Column statistics content model** provides access to summary statistics about a specific field
- **Pair-wise column statistics content model** provides access to summary statistics between two fields or values between two separate fields

Table Content Model

The table content model provides a simple model for accessing simple row and column data. The values in a particular column must all have the same type of storage (for example, strings or integers).

API

Table 23. API

Return	Method	Description
`int`	`getRowCount()`	Returns the number of rows in this table.
`int`	`getColumnCount()`	Returns the number of columns in this table.
`String`	`getColumnName(int columnIndex)`	Returns the name of the column at the specified column index. The column index starts at 0.
`StorageType`	`getStorageType(int columnIndex)`	Returns the storage type of the column at the specified index. The column index starts at 0.
`Object`	`getValueAt(int rowIndex, int columnIndex)`	Returns the value at the specified row and column index. The row and column indices start at 0.
`void`	`reset()`	Flushes any internal storage associated with this content model.

Nodes and outputs

This table lists nodes that build outputs which include this type of content model.

Table 24. Nodes and outputs

Node name	Output name	Container ID
`table`	`table`	`"table"`

Example script

```
stream = modeler.script.stream()
from modeler.api import StorageType

# Set up the variable file import node
varfilenode = stream.createAt("variablefile", "DRUG Data", 96, 96)
varfilenode.setPropertyValue("full_filename", "$CLEO_DEMOS/DRUG1n")

# Next create the aggregate node and connect it to the variable file node
aggregatenode = stream.createAt("aggregate", "Aggregate", 192, 96)
stream.link(varfilenode, aggregatenode)
```

```
# Configure the aggregate node
aggregatenode.setPropertyValue("keys", ["Drug"])
aggregatenode.setKeyedPropertyValue("aggregates", "Age", ["Min", "Max"])
aggregatenode.setKeyedPropertyValue("aggregates", "Na", ["Mean", "SDev"])

# Then create the table output node and connect it to the aggregate node
tablenode = stream.createAt("table", "Table", 288, 96)
stream.link(aggregatenode, tablenode)

# Execute the table node and capture the resulting table output object
results = []
tablenode.run(results)
tableoutput = results[0]

# Access the table output's content model
tablecontent = tableoutput.getContentModel("table")

# For each column, print column name, type and the first row
# of values from the table content
col = 0
while col < tablecontent.getColumnCount():
     print tablecontent.getColumnName(col), \
     tablecontent.getStorageType(col), \
     tablecontent.getValueAt(0, col)
     col = col + 1
```

The output in the scripting Debug tab will look something like this:

```
Age_Min Integer 15
Age_Max Integer 74
Na_Mean Real 0.730851098901
Na_SDev Real 0.116669731242
Drug String drugY
Record_Count Integer 91
```

XML Content Model

The XML Content Model provides access to XML-based content.

The XML Content Model supports the ability to access components based on XPath expressions. XPath expressions are strings that define which elements or attributes are required by the caller. The XML Content Model hides the details of constructing various objects and compiling expressions that are typically required by XPath support. This makes it simpler to call from Python scripting.

The XML Content Model includes a function that returns the XML document as a string. This allows Python script users to use their preferred Python library to parse the XML.

API

Table 25. API

Return	Method	Description
`String`	`getXMLAsString()`	Returns the XML as a string.
`number`	`getNumericValue(String xpath)`	Returns the result of evaluating the path with return type of numeric (for example, count the number of elements that match the path expression).

Table 25. API (continued)

Return	Method	Description
boolean	getBooleanValue(String xpath)	Returns the boolean result of evaluating the specified path expression.
String	getStringValue(String xpath, String attribute)	Returns either the attribute value or XML node value that matches the specified path.
List of strings	getStringValues(String xpath, String attribute)	Returns a list of all attribute values or XML node values that match the specified path.
List of lists of strings	getValuesList(String xpath, <List of strings> attributes, boolean includeValue)	Returns a list of all attribute values that match the specified path along with the XML node value if required.
Hash table (key:string, value:list of string)	getValuesMap(String xpath, String keyAttribute, <List of strings> attributes, boolean includeValue)	Returns a hash table that uses either the key attribute or XML node value as key, and the list of specified attribute values as table values.
boolean	isNamespaceAware()	Returns whether the XML parsers should be aware of namespaces. Default is False.
void	setNamespaceAware(boolean value)	Sets whether the XML parsers should be aware of namespaces. This also calls reset() to ensure changes are picked up by subsequent calls.
void	reset()	Flushes any internal storage associated with this content model (for example, a cached DOM object).

Nodes and outputs

This table lists nodes that build outputs which include this type of content model.

Table 26. Nodes and outputs

Node name	Output name	Container ID
Most model builders	Most generated models	"PMML"
"autodataprep"	n/a	"PMML"

Example script

The Python scripting code to access the content might look like this:

```
results = []
modelbuilder.run(results)
modeloutput = results[0]
cm = modeloutput.getContentModel("PMML")

dataFieldNames = cm.getStringValues("/PMML/DataDictionary/DataField", "name")
predictedNames = cm.getStringValues("//MiningSchema/MiningField[@usageType='predicted']", "name")
```

JSON Content Model

The JSON Content Model is used to provide support for JSON format content. This provides a basic API to allow callers to extract values on the assumption that they know which values are to be accessed.

API

Table 27. API

Return	Method	Description
`String`	`getJSONAsString()`	Returns the JSON content as a string.
`Object`	`getObjectAt(<List of cbjecta> path, JSONArtifact artifact) throws Exception`	Returns the object at the specified path. The supplied root artifact may be null in which case the root of the content is used. The returned value may be a literal string, integer, real or boolean, or a JSON artifact (either a JSON object or a JSON array).
`Hash table (key:object, value:object>`	`getChildValuesAt(<List of object> path, JSONArtifact artifact) throws Exception`	Returns the child values of the specified path if the path leads to a JSON object or null otherwise. The keys in the table are strings while the associated value may be a literal string, integer, real or boolean, or a JSON artifact (either a JSON object or a JSON array).
`List of objects`	`getChildrenAt(<List of object> path path, JSONArtifact artifact) throws Exception`	Returns the list of objects at the specified path if the path leads to a JSON array or null otherwise. The returned values may be a literal string, integer, real or boolean, or a JSON artifact (either a JSON object or a JSON array).
`void`	`reset()`	Flushes any internal storage associated with this content model (for example, a cached DOM object).

Example script

If there is an output builder node that creates output based on JSON format, the following could be used to access information about a set of books:

```
results = []
outputbuilder.run(results)
output = results[0]
cm = output.getContentModel("jsonContent")

bookTitle = cm.getObjectAt(["books", "ISIN123456", "title"], None)

# Alternatively, get the book object and use it as the root
# for subsequent entries
book = cm.getObjectAt(["books", "ISIN123456"], None)
bookTitle = cm.getObjectAt(["title"], book)

# Get all child values for aspecific book
bookInfo = cm.getChildValuesAt(["books", "ISIN123456"], None)

# Get the third book entry. Assumes the top-level "books" value
# contains a JSON array which can be indexed
bookInfo = cm.getObjectAt(["books", 2], None)

# Get a list of all child entries
allBooks = cm.getChildrenAt(["books"], None)
```

Column Statistics Content Model and Pairwise Statistics Content Model

The column statistics content model provides access to statistics that can be computed for each field (univariate statistics). The pairwise statistics content model provides access to statistics that can be computed between pairs of fields or values in a field.

The possible statistics measures are:

- `Count`
- `UniqueCount`
- `ValidCount`
- `Mean`
- `Sum`
- `Min`
- `Max`
- `Range`
- `Variance`
- `StandardDeviation`
- `StandardErrorOfMean`
- `Skewness`
- `SkewnessStandardError`
- `Kurtosis`
- `KurtosisStandardError`
- `Median`
- `Mode`
- `Pearson`
- `Covariance`
- `TTest`
- `FTest`

Some values are only appropriate from single column statistics while others are only appropriate for pairwise statistics.

Nodes that will produce these are:

- **Statistics node** produces column statistics and can produce pairwise statistics when correlation fields are specified
- **Data Audit node** produces column and can produce pairwise statistics when an overlay field is specified.
- **Means node** produces pairwise statistics when comparing pairs of fields or comparing a field's values with other field summaries.

Which content models and statistics are available will depend on both the particular node's capabilities and the settings within the node.

ColumnStatsContentModel API

Table 28. ColumnStatsContentModel API.

Return	Method	Description
`List<StatisticType>`	`getAvailableStatistics()`	Returns the available statistics in this model. Not all fields will necessarily have values for all statistics.
`List<String>`	`getAvailableColumns()`	Returns the column names for which statistics were computed.
`Number`	`getStatistic(String column, StatisticType statistic)`	Returns the statistic values associated with the column.
`void`	`reset()`	Flushes any internal storage associated with this content model.

PairwiseStatsContentModel API

Table 29. PairwiseStatsContentModel API.

Return	Method	Description
`List<StatisticType>`	`getAvailableStatistics()`	Returns the available statistics in this model. Not all fields will necessarily have values for all statistics.
`List<String>`	`getAvailablePrimaryColumns()`	Returns the primary column names for which statistics were computed.
`List<Object>`	`getAvailablePrimaryValues()`	Returns the values of the primary column for which statistics were computed.
`List<String>`	`getAvailableSecondaryColumns()`	Returns the secondary column names for which statistics were computed.
`Number`	`getStatistic(String primaryColumn, String secondaryColumn, StatisticType statistic)`	Returns the statistic values associated with the columns.
`Number`	`getStatistic(String primaryColumn, Object primaryValue, String secondaryColumn, StatisticType statistic)`	Returns the statistic values associated with the primary column value and the secondary column.
`void`	`reset()`	Flushes any internal storage associated with this content model.

Nodes and outputs

This table lists nodes that build outputs which include this type of content model.

Table 30. Nodes and outputs.

Node name	Output name	Container ID	Notes
`"means"` (Means node)	`"means"`	`"columnStatistics"`	
`"means"` (Means node)	`"means"`	`"pairwiseStatistics"`	
`"dataaudit"` (Data Audit node)	`"means"`	`"columnStatistics"`	

Table 30. Nodes and outputs (continued).

Node name	Output name	Container ID	Notes
"statistics" (Statistics node)	"statistics"	"columnStatistics"	Only generated when specific fields are examined.
"statistics" (Statistics node)	"statistics"	"pairwiseStatistics"	Only generated when fields are correlated.

Example script

```
from modeler.api import StatisticType
stream = modeler.script.stream()

# Set up the input data
varfile = stream.createAt("variablefile", "File", 96, 96)
varfile.setPropertyValue("full_filename", "$CLEO/DEMOS/DRUG1n")

# Now create the statistics node. This can produce both
# column statistics and pairwise statistics
statisticsnode = stream.createAt("statistics", "Stats", 192, 96)
statisticsnode.setPropertyValue("examine", ["Age", "Na", "K"])
statisticsnode.setPropertyValue("correlate", ["Age", "Na", "K"])
stream.link(varfile, statisticsnode)

results = []
statisticsnode.run(results)
statsoutput = results[0]
statscm = statsoutput.getContentModel("columnStatistics")
if (statscm != None):
 cols = statscm.getAvailableColumns()
 stats = statscm.getAvailableStatistics()
 print "Column stats:", cols[0], str(stats[0]), " = ", statscm.getStatistic(cols[0], stats[0])

statscm = statsoutput.getContentModel("pairwiseStatistics")
if (statscm != None):
 pcols = statscm.getAvailablePrimaryColumns()
 scols = statscm.getAvailableSecondaryColumns()
 stats = statscm.getAvailableStatistics()
 corr = statscm.getStatistic(pcols[0], scols[0], StatisticType.Pearson)
 print "Pairwise stats:", pcols[0], scols[0], " Pearson = ", corr
```

Chapter 6. Command Line Arguments

Invoking the Software

You can use the command line of your operating system to launch IBM SPSS Modeler as follows:

1. On a computer where IBM SPSS Modeler is installed, open a DOS, or command-prompt, window.
2. To launch the IBM SPSS Modeler interface in interactive mode, type the `modelerclient` command followed by the required arguments; for example:

```
modelerclient -stream report.str -execute
```

The available arguments (flags) allow you to connect to a server, load streams, run scripts, or specify other parameters as needed.

Using Command Line Arguments

You can append command line arguments (also referred to as *flags*) to the initial `modelerclient` command to alter the invocation of IBM SPSS Modeler.

Several types of command line arguments are available, and are described later in this section.

Table 31. Types of command line arguments.

Argument type	Where described
System arguments	See the topic "System Arguments" on page 62 for more information.
Parameter arguments	See the topic "Parameter Arguments" on page 63 for more information.
Server connection arguments	See the topic "Server Connection Arguments" on page 63 for more information.
IBM SPSS Collaboration and Deployment Services Repository connection arguments	See the topic "IBM SPSS Collaboration and Deployment Services Repository Connection Arguments" on page 64 for more information.
IBM SPSS Analytic Server connection arguments	See the topic "IBM SPSS Analytic Server Connection Arguments" on page 65 for more information.

For example, you can use the `-server`, `-stream` and `-execute` flags to connect to a server and then load and run a stream, as follows:

```
modelerclient -server -hostname myserver -port 80 -username dminer
-password 1234 -stream mystream.str -execute
```

Note that when running against a local client installation, the server connection arguments are not required.

Parameter values that contain spaces can be enclosed in double quotes—for example:

```
modelerclient -stream mystream.str -Pusername="Joe User" -execute
```

You can also execute IBM SPSS Modeler states and scripts in this manner, using the `-state` and `-script` flags, respectively.

Note: If you use a structured parameter in a command, you must precede quotation marks with a backslash. This prevents the quotation marks being removed during interpretation of the string.

Debugging Command Line Arguments

To debug a command line, use the `modelerclient` command to launch IBM SPSS Modeler with the desired arguments. This enables you to verify that commands will execute as expected. You can also confirm the values of any parameters passed from the command line in the Session Parameters dialog box (Tools menu, Set Session Parameters).

System Arguments

The following table describes system arguments available for command line invocation of the user interface.

Table 32. System arguments

Argument	Behavior/Description
`@` <commandFile>	The @ character followed by a filename specifies a command list. When `modelerclient` encounters an argument beginning with @, it operates on the commands in that file as if they had been on the command line. See the topic "Combining Multiple Arguments" on page 65 for more information.
`-directory` <dir>	Sets the default working directory. In local mode, this directory is used for both data and output. Example: `-directory c:/` or `-directory c:\\`
`-server_directory` <dir>	Sets the default server directory for data. The working directory, specified by using the `-directory` flag, is used for output.
`-execute`	After starting, execute any stream, state, or script loaded at startup. If a script is loaded in addition to a stream or state, the script alone will be executed.
`-stream` <stream>	At startup, load the stream specified. Multiple streams can be specified, but the last stream specified will be set as the current stream.
`-script` <script>	At startup, load the standalone script specified. This can be specified in addition to a stream or state as described below, but only one script can be loaded at startup.
`-model` <model>	At startup, load the generated model (*.gm* format file) specified.
`-state` <state>	At startup, load the saved state specified.
`-project` <project>	Load the specified project. Only one project can be loaded at startup.
`-output` <output>	At startup, load the saved output object (*.cou* format file).
`-help`	Display a list of command line arguments. When this option is specified, all other arguments are ignored and the Help screen is displayed.
`-P` <name>=<value>	Used to set a startup parameter. Can also be used to set node properties (slot parameters).

Note: Default directories can also be set in the user interface. To access the options, from the File menu, choose **Set Working Directory** or **Set Server Directory**.

Loading Multiple Files

From the command line, you can load multiple streams, states, and outputs at startup by repeating the relevant argument for each object loaded. For example, to load and run two streams called *report.str* and *train.str*, you would use the following command:

```
modelerclient -stream report.str -stream train.str -execute
```

Loading Objects from the IBM SPSS Collaboration and Deployment Services Repository

Because you can load certain objects from a file or from the IBM SPSS Collaboration and Deployment Services Repository (if licensed), the filename prefix `spsscr:` and, optionally, `file:` (for objects on disk) tells IBM SPSS Modeler where to look for the object. The prefix works with the following flags:

- -stream
- -script
- -output
- -model
- -project

You use the prefix to create a URI that specifies the location of the object—for example, -stream "spsscr:///folder_1/scoring_stream.str". The presence of the spsscr: prefix requires that a valid connection to the IBM SPSS Collaboration and Deployment Services Repository has been specified in the same command. So, for example, the full command would look like this:

```
modelerclient -spsscr_hostname myhost -spsscr_port 8080
-spsscr_username myusername -spsscr_password mypassword
-stream "spsscr:///folder_1/scoring_stream.str" -execute
```

Note that from the command line, you *must* use a URI. The simpler REPOSITORY_PATH is not supported. (It works only within scripts.) For more details about URIs for objects in the IBM SPSS Collaboration and Deployment Services Repository, see the topic "Accessing Objects in the IBM SPSS Collaboration and Deployment Services Repository" on page 49.

Parameter Arguments

Parameters can be used as flags during command line execution of IBM SPSS Modeler. In command line arguments, the -P flag is used to denote a parameter of the form -P <*name*>=<*value*>.

Parameters can be any of the following:

- **Simple parameters** (or parameters used directly in CLEM expressions).
- **Slot parameters**, also referred to as **node properties**. These parameters are used to modify the settings of nodes in the stream. See the topic "Node Properties Overview" on page 69 for more information.
- **Command line parameters**, used to alter the invocation of IBM SPSS Modeler.

For example, you can supply data source user names and passwords as a command line flag, as follows:

```
modelerclient -stream response.str -P:databasenode.datasource="{\"ORA 10gR2\", user1, mypsw,
 true}"
```

The format is the same as that of the datasource parameter of the databasenode node property. For more information, see: "databasenode Properties" on page 81.

Note: If the node is named, you must surround the node name with double quotes and escape the quotes with a backslash. For example, if the data source node in the preceding example has the name *Source_ABC* the entry would be as follows:

```
modelerclient -stream response.str -P:databasenode.\"Source_ABC\".datasource="{\"ORA 10gR2\",
 user1, mypsw, true}"
```

A backslash is also required in front of the quotes that identify a structured parameter, as in the following TM1 datasource example:

```
clemb -server -hostname 9.115.21.169 -port 28053 -username administrator
    -execute -stream C:\Share\TM1_Script.str -P:tm1import.pm_host="http://9.115.21.163:9510/pmhub/pm"
    -P:tm1import.tm1_connection={\"SData\",\"\",\"admin\",\"apple\"}
    -P:tm1import.selected_view={\"SalesPriorCube\",\"salesmargin%\"}
```

Server Connection Arguments

The -server flag tells IBM SPSS Modeler that it should connect to a public server, and the flags -hostname, -use_ssl, -port, -username, -password, and -domain are used to tell IBM SPSS Modeler how to connect to the public server. If no -server argument is specified, the default or local server is used.

Examples

To connect to a public server:

```
modelerclient -server -hostname myserver -port 80 -username dminer
-password 1234 -stream mystream.str -execute
```

To connect to a server cluster:

```
modelerclient -server -cluster "QA Machines" \
-spsscr_hostname pes_host -spsscr_port 8080 \
-spsscr_username asmith -spsscr_epassword xyz
```

Note that connecting to a server cluster requires the Coordinator of Processes through IBM SPSS Collaboration and Deployment Services, so the `-cluster` argument must be used in combination with the repository connection options (`spsscr_*`). See the topic "IBM SPSS Collaboration and Deployment Services Repository Connection Arguments" for more information.

Table 33. Server connection arguments.

Argument	Behavior/Description
`-server`	Runs IBM SPSS Modeler in server mode, connecting to a public server using the flags `-hostname`, `-port`, `-username`, `-password`, and `-domain`.
`-hostname <name>`	The hostname of the server machine. Available in server mode only.
`-use_ssl`	Specifies that the connection should use SSL (secure socket layer). This flag is optional; the default setting is *not* to use SSL.
`-port <number>`	The port number of the specified server. Available in server mode only.
`-cluster <name>`	Specifies a connection to a server cluster rather than a named server; this argument is an alternative to the `hostname`, `port` and `use_ssl` arguments. The name is the cluster name, or a unique URI which identifies the cluster in the IBM SPSS Collaboration and Deployment Services Repository. The server cluster is managed by the Coordinator of Processes through IBM SPSS Collaboration and Deployment Services. See the topic "IBM SPSS Collaboration and Deployment Services Repository Connection Arguments" for more information.
`-username <name>`	The user name with which to log on to the server. Available in server mode only.
`-password <password>`	The password with which to log on to the server. Available in server mode only. *Note*: If the `-password` argument is not used, you will be prompted for a password.
`-epassword <encodedpasswordstring>`	The encoded password with which to log on to the server. Available in server mode only. *Note*: An encoded password can be generated from the Tools menu of the IBM SPSS Modeler application.
`-domain <name>`	The domain used to log on to the server. Available in server mode only.
`-P <name>=<value>`	Used to set a startup parameter. Can also be used to set node properties (slot parameters).

IBM SPSS Collaboration and Deployment Services Repository Connection Arguments

If you want to store or retrieve objects from IBM SPSS Collaboration and Deployment Services via the command line, you must specify a valid connection to the IBM SPSS Collaboration and Deployment Services Repository. For example:

```
modelerclient -spsscr_hostname myhost -spsscr_port 8080
-spsscr_username myusername -spsscr_password mypassword
-stream "spsscr:///folder_1/scoring_stream.str" -execute
```

The following table lists the arguments that can be used to set up the connection.

Table 34. IBM SPSS Collaboration and Deployment Services Repository connection arguments

Argument	Behavior/Description
`-spsscr_hostname` <hostname or IP address>	The hostname or IP address of the server on which the IBM SPSS Collaboration and Deployment Services Repository is installed.
`-spsscr_port` <number>	The port number on which the IBM SPSS Collaboration and Deployment Services Repository accepts connections (typically, 8080 by default).
`-spsscr_use_ssl`	Specifies that the connection should use SSL (secure socket layer). This flag is optional; the default setting is *not* to use SSL.
`-spsscr_username` <name>	The user name with which to log on to the IBM SPSS Collaboration and Deployment Services Repository.
`-spsscr_password` <password>	The password with which to log on to the IBM SPSS Collaboration and Deployment Services Repository.
`-spsscr_epassword` <encoded password>	The encoded password with which to log on to the IBM SPSS Collaboration and Deployment Services Repository.
`-spsscr_domain` <name>	The domain used to log on to the IBM SPSS Collaboration and Deployment Services Repository. This flag is optional—do not use it unless you log on by using LDAP or Active Directory.

IBM SPSS Analytic Server Connection Arguments

If you want to store or retrieve objects from IBM SPSS Analytic Server via the command line, you must specify a valid connection to IBM SPSS Analytic Server.

Note: The location of Analytic Server is obtained from SPSS Modeler Server and cannot be changed on the client.

The following table lists the arguments that can be used to set up the connection.

Table 35. IBM SPSS Analytic Server connection arguments

Argument	Behavior/Description
`-analytic_server_username`	The user name with which to log on to IBM SPSS Analytic Server.
`-analytic_server_password`	The password with which to log on to IBM SPSS Analytic Server.
`-analytic_server_epassword`	The encoded password with which to log on to IBM SPSS Analytic Server.
`-analytic_server_credential`	The credentials used to log on to IBM SPSS Analytic Server.

Combining Multiple Arguments

Multiple arguments can be combined in a single command file specified at invocation by using the @ symbol followed by the filename. This enables you to shorten the command line invocation and overcome any operating system limitations on command length. For example, the following startup command uses the arguments specified in the file referenced by `<commandFileName>`.

```
modelerclient @<commandFileName>
```

Enclose the filename and path to the command file in quotation marks if spaces are required, as follows:

```
modelerclient @ "C:\Program Files\IBM\SPSS\Modeler\nn\scripts\my_command_file.txt"
```

The command file can contain all arguments previously specified individually at startup, with one argument per line. For example:

```
-stream report.str
-Porder.full_filename=APR_orders.dat
-Preport.filename=APR_report.txt
-execute
```

When writing and referencing command files, be sure to follow these constraints:

- Use only one command per line.
- Do not embed an `@CommandFile` argument within a command file.

Chapter 7. Properties Reference

Properties Reference Overview

You can specify a number of different properties for nodes, streams, SuperNodes, and projects. Some properties are common to all nodes, such as name, annotation, and ToolTip, while others are specific to certain types of nodes. Other properties refer to high-level stream operations, such as caching or SuperNode behavior. Properties can be accessed through the standard user interface (for example, when you open a dialog box to edit options for a node) and can also be used in a number of other ways.

- Properties can be modified through scripts, as described in this section. For more information, see "Syntax for Properties."
- Node properties can be used in SuperNode parameters.
- Node properties can also be used as part of a command line option (using the `-P` flag) when starting IBM SPSS Modeler.

In the context of scripting within IBM SPSS Modeler, node and stream properties are often called **slot parameters**. In this guide, they are referred to as node or stream properties.

For more information on the scripting language, see Scripting Language.

Syntax for Properties

Properties can be set using the following syntax

```
OBJECT.setPropertyValue(PROPERTY, VALUE)
```

or:

```
OBJECT.setKeyedPropertyValue(PROPERTY, KEY, VALUE)
```

The value of properties can be retrieved using the following syntax:

```
VARIABLE = OBJECT.getPropertyValue(PROPERTY)
```

or:

```
VARIABLE = OBJECT.getKeyedPropertyValue(PROPERTY, KEY)
```

where `OBJECT` is a node or output, `PROPERTY` is the name of the node property that your expression refers to, and `KEY` is the key value for keyed properties.. For example, the following syntax is used to find the filter node, and then set the default to include all fields and filter the `Age` field from downstream data:

```
filternode = modeler.script.stream().findByType("filter", None)
filternode.setPropertyValue("default_include", True)
filternode.setKeyedPropertyValue("include", "Age", False)
```

All nodes used in IBM SPSS Modeler can be located using the stream `findByType(TYPE, LABEL)` function. At least one of `TYPE` or `LABEL` must be specified.

Structured Properties

There are two ways in which scripting uses structured properties for increased clarity when parsing:

- To give structure to the names of properties for complex nodes, such as Type, Filter, or Balance nodes.
- To provide a format for specifying multiple properties at once.

Structuring for Complex Interfaces

The scripts for nodes with tables and other complex interfaces (for example, the Type, Filter, and Balance nodes) must follow a particular structure in order to parse correctly. These properties need a name that is more complex than the name for a single identifier, this name is called the key. For example, within a Filter node, each available field (on its upstream side) is switched on or off. In order to refer to this information, the Filter node stores one item of information per field (whether each field is true or false). This property may have (or be given) the value `True` or `False`. Suppose that a Filter node named `mynode` has (on its upstream side) a field called `Age`. To switch this to off, set the property `include`, with the key `Age`, to the value `False`, as follows:

```
mynode.setKeyedPropertyValue("include", "Age", False)
```

Structuring to Set Multiple Properties

For many nodes, you can assign more than one node or stream property at a time. This is referred to as the **multiset command** or **set block**.

In some cases, a structured property can be quite complex. An example is as follows:

```
sortnode.setPropertyValue("keys", [["K", "Descending"], ["Age", "Ascending"], ["Na", "Descending"]])
```

Another advantage that structured properties have is their ability to set several properties on a node before the node is stable. By default, a multiset sets all properties in the block before taking any action based on an individual property setting. For example, when defining a Fixed File node, using two steps to set field properties would result in errors because the node is not consistent until both settings are valid. Defining properties as a multiset circumvents this problem by setting both properties before updating the data model.

Abbreviations

Standard abbreviations are used throughout the syntax for node properties. Learning the abbreviations is helpful in constructing scripts.

Table 36. Standard abbreviations used throughout the syntax

Abbreviation	Meaning
abs	Absolute value
len	Length
min	Minimum
max	Maximum
correl	Correlation
covar	Covariance
num	Number or numeric
pct	Percent or percentage
transp	Transparency
xval	Cross-validation
var	Variance or variable (in source nodes)

Node and Stream Property Examples

Node and stream properties can be used in a variety of ways with IBM SPSS Modeler. They are most commonly used as part of a script, either a **standalone script**, used to automate multiple streams or operations, or a **stream script**, used to automate processes within a single stream. You can also specify node parameters by using the node properties within the SuperNode. At the most basic level, properties

can also be used as a command line option for starting IBM SPSS Modeler. Using the `-p` argument as part of command line invocation, you can use a stream property to change a setting in the stream.

Table 37. Node and stream property examples

Property	Meaning
`s.max_size`	Refers to the property `max_size` of the node named `s`.
`s:samplenode.max_size`	Refers to the property `max_size` of the node named `s`, which must be a Sample node.
`:samplenode.max_size`	Refers to the property `max_size` of the Sample node in the current stream (there must be only one Sample node).
`s:sample.max_size`	Refers to the property `max_size` of the node named `s`, which must be a Sample node.
`t.direction.Age`	Refers to the role of the field *Age* in the Type node `t`.
`:.max_size`	*** NOT LEGAL *** You must specify either the node name or the node type.

The example `s:sample.max_size` illustrates that you do not need to spell out node types in full.

The example `t.direction.Age` illustrates that some slot names can themselves be structured—in cases where the attributes of a node are more complex than simply individual slots with individual values. Such slots are called **structured** or **complex** properties.

Node Properties Overview

Each type of node has its own set of legal properties, and each property has a type. This type may be a general type—number, flag, or string—in which case settings for the property are coerced to the correct type. An error is raised if they cannot be coerced. Alternatively, the property reference may specify the range of legal values, such as `Discard`, `PairAndDiscard`, and `IncludeAsText`, in which case an error is raised if any other value is used. Flag properties should be read or set by using values of `true` and `false`. (Variations including `Off`, `OFF`, `off`, `No`, `NO`, `no`, `n`, `N`, `f`, `F`, `false`, `False`, `FALSE`, or `0` are also recognized when setting values but may cause errors when reading property values in some cases. All other values are regarded as true. Using `true` and `false` consistently will avoid any confusion.) In this guide's reference tables, the structured properties are indicated as such in the *Property description* column, and their usage formats are given.

Common Node Properties

A number of properties are common to all nodes (including SuperNodes) in IBM SPSS Modeler.

Table 38. Common node properties.

Property name	Data type	Property description
`use_custom_name`	*flag*	
`name`	*string*	Read-only property that reads the name (either auto or custom) for a node on the canvas.
`custom_name`	*string*	Specifies a custom name for the node.
`tooltip`	*string*	
`annotation`	*string*	

Table 38. Common node properties (continued).

Property name	Data type	Property description
keywords	*string*	Structured slot that specifies a list of keywords associated with the object (for example, ["Keyword1" "Keyword2"]).
cache_enabled	*flag*	
node_type	source_supernode process_supernode terminal_supernode all node names as specified for scripting	Read-only property used to refer to a node by type. For example, instead of referring to a node only by name, such as real_income, you can also specify the type, such as userinputnode or filternode.

SuperNode-specific properties are discussed separately, as with all other nodes. See the topic Chapter 19, "SuperNode Properties," on page 291 for more information.

Chapter 8. Stream Properties

A variety of stream properties can be controlled by scripting. To reference stream properties, you must set the execution method to use scripts:

```
stream = modeler.script.stream()
stream.setPropertyValue("execute_method", "Script")
```

Example

The node property is used to refer to the nodes in the current stream. The following stream script provides an example:

```
stream = modeler.script.stream()
annotation = stream.getPropertyValue("annotation")

annotation = annotation + "\n\nThis stream is called \"" + stream.getLabel() + "\" and
 contains the following nodes:\n"

for node in stream.iterator():
    annotation = annotation + "\n" + node.getTypeName() + " node called \"" + node.getLabel()
 + "\""

stream.setPropertyValue("annotation", annotation)
```

The above example uses the node property to create a list of all nodes in the stream and write that list in the stream annotations. The annotation produced looks like this:

```
This stream is called "druglearn" and contains the following nodes:

type node called "Define Types"
derive node called "Na_to_K"
variablefile node called "DRUG1n"
neuralnetwork node called "Drug"
c50 node called "Drug"
filter node called "Discard Fields"
```

Stream properties are described in the following table.

Table 39. Stream properties.

Property name	Data type	Property description
execute_method	Normal Script	

Table 39. Stream properties (continued).

Property name	Data type	Property description
date_format	"DDMMYY" "MMDDYY" "YYMMDD" "YYYYMMDD" "YYYYDDD" DAY MONTH "DD-MM-YY" "DD-MM-YYYY" "MM-DD-YY" "MM-DD-YYYY" "DD-MON-YY" "DD-MON-YYYY" "YYYY-MM-DD" "DD.MM.YY" "DD.MM.YYYY" "MM.DD.YYYY" "DD.MON.YY" "DD.MON.YYYY" "DD/MM/YY" "DD/MM/YYYY" "MM/DD/YY" "MM/DD/YYYY" "DD/MON/YY" "DD/MON/YYYY" MON YYYY q Q YYYY ww WK YYYY	
date_baseline	*number*	
date_2digit_baseline	*number*	
time_format	"HHMMSS" "HHMM" "MMSS" "HH:MM:SS" "HH:MM" "MM:SS" "(H)H:(M)M:(S)S" "(H)H:(M)M" "(M)M:(S)S" "HH.MM.SS" "HH.MM" "MM.SS" "(H)H.(M)M.(S)S" "(H)H.(M)M" "(M)M.(S)S"	
time_rollover	*flag*	
import_datetime_as_string	*flag*	
decimal_places	*number*	
decimal_symbol	Default Period Comma	
angles_in_radians	*flag*	
use_max_set_size	*flag*	
max_set_size	*number*	
ruleset_evaluation	Voting FirstHit	

Table 39. Stream properties (continued).

Property name	Data type	Property description
refresh_source_nodes	*flag*	Use to refresh source nodes automatically upon stream execution.
script	*string*	
annotation	*string*	
name	*string*	**Note:** This property is read-only. If you want to change the name of a stream, you should save it with a different name.
parameters		Use this property to update stream parameters from within a stand-alone script.
nodes		See detailed information below.
encoding	SystemDefault "UTF-8"	
stream_rewriting	*boolean*	
stream_rewriting_maximise_sql	*boolean*	
stream_rewriting_optimise_clem_execution	*boolean*	
stream_rewriting_optimise_syntax_execution	*boolean*	
enable_parallelism	*boolean*	
sql_generation	*boolean*	
database_caching	*boolean*	
sql_logging	*boolean*	
sql_generation_logging	*boolean*	
sql_log_native	*boolean*	
sql_log_prettyprint	*boolean*	
record_count_suppress_input	*boolean*	
record_count_feedback_interval	*integer*	
use_stream_auto_create_node_settings	*boolean*	If true, then stream-specific settings are used, otherwise user preferences are used.
create_model_applier_for_new_models	*boolean*	If true, when a model builder creates a new model, and it has no active update links, a new model applier is added. **Note:** If you are using IBM SPSS Modeler Batch version 15 you must explicitly add the model applier within your script.
create_model_applier_update_links	createEnabled createDisabled doNotCreate	Defines the type of link created when a model applier node is added automatically.
create_source_node_from_builders	*boolean*	If true, when a source builder creates a new source output, and it has no active update links, a new source node is added.

Table 39. Stream properties (continued).

Property name	Data type	Property description

`create_source_node_update_links`	`createEnabled`
	`createDisabled`
	`doNotCreate`
		Defines the type of link created when a source node is added automatically.

`has_coordinate_system`	*boolean*	If true, applies a coordinate system to the entire stream.
`coordinate_system`	*string*	The name of the selected projected coordinate system.

Chapter 9. Source Node Properties

Source Node Common Properties

Properties that are common to all source nodes are listed below, with information on specific nodes in the topics that follow.

Example 1

```
varfilenode = modeler.script.stream().create("variablefile", "Var. File")
varfilenode.setPropertyValue("full_filename", "$CLEO_DEMOS/DRUG1n")
varfilenode.setKeyedPropertyValue("check", "Age", "None")
varfilenode.setKeyedPropertyValue("values", "Age", [1, 100])
varfilenode.setKeyedPropertyValue("type", "Age", "Range")
varfilenode.setKeyedPropertyValue("direction", "Age", "Input")
```

Example 2

This script assumes that the specified data file contains a field called `Region` that represents a multi-line string.

```
from modeler.api import StorageType
from modeler.api import MeasureType

# Create a Variable File node that reads the data set containing
# the "Region" field
varfilenode = modeler.script.stream().create("variablefile", "My Geo Data")
varfilenode.setPropertyValue("full_filename", "C:/mydata/mygeodata.csv")
varfilenode.setPropertyValue("treat_square_brackets_as_lists", True)

# Override the storage type to be a list...
varfilenode.setKeyedPropertyValue("custom_storage_type", "Region", StorageType.LIST)
# ...and specify the type if values in the list and the list depth
varfilenode.setKeyedPropertyValue("custom_list_storage_type", "Region", StorageType.INTEGER)
varfilenode.setKeyedPropertyValue("custom_list_depth", "Region", 2)

# Now change the measurement to indentify the field as a geospatial value...
varfilenode.setKeyedPropertyValue("measure_type", "Region", MeasureType.GEOSPATIAL)
# ...and finally specify the necessary information about the specific
# type of geospatial object
varfilenode.setKeyedPropertyValue("geo_type", "Region", "MultiLineString")
varfilenode.setKeyedPropertyValue("geo_coordinates", "Region", "2D")
varfilenode.setKeyedPropertyValue("has_coordinate_system", "Region", True)
varfilenode.setKeyedPropertyValue("coordinate_system", "Region",
 "ETRS_1989_EPSG_Arctic_zone_5-47")
```

Table 40. Source node common properties.

Property name	Data type	Property description

`direction`	`Input`
	`Target`
	`Both`
	`None`
	`Partition`
	`Split`
	`Frequency`
	`RecordID`
		Keyed property for field roles.
		
		Usage format:
		`NODE.direction.FIELDNAME`
		Note: The values `In` and `Out` are now deprecated. Support for them may be withdrawn in a future release.

Table 40. Source node common properties (continued).

Property name	Data type	Property description
type	Range Flag Set Typeless Discrete Ordered Set Default	Type of field. Setting this property to *Default* will clear any values property setting, and if value_mode is set to *Specify*, it will be reset to *Read*. If value_mode is already set to *Pass* or *Read*, it will be unaffected by the type setting. Usage format: NODE.type.FIELDNAME
storage	Unknown String Integer Real Time Date Timestamp	Read-only keyed property for field storage type. Usage format: NODE.storage.FIELDNAME
check	None Nullify Coerce Discard Warn Abort	Keyed property for field type and range checking. Usage format: NODE.check.FIELDNAME
values	[*value value*]	For a continuous (range) field, the first value is the minimum, and the last value is the maximum. For nominal (set) fields, specify all values. For flag fields, the first value represents *false*, and the last value represents *true*. Setting this property automatically sets the value_mode property to *Specify*. The storage is determined based on the first value in the list, for example, if the first value is a *string* then the storage is set to String. Usage format: NODE.values.FIELDNAME
value_mode	Read Pass Read+ Current Specify	Determines how values are set for a field on the next data pass. Usage format: NODE.value_mode.FIELDNAME Note that you cannot set this property to *Specify* directly; to use specific values, set the values property.
default_value_mode	Read Pass	Specifies the default method for setting values for all fields. Usage format: NODE.default_value_mode This setting can be overridden for specific fields by using the value_mode property.

Table 40. Source node common properties (continued).

Property name	Data type	Property description
extend_values	*flag*	Applies when value_mode is set to *Read*. Set to *T* to add newly read values to any existing values for the field. Set to *F* to discard existing values in favor of the newly read values. Usage format: NODE.extend_values.FIELDNAME
value_labels	*string*	Used to specify a value label. Note that values must be specified first.
enable_missing	*flag*	When set to *T*, activates tracking of missing values for the field. Usage format: NODE.enable_missing.FIELDNAME
missing_values	[*value value ...*]	Specifies data values that denote missing data. Usage format: NODE.missing_values.FIELDNAME
range_missing	*flag*	When this property is set to *T*, specifies whether a missing-value (blank) range is defined for a field. Usage format: NODE.range_missing.FIELDNAME
missing_lower	*string*	When range_missing is true, specifies the lower bound of the missing-value range. Usage format: NODE.missing_lower.FIELDNAME
missing_upper	*string*	When range_missing is true, specifies the upper bound of the missing-value range. Usage format: NODE.missing_upper.FIELDNAME
null_missing	*flag*	When this property is set to *T*, nulls (undefined values that are displayed as $null$ in the software) are considered missing values. Usage format: NODE.null_missing.FIELDNAME
whitespace_missing	*flag*	When this property is set to *T*, values containing only white space (spaces, tabs, and new lines) are considered missing values. Usage format: NODE.whitespace_missing.FIELDNAME
description	*string*	Used to specify a field label or description.
default_include	*flag*	Keyed property to specify whether the default behavior is to pass or filter fields: NODE.default_include Example: set mynode:filternode.default_include = false

Table 40. Source node common properties (continued).

Property name	Data type	Property description
include	*flag*	Keyed property used to determine whether individual fields are included or filtered: NODE.include.FIELDNAME.
new_name	*string*	
measure_type	Range / MeasureType.RANGE Discrete / MeasureType.DISCRETE Flag / MeasureType.FLAG Set / MeasureType.SET OrderedSet / MeasureType.ORDERED_SET Typeless / MeasureType.TYPELESS Collection / MeasureType.COLLECTION Geospatial / MeasureType.GEOSPATIAL	This keyed property is similar to type in that it can be used to define the measurement associated with the field. What is different is that in Python scripting, the setter function can also be passed one of the MeasureType values while the getter will always return on the MeasureType values.
collection_measure	Range / MeasureType.RANGE Flag / MeasureType.FLAG Set / MeasureType.SET OrderedSet / MeasureType.ORDERED_SET Typeless / MeasureType.TYPELESS	For collection fields (lists with a depth of 0), this keyed property defines the measurement type associated with the underlying values.
geo_type	Point MultiPoint LineString MultiLineString Polygon MultiPolygon	For geospatial fields, this keyed property defines the type of geospatial object represented by this field. This should be consistent with the list depth of the values.
has_coordinate_system	*boolean*	For geospatial fields, this property defines whether this field has a coordinate system
coordinate_system	*string*	For geospatial fields, this keyed property defines the coordinate system for this field.
custom_storage_type	Unknown / MeasureType.UNKNOWN String / MeasureType.STRING Integer / MeasureType.INTEGER Real / MeasureType.REAL Time / MeasureType.TIME Date / MeasureType.DATE Timestamp / MeasureType.TIMESTAMP List / MeasureType.LIST	This keyed property is similar to custom_storage in that it can be used to define the override storage for the field. What is different is that in Python scripting, the setter function can also be passed one of the StorageType values while the getter will always return on the StorageType values.

Table 40. Source node common properties (continued).

Property name	Data type	Property description
custom_list_storage_type	String / MeasureType.STRING Integer / MeasureType.INTEGER Real / MeasureType.REAL Time / MeasureType.TIME Date / MeasureType.DATE Timestamp / MeasureType.TIMESTAMP	For list fields, this keyed property specifies the storage type of the underlying values.
custom_list_depth	*integer*	For list fields, this keyed property specifies the depth of the field

asimport Properties

The Analytic Server source enables you to run a stream on Hadoop Distributed File System (HDFS).

Example

```
node = stream.create("asimport", "My node")
node.setPropertyValue("data_source", "Drug1n")
```

Table 41. asimport properties.

asimport properties	Data type	Property description
data_source	*string*	The name of the data source.

cognosimport Node Properties

The IBM Cognos BI source node imports data from Cognos BI databases.

Example

```
node = stream.create("cognosimport", "My node")
node.setPropertyValue("cognos_connection", ["http://mycogsrv1:9300/p2pd/servlet/dispatch",
 True, "", "", ""])
node.setPropertyValue("cognos_package_name", "/Public Folders/GOSALES")
node.setPropertyValue("cognos_items", ["[GreatOutdoors].[BRANCH].[BRANCH_CODE]", "[GreatOutdoors]
.[BRANCH].[COUNTRY_CODE]"])
```

Table 42. cognosimport node properties.

cognosimport node properties	Data type	Property description
mode	Data Report	Specifies whether to import Cognos BI data (default) or reports.

Table 42. cognosimport node properties (continued).

cognosimport node properties	**Data type**	**Property description**
cognos_connection	*["string",flag,"string", "string" ,"string"]*	A list property containing the connection details for the Cognos server. The format is: ["Cognos_server_URL", login_mode, "namespace", "username", "password"] where: Cognos_server_URL is the URL of the Cognos server containing the source. login_mode indicates whether anonymous login is used, and is either true or false; if set to true, the following fields should be set to "". namespace specifies the security authentication provider used to log on to the server. username and password are those used to log on to the Cognos server. Instead of login_mode, the following modes are also available: • anonymousMode. For example: ['Cognos_server_url', 'anonymousMode', "namespace", "username", "password"] • credentialMode. For example: ['Cognos_server_url', 'credentialMode', "namespace", "username", "password"] • storedCredentialMode. For example: ['Cognos_server_url', 'storedCredentialMode', "stored_credential_name"] Where stored_credential_name is the name of a Cognos credential in the repository.
cognos_package_name	*string*	The path and name of the Cognos package from which you are importing data objects, for example: /Public Folders/GOSALES **Note:** Only forward slashes are valid.
cognos_items	*["field","field", ... ,"field"]*	The name of one or more data objects to be imported. The format of *field* is [*namespace*].[*query_subject*].[*query_item*]
cognos_filters	*field*	The name of one or more filters to apply before importing data.
cognos_data_parameters	*list*	Values for prompt parameters for data. Name-and-value pairs are enclosed in square brackets, and multiple pairs are separated by commas and the whole string enclosed in square brackets. Format: [["*param1*", "*value*"],...,["*paramN*", "*value*"]]

Table 42. cognosimport node properties (continued).

cognosimport node properties	**Data type**	**Property description**
cognos_report_directory	*field*	The Cognos path of a folder or package from which to import reports, for example: /Public Folders/GOSALES **Note:** Only forward slashes are valid.
cognos_report_name	*field*	The path and name within the report location of a report to import.
cognos_report_parameters	*list*	Values for report parameters. Name-and-value pairs are enclosed in square brackets, and multiple pairs are separated by commas and the whole string enclosed in square brackets. Format: [["*param1*", "*value*"],...,["*paramN*", "*value*"]]

databasenode Properties

The Database node can be used to import data from a variety of other packages using ODBC (Open Database Connectivity), including Microsoft SQL Server, DB2, Oracle, and others.

Example

```
import modeler.api
stream = modeler.script.stream()
nnode = stream.create("database", "My node")
node.setPropertyValue("mode", "Table")
node.setPropertyValue("query", "SELECT * FROM drug1n")
node.setPropertyValue("datasource", "Drug1n_db")
node.setPropertyValue("username", "spss")
node.setPropertyValue("password", "spss")
node.setPropertyValue("tablename", ".Drug1n")
```

Table 43. databasenode properties.

databasenode properties	**Data type**	**Property description**
mode	Table Query	Specify *Table* to connect to a database table by using dialog box controls, or specify *Query* to query the selected database by using SQL.
datasource	*string*	Database name (see also note below).
username	*string*	Database connection details (see also note below).
password	*string*	
credential	*string*	Name of credential stored in IBM SPSS Collaboration and Deployment Services. This can be used instead of the username and password properties. The credential's user name and password must match the user name and password required to access the database

Table 43. databasenode properties (continued).

databasenode properties	Data type	Property description
use_credential		Set to True or False.
epassword	*string*	Specifies an encoded password as an alternative to hard-coding a password in a script. See the topic "Generating an Encoded Password" on page 51 for more information. This property is read-only during execution.
tablename	*string*	Name of the table you want to access.
strip_spaces	None Left Right Both	Options for discarding leading and trailing spaces in strings.
use_quotes	AsNeeded Always Never	Specify whether table and column names are enclosed in quotation marks when queries are sent to the database (for example, if they contain spaces or punctuation).
query	*string*	Specifies the SQL code for the query you want to submit.

Note: If the database name (in the datasource property) contains one or more spaces, periods (also known as a "full stop"), or underscores, you can use the "backslash double quote" format to treat it as string. For example: "{\"db2v9.7.6_linux\"}" or: "{\"TDATA 131\"}". In addition, always enclose datasource string values in double quotes and curly braces, as in the following example: "{\"SQL Server\",spssuser,abcd1234,false}".

Note: If the database name (in the datasource property) contains spaces, then instead of individual properties for datasource, username and password, you can also use a single datasource property in the following format:

Table 44. databasenode properties - datasource specific.

databasenode properties	Data type	Property description
datasource	*string*	Format: [database_name,username,password[,true | false]] The last parameter is for use with encrypted passwords. If this is set to true, the password will be decrypted before use.

Use this format also if you are changing the data source; however, if you just want to change the username or password, you can use the username or password properties.

datacollectionimportnode Properties

The IBM SPSS Data Collection Data Import node imports survey data based on the IBM SPSS Data Collection Data Model used by IBM Corp. market research products. The IBM SPSS Data Collection Data Library must be installed to use this node.

Figure 7. Dimensions Data Import node

Example

```
node = stream.create("datacollectionimport", "My node")
node.setPropertyValue("metadata_name", "mrQvDsc")
node.setPropertyValue("metadata_file", "C:/Program Files/IBM/SPSS/DataCollection/DDL/Data/
Quanvert/Museum/museum.pkd")
node.setPropertyValue("casedata_name", "mrQvDsc")
node.setPropertyValue("casedata_source_type", "File")
node.setPropertyValue("casedata_file", "C:/Program Files/IBM/SPSS/DataCollection/DDL/Data/
Quanvert/Museum/museum.pkd")
node.setPropertyValue("import_system_variables", "Common")
node.setPropertyValue("import_multi_response", "MultipleFlags")
```

Table 45. datacollectionimportnode properties.

datacollectionimportnode properties	**Data type**	**Property description**
metadata_name	*string*	The name of the MDSC. The special value DimensionsMDD indicates that the standard IBM SPSS Data Collection metadata document should be used. Other possible values include: mrADODsc mrI2dDsc mrLogDsc mrQdiDrsDsc mrQvDsc mrSampleReportingMDSC mrSavDsc mrSCDsc mrScriptMDSC The special value none indicates that there is no MDSC.
metadata_file	*string*	Name of the file where the metadata is stored.
casedata_name	*string*	The name of the CDSC. Possible values include: mrADODsc mrI2dDsc mrLogDsc mrPunchDSC mrQdiDrsDsc mrQvDsc mrRdbDsc2 mrSavDsc mrScDSC mrXmlDsc The special value none indicates that there is no CDSC.

Table 45. datacollectionimportnode properties (continued).

datacollectionimportnode properties	**Data type**	**Property description**
casedata_source_type	Unknown File Folder UDL DSN	Indicates the source type of the CDSC.
casedata_file	*string*	When casedata_source_type is *File*, specifies the file containing the case data.
casedata_folder	*string*	When casedata_source_type is *Folder*, specifies the folder containing the case data.
casedata_udl_string	*string*	When casedata_source_type is *UDL*, specifies the OLD-DB connection string for the data source containing the case data.
casedata_dsn_string	*string*	When casedata_source_type is *DSN*, specifies the ODBC connection string for the data source.
casedata_project	*string*	When reading case data from a IBM SPSS Data Collection database, you can enter the name of the project. For all other case data types, this setting should be left blank.
version_import_mode	All Latest Specify	Defines how versions should be handled.
specific_version	*string*	When version_import_mode is *Specify*, defines the version of the case data to be imported.
use_language	*string*	Defines whether labels of a specific language should be used.
language	*string*	If use_language is true, defines the language code to use on import. The language code should be one of those available in the case data.
use_context	*string*	Defines whether a specific context should be imported. Contexts are used to vary the description associated with responses.
context	*string*	If use_context is true, defines the context to import. The context should be one of those available in the case data.
use_label_type	*string*	Defines whether a specific type of label should be imported.
label_type	*string*	If use_label_type is true, defines the label type to import. The label type should be one of those available in the case data.
user_id	*string*	For databases requiring an explicit login, you can provide a user ID and password to access the data source.
password	*string*	
import_system_variables	Common None All	Specifies which system variables are imported.
import_codes_variables	*flag*	

Table 45. datacollectionimportnode properties (continued).

datacollectionimportnode properties	**Data type**	**Property description**
import_sourcefile_variables	*flag*	
import_multi_response	MultipleFlags Single	

excelimportnode Properties

The Excel Import node imports data from Microsoft Excel in the .xlsx file format. An ODBC data source is not required.

Examples

```
#To use a named range:
node = stream.create("excelimport", "My node")
node.setPropertyValue("excel_file_type", "Excel2007")
node.setPropertyValue("full_filename", "C:/drug.xlsx")
node.setPropertyValue("use_named_range", True)
node.setPropertyValue("named_range", "DRUG")
node.setPropertyValue("read_field_names", True)

#To use an explicit range:
node = stream.create("excelimport", "My node")
node.setPropertyValue("excel_file_type", "Excel2007")
node.setPropertyValue("full_filename", "C:/drug.xlsx")
node.setPropertyValue("worksheet_mode", "Name")
node.setPropertyValue("worksheet_name", "Drug")
node.setPropertyValue("explicit_range_start", "A1")
node.setPropertyValue("explicit_range_end", "F300")
```

Table 46. excelimportnode properties.

excelimportnode properties	**Data type**	**Property description**
excel_file_type	Excel2007	
full_filename	*string*	The complete filename, including path.
use_named_range	*Boolean*	Whether to use a named range. If true, the named_range property is used to specify the range to read, and other worksheet and data range settings are ignored.
named_range	*string*	
worksheet_mode	Index Name	Specifies whether the worksheet is defined by index or name.
worksheet_index	*integer*	Index of the worksheet to be read, beginning with 0 for the first worksheet, 1 for the second, and so on.
worksheet_name	*string*	Name of the worksheet to be read.
data_range_mode	FirstNonBlank ExplicitRange	Specifies how the range should be determined.
blank_rows	StopReading ReturnBlankRows	When data_range_mode is *FirstNonBlank*, specifies how blank rows should be treated.

Table 46. excelimportnode properties (continued).

excelimportnode properties	Data type	Property description
explicit_range_start	*string*	When data_range_mode is *ExplicitRange*, specifies the starting point of the range to read.
explicit_range_end	*string*	
read_field_names	*Boolean*	Specifies whether the first row in the specified range should be used as field (column) names.

evimportnode Properties

The Enterprise View node creates a connection to an IBM SPSS Collaboration and Deployment Services Repository, enabling you to read Enterprise View data into a stream and to package a model in a scenario that can be accessed from the repository by other users. **Note:** The Enterprise View node was replaced in SPSS Modeler16.0 by the Data View node. For streams saved in previous releases, the Enterprise View node is still supported. However when updating or creating new streams we recommend that you use the Data View node.

Example

```
node = stream.create("evimport", "My node")
node.setPropertyValue("connection", ["Training data","/Application views/Marketing","LATEST",
"Analytic", "/Data Providers/Marketing"])
node.setPropertyValue("tablename", "cust1")
```

Table 47. evimportnode properties.

evimportnode properties	Data type	Property description
connection	*list*	Structured property--list of parameters making up an Enterprise View connection. Usage format: evimportnode.connection = [description,app_view_path, app_view_version_label, environment,DPD_path]
tablename	*string*	The name of a table in the Application View.

fixedfilenode Properties

The Fixed File node imports data from fixed-field text files—that is, files whose fields are not delimited but start at the same position and are of a fixed length. Machine-generated or legacy data are frequently stored in fixed-field format.

Example

```
node = stream.create("fixedfile", "My node")
node.setPropertyValue("full_filename", "$CLEO_DEMOS/DRUG1n")
node.setPropertyValue("record_len", 32)
node.setPropertyValue("skip_header", 1)
```

```
node.setPropertyValue("fields", [["Age", 1, 3], ["Sex", 5, 7], ["BP", 9, 10], ["Cholesterol",
 12, 22], ["Na", 24, 25], ["K", 27, 27], ["Drug", 29, 32]])
node.setPropertyValue("decimal_symbol", "Period")
node.setPropertyValue("lines_to_scan", 30)
```

Table 48. fixedfilenode properties.

fixedfilenode properties	**Data type**	**Property description**
record_len	*number*	Specifies the number of characters in each record.
line_oriented	*flag*	Skips the new-line character at the end of each record.
decimal_symbol	Default Comma Period	The type of decimal separator used in your data source.
skip_header	*number*	Specifies the number of lines to ignore at the beginning of the first record. Useful for ignoring column headers.
auto_recognize_datetime	*flag*	Specifies whether dates or times are automatically identified in the source data.
lines_to_scan	*number*	
fields	*list*	Structured property.
full_filename	*string*	Full name of file to read, including directory.
strip_spaces	None Left Right Both	Discards leading and trailing spaces in strings on import.
invalid_char_mode	Discard Replace	Removes invalid characters (null, 0, or any character non-existent in current encoding) from the data input or replaces invalid characters with the specified one-character symbol.
invalid_char_replacement	*string*	
use_custom_values	*flag*	
custom_storage	Unknown String Integer Real Time Date Timestamp	

Table 48. fixedfilenode properties (continued).

fixedfilenode properties	**Data type**	**Property description**
custom_date_format	"DDMMYY" "MMDDYY" "YYMMDD" "YYYYMMDD" "YYYYDDD" DAY MONTH "DD-MM-YY" "DD-MM-YYYY" "MM-DD-YY" "MM-DD-YYYY" "DD-MON-YY" "DD-MON-YYYY" "YYYY-MM-DD" "DD.MM.YY" "DD.MM.YYYY" "MM.DD.YY" "MM.DD.YYYY" "DD.MON.YY" "DD.MON.YYYY" "DD/MM/YY" "DD/MM/YYYY" "MM/DD/YY" "MM/DD/YYYY" "DD/MON/YY" "DD/MON/YYYY" MON YYYY q Q YYYY ww WK YYYY	This property is applicable only if a custom storage has been specified.
custom_time_format	"HHMMSS" "HHMM" "MMSS" "HH:MM:SS" "HH:MM" "MM:SS" "(H)H:(M)M:(S)S" "(H)H:(M)M" "(M)M:(S)S" "HH.MM.SS" "HH.MM" "MM.SS" "(H)H.(M)M.(S)S" "(H)H.(M)M" "(M)M.(S)S"	This property is applicable only if a custom storage has been specified.
custom_decimal_symbol	*field*	Applicable only if a custom storage has been specified.
encoding	StreamDefault SystemDefault "UTF-8"	Specifies the text-encoding method.

gsdata_import Node Properties

Use the Geospatial source node to bring map or spatial data into your data mining session.

Table 49. gsdata_import node properties

gsdata_import node properties	Data type	Property description
full_filename	*string*	Enter the file path to the .shp file you want to load.
map_service_URL	*string*	Enter the map service URL to connect to.
map_name	*string*	Only if map_service_URL is used; this contains the top level folder structure of the map service.

sasimportnode Properties

The SAS Import node imports SAS data into IBM SPSS Modeler.

Example

```
node = stream.create("sasimport", "My node")
node.setPropertyValue("format", "Windows")
node.setPropertyValue("full_filename", "C:/data/retail.sas7bdat")
node.setPropertyValue("member_name", "Test")
node.setPropertyValue("read_formats", False)
node.setPropertyValue("full_format_filename", "Test")
node.setPropertyValue("import_names", True)
```

Table 50. sasimportnode properties.

sasimportnode properties	Data type	Property description
format	Windows UNIX Transport SAS7 SAS8 SAS9	Format of the file to be imported.
full_filename	*string*	The complete filename that you enter, including its path.
member_name	*string*	Specify the member to import from the specified SAS transport file.
read_formats	*flag*	Reads data formats (such as variable labels) from the specified format file.
full_format_filename	*string*	
import_names	NamesAndLabels LabelsasNames	Specifies the method for mapping variable names and labels on import.

simgennode Properties

The Simulation Generate node provides an easy way to generate simulated data—either from scratch using user specified statistical distributions or automatically using the distributions obtained from running a Simulation Fitting node on existing historical data. This is useful when you want to evaluate the outcome of a predictive model in the presence of uncertainty in the model inputs.

Table 51. simgennode properties.

simgennode properties	Data type	Property description
fields	Structured property	See example
correlations	Structured property	See example
keep_min_max_setting	*boolean*	
refit_correlations	*boolean*	
max_cases	*integer*	Minimum value is 1000, maximum value is 2,147,483,647
create_iteration_field	*boolean*	
iteration_field_name	*string*	
replicate_results	*boolean*	
random_seed	*integer*	
parameter_xml	*string*	Returns the parameter Xml as a string

fields example

This is a structured slot parameter with the following syntax:

```
simgennode.setPropertyValue("fields", [
    [field1, storage, locked, [distribution1], min, max],
    [field2, storage, locked, [distribution2], min, max],
    [field3, storage, locked, [distribution3], min, max]
])
```

distribution is a declaration of the distribution name followed by a list containing pairs of attribute names and values. Each distribution is defined in the following way:

```
[distributionname, [[par1], [par2], [par3]]]
```

```
simgennode = modeler.script.stream().createAt("simgen", u"Sim Gen", 726, 322)
simgennode.setPropertyValue("fields", [["Age", "integer", False, ["Uniform",[["min","1"],["max","2"]]], "", ""]])
```

For example, to create a node that generates a single field with a Binomial distribution, you might use the following script:

```
simgen_node1 = modeler.script.stream().createAt("simgen", u"Sim Gen", 200, 200)
simgen_node1.setPropertyValue("fields", [["Education", "Real", False, ["Binomial", [["n", 32],
 ["prob", 0.7]]], "", ""]])
```

The Binomial distribution takes 2 parameters: n and prob. Since Binomial does not support minimum and maximum values, these are supplied as an empty string.

Note: You cannot set the distribution directly; you use it in conjunction with the fields property.

The following examples show all the possible distribution types. Note that the threshold is entered as thresh in both NegativeBinomialFailures and NegativeBinomialTrial.

```
stream = modeler.script.stream()

simgennode = stream.createAt("simgen", u"Sim Gen", 200, 200)

beta_dist = ["Field1", "Real", False, ["Beta",[["shape1","1"],["shape2","2"]]], "", ""]
binomial_dist = ["Field2", "Real", False, ["Binomial",[["n" ,"1"],["prob","1"]]], "", ""]
categorical_dist = ["Field3", "String", False, ["Categorical", [["A",0.3],["B",0.5],["C",0.2]]], "", ""]
dice_dist = ["Field4", "Real", False, ["Dice", [["1" ,"0.5"],["2","0.5"]]], "", ""]
exponential_dist = ["Field5", "Real", False, ["Exponential", [["scale","1"]]], "", ""]
fixed_dist = ["Field6", "Real", False, ["Fixed", [["value","1" ]]], "", ""]
gamma_dist = ["Field7", "Real", False, ["Gamma", [["scale","1"],["shape"," 1"]]], "", ""]
lognormal_dist = ["Field8", "Real", False, ["Lognormal", [["a","1"],["b","1" ]]], "", ""]
negbinomialfailures_dist = ["Field9", "Real", False, ["NegativeBinomialFailures",[["prob","0.5"],["thresh","1"]]], "", ""]
negbinomialtrial_dist = ["Field10", "Real", False, ["NegativeBinomialTrials",[["prob","0.2"],["thresh","1"]]], "", ""]
normal_dist = ["Field11", "Real", False, ["Normal", [["mean","1"] ,["stddev","2"]]], "", ""]
poisson_dist = ["Field12", "Real", False, ["Poisson", [["mean","1"]]], "", ""]
range_dist = ["Field13", "Real", False, ["Range", [["BEGIN","[1,3]"] ,["END","[2,4]"],["PROB","[[0.5],[0.5]]"]]], "", ""]
triangular_dist = ["Field14", "Real", False, ["Triangular", [["min","0"],["max","1"],["mode","1"]]], "", ""]
uniform_dist = ["Field15", "Real", False, ["Uniform", [["min","1"],["max","2"]]], "", ""]
weibull_dist = ["Field16", "Real", False, ["Weibull", [["a","0"],["b","1 "],["c","1"]]], "", ""]

simgennode.setPropertyValue("fields", [\
beta_dist, \
binomial_dist, \
categorical_dist, \
dice_dist, \
exponential_dist, \
fixed_dist, \
gamma_dist, \
lognormal_dist, \
negbinomialfailures_dist, \
negbinomialtrial_dist, \
normal_dist, \
poisson_dist, \
range_dist, \
triangular_dist, \
uniform_dist, \
weibull_dist
])
```

correlations example

This is a structured slot parameter with the following syntax:

```
simgennode.setPropertyValue("correlations", [
    [field1, field2, correlation],
    [field1, field3, correlation],
    [field2, field3, correlation]
])
```

Correlation can be any number between +1 and -1. You can specify as many or as few correlations as you like. Any unspecified correlations are set to zero. If any fields are unknown, the correlation value should be set on the correlation matrix (or table) and is shown in red text. When there are unknown fields, it is not possible to execute the node.

statisticsimportnode Properties

The IBM SPSS Statistics File node reads data from the *.sav* file format used by IBM SPSS Statistics, as well as cache files saved in IBM SPSS Modeler, which also use the same format.

The properties for this node are described under “statisticsimportnode Properties” on page 287.

tm1import Node Properties

The IBM Cognos TM1 source node imports data from Cognos TM1 databases.

Table 52. tm1import node properties.

tm1import node properties	**Data type**	**Property description**
pm_host	*string*	The host name. For example: `TM1_import.setPropertyValue("pm_host", 'http://9.191.86.82:9510/pmhub/pm')`
tm1_connection	*["field","field", ... ,"field"]*	A list property containing the connection details for the TM1 server. The format is: `[ "TM1_Server_Name","tm1_ username","tm1_ password"]` For example: `TM1_import.setPropertyValue("tm1_connection", ['Planning Sample', "admin", "apple"])`
selected_view	*["field" "field"]*	A list property containing the details of the selected TM1 cube and the name of the cube view from where data will be imported into SPSS. For example: `TM1_import.setPropertyValue("selected_view", ['plan_BudgetPlan', 'Goal Input'])`

userinputnode Properties

The User Input node provides an easy way to create synthetic data—either from scratch or by altering existing data. This is useful, for example, when you want to create a test dataset for modeling.

Example

```
node = stream.create("userinput", "My node")
node.setPropertyValue("names", ["test1", "test2"])
node.setKeyedPropertyValue("data", "test1", "2, 4, 8")
node.setKeyedPropertyValue("custom_storage", "test1", "Integer")
node.setPropertyValue("data_mode", "Ordered")
```

Table 53. userinputnode properties.

userinputnode properties	**Data type**	**Property description**
data		
names		Structured slot that sets or returns a list of field names generated by the node.

Table 53. userinputnode properties (continued).

userinputnode properties	**Data type**	**Property description**
custom_storage	Unknown String Integer Real Time Date Timestamp	Keyed slot that sets or returns the storage for a field.
data_mode	Combined Ordered	If Combined is specified, records are generated for each combination of set values and min/max values. The number of records generated is equal to the product of the number of values in each field. If Ordered is specified, one value is taken from each column for each record in order to generate a row of data. The number of records generated is equal to the largest number values associated with a field. Any fields with fewer data values will be padded with null values.
values		**Note:** This property has been deprecated in favor of userinputnode.data and should no longer be used.

variablefilenode Properties

The Variable File node reads data from free-field text files—that is, files whose records contain a constant number of fields but a varied number of characters. This node is also useful for files with fixed-length header text and certain types of annotations.

Example

```
node = stream.create("variablefile", "My node")
node.setPropertyValue("full_filename", "$CLEO_DEMOS/DRUG1n")
node.setPropertyValue("read_field_names", True)
node.setPropertyValue("delimit_other", True)
node.setPropertyValue("other", ",")
node.setPropertyValue("quotes_1", "Discard")
node.setPropertyValue("decimal_symbol", "Comma")
node.setPropertyValue("invalid_char_mode", "Replace")
node.setPropertyValue("invalid_char_replacement", "|")
node.setKeyedPropertyValue("use_custom_values", "Age", True)
node.setKeyedPropertyValue("direction", "Age", "Input")
node.setKeyedPropertyValue("type", "Age", "Range")
node.setKeyedPropertyValue("values", "Age", [1, 100])
```

Table 54. variablefilenode properties.

variablefilenode properties	**Data type**	**Property description**
skip_header	*number*	Specifies the number of characters to ignore at the beginning of the first record.
num_fields_auto	*flag*	Determines the number of fields in each record automatically. Records must be terminated with a new-line character.

Table 54. variablefilenode properties (continued).

variablefilenode properties	Data type	Property description
num_fields	*number*	Manually specifies the number of fields in each record.
delimit_space	*flag*	Specifies the character used to delimit field boundaries in the file.
delimit_tab	*flag*	
delimit_new_line	*flag*	
delimit_non_printing	*flag*	
delimit_comma	*flag*	In cases where the comma is both the field delimiter and the decimal separator for streams, set delimit_other to *true*, and specify a comma as the delimiter by using the other property.
delimit_other	*flag*	Allows you to specify a custom delimiter using the other property.
other	*string*	Specifies the delimiter used when delimit_other is *true*.
decimal_symbol	Default Comma Period	Specifies the decimal separator used in the data source.
multi_blank	*flag*	Treats multiple adjacent blank delimiter characters as a single delimiter.
read_field_names	*flag*	Treats the first row in the data file as labels for the column.
strip_spaces	None Left Right Both	Discards leading and trailing spaces in strings on import.
invalid_char_mode	Discard Replace	Removes invalid characters (null, 0, or any character non-existent in current encoding) from the data input or replaces invalid characters with the specified one-character symbol.
invalid_char_replacement	*string*	
break_case_by_newline	*flag*	Specifies that the line delimiter is the newline character.
lines_to_scan	*number*	Specifies how many lines to scan for specified data types.
auto_recognize_datetime	*flag*	Specifies whether dates or times are automatically identified in the source data.
quotes_1	Discard PairAndDiscard IncludeAsText	Specifies how single quotation marks are treated upon import.
quotes_2	Discard PairAndDiscard IncludeAsText	Specifies how double quotation marks are treated upon import.
full_filename	*string*	Full name of file to be read, including directory.
use_custom_values	*flag*	

Table 54. variablefilenode properties (continued).

variablefilenode properties	**Data type**	**Property description**
custom_storage	Unknown String Integer Real Time Date Timestamp	
custom_date_format	"DDMMYY" "MMDDYY" "YYMMDD" "YYYYMMDD" "YYYYDDD" DAY MONTH "DD-MM-YY" "DD-MM-YYYY" "MM-DD-YY" "MM-DD-YYYY" "DD-MON-YY" "DD-MON-YYYY" "YYYY-MM-DD" "DD.MM.YY" "DD.MM.YYYY" "MM.DD.YY" "MM.DD.YYYY" "DD.MON.YY" "DD.MON.YYYY" "DD/MM/YY" "DD/MM/YYYY" "MM/DD/YY" "MM/DD/YYYY" "DD/MON/YY" "DD/MON/YYYY" MON YYYY q Q YYYY ww WK YYYY	Applicable only if a custom storage has been specified.
custom_time_format	"HHMMSS" "HHMM" "MMSS" "HH:MM:SS" "HH:MM" "MM:SS" "(H)H:(M)M:(S)S" "(H)H:(M)M" "(M)M:(S)S" "HH.MM.SS" "HH.MM" "MM.SS" "(H)H.(M)M.(S)S" "(H)H.(M)M" "(M)M.(S)S"	Applicable only if a custom storage has been specified.
custom_decimal_symbol	*field*	Applicable only if a custom storage has been specified.
encoding	StreamDefault SystemDefault "UTF-8"	Specifies the text-encoding method.

xmlimportnode Properties

The XML source node imports data in XML format into the stream. You can import a single file, or all files in a directory. You can optionally specify a schema file from which to read the XML structure.

Example

```
node = stream.create("xmlimport", "My node")
node.setPropertyValue("full_filename", "c:/import/ebooks.xml")
node.setPropertyValue("records", "/author/name")
```

Table 55. xmlimportnode properties.

xmlimportnode properties	**Data type**	**Property description**
read	single directory	Reads a single data file (default), or all XML files in a directory.
recurse	*flag*	Specifies whether to additionally read XML files from all the subdirectories of the specified directory.
full_filename	*string*	(required) Full path and file name of XML file to import (if read = single).
directory_name	*string*	(required) Full path and name of directory from which to import XML files (if read = directory).
full_schema_filename	*string*	Full path and file name of XSD or DTD file from which to read the XML structure. If you omit this parameter, structure is read from the XML source file.
records	*string*	XPath expression (e.g. /author/name) to define the record boundary. Each time this element is encountered in the source file, a new record is created.
mode	read specify	Read all data (default), or specify which items to read.
fields		List of items (elements and attributes) to import. Each item in the list is an XPath expression.

dataviewimport Properties

The Data View node imports Data View data into IBM SPSS Modeler.

Example

```
stream = modeler.script.stream()

dvnode = stream.createAt("dataviewimport", "Data View", 96, 96)
dvnode.setPropertyValue("analytic_data_source",
```

```
["","/folder/adv", "LATEST"])
dvnode.setPropertyValue("table_name", ["","com.ibm.spss.Table"])
dvnode.setPropertyValue("data_access_plan",
["","DataAccessPlan"])
dvnode.setPropertyValue("optional_attributes",
[["","NewDerivedAttribute"]])
dvnode.setPropertyValue("include_xml", True)
dvnode.setPropertyValue("include_xml_field", "xml_data")
```

Table 56. dataviewimport properties

dataviewimport properties	**Data type**	**Property description**
analytic_data_source	*string*	The Analytic Data View object stored in IBM SPSS Collaboration and Deployment Services. The path name and the version label for the version to use. ["Object ID","Full path", "Version"]
table_name	*string*	The data view table used in the Analytic Data View. The table name must be package qualified. You can get the package by exporting the BOM from IBM SPSS Collaboration and Deployment Services Deployment Manager client and looking in the default.bom file in the exported zip archive. The package name should always be the same unless the BOM was imported from IBM Operational Decision Management (iLOG). ["Object ID", "Name"]
data_access_plan	*string*	The data access plan used to provide data for the Analytic Data View. ["Object ID","Name"]
optional_attributes	*string*	A list of derived attributes to include. [["ID1","Name1"], ["ID2", "Name2"]]
include_xml	*boolean*	True if a field with XOM instance data is to be included. Unless IBM Analytical Decision Management iLOG nodes are used, the recommended setting is false. Turning this on may add a lot of extra processing.
include_xml_field	*string*	The name of the field to add when include_xml is set to true.

Chapter 10. Record Operations Node Properties

appendnode Properties

The Append node concatenates sets of records. It is useful for combining datasets with similar structures but different data.

Example

```
node = stream.create("append", "My node")
node.setPropertyValue("match_by", "Name")
node.setPropertyValue("match_case", True)
node.setPropertyValue("include_fields_from", "All")
node.setPropertyValue("create_tag_field", True)
node.setPropertyValue("tag_field_name", "Append_Flag")
```

Table 57. appendnode properties.

appendnode properties	Data type	Property description
match_by	Position Name	You can append datasets based on the position of fields in the main data source or the name of fields in the input datasets.
match_case	*flag*	Enables case sensitivity when matching field names.
include_fields_from	Main All	
create_tag_field	*flag*	
tag_field_name	*string*	

aggregatenode Properties

The Aggregate node replaces a sequence of input records with summarized, aggregated output records.

Example

```
node = stream.create("aggregate", "My node")
# dbnode is a configured database import node
stream.link(dbnode, node)
node.setPropertyValue("contiguous", True)
node.setPropertyValue("keys", ["Drug"])
node.setKeyedPropertyValue("aggregates", "Age", ["Sum", "Mean"])
node.setPropertyValue("inc_record_count", True)
node.setPropertyValue("count_field", "index")
node.setPropertyValue("extension", "Aggregated_")
node.setPropertyValue("add_as", "Prefix")
```

Table 58. aggregatenode properties.

aggregatenode properties	Data type	Property description
keys	*list*	Lists fields that can be used as keys for aggregation. For example, if Sex and Region are your key fields, each unique combination of M and F with regions N and S (four unique combinations) will have an aggregated record.
contiguous	*flag*	Select this option if you know that all records with the same key values are grouped together in the input (for example, if the input is sorted on the key fields). Doing so can improve performance.
aggregates		Structured property listing the numeric fields whose values will be aggregated, as well as the selected modes of aggregation.
aggregate_exprs		Keyed property which keys the derived field name with the aggregate expression used to compute it. For example: `aggregatenode.setKeyedPropertyValue ("aggregate_exprs", "Na_MAX", "MAX('Na')")`
extension	*string*	Specify a prefix or suffix for duplicate aggregated fields (sample below).
add_as	Suffix Prefix	
inc_record_count	*flag*	Creates an extra field that specifies how many input records were aggregated to form each aggregate record.
count_field	*string*	Specifies the name of the record count field.
allow_approximation	*Boolean*	Allows approximation of order statistics when aggregation is performed in Analytic Server
bin_count	*integer*	Specifies the number of bins to use in approximation

balancenode Properties

The Balance node corrects imbalances in a dataset, so it conforms to a specified condition. The balancing directive adjusts the proportion of records where a condition is true by the factor specified.

Example

```
node = stream.create("balance", "My node")
node.setPropertyValue("training_data_only", True)
node.setPropertyValue("directives", [[1.3, "Age > 60"], [1.5, "Na > 0.5"]])
```

Table 59. balancenode properties.

balancenode properties	Data type	Property description
directives		Structured property to balance proportion of field values based on number specified (see example below).

Table 59. balancenode properties (continued).

balancenode properties	Data type	Property description
training_data_only	*flag*	Specifies that only training data should be balanced. If no partition field is present in the stream, then this option is ignored.

This node property uses the format:

[[*number, string*] \ [*number, string*] \ ... [*number, string*]].

Note: If strings (using double quotation marks) are embedded in the expression, they must be preceded by the escape character " \ ". The " \ " character is also the line continuation character, which you can use to align the arguments for clarity.

derive_stbnode Properties

The Space-Time-Boxes node derives Space-Time-Boxes from latitude, longitude and timestamp fields. You can also identify frequent Space-Time-Boxes as hangouts.

Example

```
node = modeler.script.stream().createAt("derive_stb", "My node", 96, 96)

# Individual Records mode
node.setPropertyValue("mode", "IndividualRecords")
node.setPropertyValue("latitude_field", "Latitude")
node.setPropertyValue("longitude_field", "Longitude")
node.setPropertyValue("timestamp_field", "OccurredAt")
node.setPropertyValue("densities", ["STB_GH7_1HOUR", "STB_GH7_30MINS"])
node.setPropertyValue("add_extension_as", "Prefix")
node.setPropertyValue("name_extension", "stb_")

# Hangouts mode
node.setPropertyValue("mode", "Hangouts")
node.setPropertyValue("hangout_density", "STB_GH7_30MINS")
node.setPropertyValue("id_field", "Event")
node.setPropertyValue("qualifying_duration", "30MINUTES")
node.setPropertyValue("min_events", 4)
node.setPropertyValue("qualifying_pct", 65)
```

Table 60. Space-Time-Boxes node properties

derive_stbnode properties	Data type	Property description
mode	IndividualRecords Hangouts	
latitude_field	*field*	
longitude_field	*field*	
timestamp_field	*field*	
hangout_density	*density*	A single density. See densities for valid density values.

Table 60. Space-Time-Boxes node properties (continued)

derive_stbnode properties	**Data type**	**Property description**
densities	[*density*,*density*,..., *density*]	Each density is a string, for example STB_GH8_1DAY. **Note:** There are limits to which densities are valid. For the geohash, values from GH1 to GH15 can be used. For the temporal part, the following values can be used: EVER 1YEAR 1MONTH 1DAY 12HOURS 8HOURS 6HOURS 4HOURS 3HOURS 2HOURS 1HOUR 30MINS 15MINS 10MINS 5MINS 2MINS 1MIN 30SECS 15SECS 10SECS 5SECS 2SECS 1SEC
id_field	*field*	
qualifying_duration	1DAY 12HOURS 8HOURS 6HOURS 4HOURS 3HOURS 2Hours 1HOUR 30MIN 15MIN 10MIN 5MIN 2MIN 1MIN 30SECS 15SECS 10SECS 5SECS 2SECS 1SECS	Must be a string.
min_events	*integer*	Minimum valid integer value is 2.
qualifying_pct	*integer*	Must be in the range of 1 and 100.
add_extension_as	Prefix Suffix	
name_extension	*string*	

distinctnode Properties

The Distinct node removes duplicate records, either by passing the first distinct record to the data stream or by discarding the first record and passing any duplicates to the data stream instead.

Example

```
node = stream.create("distinct", "My node")
node.setPropertyValue("mode", "Include")
node.setPropertyValue("fields", ["Age" "Sex"])
node.setPropertyValue("keys_pre_sorted", True)
```

Table 61. distinctnode properties.

distinctnode properties	Data type	Property description
mode	Include Discard	You can include the first distinct record in the data stream, or discard the first distinct record and pass any duplicate records to the data stream instead.
grouping_fields	*list*	Lists fields used to determine whether records are identical. **Note:** This property is deprecated from IBM SPSS Modeler 16 onwards.
composite_value	Structured slot	See example below.
composite_values	Structured slot	See example below.
inc_record_count	*flag*	Creates an extra field that specifies how many input records were aggregated to form each aggregate record.
count_field	*string*	Specifies the name of the record count field.
sort_keys	Structured slot.	**Note:** This property is deprecated from IBM SPSS Modeler 16 onwards.
default_ascending	*flag*	
low_distinct_key_count	*flag*	Specifies that you have only a small number of records and/or a small number of unique values of the key field(s).
keys_pre_sorted	*flag*	Specifies that all records with the same key values are grouped together in the input.
disable_sql_generation	*flag*	

Example for composite_value property

The composite_value property has the following general form:

```
node.setKeyedPropertyValue("composite_value", FIELD, FILLOPTION)
```

FILLOPTION has the form [FillType, Option1, Option2, ...].

Examples:

```
node.setKeyedPropertyValue("composite_value", "Age", ["First"])
node.setKeyedPropertyValue("composite_value", "Age", ["last"])
node.setKeyedPropertyValue("composite_value", "Age", ["Total"])
node.setKeyedPropertyValue("composite_value", "Age", ["Average"])
node.setKeyedPropertyValue("composite_value", "Age", ["Min"])
```

```
node.setKeyedPropertyValue("composite_value", "Age", ["Max"])
node.setKeyedPropertyValue("composite_value", "Date", ["Earliest"])
node.setKeyedPropertyValue("composite_value", "Date", ["Latest"])
node.setKeyedPropertyValue("composite_value", "Code", ["FirstAlpha"])
node.setKeyedPropertyValue("composite_value", "Code", ["LastAlpha"])
```

The custom options require more than one argument, these are added as a list, for example:

```
node.setKeyedPropertyValue("composite_value", "Name", ["MostFrequent", "FirstRecord"])
node.setKeyedPropertyValue("composite_value", "Date", ["LeastFrequent", "LastRecord"])
node.setKeyedPropertyValue("composite_value", "Pending", ["IncludesValue", "T", "F"])
node.setKeyedPropertyValue("composite_value", "Marital", ["FirstMatch", "Married", "Divorced", "Separated"])
node.setKeyedPropertyValue("composite_value", "Code", ["Concatenate"])
node.setKeyedPropertyValue("composite_value", "Code", ["Concatenate", "Space"])
node.setKeyedPropertyValue("composite_value", "Code", ["Concatenate", "Comma"])
node.setKeyedPropertyValue("composite_value", "Code", ["Concatenate", "UnderScore"])
```

Example for `composite_values` property

The `composite_values` property has the following general form:

```
node.setPropertyValue("composite_values", [
                      [FIELD1, [FILLOPTION1]],
                      [FIELD2, [FILLOPTION2]],
.
.
])
```

Example:

```
node.setPropertyValue("composite_values", [
    ["Age", ["First"]],
    ["Name", ["MostFrequent", "First"]],
    ["Pending", ["IncludesValue", "T"]],
    ["Marital", ["FirstMatch", "Married", "Divorced", "Separated"]],
    ["Code", ["Concatenate", "Comma"]]
])
```

mergenode Properties

The Merge node takes multiple input records and creates a single output record containing some or all of the input fields. It is useful for merging data from different sources, such as internal customer data and purchased demographic data.

Example

```
node = stream.create("merge", "My node")
# assume customerdata and salesdata are configured database import nodes
stream.link(customerdata, node)
stream.link(salesdata, node)
node.setPropertyValue("method", "Keys")
node.setPropertyValue("key_fields", ["id"])
node.setPropertyValue("common_keys", True)
node.setPropertyValue("join", "PartialOuter")
node.setKeyedPropertyValue("outer_join_tag", "2", True)
node.setKeyedPropertyValue("outer_join_tag", "4", True)
node.setPropertyValue("single_large_input", True)
node.setPropertyValue("single_large_input_tag", "2")
node.setPropertyValue("use_existing_sort_keys", True)
node.setPropertyValue("existing_sort_keys", [["id", "Ascending"]])
```

Table 62. mergenode properties.

mergenode properties	Data type	Property description
method	Order Keys Condition Rankedcondition	Specify whether records are merged in the order they are listed in the data files, if one or more key fields will be used to merge records with the same value in the key fields, if records will be merged if a specified condition is satisfied, or if each row pairing in the primary and all secondary data sets are to be merged; using the ranking expression to sort any multiple matches into order from low to high.
condition	*string*	If method is set to Condition, specifies the condition for including or discarding records.
key_fields	*list*	
common_keys	*flag*	
join	Inner FullOuter PartialOuter Anti	
outer_join_tag.n	*flag*	In this property, *n* is the tag name as displayed in the Select Dataset dialog box. Note that multiple tag names may be specified, as any number of datasets could contribute incomplete records.
single_large_input	*flag*	Specifies whether optimization for having one input relatively large compared to the other inputs will be used.
single_large_input_tag	*string*	Specifies the tag name as displayed in the Select Large Dataset dialog box. Note that the usage of this property differs slightly from the outer_join_tag property (flag versus string) because only one input dataset can be specified.
use_existing_sort_keys	*flag*	Specifies whether the inputs are already sorted by one or more key fields.
existing_sort_keys	[['*string'*, 'Ascending'] \ ['*string''*, 'Descending']]	Specifies the fields that are already sorted and the direction in which they are sorted.
primary_dataset	*string*	If method is Rankedcondition, select the primary data set in the merge. This can be considered as the left side of an outer join merge.
add_tag_duplicate	*Boolean*	If method is Rankedcondition, and this is set to Y, if the resulting merged data set contains multiple fields with the same name from different data sources the respective tags from the data sources are added at the start of the field column headers.
merge_condition	*string*	
ranking_expression	*string*	
Num_matches	*integer*	The number of matches to be returned, based on the merge_condition and ranking_expression. Minimum 1, maximum 100.

rfmaggregatenode Properties

The Recency, Frequency, Monetary (RFM) Aggregate node enables you to take customers' historical transactional data, strip away any unused data, and combine all of their remaining transaction data into a single row that lists when they last dealt with you, how many transactions they have made, and the total monetary value of those transactions.

Example

```
node = stream.create("rfmaggregate", "My node")
node.setPropertyValue("relative_to", "Fixed")
node.setPropertyValue("reference_date", "2007-10-12")
node.setPropertyValue("id_field", "CardID")
node.setPropertyValue("date_field", "Date")
node.setPropertyValue("value_field", "Amount")
node.setPropertyValue("only_recent_transactions", True)
node.setPropertyValue("transaction_date_after", "2000-10-01")
```

Table 63. rfmaggregatenode properties.

rfmaggregatenode properties	**Data type**	**Property description**
relative_to	Fixed Today	Specify the date from which the recency of transactions will be calculated.
reference_date	*date*	Only available if Fixed is chosen in relative_to.
contiguous	*flag*	If your data are presorted so that all records with the same ID appear together in the data stream, selecting this option speeds up processing.
id_field	*field*	Specify the field to be used to identify the customer and their transactions.
date_field	*field*	Specify the date field to be used to calculate recency against.
value_field	*field*	Specify the field to be used to calculate the monetary value.
extension	*string*	Specify a prefix or suffix for duplicate aggregated fields.
add_as	Suffix Prefix	Specify if the extension should be added as a suffix or a prefix.
discard_low_value_records	*flag*	Enable use of the discard_records_below setting.
discard_records_below	*number*	Specify a minimum value below which any transaction details are not used when calculating the RFM totals. The units of value relate to the value field selected.
only_recent_transactions	*flag*	Enable use of either the specify_transaction_date or transaction_within_last settings.
specify_transaction_date	*flag*	
transaction_date_after	*date*	Only available if specify_transaction_date is selected. Specify the transaction date after which records will be included in your analysis.
transaction_within_last	*number*	Only available if transaction_within_last is selected. Specify the number and type of periods (days, weeks, months, or years) back from the Calculate Recency relative to date after which records will be included in your analysis.

Table 63. rfmaggregatenode properties (continued).

rfmaggregatenode properties	Data type	Property description
transaction_scale	Days Weeks Months Years	Only available if transaction_within_last is selected. Specify the number and type of periods (days, weeks, months, or years) back from the Calculate Recency relative to date after which records will be included in your analysis.
save_r2	*flag*	Displays the date of the second most recent transaction for each customer.
save_r3	*flag*	Only available if save_r2 is selected. Displays the date of the third most recent transaction for each customer.

Rprocessnode Properties

The R Process node enables you to take data from an IBM(r) SPSS(r) Modeler stream and modify the data using your own custom R script. After the data is modified it is returned to the stream.

Example

```
node = stream.create("rprocess", "My node")
node.setPropertyValue("custom_name", "my_node")
node.setPropertyValue("syntax", """day<-as.Date(modelerData$dob, format="%Y-%m-%d")
next_day<-day + 1
modelerData<-cbind(modelerData,next_day)
var1<-c(fieldName="Next day",fieldLabel="",fieldStorage="date",fieldMeasure="",fieldFormat="",
fieldRole="")
modelerDataModel<-data.frame(modelerDataModel,var1)""")
node.setPropertyValue("convert_datetime", "POSIXct")
```

Table 64. Rprocessnode properties.

Rprocessnode properties	Data type	Property description
syntax	*string*	
convert_flags	StringsAndDoubles LogicalValues	
convert_datetime	*flag*	
convert_datetime_class	POSIXct POSIXlt	
convert_missing	*flag*	

samplenode Properties

The Sample node selects a subset of records. A variety of sample types are supported, including stratified, clustered, and nonrandom (structured) samples. Sampling can be useful to improve performance, and to select groups of related records or transactions for analysis.

Example

```
/* Create two Sample nodes to extract
   different samples from the same data */

node = stream.create("sample", "My node")
node.setPropertyValue("method", "Simple")
node.setPropertyValue("mode", "Include")
node.setPropertyValue("sample_type", "First")
node.setPropertyValue("first_n", 500)

node = stream.create("sample", "My node")
node.setPropertyValue("method", "Complex")
node.setPropertyValue("stratify_by", ["Sex", "Cholesterol"])
node.setPropertyValue("sample_units", "Proportions")
node.setPropertyValue("sample_size_proportions", "Custom")
node.setPropertyValue("sizes_proportions", [["M", "High", "Default"], ["M", "Normal", "Default"],
 ["F", "High", 0.3], ["F", "Normal", 0.3]])
```

Table 65. samplenode properties.

samplenode properties	**Data type**	**Property description**
method	Simple Complex	
mode	Include Discard	Include or discard records that meet the specified condition.
sample_type	First OneInN RandomPct	Specifies the sampling method.
first_n	*integer*	Records up to the specified cutoff point will be included or discarded.
one_in_n	*number*	Include or discard every *n*th record.
rand_pct	*number*	Specify the percentage of records to include or discard.
use_max_size	*flag*	Enable use of the maximum_size setting.
maximum_size	*integer*	Specify the largest sample to be included or discarded from the data stream. This option is redundant and therefore disabled when First and Include are specified.
set_random_seed	*flag*	Enables use of the random seed setting.
random_seed	*integer*	Specify the value used as a random seed.
complex_sample_type	Random Systematic	
sample_units	Proportions Counts	
sample_size_proportions	Fixed Custom Variable	
sample_size_counts	Fixed Custom Variable	
fixed_proportions	*number*	
fixed_counts	*integer*	
variable_proportions	*field*	

Table 65. samplenode properties (continued).

samplenode properties	**Data type**	**Property description**
variable_counts	*field*	
use_min_stratum_size	*flag*	
minimum_stratum_size	*integer*	This option only applies when a Complex sample is taken with Sample units=Proportions.
use_max_stratum_size	*flag*	
maximum_stratum_size	*integer*	This option only applies when a Complex sample is taken with Sample units=Proportions.
clusters	*field*	
stratify_by	*[field1 ... fieldN]*	
specify_input_weight	*flag*	
input_weight	*field*	
new_output_weight	*string*	
sizes_proportions	[[string *string value*][string *string value*]...]	If sample_units=proportions and sample_size_proportions=Custom, specifies a value for each possible combination of values of stratification fields.
default_proportion	*number*	
sizes_counts	[[string *string value*][string *string value*]...]	Specifies a value for each possible combination of values of stratification fields. Usage is similar to sizes_proportions but specifying an integer rather than a proportion.
default_count	*number*	

selectnode Properties

The Select node selects or discards a subset of records from the data stream based on a specific condition. For example, you might select the records that pertain to a particular sales region.

Example

```
node = stream.create("select", "My node")
node.setPropertyValue("mode", "Include")
node.setPropertyValue("condition", "Age < 18")
```

Table 66. selectnode properties.

selectnode properties	**Data type**	**Property description**
mode	Include Discard	Specifies whether to include or discard selected records.
condition	*string*	Condition for including or discarding records.

sortnode Properties

The Sort node sorts records into ascending or descending order based on the values of one or more fields.

Example

```
node = stream.create("sort", "My node")
node.setPropertyValue("keys", [["Age", "Ascending"], ["Sex", "Descending"]])
node.setPropertyValue("default_ascending", False)
node.setPropertyValue("use_existing_keys", True)
node.setPropertyValue("existing_keys", [["Age", "Ascending"]])
```

Table 67. sortnode properties.

sortnode properties	Data type	Property description
keys	*list*	Specifies the fields you want to sort against. If no direction is specified, the default is used.
default_ascending	*flag*	Specifies the default sort order.
use_existing_keys	*flag*	Specifies whether sorting is optimized by using the previous sort order for fields that are already sorted.
existing_keys		Specifies the fields that are already sorted and the direction in which they are sorted. Uses the same format as the keys property.

streamingts Properties

The Streaming TS node builds and scores time series models in one step, without the need for a Time Intervals node.

Example

```
node = stream.create("streamingts", "My node")
node.setPropertyValue("deployment_force_rebuild", True)
node.setPropertyValue("deployment_rebuild_mode", "Count")
node.setPropertyValue("deployment_rebuild_count", 3)
node.setPropertyValue("deployment_rebuild_pct", 11)
node.setPropertyValue("deployment_rebuild_field", "Year")
```

Table 68. streamingts properties.

streamingts properties	Data type	Property description
custom_fields	*flag*	If custom_fields=false, the settings from an upstream Type node are used. If custom_fields=true, targets and inputs must be specified.
targets	[*field1...fieldN*]	
inputs	[*field1...fieldN*]	
method	ExpertModeler Exsmooth Arima	

Table 68. streamingts properties (continued).

streamingts properties	Data type	Property description
calculate_conf	*flag*	
conf_limit_pct	*real*	
use_time_intervals_node	*flag*	If use_time_intervals_node=true, then the settings from an upstream Time Intervals node are used. If use_time_intervals_node=false, interval_offset_position, interval_offset, and interval_type must be specified.
interval_offset_position	LastObservation LastRecord	LastObservation refers to **Last valid observation**. LastRecord refers to **Count back from last record**.
interval_offset	*number*	
interval_type	Periods Years Quarters Months WeeksNonPeriodic DaysNonPeriodic HoursNonPeriodic MinutesNonPeriodic SecondsNonPeriodic	
events	*fields*	
expert_modeler_method	AllModels Exsmooth Arima	
consider_seasonal	*flag*	
detect_outliers	*flag*	
expert_outlier_additive	*flag*	
expert_outlier_level_shift	*flag*	
expert_outlier_innovational	*flag*	
expert_outlier_transient	*flag*	
expert_outlier_seasonal_additive	*flag*	
expert_outlier_local_trend	*flag*	
expert_outlier_additive_patch	*flag*	
exsmooth_model_type	Simple HoltsLinearTrend BrownsLinearTrend DampedTrend SimpleSeasonal WintersAdditive WintersMultiplicative	
exsmooth_transformation_type	None SquareRoot NaturalLog	
arima_p	*integer*	Same property as for Time Series modeling node
arima_d	*integer*	Same property as for Time Series modeling node
arima_q	*integer*	Same property as for Time Series modeling node

Table 68. streamingts properties (continued).

streamingts properties	Data type	Property description
arima_sp	*integer*	Same property as for Time Series modeling node
arima_sd	*integer*	Same property as for Time Series modeling node
arima_sq	*integer*	Same property as for Time Series modeling node
arima_transformation_type	None SquareRoot NaturalLog	Same property as for Time Series modeling node
arima_include_constant	*flag*	Same property as for Time Series modeling node
tf_arima_p.*fieldname*	*integer*	Same property as for Time Series modeling node. For transfer functions.
tf_arima_d.*fieldname*	*integer*	Same property as for Time Series modeling node. For transfer functions.
tf_arima_q.*fieldname*	*integer*	Same property as for Time Series modeling node. For transfer functions.
tf_arima_sp.*fieldname*	*integer*	Same property as for Time Series modeling node. For transfer functions.
tf_arima_sd.*fieldname*	*integer*	Same property as for Time Series modeling node. For transfer functions.
tf_arima_sq.*fieldname*	*integer*	Same property as for Time Series modeling node. For transfer functions.
tf_arima_delay.*fieldname*	*integer*	Same property as for Time Series modeling node. For transfer functions.
tf_arima_transformation_type.*fieldname*	None SquareRoot NaturalLog	
arima_detect_outlier_mode	None Automatic	
arima_outlier_additive	*flag*	
arima_outlier_level_shift	*flag*	
arima_outlier_innovational	*flag*	
arima_outlier_transient	*flag*	
arima_outlier_seasonal_additive	*flag*	
arima_outlier_local_trend	*flag*	
arima_outlier_additive_patch	*flag*	
deployment_force_rebuild	*flag*	
deployment_rebuild_mode	Count Percent	
deployment_rebuild_count	*number*	
deployment_rebuild_pct	*number*	
deployment_rebuild_field	*<field>*	

Chapter 11. Field Operations Node Properties

anonymizenode Properties

The Anonymize node transforms the way field names and values are represented downstream, thus disguising the original data. This can be useful if you want to allow other users to build models using sensitive data, such as customer names or other details.

Example

```
stream = modeler.script.stream()
varfilenode = stream.createAt("variablefile", "File", 96, 96)
varfilenode.setPropertyValue("full_filename", "$CLEO/DEMOS/DRUG1n")
node = stream.createAt("anonymize", "My node", 192, 96)
# Anonymize node requires the input fields while setting the values
stream.link(varfilenode, node)
node.setKeyedPropertyValue("enable_anonymize", "Age", True)
node.setKeyedPropertyValue("transformation", "Age", "Random")
node.setKeyedPropertyValue("set_random_seed", "Age", True)
node.setKeyedPropertyValue("random_seed", "Age", 123)
node.setKeyedPropertyValue("enable_anonymize", "Drug", True)
node.setKeyedPropertyValue("use_prefix", "Drug", True)
node.setKeyedPropertyValue("prefix", "Drug", "myprefix")
```

Table 69. anonymizenode properties

anonymizenode properties	**Data type**	**Property description**
enable_anonymize	*flag*	When set to True, activates anonymization of field values (equivalent to selecting **Yes** for that field in the Anonymize Values column).
use_prefix	*flag*	When set to True, a custom prefix will be used if one has been specified. Applies to fields that will be anonymized by the Hash method and is equivalent to choosing the **Custom** radio button in the Replace Values dialog box for that field.
prefix	*string*	Equivalent to typing a prefix into the text box in the Replace Values dialog box. The default prefix is the default value if nothing else has been specified.
transformation	Random Fixed	Determines whether the transformation parameters for a field anonymized by the Transform method will be random or fixed.
set_random_seed	*flag*	When set to True, the specified seed value will be used (if transformation is also set to Random).
random_seed	*integer*	When set_random_seed is set to True, this is the seed for the random number.
scale	*number*	When transformation is set to Fixed, this value is used for "scale by." The maximum scale value is normally 10 but may be reduced to avoid overflow.
translate	*number*	When transformation is set to Fixed, this value is used for "translate." The maximum translate value is normally 1000 but may be reduced to avoid overflow.

autodataprepnode Properties

The Automated Data Preparation (ADP) node can analyze your data and identify fixes, screen out fields that are problematic or not likely to be useful, derive new attributes when appropriate, and improve performance through intelligent screening and sampling techniques. You can use the node in fully automated fashion, allowing the node to choose and apply fixes, or you can preview the changes before they are made and accept, reject, or amend them as desired.

Example

```
node = stream.create("autodataprep", "My node")
node.setPropertyValue("objective", "Balanced")
node.setPropertyValue("excluded_fields", "Filter")
node.setPropertyValue("prepare_dates_and_times", True)
node.setPropertyValue("compute_time_until_date", True)
node.setPropertyValue("reference_date", "Today")
node.setPropertyValue("units_for_date_durations", "Automatic")
```

Table 70. autodataprepnode properties

autodataprepnode properties	**Data type**	**Property description**
objective	Balanced Speed Accuracy Custom	
custom_fields	*flag*	If true, allows you to specify target, input, and other fields for the current node. If false, the current settings from an upstream Type node are used.
target	*field*	Specifies a single target field.
inputs	[*field1 ... fieldN*]	Input or predictor fields used by the model.
use_frequency	*flag*	
frequency_field	*field*	
use_weight	*flag*	
weight_field	*field*	
excluded_fields	Filter None	
if_fields_do_not_match	StopExecution ClearAnalysis	
prepare_dates_and_times	*flag*	Control access to all the date and time fields
compute_time_until_date	*flag*	
reference_date	Today Fixed	
fixed_date	*date*	
units_for_date_durations	Automatic Fixed	
fixed_date_units	Years Months Days	
compute_time_until_time	*flag*	

Table 70. autodataprepnode properties (continued)

autodataprepnode properties	**Data type**	**Property description**
reference_time	CurrentTime Fixed	
fixed_time	*time*	
units_for_time_durations	Automatic Fixed	
fixed_date_units	Hours Minutes Seconds	
extract_year_from_date	*flag*	
extract_month_from_date	*flag*	
extract_day_from_date	*flag*	
extract_hour_from_time	*flag*	
extract_minute_from_time	*flag*	
extract_second_from_time	*flag*	
exclude_low_quality_inputs	*flag*	
exclude_too_many_missing	*flag*	
maximum_percentage_missing	*number*	
exclude_too_many_categories	*flag*	
maximum_number_categories	*number*	
exclude_if_large_category	*flag*	
maximum_percentage_category	*number*	
prepare_inputs_and_target	*flag*	
adjust_type_inputs	*flag*	
adjust_type_target	*flag*	
reorder_nominal_inputs	*flag*	
reorder_nominal_target	*flag*	
replace_outliers_inputs	*flag*	
replace_outliers_target	*flag*	
replace_missing_continuous_inputs	*flag*	
replace_missing_continuous_target	*flag*	
replace_missing_nominal_inputs	*flag*	
replace_missing_nominal_target	*flag*	
replace_missing_ordinal_inputs	*flag*	
replace_missing_ordinal_target	*flag*	
maximum_values_for_ordinal	*number*	
minimum_values_for_continuous	*number*	
outlier_cutoff_value	*number*	
outlier_method	Replace Delete	
rescale_continuous_inputs	*flag*	
rescaling_method	MinMax ZScore	

Table 70. autodataprepnode properties (continued)

autodataprepnode properties	**Data type**	**Property description**
min_max_minimum	*number*	
min_max_maximum	*number*	
z_score_final_mean	*number*	
z_score_final_sd	*number*	
rescale_continuous_target	*flag*	
target_final_mean	*number*	
target_final_sd	*number*	
transform_select_input_fields	*flag*	
maximize_association_with_target	*flag*	
p_value_for_merging	*number*	
merge_ordinal_features	*flag*	
merge_nominal_features	*flag*	
minimum_cases_in_category	*number*	
bin_continuous_fields	*flag*	
p_value_for_binning	*number*	
perform_feature_selection	*flag*	
p_value_for_selection	*number*	
perform_feature_construction	*flag*	
transformed_target_name_extension	*string*	
transformed_inputs_name_extension	*string*	
constructed_features_root_name	*string*	
years_duration_ name_extension	*string*	
months_duration_ name_extension	*string*	
days_duration_ name_extension	*string*	
hours_duration_ name_extension	*string*	
minutes_duration_ name_extension	*string*	
seconds_duration_ name_extension	*string*	
year_cyclical_name_extension	*string*	
month_cyclical_name_extension	*string*	
day_cyclical_name_extension	*string*	
hour_cyclical_name_extension	*string*	
minute_cyclical_name_extension	*string*	
second_cyclical_name_extension	*string*	

astimeintervalsnode Properties

The original Time Intervals node is not compatible with Analytic Server (AS). The AS Time Intervals node (new in SPSS Modeler release 17.0) contains a subset of the functions of the existing Time Intervals node that can be used with Analytic Server.

Use the AS Time Intervals node to specify intervals and derive a new time field for estimating or forecasting. A full range of time intervals is supported, from seconds to years.

Table 71. astimeintervalsnode properties

astimeintervalsnode properties	**Data type**	**Property description**
`time_field`	*field*	Can accept only a single continuous field. That field is used by the node as the aggregation key for converting the interval. If an integer field is used here it is considered to be a time index.
`dimensions`	*[field1 field2 ... fieldn]*	These fields are used to create individual time series based on the field values.
`fields_to_aggregate`	*[field1 field2 ... fieldn]*	These fields are aggregated as part of changing the period of the time field. Any fields not included in this picker are filtered out of the data leaving the node.

binningnode Properties

The Binning node automatically creates new nominal (set) fields based on the values of one or more existing continuous (numeric range) fields. For example, you can transform a continuous income field into a new categorical field containing groups of income as deviations from the mean. Once you have created bins for the new field, you can generate a Derive node based on the cut points.

Example

```
node = stream.create("binning", "My node")
node.setPropertyValue("fields", ["Na", "K"])
node.setPropertyValue("method", "Rank")
node.setPropertyValue("fixed_width_name_extension", "_binned")
node.setPropertyValue("fixed_width_add_as", "Suffix")
node.setPropertyValue("fixed_bin_method", "Count")
node.setPropertyValue("fixed_bin_count", 10)
node.setPropertyValue("fixed_bin_width", 3.5)
node.setPropertyValue("tile10", True)
```

Table 72. binningnode properties

binningnode properties	**Data type**	**Property description**
`fields`	*[field1 field2 ... fieldn]*	Continuous (numeric range) fields pending transformation. You can bin multiple fields simultaneously.

`method`	`FixedWidth`
	`EqualCount`
	`Rank`
	`SDev`
	`Optimal`
		Method used for determining cut points for new field bins (categories).

Table 72. binningnode properties (continued)

binningnode properties	Data type	Property description
rcalculate_bins	Always IfNecessary	Specifies whether the bins are recalculated and the data placed in the relevant bin every time the node is executed, or that data is added only to existing bins and any new bins that have been added.
fixed_width_name_extension	*string*	The default extension is *_BIN*.
fixed_width_add_as	Suffix Prefix	Specifies whether the extension is added to the end (suffix) of the field name or to the start (prefix). The default extension is *income_BIN*.
fixed_bin_method	Width Count	
fixed_bin_count	*integer*	Specifies an integer used to determine the number of fixed-width bins (categories) for the new field(s).
fixed_bin_width	*real*	Value (integer or real) for calculating width of the bin.
equal_count_name_ extension	*string*	The default extension is *_TILE*.
equal_count_add_as	Suffix Prefix	Specifies an extension, either suffix or prefix, used for the field name generated by using standard p-tiles. The default extension is *_TILE* plus *N*, where *N* is the tile number.
tile4	*flag*	Generates four quantile bins, each containing 25% of cases.
tile5	*flag*	Generates five quintile bins.
tile10	*flag*	Generates 10 decile bins.
tile20	*flag*	Generates 20 vingtile bins.
tile100	*flag*	Generates 100 percentile bins.
use_custom_tile	*flag*	
custom_tile_name_extension	*string*	The default extension is *_TILEN*.
custom_tile_add_as	Suffix Prefix	
custom_tile	*integer*	
equal_count_method	RecordCount ValueSum	The RecordCount method seeks to assign an equal number of records to each bin, while ValueSum assigns records so that the sum of the values in each bin is equal.
tied_values_method	Next Current Random	Specifies which bin tied value data is to be put in.
rank_order	Ascending Descending	This property includes Ascending (lowest value is marked 1) or Descending (highest value is marked 1).
rank_add_as	Suffix Prefix	This option applies to rank, fractional rank, and percentage rank.
rank	*flag*	
rank_name_extension	*string*	The default extension is *_RANK*.

Table 72. binningnode properties (continued)

binningnode properties	Data type	Property description
rank_fractional	*flag*	Ranks cases where the value of the new field equals rank divided by the sum of the weights of the nonmissing cases. Fractional ranks fall in the range of 0–1.
rank_fractional_name_ extension	*string*	The default extension is *_F_RANK*.
rank_pct	*flag*	Each rank is divided by the number of records with valid values and multiplied by 100. Percentage fractional ranks fall in the range of 1–100.
rank_pct_name_extension	*string*	The default extension is *_P_RANK*.
sdev_name_extension	*string*	
sdev_add_as	Suffix Prefix	
sdev_count	One Two Three	
optimal_name_extension	*string*	The default extension is *_OPTIMAL*.
optimal_add_as	Suffix Prefix	
optimal_supervisor_field	*field*	Field chosen as the supervisory field to which the fields selected for binning are related.
optimal_merge_bins	*flag*	Specifies that any bins with small case counts will be added to a larger, neighboring bin.
optimal_small_bin_threshold	*integer*	
optimal_pre_bin	*flag*	Indicates that prebinning of dataset is to take place.
optimal_max_bins	*integer*	Specifies an upper limit to avoid creating an inordinately large number of bins.
optimal_lower_end_point	Inclusive Exclusive	
optimal_first_bin	Unbounded Bounded	
optimal_last_bin	Unbounded Bounded	

derivenode Properties

The Derive node modifies data values or creates new fields from one or more existing fields. It creates fields of type formula, flag, nominal, state, count, and conditional.

Example 1

```
# Create and configure a Flag Derive field node
node = stream.create("derive", "My node")
node.setPropertyValue("new_name", "DrugX_Flag")
```

```
node.setPropertyValue("result_type", "Flag")
node.setPropertyValue("flag_true", "1")
node.setPropertyValue("flag_false", "0")
node.setPropertyValue("flag_expr", "'Drug' == \"drugX\"")

# Create and configure a Conditional Derive field node
node = stream.create("derive", "My node")
node.setPropertyValue("result_type", "Conditional")
node.setPropertyValue("cond_if_cond", "@OFFSET(\"Age\", 1) = \"Age\"")
node.setPropertyValue("cond_then_expr", "(@OFFSET(\"Age\", 1) = \"Age\" >< @INDEX")
node.setPropertyValue("cond_else_expr", "\"Age\"")
```

Example 2

This script assumes that there are two numeric columns called `XPos` and `YPos` that represent the X and Y coordinates of a point (for example, where an event took place). The script creates a Derive node that computes a geospatial column from the X and Y coordinates representing that point in a specific coordinate system:

```
stream = modeler.script.stream()
# Other stream configuration code
node = stream.createAt("derive", "Location", 192, 96)
node.setPropertyValue("new_name", "Location")
node.setPropertyValue("formula_expr", "['XPos', 'YPos']")
node.setPropertyValue("formula_type", "Geospatial")
# Now we have set the general measurement type, define the
# specifics of the geospatial object
node.setPropertyValue("geo_type", "Point")
node.setPropertyValue("has_coordinate_system", True)
node.setPropertyValue("coordinate_system", "ETRS_1989_EPSG_Arctic_zone_5-47")
```

Table 73. derivenode properties

derivenode properties	**Data type**	**Property description**
new_name	*string*	Name of new field.
mode	Single Multiple	Specifies single or multiple fields.
fields	*list*	Used in Multiple mode only to select multiple fields.
name_extension	*string*	Specifies the extension for the new field name(s).
add_as	Suffix Prefix	Adds the extension as a prefix (at the beginning) or as a suffix (at the end) of the field name.
result_type	Formula Flag Set State Count Conditional	The six types of new fields that you can create.
formula_expr	*string*	Expression for calculating a new field value in a Derive node.
flag_expr	*string*	
flag_true	*string*	
flag_false	*string*	
set_default	*string*	

Table 73. derivenode properties (continued)

derivenode properties	**Data type**	**Property description**
set_value_cond	*string*	Structured to supply the condition associated with a given value.
state_on_val	*string*	Specifies the value for the new field when the On condition is met.
state_off_val	*string*	Specifies the value for the new field when the Off condition is met.
state_on_expression	*string*	
state_off_expression	*string*	
state_initial	On Off	Assigns each record of the new field an initial value of On or Off. This value can change as each condition is met.
count_initial_val	*string*	
count_inc_condition	*string*	
count_inc_expression	*string*	
count_reset_condition	*string*	
cond_if_cond	*string*	
cond_then_expr	*string*	
cond_else_expr	*string*	
formula_measure_type	Range / MeasureType.RANGE Discrete / MeasureType.DISCRETE Flag / MeasureType.FLAG Set / MeasureType.SET OrderedSet / MeasureType.ORDERED_SET Typeless / MeasureType.TYPELESS Collection / MeasureType.COLLECTION Geospatial / MeasureType.GEOSPATIAL	This property can be used to define the measurement associated with the derived field. The setter function can be passed either a string or one of the MeasureType values. The getter will always return on the MeasureType values.
collection_measure	Range / MeasureType.RANGE Flag / MeasureType.FLAG Set / MeasureType.SET OrderedSet / MeasureType.ORDERED_SET Typeless / MeasureType.TYPELESS	For collection fields (lists with a depth of 0), this property defines the measurement type associated with the underlying values.
geo_type	Point MultiPoint LineString MultiLineString Polygon MultiPolygon	For geospatial fields, this property defines the type of geospatial object represented by this field. This should be consistent with the list depth of the values
has_coordinate_system	*boolean*	For geospatial fields, this property defines whether this field has a coordinate system
coordinate_system	*string*	For geospatial fields, this property defines the coordinate system for this field

ensemblenode Properties

The Ensemble node combines two or more model nuggets to obtain more accurate predictions than can be gained from any one model.

Example

```
# Create and configure an Ensemble node
# Use this node with the models in demos\streams\pm_binaryclassifier.str
node = stream.create("ensemble", "My node")
node.setPropertyValue("ensemble_target_field", "response")
node.setPropertyValue("filter_individual_model_output", False)
node.setPropertyValue("flag_ensemble_method", "ConfidenceWeightedVoting")
node.setPropertyValue("flag_voting_tie_selection", "HighestConfidence")
```

Table 74. ensemblenode properties.

ensemblenode properties	Data type	Property description
ensemble_target_field	*field*	Specifies the target field for all models used in the ensemble.
filter_individual_model_output	*flag*	Specifies whether scoring results from individual models should be suppressed.
flag_ensemble_method	Voting ConfidenceWeightedVoting RawPropensityWeightedVoting AdjustedPropensityWeightedVoting HighestConfidence AverageRawPropensity AverageAdjustedPropensity	Specifies the method used to determine the ensemble score. This setting applies only if the selected target is a flag field.
set_ensemble_method	Voting ConfidenceWeightedVoting HighestConfidence	Specifies the method used to determine the ensemble score. This setting applies only if the selected target is a nominal field.
flag_voting_tie_selection	Random HighestConfidence RawPropensity AdjustedPropensity	If a voting method is selected, specifies how ties are resolved. This setting applies only if the selected target is a flag field.
set_voting_tie_selection	Random HighestConfidence	If a voting method is selected, specifies how ties are resolved. This setting applies only if the selected target is a nominal field.
calculate_standard_error	*flag*	If the target field is continuous, a standard error calculation is run by default to calculate the difference between the measured or estimated values and the true values; and to show how close those estimates matched.

fillernode Properties

The Filler node replaces field values and changes storage. You can choose to replace values based on a CLEM condition, such as `@BLANK(@FIELD)`. Alternatively, you can choose to replace all blanks or null values with a specific value. A Filler node is often used together with a Type node to replace missing values.

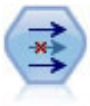
Example

```
node = stream.create("filler", "My node")
node.setPropertyValue("fields", ["Age"])
node.setPropertyValue("replace_mode", "Always")
node.setPropertyValue("condition", "(\"Age\" > 60) and (\"Sex\" = \"M\"")
node.setPropertyValue("replace_with", "\"old man\"")
```

Table 75. fillernode properties

fillernode properties	**Data type**	**Property description**
fields	*list*	Fields from the dataset whose values will be examined and replaced.
replace_mode	Always Conditional Blank Null BlankAndNull	You can replace all values, blank values, or null values, or replace based on a specified condition.
condition	*string*	
replace_with	*string*	

filternode Properties



The Filter node filters (discards) fields, renames fields, and maps fields from one source node to another.

Example

```
node = stream.create("filter", "My node")
node.setPropertyValue("default_include", True)
node.setKeyedPropertyValue("new_name", "Drug", "Chemical")
node.setKeyedPropertyValue("include", "Drug", False)
```

Using the default_include property. Note that setting the value of the `default_include` property does not automatically include or exclude all fields; it simply determines the default for the current selection. This is functionally equivalent to clicking the **Include fields by default** button in the Filter node dialog box. For example, suppose you run the following script:

```
node = modeler.script.stream().create("filter", "Filter")
node.setPropertyValue("default_include", False)
# Include these two fields in the list
for f in ["Age", "Sex"]:
    node.setKeyedPropertyValue("include", f, True)
```

This will cause the node to pass the fields *Age* and *Sex* and discard all others. Now suppose you run the same script again but name two different fields:

```
node = modeler.script.stream().create("filter", "Filter")
node.setPropertyValue("default_include", False)
# Include these two fields in the list
for f in ["BP", "Na"]:
    node.setKeyedPropertyValue("include", f, True)
```

This will add two more fields to the filter so that a total of four fields are passed (*Age*, *Sex*, *BP*, *Na*). In other words, resetting the value of `default_include` to `False` doesn't automatically reset all fields.

Alternatively, if you now change `default_include` to `True`, either using a script or in the Filter node dialog box, this would flip the behavior so the four fields listed above would be discarded rather than included. When in doubt, experimenting with the controls in the Filter node dialog box may be helpful in understanding this interaction.

Table 76. filternode properties

filternode properties	**Data type**	**Property description**
`default_include`	*flag*	Keyed property to specify whether the default behavior is to pass or filter fields: Note that setting this property does not automatically include or exclude all fields; it simply determines whether selected fields are included or excluded by default. See example below for additional comments.
`include`	*flag*	Keyed property for field inclusion and removal.
`new_name`	*string*	

historynode Properties

The History node creates new fields containing data from fields in previous records. History nodes are most often used for sequential data, such as time series data. Before using a History node, you may want to sort the data using a Sort node.

Example

```
node = stream.create("history", "My node")
node.setPropertyValue("fields", ["Drug"])
node.setPropertyValue("offset", 1)
node.setPropertyValue("span", 3)
node.setPropertyValue("unavailable", "Discard")
node.setPropertyValue("fill_with", "undef")
```

Table 77. historynode properties

historynode properties	**Data type**	**Property description**
`fields`	*list*	Fields for which you want a history.
`offset`	*number*	Specifies the latest record (prior to the current record) from which you want to extract historical field values.
`span`	*number*	Specifies the number of prior records from which you want to extract values.

Table 77. historynode properties (continued)

historynode properties	Data type	Property description
unavailable	Discard Leave Fill	For handling records that have no history values, usually referring to the first several records (at the top of the dataset) for which there are no previous records to use as a history.
fill_with	String Number	Specifies a value or string to be used for records where no history value is available.

partitionnode Properties

The Partition node generates a partition field, which splits the data into separate subsets for the training, testing, and validation stages of model building.

Example

```
node = stream.create("partition", "My node")
node.setPropertyValue("create_validation", True)
node.setPropertyValue("training_size", 33)
node.setPropertyValue("testing_size", 33)
node.setPropertyValue("validation_size", 33)
node.setPropertyValue("set_random_seed", True)
node.setPropertyValue("random_seed", 123)
node.setPropertyValue("value_mode", "System")
```

Table 78. partitionnode properties

partitionnode properties	Data type	Property description
new_name	*string*	Name of the partition field generated by the node.
create_validation	*flag*	Specifies whether a validation partition should be created.
training_size	*integer*	Percentage of records (0–100) to be allocated to the training partition.
testing_size	*integer*	Percentage of records (0–100) to be allocated to the testing partition.
validation_size	*integer*	Percentage of records (0–100) to be allocated to the validation partition. Ignored if a validation partition is not created.
training_label	*string*	Label for the training partition.
testing_label	*string*	Label for the testing partition.
validation_label	*string*	Label for the validation partition. Ignored if a validation partition is not created.
value_mode	System SystemAndLabel Label	Specifies the values used to represent each partition in the data. For example, the training sample can be represented by the system integer 1, the label Training, or a combination of the two, 1_Training.
set_random_seed	*Boolean*	Specifies whether a user-specified random seed should be used.

Table 78. partitionnode properties (continued)

partitionnode properties	Data type	Property description
random_seed	*integer*	A user-specified random seed value. For this value to be used, set_random_seed must be set to True.
enable_sql_generation	*Boolean*	Specifies whether to use SQL pushback to assign records to partitions.
unique_field		Specifies the input field used to ensure that records are assigned to partitions in a random but repeatable way. For this value to be used, enable_sql_generation must be set to True.

reclassifynode Properties

The Reclassify node transforms one set of categorical values to another. Reclassification is useful for collapsing categories or regrouping data for analysis.

Example

```
node = stream.create("reclassify", "My node")
node.setPropertyValue("mode", "Multiple")
node.setPropertyValue("replace_field", True)
node.setPropertyValue("field", "Drug")
node.setPropertyValue("new_name", "Chemical")
node.setPropertyValue("fields", ["Drug", "BP"])
node.setPropertyValue("name_extension", "reclassified")
node.setPropertyValue("add_as", "Prefix")
node.setKeyedPropertyValue("reclassify", "drugA", True)
node.setPropertyValue("use_default", True)
node.setPropertyValue("default", "BrandX")
node.setPropertyValue("pick_list", ["BrandX", "Placebo", "Generic"])
```

Table 79. reclassifynode properties

reclassifynode properties	Data type	Property description
mode	Single Multiple	Single reclassifies the categories for one field. Multiple activates options enabling the transformation of more than one field at a time.
replace_field	*flag*	
field	*string*	Used only in Single mode.
new_name	*string*	Used only in Single mode.
fields	*[field1 field2 ... fieldn]*	Used only in Multiple mode.
name_extension	*string*	Used only in Multiple mode.
add_as	Suffix Prefix	Used only in Multiple mode.
reclassify	*string*	Structured property for field values.
use_default	*flag*	Use the default value.
default	*string*	Specify a default value.

Table 79. reclassifynode properties (continued)

reclassifynode properties	Data type	Property description
pick_list	*[string string ... string]*	Allows a user to import a list of known new values to populate the drop-down list in the table.

reordernode Properties

The Field Reorder node defines the natural order used to display fields downstream. This order affects the display of fields in a variety of places, such as tables, lists, and the Field Chooser. This operation is useful when working with wide datasets to make fields of interest more visible.

Example

```
node = stream.create("reorder", "My node")
node.setPropertyValue("mode", "Custom")
node.setPropertyValue("sort_by", "Storage")
node.setPropertyValue("ascending", False)
node.setPropertyValue("start_fields", ["Age", "Cholesterol"])
node.setPropertyValue("end_fields", ["Drug"])
```

Table 80. reordernode properties

reordernode properties	Data type	Property description
mode	Custom Auto	You can sort values automatically or specify a custom order.
sort_by	Name Type Storage	
ascending	*flag*	
start_fields	*[field1 field2 ... fieldn]*	New fields are inserted after these fields.
end_fields	*[field1 field2 ... fieldn]*	New fields are inserted before these fields.

reprojectnode Properties

Within SPSS Modeler, items such as the Expression Builder spatial functions, the Spatio-Temporal Prediction (STP) Node, and the Map Visualization Node use the projected coordinate system. Use the Reproject node to change the coordinate system of any data that you import that uses a geographic coordinate system.

Table 81. reprojectnode properties

reprojectnode properties	Data type	Property description
reproject_fields	*[field1 field2 ... fieldn]*	List all the fields that are to be reprojected.
reproject_type	Streamdefault Specify	Choose how to reproject the fields.
coordinate_system	*string*	The name of the coordinate system to be applied to the fields. Example: `set reprojectnode.coordinate_system = "WGS_1984_World_Mercator"`

restructurenode Properties

The Restructure node converts a nominal or flag field into a group of fields that can be populated with the values of yet another field. For example, given a field named *payment type*, with values of *credit*, *cash*, and *debit*, three new fields would be created (*credit*, *cash*, *debit*), each of which might contain the value of the actual payment made.

Example

```
node = stream.create("restructure", "My node")
node.setKeyedPropertyValue("fields_from", "Drug", ["drugA", "drugX"])
node.setPropertyValue("include_field_name", True)
node.setPropertyValue("value_mode", "OtherFields")
node.setPropertyValue("value_fields", ["Age", "BP"])
```

Table 82. restructurenode properties

restructurenode properties	**Data type**	**Property description**
`fields_from`	[*category category category*] `all`	
`include_field_name`	*flag*	Indicates whether to use the field name in the restructured field name.
`value_mode`	`OtherFields` `Flags`	Indicates the mode for specifying the values for the restructured fields. With `OtherFields`, you must specify which fields to use (see below). With `Flags`, the values are numeric flags.
`value_fields`	*list*	Required if `value_mode` is `OtherFields`. Specifies which fields to use as value fields.

rfmanalysisnode Properties

The Recency, Frequency, Monetary (RFM) Analysis node enables you to determine quantitatively which customers are likely to be the best ones by examining how recently they last purchased from you (recency), how often they purchased (frequency), and how much they spent over all transactions (monetary).

Example

```
node = stream.create("rfmanalysis", "My node")
node.setPropertyValue("recency", "Recency")
node.setPropertyValue("frequency", "Frequency")
node.setPropertyValue("monetary", "Monetary")
node.setPropertyValue("tied_values_method", "Next")
node.setPropertyValue("recalculate_bins", "IfNecessary")
node.setPropertyValue("recency_thresholds", [1, 500, 800, 1500, 2000, 2500])
```

Table 83. rfmanalysisnode properties

rfmanalysisnode properties	**Data type**	**Property description**
`recency`	*field*	Specify the recency field. This may be a date, timestamp, or simple number.
`frequency`	*field*	Specify the frequency field.
`monetary`	*field*	Specify the monetary field.

Table 83. rfmanalysisnode properties (continued)

rfmanalysisnode properties	Data type	Property description
recency_bins	*integer*	Specify the number of recency bins to be generated.
recency_weight	*number*	Specify the weighting to be applied to recency data. The default is 100.
frequency_bins	*integer*	Specify the number of frequency bins to be generated.
frequency_weight	*number*	Specify the weighting to be applied to frequency data. The default is 10.
monetary_bins	*integer*	Specify the number of monetary bins to be generated.
monetary_weight	*number*	Specify the weighting to be applied to monetary data. The default is 1.
tied_values_method	Next Current	Specify which bin tied value data is to be put in.
recalculate_bins	Always IfNecessary	
add_outliers	*flag*	Available only if recalculate_bins is set to IfNecessary. If set, records that lie below the lower bin will be added to the lower bin, and records above the highest bin will be added to the highest bin.
binned_field	Recency Frequency Monetary	
recency_thresholds	*value value*	Available only if recalculate_bins is set to Always. Specify the upper and lower thresholds for the recency bins. The upper threshold of one bin is used as the lower threshold of the next—for example, [10 30 60] would define two bins, the first bin with upper and lower thresholds of 10 and 30, with the second bin thresholds of 30 and 60.
frequency_thresholds	*value value*	Available only if recalculate_bins is set to Always.
monetary_thresholds	*value value*	Available only if recalculate_bins is set to Always.

settoflagnode Properties

The Set to Flag node derives multiple flag fields based on the categorical values defined for one or more nominal fields.

Example

```
node = stream.create("settoflag", "My node")
node.setKeyedPropertyValue("fields_from", "Drug", ["drugA", "drugX"])
node.setPropertyValue("true_value", "1")
node.setPropertyValue("false_value", "0")
node.setPropertyValue("use_extension", True)
node.setPropertyValue("extension", "Drug_Flag")
node.setPropertyValue("add_as", "Suffix")
node.setPropertyValue("aggregate", True)
node.setPropertyValue("keys", ["Cholesterol"])
```

Table 84. settoflagnode properties

settoflagnode properties	**Data type**	**Property description**
fields_from	[*category category category*] all	
true_value	*string*	Specifies the true value used by the node when setting a flag. The default is T.
false_value	*string*	Specifies the false value used by the node when setting a flag. The default is F.
use_extension	*flag*	Use an extension as a suffix or prefix to the new flag field.
extension	*string*	
add_as	Suffix Prefix	Specifies whether the extension is added as a suffix or prefix.
aggregate	*flag*	Groups records together based on key fields. All flag fields in a group are enabled if any record is set to true.
keys	*list*	Key fields.

statisticstransformnode Properties

The Statistics Transform node runs a selection of IBM SPSS Statistics syntax commands against data sources in IBM SPSS Modeler. This node requires a licensed copy of IBM SPSS Statistics.

The properties for this node are described under “statisticstransformnode Properties” on page 287.

timeintervalsnode Properties

The Time Intervals node specifies intervals and creates labels (if needed) for modeling time series data. If values are not evenly spaced, the node can pad or aggregate values as needed to generate a uniform interval between records.

Example

```
node = stream.create("timeintervals", "My node")
node.setPropertyValue("interval_type", "SecondsPerDay")
node.setPropertyValue("days_per_week", 4)
node.setPropertyValue("week_begins_on", "Tuesday")
node.setPropertyValue("hours_per_day", 10)
```

```
node.setPropertyValue("day_begins_hour", 7)
node.setPropertyValue("day_begins_minute", 5)
node.setPropertyValue("day_begins_second", 17)
node.setPropertyValue("mode", "Label")
node.setPropertyValue("year_start", 2005)
node.setPropertyValue("month_start", "January")
node.setPropertyValue("day_start", 4)
node.setKeyedPropertyValue("pad", "AGE", "MeanOfRecentPoints")
node.setPropertyValue("agg_mode", "Specify")
node.setPropertyValue("agg_set_default", "Last")
```

Table 85. timeintervalsnode properties.

timeintervalsnode properties	**Data type**	**Property description**
interval_type	None Periods CyclicPeriods Years Quarters Months DaysPerWeek DaysNonPeriodic HoursPerDay HoursNonPeriodic MinutesPerDay MinutesNonPeriodic SecondsPerDay SecondsNonPeriodic	
mode	Label Create	Specifies whether you want to label records consecutively or build the series based on a specified date, timestamp, or time field.
field	*field*	When building the series from the data, specifies the field that indicates the date or time for each record.
period_start	*integer*	Specifies the starting interval for periods or cyclic periods
cycle_start	*integer*	Starting cycle for cyclic periods.
year_start	*integer*	For interval types where applicable, year in which the first interval falls.
quarter_start	*integer*	For interval types where applicable, quarter in which the first interval falls.
month_start	January February March April May June July August September October November December	
day_start	*integer*	
hour_start	*integer*	
minute_start	*integer*	
second_start	*integer*	

Table 85. timeintervalsnode properties (continued).

timeintervalsnode properties	Data type	Property description
periods_per_cycle	*integer*	For cyclic periods, number within each cycle.
fiscal_year_begins	January February March April May June July August September October November December	For quarterly intervals, specifies the month when the fiscal year begins.
week_begins_on	Sunday Monday Tuesday Wednesday Thursday Friday Saturday Sunday	For periodic intervals (days per week, hours per day, minutes per day, and seconds per day), specifies the day on which the week begins.
day_begins_hour	*integer*	For periodic intervals (hours per day, minutes per day, seconds per day), specifies the hour when the day begins. Can be used in combination with day_begins_minute and day_begins_second to specify an exact time such as *8:05:01*. See usage example below.
day_begins_minute	*integer*	For periodic intervals (hours per day, minutes per day, seconds per day), specifies the minute when the day begins (for example, the *5* in *8:05*).
day_begins_second	*integer*	For periodic intervals (hours per day, minutes per day, seconds per day), specifies the second when the day begins (for example, the *17* in *8:05:17*).
days_per_week	*integer*	For periodic intervals (days per week, hours per day, minutes per day, and seconds per day), specifies the number of days per week.
hours_per_day	*integer*	For periodic intervals (hours per day, minutes per day, and seconds per day), specifies the number of hours in the day.
interval_increment	1 2 3 4 5 6 10 15 20 30	For minutes per day and seconds per day, specifies the number of minutes or seconds to increment for each record.
field_name_extension	*string*	
field_name_extension_as_prefix	*flag*	

Table 85. timeintervalsnode properties (continued).

timeintervalsnode properties	**Data type**	**Property description**
date_format	"DDMMYY" "MMDDYY" "YYMMDD" "YYYYMMDD" "YYYYDDD" DAY MONTH "DD-MM-YY" "DD-MM-YYYY" "MM-DD-YY" "MM-DD-YYYY" "DD-MON-YY" "DD-MON-YYYY" "YYYY-MM-DD" "DD.MM.YY" "DD.MM.YYYY" "MM.DD.YYYY" "DD.MON.YY" "DD.MON.YYYY" "DD/MM/YY" "DD/MM/YYYY" "MM/DD/YY" "MM/DD/YYYY" "DD/MON/YY" "DD/MON/YYYY" MON YYYY q Q YYYY ww WK YYYY	
time_format	"HHMMSS" "HHMM" "MMSS" "HH:MM:SS" "HH:MM" "MM:SS" "(H)H:(M)M:(S)S" "(H)H:(M)M" "(M)M:(S)S" "HH.MM.SS" "HH.MM" "MM.SS" "(H)H.(M)M.(S)S" "(H)H.(M)M" "(M)M.(S)S"	
aggregate	Mean Sum Mode Min Max First Last TrueIfAnyTrue	Specifies the aggregation method for a field.
pad	Blank MeanOfRecentPoints True False	Specifies the padding method for a field.
agg_mode	All Specify	Specifies whether to aggregate or pad all fields with default functions as needed or specify the fields and functions to use.

Table 85. timeintervalsnode properties (continued).

timeintervalsnode properties	Data type	Property description
agg_range_default	Mean Sum Mode Min Max	Specifies the default function to use when aggregating continuous fields.
agg_set_default	Mode First Last	Specifies the default function to use when aggregating nominal fields.
agg_flag_default	TrueIfAnyTrue Mode First Last	
pad_range_default	Blank MeanOfRecentPoints	Specifies the default function to use when padding continuous fields.
pad_set_default	Blank MostRecentValue	
pad_flag_default	Blank True False	
max_records_to_create	*integer*	Specifies the maximum number of records to create when padding the series.
estimation_from_beginning	*flag*	
estimation_to_end	*flag*	
estimation_start_offset	*integer*	
estimation_num_holdouts	*integer*	
create_future_records	*flag*	
num_future_records	*integer*	
create_future_field	*flag*	
future_field_name	*string*	

transposenode Properties

The Transpose node swaps the data in rows and columns so that records become fields and fields become records.

Example

```
node = stream.create("transpose", "My node")
node.setPropertyValue("transposed_names", "Read")
node.setPropertyValue("read_from_field", "TimeLabel")
node.setPropertyValue("max_num_fields", "1000")
node.setPropertyValue("id_field_name", "ID")
```

Table 86. transposenode properties

transposenode properties	Data type	Property description
transposed_names	Prefix Read	New field names can be generated automatically based on a specified prefix, or they can be read from an existing field in the data.
prefix	*string*	
num_new_fields	*integer*	When using a prefix, specifies the maximum number of new fields to create.
read_from_field	*field*	Field from which names are read. This must be an instantiated field or an error will occur when the node is executed.
max_num_fields	*integer*	When reading names from a field, specifies an upper limit to avoid creating an inordinately large number of fields.
transpose_type	Numeric String Custom	By default, only continuous (numeric range) fields are transposed, but you can choose a custom subset of numeric fields or transpose all string fields instead.
transpose_fields	*list*	Specifies the fields to transpose when the Custom option is used.
id_field_name	*field*	

typenode Properties

The Type node specifies field metadata and properties. For example, you can specify a measurement level (continuous, nominal, ordinal, or flag) for each field, set options for handling missing values and system nulls, set the role of a field for modeling purposes, specify field and value labels, and specify values for a field.

Example

```
node = stream.createAt("type", "My node", 50, 50)
node.setKeyedPropertyValue("check", "Cholesterol", "Coerce")
node.setKeyedPropertyValue("direction", "Drug", "Input")
node.setKeyedPropertyValue("type", "K", "Range")
node.setKeyedPropertyValue("values", "Drug", ["drugA", "drugB", "drugC", "drugD", "drugX",
 "drugY", "drugZ"])
node.setKeyedPropertyValue("null_missing", "BP", False)
node.setKeyedPropertyValue("whitespace_missing", "BP", False)
node.setKeyedPropertyValue("description", "BP", "Blood Pressure")
node.setKeyedPropertyValue("value_labels", "BP", [["HIGH", "High Blood Pressure"],
 ["NORMAL", "normal blood pressure"]])
```

Note that in some cases you may need to fully instantiate the Type node in order for other nodes to work correctly, such as the fields from property of the Set to Flag node. You can simply connect a Table node and execute it to instantiate the fields:

```
tablenode = stream.createAt("table", "Table node", 150, 50)
stream.link(node, tablenode)
tablenode.run(None)
stream.delete(tablenode)
```

Table 87. typenode properties.

typenode properties	Data type	Property description
direction	Input Target Both None Partition Split Frequency RecordID	Keyed property for field roles. **Note:** The values In and Out are now deprecated. Support for them may be withdrawn in a future release.
type	Range Flag Set Typeless Discrete OrderedSet Default	Measurement level of the field (previously called the "type" of field). Setting type to Default will clear any values parameter setting, and if value_mode has the value Specify, it will be reset to Read. If value_mode is set to Pass or Read, setting type will not affect value_mode. **Note:** The data types used internally differ from those visible in the type node. The correspondence is as follows: Range -> Continuous Set - > Nominal OrderedSet -> Ordinal Discrete- > Categorical
storage	Unknown String Integer Real Time Date Timestamp	Read-only keyed property for field storage type.
check	None Nullify Coerce Discard Warn Abort	Keyed property for field type and range checking.
values	[*value value*]	For continuous fields, the first value is the minimum, and the last value is the maximum. For nominal fields, specify all values. For flag fields, the first value represents *false*, and the last value represents *true*. Setting this property automatically sets the value_mode property to Specify.
value_mode	Read Pass Read+ Current Specify	Determines how values are set. Note that you cannot set this property to Specify directly; to use specific values, set the values property.
extend_values	*flag*	Applies when value_mode is set to Read. Set to T to add newly read values to any existing values for the field. Set to F to discard existing values in favor of the newly read values.
enable_missing	*flag*	When set to T, activates tracking of missing values for the field.
missing_values	[*value value ...*]	Specifies data values that denote missing data.

Table 87. typenode properties (continued).

typenode properties	Data type	Property description
range_missing	*flag*	Specifies whether a missing-value (blank) range is defined for a field.
missing_lower	*string*	When range_missing is true, specifies the lower bound of the missing-value range.
missing_upper	*string*	When range_missing is true, specifies the upper bound of the missing-value range.
null_missing	*flag*	When set to T, *nulls* (undefined values that are displayed as $null$ in the software) are considered missing values.
whitespace_ missing	*flag*	When set to T, values containing only white space (spaces, tabs, and new lines) are considered missing values.
description	*string*	Specifies the description for a field.
value_labels	*[[Value LabelString] [Value LabelString] ...]*	Used to specify labels for value pairs.
display_places	*integer*	Sets the number of decimal places for the field when displayed (applies only to fields with REAL storage). A value of –1 will use the stream default.
export_places	*integer*	Sets the number of decimal places for the field when exported (applies only to fields with REAL storage). A value of –1 will use the stream default.
decimal_separator	DEFAULT PERIOD COMMA	Sets the decimal separator for the field (applies only to fields with REAL storage).
date_format	"DDMMYY" "MMDDYY" "YYMMDD" "YYYYMMDD" "YYYYDDD" DAY MONTH "DD-MM-YY" "DD-MM-YYYY" "MM-DD-YY" "MM-DD-YYYY" "DD-MON-YY" "DD-MON-YYYY" "YYYY-MM-DD" "DD.MM.YY" "DD.MM.YYYY" "MM.DD.YYYY" "DD.MON.YY" "DD.MON.YYYY" "DD/MM/YY" "DD/MM/YYYY" "MM/DD/YY" "MM/DD/YYYY" "DD/MON/YY" "DD/MON/YYYY" MON YYYY q Q YYYY ww WK YYYY	Sets the date format for the field (applies only to fields with DATE or TIMESTAMP storage).

Table 87. typenode properties (continued).

typenode properties	Data type	Property description
time_format	"HHMMSS" "HHMM" "MMSS" "HH:MM:SS" "HH:MM" "MM:SS" "(H)H:(M)M:(S)S" "(H)H:(M)M" "(M)M:(S)S" "HH.MM.SS" "HH.MM" "MM.SS" "(H)H.(M)M.(S)S" "(H)H.(M)M" "(M)M.(S)S"	Sets the time format for the field (applies only to fields with TIME or TIMESTAMP storage).
number_format	DEFAULT STANDARD SCIENTIFIC CURRENCY	Sets the number display format for the field.
standard_places	*integer*	Sets the number of decimal places for the field when displayed in standard format. A value of –1 will use the stream default. Note that the existing display_places slot will also change this but is now deprecated.
scientific_places	*integer*	Sets the number of decimal places for the field when displayed in scientific format. A value of –1 will use the stream default.
currency_places	*integer*	Sets the number of decimal places for the field when displayed in currency format. A value of –1 will use the stream default.
grouping_symbol	DEFAULT NONE LOCALE PERIOD COMMA SPACE	Sets the grouping symbol for the field.
column_width	*integer*	Sets the column width for the field. A value of –1 will set column width to Auto.
justify	AUTO CENTER LEFT RIGHT	Sets the column justification for the field.
measure_type	Range / MeasureType.RANGE Discrete / MeasureType.DISCRETE Flag / MeasureType.FLAG Set / MeasureType.SET OrderedSet / MeasureType.ORDERED_SET Typeless / MeasureType.TYPELESS Collection / MeasureType.COLLECTION Geospatial / MeasureType.GEOSPATIAL	This keyed property is similar to type in that it can be used to define the measurement associated with the field. What is different is that in Python scripting, the setter function can also be passed one of the MeasureType values while the getter will always return on the MeasureType values.

Table 87. typenode properties (continued).

typenode properties	Data type	Property description
collection_ measure	Range / MeasureType.RANGE Flag / MeasureType.FLAG Set / MeasureType.SET OrderedSet / MeasureType.ORDERED_SET Typeless / MeasureType.TYPELESS	For collection fields (lists with a depth of 0), this keyed property defines the measurement type associated with the underlying values.
geo_type	Point MultiPoint LineString MultiLineString Polygon MultiPolygon	For geospatial fields, this keyed property defines the type of geospatial object represented by this field. This should be consistent with the list depth of the values.
has_coordinate_ system	*boolean*	For geospatial fields, this property defines whether this field has a coordinate system
coordinate_system	*string*	For geospatial fields, this keyed property defines the coordinate system for this field.
custom_storage_ type	Unknown / MeasureType.UNKNOWN String / MeasureType.STRING Integer / MeasureType.INTEGER Real / MeasureType.REAL Time / MeasureType.TIME Date / MeasureType.DATE Timestamp / MeasureType.TIMESTAMP List / MeasureType.LIST	This keyed property is similar to custom_storage in that it can be used to define the override storage for the field. What is different is that in Python scripting, the setter function can also be passed one of the StorageType values while the getter will always return on the StorageType values.
custom_list_ storage_type	String / MeasureType.STRING Integer / MeasureType.INTEGER Real / MeasureType.REAL Time / MeasureType.TIME Date / MeasureType.DATE Timestamp / MeasureType.TIMESTAMP	For list fields, this keyed property specifies the storage type of the underlying values.
custom_list_depth	*integer*	For list fields, this keyed property specifies the depth of the field

Chapter 12. Graph Node Properties

Graph Node Common Properties

This section describes the properties available for graph nodes, including common properties and properties that are specific to each node type.

Table 88. Common graph node properties

Common graph node properties	Data type	Property description
`title`	*string*	Specifies the title. Example: "This is a title."
`caption`	*string*	Specifies the caption. Example: "This is a caption."
`output_mode`	`Screen` `File`	Specifies whether output from the graph node is displayed or written to a file.

`output_format`	`BMP`
	`JPEG`
	`PNG`
	`HTML`
	`output` (*.cou*)
		Specifies the type of output. The exact type of output allowed for each node varies.

`full_filename`	*string*	Specifies the target path and filename for output generated from the graph node.
`use_graph_size`	*flag*	Controls whether the graph is sized explicitly, using the width and height properties below. Affects only graphs that are output to screen. Not available for the Distribution node.
`graph_width`	*number*	When `use_graph_size` is `True`, sets the graph width in pixels.
`graph_height`	*number*	When `use_graph_size` is `True`, sets the graph height in pixels.

Turning off optional fields

Optional fields, such as an overlay field for plots, can be turned off by setting the property value to `" "` (empty string), as shown in the following example:

```
plotnode.setPropertyValue("color_field", "")
```

Specifying colors

The colors for titles, captions, backgrounds, and labels can be specified by using the hexadecimal strings starting with the hash (#) symbol. For example, to set the graph background to sky blue, you would use the following statement:

```
mygraphnode.setPropertyValue("graph_background", "#87CEEB")
```

Here, the first two digits, 87, specify the red content; the middle two digits, CE, specify the green content; and the last two digits, EB, specify the blue content. Each digit can take a value in the range 0–9 or A–F. Together, these values can specify a red-green-blue, or RGB, color.

Note: When specifying colors in RGB, you can use the Field Chooser in the user interface to determine the correct color code. Simply hover over the color to activate a ToolTip with the desired information.

collectionnode Properties

The Collection node shows the distribution of values for one numeric field relative to the values of another. (It creates graphs that are similar to histograms.) It is useful for illustrating a variable or field whose values change over time. Using 3-D graphing, you can also include a symbolic axis displaying distributions by category.

Example

```
node = stream.create("collection", "My node")
# "Plot" tab
node.setPropertyValue("three_D", True)
node.setPropertyValue("collect_field", "Drug")
node.setPropertyValue("over_field", "Age")
node.setPropertyValue("by_field", "BP")
node.setPropertyValue("operation", "Sum")
# "Overlay" section
node.setPropertyValue("color_field", "Drug")
node.setPropertyValue("panel_field", "Sex")
node.setPropertyValue("animation_field", "")
# "Options" tab
node.setPropertyValue("range_mode", "Automatic")
node.setPropertyValue("range_min", 1)
node.setPropertyValue("range_max", 100)
node.setPropertyValue("bins", "ByNumber")
node.setPropertyValue("num_bins", 10)
node.setPropertyValue("bin_width", 5)
```

Table 89. collectionnode properties

collectionnode properties	**Data type**	**Property description**
over_field	*field*	
over_label_auto	*flag*	
over_label	*string*	
collect_field	*field*	
collect_label_auto	*flag*	
collect_label	*string*	
three_D	*flag*	
by_field	*field*	
by_label_auto	*flag*	
by_label	*string*	
operation	Sum Mean Min Max SDev	
color_field	*string*	
panel_field	*string*	
animation_field	*string*	
range_mode	Automatic UserDefined	
range_min	*number*	

Table 89. collectionnode properties (continued)

collectionnode properties	Data type	Property description
range_max	*number*	
bins	ByNumber ByWidth	
num_bins	*number*	
bin_width	*number*	
use_grid	*flag*	
graph_background	*color*	Standard graph colors are described at the beginning of this section.
page_background	*color*	Standard graph colors are described at the beginning of this section.

distributionnode Properties

The Distribution node shows the occurrence of symbolic (categorical) values, such as mortgage type or gender. Typically, you might use the Distribution node to show imbalances in the data, which you could then rectify using a Balance node before creating a model.

Example

```
node = stream.create("distribution", "My node")
# "Plot" tab
node.setPropertyValue("plot", "Flags")
node.setPropertyValue("x_field", "Age")
node.setPropertyValue("color_field", "Drug")
node.setPropertyValue("normalize", True)
node.setPropertyValue("sort_mode", "ByOccurence")
node.setPropertyValue("use_proportional_scale", True)
```

Table 90. distributionnode properties

distributionnode properties	Data type	Property description
plot	SelectedFields Flags	
x_field	*field*	
color_field	*field*	Overlay field.
normalize	*flag*	
sort_mode	ByOccurence Alphabetic	
use_proportional_scale	*flag*	

evaluationnode Properties

The Evaluation node helps to evaluate and compare predictive models. The evaluation chart shows how well models predict particular outcomes. It sorts records based on the predicted value and confidence of the prediction. It splits the records into groups of equal size (**quantiles**) and then plots the value of the business criterion for each quantile from highest to lowest. Multiple models are shown as separate lines in the plot.

Example

```
node = stream.create("evaluation", "My node")
# "Plot" tab
node.setPropertyValue("chart_type", "Gains")
node.setPropertyValue("cumulative", False)
node.setPropertyValue("field_detection_method", "Name")
node.setPropertyValue("inc_baseline", True)
node.setPropertyValue("n_tile", "Deciles")
node.setPropertyValue("style", "Point")
node.setPropertyValue("point_type", "Dot")
node.setPropertyValue("use_fixed_cost", True)
node.setPropertyValue("cost_value", 5.0)
node.setPropertyValue("cost_field", "Na")
node.setPropertyValue("use_fixed_revenue", True)
node.setPropertyValue("revenue_value", 30.0)
node.setPropertyValue("revenue_field", "Age")
node.setPropertyValue("use_fixed_weight", True)
node.setPropertyValue("weight_value", 2.0)
node.setPropertyValue("weight_field", "K")
```

Table 91. evaluationnode properties.

evaluationnode properties	**Data type**	**Property description**
chart_type	Gains Response Lift Profit ROI ROC	
inc_baseline	*flag*	
field_detection_method	Metadata Name	
use_fixed_cost	*flag*	
cost_value	*number*	
cost_field	*string*	
use_fixed_revenue	*flag*	
revenue_value	*number*	
revenue_field	*string*	
use_fixed_weight	*flag*	
weight_value	*number*	
weight_field	*field*	
n_tile	Quartiles Quintles Deciles Vingtiles Percentiles 1000-tiles	
cumulative	*flag*	
style	Line Point	

Table 91. evaluationnode properties (continued).

evaluationnode properties	Data type	Property description
point_type	Rectangle Dot Triangle Hexagon Plus Pentagon Star BowTie HorizontalDash VerticalDash IronCross Factory House Cathedral OnionDome ConcaveTriangle OblateGlobe CatEye FourSidedPillow RoundRectangle Fan	
export_data	*flag*	
data_filename	*string*	
delimiter	*string*	
new_line	*flag*	
inc_field_names	*flag*	
inc_best_line	*flag*	
inc_business_rule	*flag*	
business_rule_condition	*string*	
plot_score_fields	*flag*	
score_fields	*[field1 ... fieldN]*	
target_field	*field*	
use_hit_condition	*flag*	
hit_condition	*string*	
use_score_expression	*flag*	
score_expression	*string*	
caption_auto	*flag*	

graphboardnode Properties

The Graphboard node offers many different types of graphs in one single node. Using this node, you can choose the data fields you want to explore and then select a graph from those available for the selected data. The node automatically filters out any graph types that would not work with the field choices.

Note: If you set a property that is not valid for the graph type (for example, specifying `y_field` for a histogram), that property is ignored.

Note: In the UI, on the Detailed tab of many different graph types, there is a **Summary** field; this field is not currently supported by scripting.

Example

```
node = stream.create("graphboard", "My node")
node.setPropertyValue("graph_type", "Line")
node.setPropertyValue("x_field", "K")
node.setPropertyValue("y_field", "Na")
```

Table 92. graphboardnode properties

graphboard properties	Data type	Property description
graph_type	2DDotplot 3DArea 3DBar 3DDensity 3DHistogram 3DPie 3DScatterplot Area ArrowMap Bar BarCounts BarCountsMap BarMap BinnedScatter Boxplot Bubble ChoroplethMeans ChoroplethMedians ChoroplethSums ChoroplethValues ChoroplethCounts CoordinateMap CoordinateChoroplethMeans CoordinateChoroplethMedians CoordinateChoroplethSums CoordinateChoroplethValues CoordinateChoroplethCounts Dotplot Heatmap HexBinScatter Histogram Line LineChartMap LineOverlayMap Parallel Path Pie PieCountMap PieCounts PieMap PointOverlayMap PolygonOverlayMap Ribbon Scatterplot SPLOM Surface	Identifies the graph type.
x_field	*field*	Specifies a custom label for the *x* axis. Available only for labels.

Table 92. graphboardnode properties (continued)

graphboard properties	Data type	Property description
y_field	*field*	Specifies a custom label for the *y* axis. Available only for labels.
z_field	*field*	Used in some 3-D graphs.
color_field	*field*	Used in heat maps.
size_field	*field*	Used in bubble plots.
categories_field	*field*	
values_field	*field*	
rows_field	*field*	
columns_field	*field*	
fields	*field*	
start_longitude_field	*field*	Used with arrows on a reference map.
end_longitude_field	*field*	
start_latitude_field	*field*	
end_latitude_field	*field*	
data_key_field	*field*	Used in various maps.
panelrow_field	*string*	
panelcol_field	*string*	
animation_field	*string*	
longitude_field	*field*	Used with co-ordinates on maps.
latitude_field	*field*	
map_color_field	*field*	

histogramnode Properties

The Histogram node shows the occurrence of values for numeric fields. It is often used to explore the data before manipulations and model building. Similar to the Distribution node, the Histogram node frequently reveals imbalances in the data.

Example

```
node = stream.create("histogram", "My node")
# "Plot" tab
node.setPropertyValue("field", "Drug")
node.setPropertyValue("color_field", "Drug")
node.setPropertyValue("panel_field", "Sex")
node.setPropertyValue("animation_field", "")
# "Options" tab
node.setPropertyValue("range_mode", "Automatic")
node.setPropertyValue("range_min", 1.0)
node.setPropertyValue("range_max", 100.0)
node.setPropertyValue("num_bins", 10)
node.setPropertyValue("bin_width", 10)
node.setPropertyValue("normalize", True)
node.setPropertyValue("separate_bands", False)
```

Table 93. histogramnode properties

histogramnode properties	Data type	Property description
field	*field*	
color_field	*field*	
panel_field	*field*	
animation_field	*field*	
range_mode	Automatic UserDefined	
range_min	*number*	
range_max	*number*	
bins	ByNumber ByWidth	
num_bins	*number*	
bin_width	*number*	
normalize	*flag*	
separate_bands	*flag*	
x_label_auto	*flag*	
x_label	*string*	
y_label_auto	*flag*	
y_label	*string*	
use_grid	*flag*	
graph_background	*color*	Standard graph colors are described at the beginning of this section.
page_background	*color*	Standard graph colors are described at the beginning of this section.
normal_curve	*flag*	Indicates whether the normal distribution curve should be shown on the output.

multiplotnode Properties

The Multiplot node creates a plot that displays multiple *Y* fields over a single *X* field. The *Y* fields are plotted as colored lines; each is equivalent to a Plot node with Style set to **Line** and X Mode set to **Sort**. Multiplots are useful when you want to explore the fluctuation of several variables over time.

Example

```
node = stream.create("multiplot", "My node")
# "Plot" tab
node.setPropertyValue("x_field", "Age")
node.setPropertyValue("y_fields", ["Drug", "BP"])
node.setPropertyValue("panel_field", "Sex")
# "Overlay" section
node.setPropertyValue("animation_field", "")
node.setPropertyValue("tooltip", "test")
node.setPropertyValue("normalize", True)
node.setPropertyValue("use_overlay_expr", False)
```

```
node.setPropertyValue("overlay_expression", "test")
node.setPropertyValue("records_limit", 500)
node.setPropertyValue("if_over_limit", "PlotSample")
```

Table 94. multiplotnode properties

multiplotnode properties	**Data type**	**Property description**
x_field	*field*	
y_fields	*list*	
panel_field	*field*	
animation_field	*field*	
normalize	*flag*	
use_overlay_expr	*flag*	
overlay_expression	*string*	
records_limit	*number*	
if_over_limit	PlotBins PlotSample PlotAll	
x_label_auto	*flag*	
x_label	*string*	
y_label_auto	*flag*	
y_label	*string*	
use_grid	*flag*	
graph_background	*color*	Standard graph colors are described at the beginning of this section.
page_background	*color*	Standard graph colors are described at the beginning of this section.

plotnode Properties

The Plot node shows the relationship between numeric fields. You can create a plot by using points (a scatterplot) or lines.

Example

```
node = stream.create("plot", "My node")
# "Plot" tab
node.setPropertyValue("three_D", True)
node.setPropertyValue("x_field", "BP")
node.setPropertyValue("y_field", "Cholesterol")
node.setPropertyValue("z_field", "Drug")
# "Overlay" section
node.setPropertyValue("color_field", "Drug")
node.setPropertyValue("size_field", "Age")
node.setPropertyValue("shape_field", "")
node.setPropertyValue("panel_field", "Sex")
node.setPropertyValue("animation_field", "BP")
node.setPropertyValue("transp_field", "")
node.setPropertyValue("style", "Point")
# "Output" tab
```

```
node.setPropertyValue("output_mode", "File")
node.setPropertyValue("output_format", "JPEG")
node.setPropertyValue("full_filename", "C:/temp/graph_output/plot_output.jpeg")
```

Table 95. plotnode properties.

plotnode properties	**Data type**	**Property description**
x_field	*field*	Specifies a custom label for the *x* axis. Available only for labels.
y_field	*field*	Specifies a custom label for the *y* axis. Available only for labels.
three_D	*flag*	Specifies a custom label for the *y* axis. Available only for labels in 3-D graphs.
z_field	*field*	
color_field	*field*	Overlay field.
size_field	*field*	
shape_field	*field*	
panel_field	*field*	Specifies a nominal or flag field for use in making a separate chart for each category. Charts are paneled together in one output window.
animation_field	*field*	Specifies a nominal or flag field for illustrating data value categories by creating a series of charts displayed in sequence using animation.
transp_field	*field*	Specifies a field for illustrating data value categories by using a different level of transparency for each category. Not available for line plots.
overlay_type	None Smoother Function	Specifies whether an overlay function or LOESS smoother is displayed.
overlay_expression	*string*	Specifies the expression used when overlay_type is set to Function.
style	Point Line	
point_type	Rectangle Dot Triangle Hexagon Plus Pentagon Star BowTie HorizontalDash VerticalDash IronCross Factory House Cathedral OnionDome ConcaveTriangle OblateGlobe CatEye FourSidedPillow RoundRectangle Fan	

Table 95. plotnode properties (continued).

plotnode properties	Data type	Property description
x_mode	Sort Overlay AsRead	
x_range_mode	Automatic UserDefined	
x_range_min	*number*	
x_range_max	*number*	
y_range_mode	Automatic UserDefined	
y_range_min	*number*	
y_range_max	*number*	
z_range_mode	Automatic UserDefined	
z_range_min	*number*	
z_range_max	*number*	
jitter	*flag*	
records_limit	*number*	
if_over_limit	PlotBins PlotSample PlotAll	
x_label_auto	*flag*	
x_label	*string*	
y_label_auto	*flag*	
y_label	*string*	
z_label_auto	*flag*	
z_label	*string*	
use_grid	*flag*	
graph_background	*color*	Standard graph colors are described at the beginning of this section.
page_background	*color*	Standard graph colors are described at the beginning of this section.
use_overlay_expr	*flag*	Deprecated in favor of overlay_type.

timeplotnode Properties

The Time Plot node displays one or more sets of time series data. Typically, you would first use a Time Intervals node to create a *TimeLabel* field, which would be used to label the *x* axis.

Example

```
node = stream.create("timeplot", "My node")
node.setPropertyValue("y_fields", ["sales", "men", "women"])
node.setPropertyValue("panel", True)
node.setPropertyValue("normalize", True)
```

```
node.setPropertyValue("line", True)
node.setPropertyValue("smoother", True)
node.setPropertyValue("use_records_limit", True)
node.setPropertyValue("records_limit", 2000)
# Appearance settings
node.setPropertyValue("symbol_size", 2.0)
```

Table 96. timeplotnode properties.

timeplotnode properties	**Data type**	**Property description**
plot_series	Series Models	
use_custom_x_field	*flag*	
x_field	*field*	
y_fields	*list*	
panel	*flag*	
normalize	*flag*	
line	*flag*	
points	*flag*	
point_type	Rectangle Dot Triangle Hexagon Plus Pentagon Star BowTie HorizontalDash VerticalDash IronCross Factory House Cathedral OnionDome ConcaveTriangle OblateGlobe CatEye FourSidedPillow RoundRectangle Fan	
smoother	*flag*	You can add smoothers to the plot only if you set panel to True.
use_records_limit	*flag*	
records_limit	*integer*	
symbol_size	*number*	Specifies a symbol size.
panel_layout	Horizontal Vertical	

webnode Properties

The Web node illustrates the strength of the relationship between values of two or more symbolic (categorical) fields. The graph uses lines of various widths to indicate connection strength. You might use a Web node, for example, to explore the relationship between the purchase of a set of items at an e-commerce site.

Example

```
node = stream.create("web", "My node")
# "Plot" tab
node.setPropertyValue("use_directed_web", True)
node.setPropertyValue("to_field", "Drug")
node.setPropertyValue("fields", ["BP", "Cholesterol", "Sex", "Drug"])
node.setPropertyValue("from_fields", ["BP", "Cholesterol", "Sex"])
node.setPropertyValue("true_flags_only", False)
node.setPropertyValue("line_values", "Absolute")
node.setPropertyValue("strong_links_heavier", True)
# "Options" tab
node.setPropertyValue("max_num_links", 300)
node.setPropertyValue("links_above", 10)
node.setPropertyValue("num_links", "ShowAll")
node.setPropertyValue("discard_links_min", True)
node.setPropertyValue("links_min_records", 5)
node.setPropertyValue("discard_links_max", True)
node.setPropertyValue("weak_below", 10)
node.setPropertyValue("strong_above", 19)
node.setPropertyValue("link_size_continuous", True)
node.setPropertyValue("web_display", "Circular")
```

Table 97. webnode properties

webnode properties	**Data type**	**Property description**
use_directed_web	*flag*	
fields	*list*	
to_field	*field*	
from_fields	*list*	
true_flags_only	*flag*	
line_values	Absolute OverallPct PctLarger PctSmaller	
strong_links_heavier	*flag*	
num_links	ShowMaximum ShowLinksAbove ShowAll	
max_num_links	*number*	
links_above	*number*	
discard_links_min	*flag*	
links_min_records	*number*	
discard_links_max	*flag*	
links_max_records	*number*	
weak_below	*number*	
strong_above	*number*	
link_size_continuous	*flag*	
web_display	Circular Network Directed Grid	

Table 97. webnode properties (continued)

webnode properties	Data type	Property description
graph_background	*color*	Standard graph colors are described at the beginning of this section.
symbol_size	*number*	Specifies a symbol size.

Chapter 13. Modeling Node Properties

Common Modeling Node Properties

The following properties are common to some or all modeling nodes. Any exceptions are noted in the documentation for individual modeling nodes as appropriate.

Table 98. Common modeling node properties

Property	Values	Property description
`custom_fields`	*flag*	If true, allows you to specify target, input, and other fields for the current node. If false, the current settings from an upstream Type node are used.

`target`
or
`targets`
	field
	
	or
	[*field1 ... fieldN*]
		Specifies a single target field or multiple target fields depending on the model type.

`inputs`	[*field1 ... fieldN*]	Input or predictor fields used by the model.
`partition`	*field*	
`use_partitioned_data`	*flag*	If a partition field is defined, this option ensures that only data from the training partition is used to build the model.
`use_split_data`	*flag*	
`splits`	*[field1 ... fieldN]*	Specifies the field or fields to use for split modeling. Effective only if `use_split_data` is set to `True`.
`use_frequency`	*flag*	Weight and frequency fields are used by specific models as noted for each model type.
`frequency_field`	*field*	
`use_weight`	*flag*	
`weight_field`	*field*	
`use_model_name`	*flag*	
`model_name`	*string*	Custom name for new model.
`mode`	`Simple` `Expert`	

anomalydetectionnode Properties

The Anomaly Detection node identifies unusual cases, or outliers, that do not conform to patterns of "normal" data. With this node, it is possible to identify outliers even if they do not fit any previously known patterns and even if you are not exactly sure what you are looking for.

Example

```
node = stream.create("anomalydetection", "My node")
node.setPropertyValue("anomaly_method", "PerRecords")
node.setPropertyValue("percent_records", 95)
node.setPropertyValue("mode", "Expert")
node.setPropertyValue("peer_group_num_auto", True)
node.setPropertyValue("min_num_peer_groups", 3)
node.setPropertyValue("max_num_peer_groups", 10)
```

Table 99. anomalydetectionnode properties

anomalydetectionnode Properties	**Values**	**Property description**
inputs	*[field1 ... fieldN]*	Anomaly Detection models screen records based on the specified input fields. They do not use a target field. Weight and frequency fields are also not used. See the topic "Common Modeling Node Properties" on page 155 for more information.
mode	Expert Simple	
anomaly_method	IndexLevel PerRecords NumRecords	Specifies the method used to determine the cutoff value for flagging records as anomalous.
index_level	*number*	Specifies the minimum cutoff value for flagging anomalies.
percent_records	*number*	Sets the threshold for flagging records based on the percentage of records in the training data.
num_records	*number*	Sets the threshold for flagging records based on the number of records in the training data.
num_fields	*integer*	The number of fields to report for each anomalous record.
impute_missing_values	*flag*	
adjustment_coeff	*number*	Value used to balance the relative weight given to continuous and categorical fields in calculating the distance.
peer_group_num_auto	*flag*	Automatically calculates the number of peer groups.
min_num_peer_groups	*integer*	Specifies the minimum number of peer groups used when peer_group_num_auto is set to True.
max_num_per_groups	*integer*	Specifies the maximum number of peer groups.
num_peer_groups	*integer*	Specifies the number of peer groups used when peer_group_num_auto is set to False.
noise_level	*number*	Determines how outliers are treated during clustering. Specify a value between 0 and 0.5.
noise_ratio	*number*	Specifies the portion of memory allocated for the component that should be used for noise buffering. Specify a value between 0 and 0.5.

apriorinode Properties

The Apriori node extracts a set of rules from the data, pulling out the rules with the highest information content. Apriori offers five different methods of selecting rules and uses a sophisticated indexing scheme to process large data sets efficiently. For large problems, Apriori is generally faster to train; it has no arbitrary limit on the number of rules that can be retained, and it can handle rules with up to 32 preconditions. Apriori requires that input and output fields all be categorical but delivers better performance because it is optimized for this type of data.

Example

```
node = stream.create("apriori", "My node")
# "Fields" tab
node.setPropertyValue("custom_fields", True)
node.setPropertyValue("partition", "Test")
# For non-transactional
node.setPropertyValue("use_transactional_data", False)
node.setPropertyValue("consequents", ["Age"])
node.setPropertyValue("antecedents", ["BP", "Cholesterol", "Drug"])
# For transactional
node.setPropertyValue("use_transactional_data", True)
node.setPropertyValue("id_field", "Age")
node.setPropertyValue("contiguous", True)
node.setPropertyValue("content_field", "Drug")
# "Model" tab
node.setPropertyValue("use_model_name", False)
node.setPropertyValue("model_name", "Apriori_bp_choles_drug")
node.setPropertyValue("min_supp", 7.0)
node.setPropertyValue("min_conf", 30.0)
node.setPropertyValue("max_antecedents", 7)
node.setPropertyValue("true_flags", False)
node.setPropertyValue("optimize", "Memory")
# "Expert" tab
node.setPropertyValue("mode", "Expert")
node.setPropertyValue("evaluation", "ConfidenceRatio")
node.setPropertyValue("lower_bound", 7)
```

Table 100. apriorinode properties

apriorinode Properties	**Values**	**Property description**
consequents	*field*	Apriori models use Consequents and Antecedents in place of the standard target and input fields. Weight and frequency fields are not used. See the topic "Common Modeling Node Properties" on page 155 for more information.
antecedents	[*field1 ... fieldN*]	
min_supp	*number*	
min_conf	*number*	
max_antecedents	*number*	
true_flags	*flag*	
optimize	Speed Memory	
use_transactional_data	*flag*	
contiguous	*flag*	

Table 100. apriorinode properties (continued)

apriorinode Properties	Values	Property description
id_field	*string*	
content_field	*string*	
mode	Simple Expert	
evaluation	RuleConfidence DifferenceToPrior ConfidenceRatio InformationDifference NormalizedChiSquare	
lower_bound	*number*	
optimize	Speed Memory	Use to specify whether model building should be optimized for speed or for memory.

associationrulesnode Properties

The Association Rules Node is similar to the Apriori Node; however, unlike Apriori, the Association Rules Node can process list data. In addition, the Association Rules Node can be used with IBM SPSS Analytic Server to process big data and take advantage of faster parallel processing.

Table 101. associationrulesnode properties

associationrulesnode properties	Data type	Property description
predictions	*field*	Fields in this list can only appear as a predictor of a rule
conditions	*[field1...fieldN]*	Fields in this list can only appear as a condition of a rule
max_rule_conditions	*integer*	The maximum number of conditions that can be included in a single rule. Minimum 1, maximum 9.
max_rule_predictions	*integer*	The maximum number of predictions that can be included in a single rule. Minimum 1, maximum 5.
max_num_rules	*integer*	The maximum number of rules that can be considered as part of rule building. Minimum 1, maximum 10,000.
rule_criterion_top_n	Confidence Rulesupport Lift Conditionsupport Deployability	The rule criterion that determines the value by which the top "N" rules in the model are chosen.
true_flags	*Boolean*	Setting as *Y* determines that only the true values for flag fields are considered during rule building.
rule_criterion	*Boolean*	Setting as *Y* determines that the rule criterion values are used for excluding rules during model building.

Table 101. associationrulesnode properties (continued)

associationrulesnode properties	Data type	Property description
min_confidence	*number*	0.1 to 100 - the percentage value for the minimum required confidence level for a rule produced by the model. If the model produces a rule with a confidence level less than the value specified here the rule is discarded.
min_rule_support	*number*	0.1 to 100 - the percentage value for the minimum required rule support for a rule produced by the model. If the model produces a rule with a rule support level less than the specified value the rule is discarded.
min_condition_support	*number*	0.1 to 100 - the percentage value for the minimum required condition support for a rule produced by the model. If the model produces a rule with a condition support level less than the specified value the rule is discarded.
min_lift	*integer*	1 to 10 - represents the minimum required lift for a rule produced by the model. If the model produces a rule with a lift level less than the specified value the rule is discarded.
exclude_rules	*Boolean*	Used to select a list of related fields from which you do not want the model to create rules. Example: set :gsarsnode.exclude_rules = [[[field1,field2, field3]],[[field4, field5]]] - where each list of fields separated by [] is a row in the table.
num_bins	*integer*	Set the number of automatic bins that continuous fields are binned to. Minimum 2, maximum 10.
max_list_length	*integer*	Applies to any list fields for which the maximum length is not known. Elements in the list up until the number specified here are included in the model build; any further elements are discarded. Minimum 1, maximum 100.
output_confidence	*Boolean*	
output_rule_support	*Boolean*	
output_lift	*Boolean*	
output_condition_support	*Boolean*	
output_deployability	*Boolean*	
rules_to_display	upto all	The maximum number of rules to display in the output tables.
display_upto	*integer*	If upto is set in rules_to_display, set the number of rules to display in the output tables. Minimum 1.
field_transformations	*Boolean*	
records_summary	*Boolean*	
rule_statistics	*Boolean*	
most_frequent_values	*Boolean*	
most_frequent_fields	*Boolean*	
word_cloud	*Boolean*	

Table 101. associationrulesnode properties (continued)

associationrulesnode properties	Data type	Property description
word_cloud_sort	Confidence Rulesupport Lift Conditionsupport Deployability	
word_cloud_display	*integer*	Minimum 1, maximum 20
max_predictions	*integer*	The maximum number of rules that can be applied to each input to the score.
criterion	Confidence Rulesupport Lift Conditionsupport Deployability	Select the measure used to determine the strength of rules.
allow_repeats	*Boolean*	Determine whether rules with the same prediction are included in the score.
check_input	NoPredictions Predictions NoCheck	

autoclassifiernode Properties

The Auto Classifier node creates and compares a number of different models for binary outcomes (yes or no, churn or do not churn, and so on), allowing you to choose the best approach for a given analysis. A number of modeling algorithms are supported, making it possible to select the methods you want to use, the specific options for each, and the criteria for comparing the results. The node generates a set of models based on the specified options and ranks the best candidates according to the criteria you specify.

Example

```
node = stream.create("autoclassifier", "My node")
node.setPropertyValue("ranking_measure", "Accuracy")
node.setPropertyValue("ranking_dataset", "Training")
node.setPropertyValue("enable_accuracy_limit", True)
node.setPropertyValue("accuracy_limit", 0.9)
node.setPropertyValue("calculate_variable_importance", True)
node.setPropertyValue("use_costs", True)
node.setPropertyValue("svm", False)
```

Table 102. autoclassifiernode properties.

autoclassifiernode Properties	Values	Property description
target	*field*	For flag targets, the Auto Classifier node requires a single target and one or more input fields. Weight and frequency fields can also be specified. See the topic "Common Modeling Node Properties" on page 155 for more information.

Table 102. autoclassifiernode properties (continued).

autoclassifiernode Properties	**Values**	**Property description**
ranking_measure	Accuracy Area_under_curve Profit Lift Num_variables	
ranking_dataset	Training Test	
number_of_models	*integer*	Number of models to include in the model nugget. Specify an integer between 1 and 100.
calculate_variable_importance	*flag*	
enable_accuracy_limit	*flag*	
accuracy_limit	*integer*	Integer between 0 and 100.
enable_ area_under_curve _limit	*flag*	
area_under_curve_limit	*number*	Real number between 0.0 and 1.0.
enable_profit_limit	*flag*	
profit_limit	*number*	Integer greater than 0.
enable_lift_limit	*flag*	
lift_limit	*number*	Real number greater than 1.0.
enable_number_of_variables_limit	*flag*	
number_of_variables_limit	*number*	Integer greater than 0.
use_fixed_cost	*flag*	
fixed_cost	*number*	Real number greater than 0.0.
variable_cost	*field*	
use_fixed_revenue	*flag*	
fixed_revenue	*number*	Real number greater than 0.0.
variable_revenue	*field*	
use_fixed_weight	*flag*	
fixed_weight	*number*	Real number greater than 0.0
variable_weight	*field*	
lift_percentile	*number*	Integer between 0 and 100.
enable_model_build_time_limit	*flag*	
model_build_time_limit	*number*	Integer set to the number of minutes to limit the time taken to build each individual model.
enable_stop_after_time_limit	*flag*	
stop_after_time_limit	*number*	Real number set to the number of hours to limit the overall elapsed time for an auto classifier run.
enable_stop_after_valid_model_produced	*flag*	
use_costs	*flag*	
<algorithm>	*flag*	Enables or disables the use of a specific algorithm.

Table 102. autoclassifiernode properties (continued).

autoclassifiernode Properties	Values	Property description
<algorithm>.<property>	*string*	Sets a property value for a specific algorithm. See the topic "Setting Algorithm Properties" for more information.

Setting Algorithm Properties

For the Auto Classifier, Auto Numeric, and Auto Cluster nodes, properties for specific algorithms used by the node can be set using the general form:

```
autonode.setKeyedPropertyValue(<algorithm>, <property>, <value>)
```

For example:

```
node.setKeyedPropertyValue("neuralnetwork", "method", "MultilayerPerceptron")
```

Algorithm names for the Auto Classifier node are `cart`, `chaid`, `quest`, `c50`, `logreg`, `decisionlist`, `bayesnet`, `discriminant`, `svm` and `knn`.

Algorithm names for the Auto Numeric node are `cart`, `chaid`, `neuralnetwork`, `genlin`, `svm`, `regression`, `linear` and `knn`.

Algorithm names for the Auto Cluster node are `twostep`, `k-means`, and `kohonen`.

Property names are standard as documented for each algorithm node.

Algorithm properties that contain periods or other punctuation must be wrapped in single quotes, for example:

```
node.setKeyedPropertyValue("logreg", "tolerance", "1.0E-5")
```

Multiple values can also be assigned for property, for example:

```
node.setKeyedPropertyValue("decisionlist", "search_direction", ["Up", "Down"])
```

To enable or disable the use of a specific algorithm:

```
node.setPropertyValue("chaid", True)
```

Note: In cases where certain algorithm options are not available in the Auto Classifier node, or when only a single value can be specified rather than a range of values, the same limits apply with scripting as when accessing the node in the standard manner.

autoclusternode Properties

The Auto Cluster node estimates and compares clustering models, which identify groups of records that have similar characteristics. The node works in the same manner as other automated modeling nodes, allowing you to experiment with multiple combinations of options in a single modeling pass. Models can be compared using basic measures with which to attempt to filter and rank the usefulness of the cluster models, and provide a measure based on the importance of particular fields.

Example

```
node = stream.create("autocluster", "My node")
node.setPropertyValue("ranking_measure", "Silhouette")
node.setPropertyValue("ranking_dataset", "Training")
node.setPropertyValue("enable_silhouette_limit", True)
node.setPropertyValue("silhouette_limit", 5)
```

Table 103. autoclusternode properties

autoclusternode Properties	**Values**	**Property description**
evaluation	*field*	**Note:** Auto Cluster node only. Identifies the field for which an importance value will be calculated. Alternatively, can be used to identify how well the cluster differentiates the value of this field and, therefore; how well the model will predict this field.
ranking_measure	Silhouette Num_clusters Size_smallest_cluster Size_largest_cluster Smallest_to_largest Importance	
ranking_dataset	Training Test	
summary_limit	*integer*	Number of models to list in the report. Specify an integer between 1 and 100.
enable_silhouette_limit	*flag*	
silhouette_limit	*integer*	Integer between 0 and 100.
enable_number_less_limit	*flag*	
number_less_limit	*number*	Real number between 0.0 and 1.0.
enable_number_greater_limit	*flag*	
number_greater_limit	*number*	Integer greater than 0.
enable_smallest_cluster_limit	*flag*	
smallest_cluster_units	Percentage Counts	
smallest_cluster_limit_percentage	*number*	
smallest_cluster_limit_count	*integer*	Integer greater than 0.
enable_largest_cluster_limit	*flag*	
largest_cluster_units	Percentage Counts	
largest_cluster_limit_percentage	*number*	
largest_cluster_limit_count	*integer*	
enable_smallest_largest_limit	*flag*	
smallest_largest_limit	*number*	
enable_importance_limit	*flag*	
importance_limit_condition	Greater_than Less_than	
importance_limit_greater_than	*number*	Integer between 0 and 100.
importance_limit_less_than	*number*	Integer between 0 and 100.

Table 103. autoclusternode properties (continued)

autoclusternode Properties	Values	Property description
<algorithm>	*flag*	Enables or disables the use of a specific algorithm.
<algorithm>.<property>	*string*	Sets a property value for a specific algorithm. See the topic "Setting Algorithm Properties" on page 162 for more information.

autonumericnode Properties

The Auto Numeric node estimates and compares models for continuous numeric range outcomes using a number of different methods. The node works in the same manner as the Auto Classifier node, allowing you to choose the algorithms to use and to experiment with multiple combinations of options in a single modeling pass. Supported algorithms include neural networks, C&R Tree, CHAID, linear regression, generalized linear regression, and support vector machines (SVM). Models can be compared based on correlation, relative error, or number of variables used.

Example

```
node = stream.create("autonumeric", "My node")
node.setPropertyValue("ranking_measure", "Correlation")
node.setPropertyValue("ranking_dataset", "Training")
node.setPropertyValue("enable_correlation_limit", True)
node.setPropertyValue("correlation_limit", 0.8)
node.setPropertyValue("calculate_variable_importance", True)
node.setPropertyValue("neuralnetwork", True)
node.setPropertyValue("chaid", False)
```

Table 104. autonumericnode properties

autonumericnode Properties	Values	Property description
custom_fields	*flag*	If True, custom field settings will be used instead of type node settings.
target	*field*	The Auto Numeric node requires a single target and one or more input fields. Weight and frequency fields can also be specified. See the topic "Common Modeling Node Properties" on page 155 for more information.
inputs	*[field1 ... field2]*	
partition	*field*	
use_frequency	*flag*	
frequency_field	*field*	
use_weight	*flag*	
weight_field	*field*	
use_partitioned_data	*flag*	If a partition field is defined, only the training data are used for model building.
ranking_measure	Correlation NumberOfFields	
ranking_dataset	Test Training	

Table 104. autonumericnode properties (continued)

autonumericnode Properties	Values	Property description
number_of_models	*integer*	Number of models to include in the model nugget. Specify an integer between 1 and 100.
calculate_variable_importance	*flag*	
enable_correlation_limit	*flag*	
correlation_limit	*integer*	
enable_number_of_fields_limit	*flag*	
number_of_fields_limit	*integer*	
enable_relative_error_limit	*flag*	
relative_error_limit	*integer*	
enable_model_build_time_limit	*flag*	
model_build_time_limit	*integer*	
enable_stop_after_time_limit	*flag*	
stop_after_time_limit	*integer*	
stop_if_valid_model	*flag*	
<algorithm>	*flag*	Enables or disables the use of a specific algorithm.
<algorithm>.<property>	*string*	Sets a property value for a specific algorithm. See the topic "Setting Algorithm Properties" on page 162 for more information.

bayesnetnode Properties

The Bayesian Network node enables you to build a probability model by combining observed and recorded evidence with real-world knowledge to establish the likelihood of occurrences. The node focuses on Tree Augmented Naïve Bayes (TAN) and Markov Blanket networks that are primarily used for classification.

Example

```
node = stream.create("bayesnet", "My node")
node.setPropertyValue("continue_training_existing_model", True)
node.setPropertyValue("structure_type", "MarkovBlanket")
node.setPropertyValue("use_feature_selection", True)
# Expert tab
node.setPropertyValue("mode", "Expert")
node.setPropertyValue("all_probabilities", True)
node.setPropertyValue("independence", "Pearson")
```

Table 105. bayesnetnode properties

bayesnetnode Properties	Values	Property description
inputs	*[field1 ... fieldN]*	Bayesian network models use a single target field, and one or more input fields. Continuous fields are automatically binned. See the topic "Common Modeling Node Properties" on page 155 for more information.

Table 105. bayesnetnode properties (continued)

bayesnetnode Properties	Values	Property description
continue_training_existing_model	*flag*	
structure_type	TAN MarkovBlanket	Select the structure to be used when building the Bayesian network.
use_feature_selection	*flag*	
parameter_learning_method	Likelihood Bayes	Specifies the method used to estimate the conditional probability tables between nodes where the values of the parents are known.
mode	Expert Simple	
missing_values	*flag*	
all_probabilities	*flag*	
independence	Likelihood Pearson	Specifies the method used to determine whether paired observations on two variables are independent of each other.
significance_level	*number*	Specifies the cutoff value for determining independence.
maximal_conditioning_set	*number*	Sets the maximal number of conditioning variables to be used for independence testing.
inputs_always_selected	*[field1 ... fieldN]*	Specifies which fields from the dataset are always to be used when building the Bayesian network. **Note:** The target field is always selected.
maximum_number_inputs	*number*	Specifies the maximum number of input fields to be used in building the Bayesian network.
calculate_variable_importance	*flag*	
calculate_raw_propensities	*flag*	
calculate_adjusted_propensities	*flag*	
adjusted_propensity_partition	Test Validation	

buildr Properties

The R Building node enables you to enter custom R script to perform model building and model scoring deployed in IBM SPSS Modeler.

Example

```
node = stream.create("buildr", "My node")
node.setPropertyValue("score_syntax", """
result<-predict(modelerModel,newdata=modelerData)
modelerData<-cbind(modelerData,result)
var1<-c(fieldName="NaPrediction",fieldLabel="",fieldStorage="real",fieldMeasure="",
fieldFormat="",fieldRole="")
modelerDataModel<-data.frame(modelerDataModel,var1)""")
```

Table 106. buildr properties.

buildr Properties	Values	Property description
build_syntax	*string*	R scripting syntax for model building.
score_syntax	*string*	R scripting syntax for model scoring.
convert_flags	StringsAndDoubles LogicalValues	Option to convert flag fields.
convert_datetime	*flag*	Option to convert variables with date or datetime formats to R date/time formats.
convert_datetime_class	POSIXct POSIXlt	Options to specify to what format variables with date or datetime formats are converted.
convert_missing	*flag*	Option to convert missing values to R NA value.
output_html	*flag*	Option to display graphs on a tab in the R model nugget.
output_text	*flag*	Option to write R console text output to a tab in the R model nugget.

c50node Properties

The C5.0 node builds either a decision tree or a rule set. The model works by splitting the sample based on the field that provides the maximum information gain at each level. The target field must be categorical. Multiple splits into more than two subgroups are allowed.

Example

```
node = stream.create("c50", "My node")
# "Model" tab
node.setPropertyValue("use_model_name", False)
node.setPropertyValue("model_name", "C5_Drug")
node.setPropertyValue("use_partitioned_data", True)
node.setPropertyValue("output_type", "DecisionTree")
node.setPropertyValue("use_xval", True)
node.setPropertyValue("xval_num_folds", 3)
node.setPropertyValue("mode", "Expert")
node.setPropertyValue("favor", "Generality")
node.setPropertyValue("min_child_records", 3)
# "Costs" tab
node.setPropertyValue("use_costs", True)
node.setPropertyValue("costs", [["drugA", "drugX", 2]])
```

Table 107. c50node properties

c50node Properties	Values	Property description
target	*field*	C50 models use a single target field and one or more input fields. A weight field can also be specified. See the topic "Common Modeling Node Properties" on page 155 for more information.
output_type	DecisionTree RuleSet	
group_symbolics	*flag*	
use_boost	*flag*	

Table 107. c50node properties (continued)

c50node Properties	Values	Property description
boost_num_trials	*number*	
use_xval	*flag*	
xval_num_folds	*number*	
mode	Simple Expert	
favor	Accuracy Generality	Favor accuracy or generality.
expected_noise	*number*	
min_child_records	*number*	
pruning_severity	*number*	
use_costs	*flag*	
costs	*structured*	This is a structured property.
use_winnowing	*flag*	
use_global_pruning	*flag*	On (True) by default.
calculate_variable_importance	*flag*	
calculate_raw_propensities	*flag*	
calculate_adjusted_propensities	*flag*	
adjusted_propensity_partition	Test Validation	

carmanode Properties

The CARMA model extracts a set of rules from the data without requiring you to specify input or target fields. In contrast to Apriori the CARMA node offers build settings for rule support (support for both antecedent and consequent) rather than just antecedent support. This means that the rules generated can be used for a wider variety of applications—for example, to find a list of products or services (antecedents) whose consequent is the item that you want to promote this holiday season.

Example

```
node = stream.create("carma", "My node")
# "Fields" tab
node.setPropertyValue("custom_fields", True)
node.setPropertyValue("use_transactional_data", True)
node.setPropertyValue("inputs", ["BP", "Cholesterol", "Drug"])
node.setPropertyValue("partition", "Test")
# "Model" tab
node.setPropertyValue("use_model_name", False)
node.setPropertyValue("model_name", "age_bp_drug")
node.setPropertyValue("use_partitioned_data", False)
node.setPropertyValue("min_supp", 10.0)
node.setPropertyValue("min_conf", 30.0)
node.setPropertyValue("max_size", 5)
# Expert Options
node.setPropertyValue("mode", "Expert")
node.setPropertyValue("use_pruning", True)
node.setPropertyValue("pruning_value", 300)
```

```
node.setPropertyValue("vary_support", True)
node.setPropertyValue("estimated_transactions", 30)
node.setPropertyValue("rules_without_antecedents", True)
```

Table 108. carmanode properties

carmanode Properties	Values	Property description
inputs	*[field1 ... fieldn]*	CARMA models use a list of input fields, but no target. Weight and frequency fields are not used. See the topic "Common Modeling Node Properties" on page 155 for more information.
id_field	*field*	Field used as the ID field for model building.
contiguous	*flag*	Used to specify whether IDs in the ID field are contiguous.
use_transactional_data	*flag*	
content_field	*field*	
min_supp	*number(percent)*	Relates to rule support rather than antecedent support. The default is 20%.
min_conf	*number(percent)*	The default is 20%.
max_size	*number*	The default is 10.
mode	Simple Expert	The default is Simple.
exclude_multiple	*flag*	Excludes rules with multiple consequents. The default is False.
use_pruning	*flag*	The default is False.
pruning_value	*number*	The default is 500.
vary_support	*flag*	
estimated_transactions	*integer*	
rules_without_antecedents	*flag*	

cartnode Properties

The Classification and Regression (C&R) Tree node generates a decision tree that allows you to predict or classify future observations. The method uses recursive partitioning to split the training records into segments by minimizing the impurity at each step, where a node in the tree is considered "pure" if 100% of cases in the node fall into a specific category of the target field. Target and input fields can be numeric ranges or categorical (nominal, ordinal, or flags); all splits are binary (only two subgroups).

Example

```
node = stream.createAt("cart", "My node", 200, 100)
# "Fields" tab
node.setPropertyValue("custom_fields", True)
node.setPropertyValue("target", "Drug")
node.setPropertyValue("inputs", ["Age", "BP", "Cholesterol"])
# "Build Options" tab, "Objective" panel
node.setPropertyValue("model_output_type", "InteractiveBuilder")
node.setPropertyValue("use_tree_directives", True)
node.setPropertyValue("tree_directives", """Grow Node Index 0 Children 1 2
Grow Node Index 2 Children 3 4""")
```

```
# "Build Options" tab, "Basics" panel
node.setPropertyValue("prune_tree", False)
node.setPropertyValue("use_std_err_rule", True)
node.setPropertyValue("std_err_multiplier", 3.0)
node.setPropertyValue("max_surrogates", 7)
# "Build Options" tab, "Stopping Rules" panel
node.setPropertyValue("use_percentage", True)
node.setPropertyValue("min_parent_records_pc", 5)
node.setPropertyValue("min_child_records_pc", 3)
# "Build Options" tab, "Advanced" panel
node.setPropertyValue("min_impurity", 0.0003)
node.setPropertyValue("impurity_measure", "Twoing")
# "Model Options" tab
node.setPropertyValue("use_model_name", True)
node.setPropertyValue("model_name", "Cart_Drug")
```

Table 109. cartnode properties

cartnode Properties	**Values**	**Property description**
target	*field*	C&R Tree models require a single target and one or more input fields. A frequency field can also be specified. See the topic "Common Modeling Node Properties" on page 155 for more information.
continue_training_existing_model	*flag*	
objective	Standard Boosting Bagging psm	psm is used for very large datasets, and requires a Server connection.
model_output_type	Single InteractiveBuilder	
use_tree_directives	*flag*	
tree_directives	*string*	Specify directives for growing the tree. Directives can be wrapped in triple quotes to avoid escaping newlines or quotes. Note that directives may be highly sensitive to minor changes in data or modeling options and may not generalize to other datasets.
use_max_depth	Default Custom	
max_depth	*integer*	Maximum tree depth, from 0 to 1000. Used only if use_max_depth = Custom.
prune_tree	*flag*	Prune tree to avoid overfitting.
use_std_err	*flag*	Use maximum difference in risk (in Standard Errors).
std_err_multiplier	*number*	Maximum difference.
max_surrogates	*number*	Maximum surrogates.
use_percentage	*flag*	
min_parent_records_pc	*number*	
min_child_records_pc	*number*	
min_parent_records_abs	*number*	

Table 109. cartnode properties (continued)

cartnode Properties	Values	Property description
min_child_records_abs	*number*	
use_costs	*flag*	
costs	*structured*	Structured property.
priors	Data Equal Custom	
custom_priors	*structured*	Structured property.
adjust_priors	*flag*	
trails	*number*	Number of component models for boosting or bagging.
set_ensemble_method	Voting HighestProbability HighestMeanProbability	Default combining rule for categorical targets.
range_ensemble_method	Mean Median	Default combining rule for continuous targets.
large_boost	*flag*	Apply boosting to very large data sets.
min_impurity	*number*	
impurity_measure	Gini Twoing Ordered	
train_pct	*number*	Overfit prevention set.
set_random_seed	*flag*	Replicate results option.
seed	*number*	
calculate_variable_importance	*flag*	
calculate_raw_propensities	*flag*	
calculate_adjusted_propensities	*flag*	
adjusted_propensity_partition	Test Validation	

chaidnode Properties

The CHAID node generates decision trees using chi-square statistics to identify optimal splits. Unlike the C&R Tree and QUEST nodes, CHAID can generate nonbinary trees, meaning that some splits have more than two branches. Target and input fields can be numeric range (continuous) or categorical. Exhaustive CHAID is a modification of CHAID that does a more thorough job of examining all possible splits but takes longer to compute.

Example

```
filenode = stream.createAt("variablefile", "My node", 100, 100)
filenode.setPropertyValue("full_filename", "$CLEO_DEMOS/DRUG1n")
node = stream.createAt("chaid", "My node", 200, 100)
stream.link(filenode, node)

node.setPropertyValue("custom_fields", True)
node.setPropertyValue("target", "Drug")
node.setPropertyValue("inputs", ["Age", "Na", "K", "Cholesterol", "BP"])
```

```
node.setPropertyValue("use_model_name", True)
node.setPropertyValue("model_name", "CHAID")
node.setPropertyValue("method", "Chaid")
node.setPropertyValue("model_output_type", "InteractiveBuilder")
node.setPropertyValue("use_tree_directives", True)
node.setPropertyValue("tree_directives", "Test")
node.setPropertyValue("split_alpha", 0.03)
node.setPropertyValue("merge_alpha", 0.04)
node.setPropertyValue("chi_square", "Pearson")
node.setPropertyValue("use_percentage", False)
node.setPropertyValue("min_parent_records_abs", 40)
node.setPropertyValue("min_child_records_abs", 30)
node.setPropertyValue("epsilon", 0.003)
node.setPropertyValue("max_iterations", 75)
node.setPropertyValue("split_merged_categories", True)
node.setPropertyValue("bonferroni_adjustment", True)
```

Table 110. chaidnode properties

chaidnode Properties	**Values**	**Property description**
target	*field*	CHAID models require a single target and one or more input fields. A frequency field can also be specified. See the topic "Common Modeling Node Properties" on page 155 for more information.
continue_training_existing_model	*flag*	
objective	Standard Boosting Bagging psm	psm is used for very large datasets, and requires a Server connection.
model_output_type	Single InteractiveBuilder	
use_tree_directives	*flag*	
tree_directives	*string*	
method	Chaid ExhaustiveChaid	
use_max_depth	Default Custom	
max_depth	*integer*	Maximum tree depth, from 0 to 1000. Used only if use_max_depth = Custom.
use_percentage	*flag*	
min_parent_records_pc	*number*	
min_child_records_pc	*number*	
min_parent_records_abs	*number*	
min_child_records_abs	*number*	
use_costs	*flag*	
costs	*structured*	Structured property.
trails	*number*	Number of component models for boosting or bagging.
set_ensemble_method	Voting HighestProbability HighestMeanProbability	Default combining rule for categorical targets.

Table 110. chaidnode properties (continued)

chaidnode Properties	Values	Property description
range_ensemble_method	Mean Median	Default combining rule for continuous targets.
large_boost	*flag*	Apply boosting to very large data sets.
split_alpha	*number*	Significance level for splitting.
merge_alpha	*number*	Significance level for merging.
bonferroni_adjustment	*flag*	Adjust significance values using Bonferroni method.
split_merged_categories	*flag*	Allow resplitting of merged categories.
chi_square	Pearson LR	Method used to calculate the chi-square statistic: Pearson or Likelihood Ratio
epsilon	*number*	Minimum change in expected cell frequencies..
max_iterations	*number*	Maximum iterations for convergence.
set_random_seed	*integer*	
seed	*number*	
calculate_variable_importance	*flag*	
calculate_raw_propensities	*flag*	
calculate_adjusted_propensities	*flag*	
adjusted_propensity_partition	Test Validation	
maximum_number_of_models	*integer*	

coxregnode Properties

The Cox regression node enables you to build a survival model for time-to-event data in the presence of censored records. The model produces a survival function that predicts the probability that the event of interest has occurred at a given time (*t*) for given values of the input variables.

Example

```
node = stream.create("coxreg", "My node")
node.setPropertyValue("survival_time", "tenure")
node.setPropertyValue("method", "BackwardsStepwise")
# Expert tab
node.setPropertyValue("mode", "Expert")
node.setPropertyValue("removal_criterion", "Conditional")
node.setPropertyValue("survival", True)
```

Table 111. coxregnode properties

coxregnode Properties	Values	Property description
survival_time	*field*	Cox regression models require a single field containing the survival times.

Table 111. coxregnode properties (continued)

coxregnode Properties	Values	Property description
target	*field*	Cox regression models require a single target field, and one or more input fields. See the topic "Common Modeling Node Properties" on page 155 for more information.
method	Enter Stepwise BackwardsStepwise	
groups	*field*	
model_type	MainEffects Custom	
custom_terms	[*"BP*Sex" "BP*Age"*]	
mode	Expert Simple	
max_iterations	*number*	
p_converge	1.0E-4 1.0E-5 1.0E-6 1.0E-7 1.0E-8 0	
p_converge	1.0E-4 1.0E-5 1.0E-6 1.0E-7 1.0E-8 0	
l_converge	1.0E-1 1.0E-2 1.0E-3 1.0E-4 1.0E-5 0	
removal_criterion	LR Wald Conditional	
probability_entry	*number*	
probability_removal	*number*	
output_display	EachStep LastStep	
ci_enable	*flag*	
ci_value	90 95 99	
correlation	*flag*	
display_baseline	*flag*	
survival	*flag*	
hazard	*flag*	

Table 111. coxregnode properties (continued)

coxregnode Properties	Values	Property description
log_minus_log	*flag*	
one_minus_survival	*flag*	
separate_line	*field*	
value	*number* or *string*	If no value is specified for a field, the default option "Mean" will be used for that field.

decisionlistnode Properties

The Decision List node identifies subgroups, or segments, that show a higher or lower likelihood of a given binary outcome relative to the overall population. For example, you might look for customers who are unlikely to churn or are most likely to respond favorably to a campaign. You can incorporate your business knowledge into the model by adding your own custom segments and previewing alternative models side by side to compare the results. Decision List models consist of a list of rules in which each rule has a condition and an outcome. Rules are applied in order, and the first rule that matches determines the outcome.

Example

```
node = stream.create("decisionlist", "My node")
node.setPropertyValue("search_direction", "Down")
node.setPropertyValue("target_value", 1)
node.setPropertyValue("max_rules", 4)
node.setPropertyValue("min_group_size_pct", 15)
```

Table 112. decisionlistnode properties

decisionlistnode Properties	Values	Property description
target	*field*	Decision List models use a single target and one or more input fields. A frequency field can also be specified. See the topic "Common Modeling Node Properties" on page 155 for more information.
model_output_type	Model InteractiveBuilder	
search_direction	Up Down	Relates to finding segments; where Up is the equivalent of High Probability, and Down is the equivalent of Low Probability..
target_value	*string*	If not specified, will assume true value for flags.
max_rules	*integer*	The maximum number of segments excluding the remainder.
min_group_size	*integer*	Minimum segment size.
min_group_size_pct	*number*	Minimum segment size as a percentage.
confidence_level	*number*	Minimum threshold that an input field has to improve the likelihood of response (give lift), to make it worth adding to a segment definition.
max_segments_per_rule	*integer*	

Table 112. decisionlistnode properties (continued)

decisionlistnode Properties	Values	Property description
mode	Simple Expert	
bin_method	EqualWidth EqualCount	
bin_count	*number*	
max_models_per_cycle	*integer*	Search width for lists.
max_rules_per_cycle	*integer*	Search width for segment rules.
segment_growth	*number*	
include_missing	*flag*	
final_results_only	*flag*	
reuse_fields	*flag*	Allows attributes (input fields which appear in rules) to be re-used.
max_alternatives	*integer*	
calculate_raw_propensities	*flag*	
calculate_adjusted_propensities	*flag*	
adjusted_propensity_partition	Test Validation	

discriminantnode Properties

Discriminant analysis makes more stringent assumptions than logistic regression but can be a valuable alternative or supplement to a logistic regression analysis when those assumptions are met.

Example

```
node = stream.create("discriminant", "My node")
node.setPropertyValue("target", "custcat")
node.setPropertyValue("use_partitioned_data", False)
node.setPropertyValue("method", "Stepwise")
```

Table 113. discriminantnode properties

discriminantnode Properties	Values	Property description
target	*field*	Discriminant models require a single target field and one or more input fields. Weight and frequency fields are not used. See the topic "Common Modeling Node Properties" on page 155 for more information.
method	Enter Stepwise	
mode	Simple Expert	
prior_probabilities	AllEqual ComputeFromSizes	

Table 113. discriminantnode properties (continued)

discriminantnode Properties	**Values**	**Property description**
covariance_matrix	WithinGroups SeparateGroups	
means	*flag*	Statistics options in the Advanced Output dialog box.
univariate_anovas	*flag*	
box_m	*flag*	
within_group_covariance	*flag*	
within_groups_correlation	*flag*	
separate_groups_covariance	*flag*	
total_covariance	*flag*	
fishers	*flag*	
unstandardized	*flag*	
casewise_results	*flag*	Classification options in the Advanced Output dialog box.
limit_to_first	*number*	Default value is 10.
summary_table	*flag*	
leave_one_classification	*flag*	
combined_groups	*flag*	
separate_groups_covariance	*flag*	Matrices option **Separate-groups covariance**.
territorial_map	*flag*	
combined_groups	*flag*	Plot option **Combined-groups**.
separate_groups	*flag*	Plot option **Separate-groups**.
summary_of_steps	*flag*	
F_pairwise	*flag*	
stepwise_method	WilksLambda UnexplainedVariance MahalanobisDistance SmallestF RaosV	
V_to_enter	*number*	
criteria	UseValue UseProbability	
F_value_entry	*number*	Default value is 3.84.
F_value_removal	*number*	Default value is 2.71.
probability_entry	*number*	Default value is 0.05.
probability_removal	*number*	Default value is 0.10.
calculate_variable_importance	*flag*	
calculate_raw_propensities	*flag*	
calculate_adjusted_propensities	*flag*	
adjusted_propensity_partition	Test Validation	

factornode Properties

The PCA/Factor node provides powerful data-reduction techniques to reduce the complexity of your data. Principal components analysis (PCA) finds linear combinations of the input fields that do the best job of capturing the variance in the entire set of fields, where the components are orthogonal (perpendicular) to each other. Factor analysis attempts to identify underlying factors that explain the pattern of correlations within a set of observed fields. For both approaches, the goal is to find a small number of derived fields that effectively summarizes the information in the original set of fields.

Example

```
node = stream.create("factor", "My node")
# "Fields" tab
node.setPropertyValue("custom_fields", True)
node.setPropertyValue("inputs", ["BP", "Na", "K"])
node.setPropertyValue("partition", "Test")
# "Model" tab
node.setPropertyValue("use_model_name", True)
node.setPropertyValue("model_name", "Factor_Age")
node.setPropertyValue("use_partitioned_data", False)
node.setPropertyValue("method", "GLS")
# Expert options
node.setPropertyValue("mode", "Expert")
node.setPropertyValue("complete_records", True)
node.setPropertyValue("matrix", "Covariance")
node.setPropertyValue("max_iterations", 30)
node.setPropertyValue("extract_factors", "ByFactors")
node.setPropertyValue("min_eigenvalue", 3.0)
node.setPropertyValue("max_factor", 7)
node.setPropertyValue("sort_values", True)
node.setPropertyValue("hide_values", True)
node.setPropertyValue("hide_below", 0.7)
# "Rotation" section
node.setPropertyValue("rotation", "DirectOblimin")
node.setPropertyValue("delta", 0.3)
node.setPropertyValue("kappa", 7.0)
```

Table 114. factornode properties

factornode Properties	**Values**	**Property description**
inputs	[*field1 ... fieldN*]	PCA/Factor models use a list of input fields, but no target. Weight and frequency fields are not used. See the topic "Common Modeling Node Properties" on page 155 for more information.
method	PC ULS GLS ML PAF Alpha Image	
mode	Simple Expert	
max_iterations	*number*	
complete_records	*flag*	

Table 114. factornode properties (continued)

factornode Properties	Values	Property description
matrix	Correlation Covariance	
extract_factors	ByEigenvalues ByFactors	
min_eigenvalue	*number*	
max_factor	*number*	
rotation	None Varimax DirectOblimin Equamax Quartimax Promax	
delta	*number*	If you select DirectOblimin as your rotation data type, you can specify a value for delta. If you do not specify a value, the default value for delta is used.
kappa	*number*	If you select Promax as your rotation data type, you can specify a value for kappa. If you do not specify a value, the default value for kappa is used.
sort_values	*flag*	
hide_values	*flag*	
hide_below	*number*	

featureselectionnode Properties

The Feature Selection node screens input fields for removal based on a set of criteria (such as the percentage of missing values); it then ranks the importance of remaining inputs relative to a specified target. For example, given a data set with hundreds of potential inputs, which are most likely to be useful in modeling patient outcomes?

Example

```
node = stream.create("featureselection", "My node")
node.setPropertyValue("screen_single_category", True)
node.setPropertyValue("max_single_category", 95)
node.setPropertyValue("screen_missing_values", True)
node.setPropertyValue("max_missing_values", 80)
node.setPropertyValue("criteria", "Likelihood")
node.setPropertyValue("unimportant_below", 0.8)
node.setPropertyValue("important_above", 0.9)
node.setPropertyValue("important_label", "Check Me Out!")
node.setPropertyValue("selection_mode", "TopN")
node.setPropertyValue("top_n", 15)
```

For a more detailed example that creates and applies a Feature Selection model, see in.

Table 115. featureselectionnode properties

featureselectionnode Properties	**Values**	**Property description**
target	*field*	Feature Selection models rank predictors relative to the specified target. Weight and frequency fields are not used. See the topic "Common Modeling Node Properties" on page 155 for more information.
screen_single_category	*flag*	If True, screens fields that have too many records falling into the same category relative to the total number of records.
max_single_category	*number*	Specifies the threshold used when screen_single_category is True.
screen_missing_values	*flag*	If True, screens fields with too many missing values, expressed as a percentage of the total number of records.
max_missing_values	*number*	
screen_num_categories	*flag*	If True, screens fields with too many categories relative to the total number of records.
max_num_categories	*number*	
screen_std_dev	*flag*	If True, screens fields with a standard deviation of less than or equal to the specified minimum.
min_std_dev	*number*	
screen_coeff_of_var	*flag*	If True, screens fields with a coefficient of variance less than or equal to the specified minimum.
min_coeff_of_var	*number*	
criteria	Pearson Likelihood CramersV Lambda	When ranking categorical predictors against a categorical target, specifies the measure on which the importance value is based.
unimportant_below	*number*	Specifies the threshold *p* values used to rank variables as important, marginal, or unimportant. Accepts values from 0.0 to 1.0.
important_above	*number*	Accepts values from 0.0 to 1.0.
unimportant_label	*string*	Specifies the label for the unimportant ranking.
marginal_label	*string*	
important_label	*string*	
selection_mode	ImportanceLevel ImportanceValue TopN	
select_important	*flag*	When selection_mode is set to ImportanceLevel, specifies whether to select important fields.

Table 115. featureselectionnode properties (continued)

featureselectionnode Properties	Values	Property description
select_marginal	*flag*	When selection_mode is set to ImportanceLevel, specifies whether to select marginal fields.
select_unimportant	*flag*	When selection_mode is set to ImportanceLevel, specifies whether to select unimportant fields.
importance_value	*number*	When selection_mode is set to ImportanceValue, specifies the cutoff value to use. Accepts values from 0 to 100.
top_n	*integer*	When selection_mode is set to TopN, specifies the cutoff value to use. Accepts values from 0 to 1000.

genlinnode Properties

The Generalized Linear model expands the general linear model so that the dependent variable is linearly related to the factors and covariates through a specified link function. Moreover, the model allows for the dependent variable to have a non-normal distribution. It covers the functionality of a wide number of statistical models, including linear regression, logistic regression, loglinear models for count data, and interval-censored survival models.

Example

```
node = stream.create("genlin", "My node")
node.setPropertyValue("model_type", "MainAndAllTwoWayEffects")
node.setPropertyValue("offset_type", "Variable")
node.setPropertyValue("offset_field", "Claimant")
```

Table 116. genlinnode properties

genlinnode Properties	Values	Property description
target	*field*	Generalized Linear models require a single target field which must be a nominal or flag field, and one or more input fields. A weight field can also be specified. See the topic "Common Modeling Node Properties" on page 155 for more information.
use_weight	*flag*	
weight_field	*field*	Field type is only continuous.
target_represents_trials	*flag*	
trials_type	Variable FixedValue	
trials_field	*field*	Field type is continuous, flag, or ordinal.
trials_number	*number*	Default value is 10.
model_type	MainEffects MainAndAllTwoWayEffects	
offset_type	Variable FixedValue	

Table 116. genlinnode properties (continued)

genlinnode Properties	Values	Property description
offset_field	*field*	Field type is only continuous.
offset_value	*number*	Must be a real number.
base_category	Last First	
include_intercept	*flag*	
mode	Simple Expert	
distribution	BINOMIAL GAMMA IGAUSS NEGBIN NORMAL POISSON TWEEDIE MULTINOMIAL	IGAUSS: Inverse Gaussian. NEGBIN: Negative binomial.
negbin_para_type	Specify Estimate	
negbin_parameter	*number*	Default value is 1. Must contain a non-negative real number.
tweedie_parameter	*number*	
link_function	IDENTITY CLOGLOG LOG LOGC LOGIT NEGBIN NLOGLOG ODDSPOWER PROBIT POWER CUMCAUCHIT CUMCLOGLOG CUMLOGIT CUMNLOGLOG CUMPROBIT	CLOGLOG: Complementary log-log. LOGC: log complement. NEGBIN: Negative binomial. NLOGLOG: Negative log-log. CUMCAUCHIT: Cumulative cauchit. CUMCLOGLOG: Cumulative complementary log-log. CUMLOGIT: Cumulative logit. CUMNLOGLOG: Cumulative negative log-log. CUMPROBIT: Cumulative probit.
power	*number*	Value must be real, nonzero number.
method	Hybrid Fisher NewtonRaphson	
max_fisher_iterations	*number*	Default value is 1; only positive integers allowed.
scale_method	MaxLikelihoodEstimate Deviance PearsonChiSquare FixedValue	
scale_value	*number*	Default value is 1; must be greater than 0.
covariance_matrix	ModelEstimator RobustEstimator	

Table 116. genlinnode properties (continued)

genlinnode Properties	**Values**	**Property description**
max_iterations	*number*	Default value is 100; non-negative integers only.
max_step_halving	*number*	Default value is 5; positive integers only.
check_separation	*flag*	
start_iteration	*number*	Default value is 20; only positive integers allowed.
estimates_change	*flag*	
estimates_change_min	*number*	Default value is 1E-006; only positive numbers allowed.
estimates_change_type	Absolute Relative	
loglikelihood_change	*flag*	
loglikelihood_change_min	*number*	Only positive numbers allowed.
loglikelihood_change_type	Absolute Relative	
hessian_convergence	*flag*	
hessian_convergence_min	*number*	Only positive numbers allowed.
hessian_convergence_type	Absolute Relative	
case_summary	*flag*	
contrast_matrices	*flag*	
descriptive_statistics	*flag*	
estimable_functions	*flag*	
model_info	*flag*	
iteration_history	*flag*	
goodness_of_fit	*flag*	
print_interval	*number*	Default value is 1; must be positive integer.
model_summary	*flag*	
lagrange_multiplier	*flag*	
parameter_estimates	*flag*	
include_exponential	*flag*	
covariance_estimates	*flag*	
correlation_estimates	*flag*	
analysis_type	TypeI TypeIII TypeIAndTypeIII	
statistics	Wald LR	
citype	Wald Profile	
tolerancelevel	*number*	Default value is 0.0001.
confidence_interval	*number*	Default value is 95.

Table 116. genlinnode properties (continued)

genlinnode Properties	Values	Property description
loglikelihood_function	Full Kernel	
singularity_tolerance	1E-007 1E-008 1E-009 1E-010 1E-011 1E-012	
value_order	Ascending Descending DataOrder	
calculate_variable_importance	*flag*	
calculate_raw_propensities	*flag*	
calculate_adjusted_propensities	*flag*	
adjusted_propensity_partition	Test Validation	

glmmnode Properties

A generalized linear mixed model (GLMM) extends the linear model so that the target can have a non-normal distribution, is linearly related to the factors and covariates via a specified link function, and so that the observations can be correlated. Generalized linear mixed models cover a wide variety of models, from simple linear regression to complex multilevel models for non-normal longitudinal data.

Table 117. glmmnode properties.

glmmnode Properties	Values	Property description
residual_subject_spec	*structured*	The combination of values of the specified categorical fields that uniquely define subjects within the data set
repeated_measures	*structured*	Fields used to identify repeated observations.
residual_group_spec	[*field1 ... fieldN*]	Fields that define independent sets of repeated effects covariance parameters.
residual_covariance_type	Diagonal AR1 ARMA11 COMPOUND_SYMMETRY IDENTITY TOEPLITZ UNSTRUCTURED VARIANCE_COMPONENTS	Specifies covariance structure for residuals.
custom_target	*flag*	Indicates whether to use target defined in upstream node (false) or custom target specified by target_field (true).
target_field	*field*	Field to use as target if custom_target is true.

Table 117. glmmnode properties (continued).

glmmnode Properties	Values	Property description
use_trials	*flag*	Indicates whether additional field or value specifying number of trials is to be used when target response is a number of events occurring in a set of trials. Default is false.
use_field_or_value	Field Value	Indicates whether field (default) or value is used to specify number of trials.
trials_field	*field*	Field to use to specify number of trials.
trials_value	*integer*	Value to use to specify number of trials. If specified, minimum value is 1.
use_custom_target_reference	*flag*	Indicates whether custom reference category is to be used for a categorical target. Default is false.
target_reference_value	*string*	Reference category to use if use_custom_target_reference is true.
dist_link_combination	Nominal Logit GammaLog BinomialLogit PoissonLog BinomialProbit NegbinLog BinomialLogC Custom	Common models for distribution of values for target. Choose Custom to specify a distribution from the list provided bytarget_distribution.
target_distribution	Normal Binomial Multinomial Gamma Inverse NegativeBinomial Poisson	Distribution of values for target when dist_link_combination is Custom.
link_function_type	Identity LogC Log CLOGLOG Logit NLOGLOG PROBIT POWER CAUCHIT	Link function to relate target values to predictors. If target_distribution is Binomial you can use any of the listed link functions. If target_distribution is Multinomial you can use CLOGLOG, CAUCHIT, LOGIT, NLOGLOG, or PROBIT. If target_distribution is anything other than Binomial or Multinomial you can use IDENTITY, LOG, or POWER.
link_function_param	*number*	Link function parameter value to use. Only applicable if normal_link_function or link_function_type is POWER.
use_predefined_inputs	*flag*	Indicates whether fixed effect fields are to be those defined upstream as input fields (true) or those from fixed_effects_list (false). Default is false.
fixed_effects_list	*structured*	If use_predefined_inputs is false, specifies the input fields to use as fixed effect fields.

Table 117. glmmnode properties (continued).

glmmnode Properties	Values	Property description
use_intercept	*flag*	If true (default), includes the intercept in the model.
random_effects_list	*structured*	List of fields to specify as random effects.
regression_weight_field	*field*	Field to use as analysis weight field.
use_offset	None offset_value offset_field	Indicates how offset is specified. Value None means no offset is used.
offset_value	*number*	Value to use for offset if use_offset is set to offset_value.
offset_field	*field*	Field to use for offset value if use_offset is set to offset_field.
target_category_order	Ascending Descending Data	Sorting order for categorical targets. Value Data specifies using the sort order found in the data. Default is Ascending.
inputs_category_order	Ascending Descending Data	Sorting order for categorical predictors. Value Data specifies using the sort order found in the data. Default is Ascending.
max_iterations	*integer*	Maximum number of iterations the algorithm will perform. A non-negative integer; default is 100.
confidence_level	*integer*	Confidence level used to compute interval estimates of the model coefficients. A non-negative integer; maximum is 100, default is 95.
degrees_of_freedom_method	Fixed Varied	Specifies how degrees of freedom are computed for significance test.
test_fixed_effects_coeffecients	Model Robust	Method for computing the parameter estimates covariance matrix.
use_p_converge	*flag*	Option for parameter convergence.
p_converge	*number*	Blank, or any positive value.
p_converge_type	Absolute Relative	
use_l_converge	*flag*	Option for log-likelihood convergence.
l_converge	*number*	Blank, or any positive value.
l_converge_type	Absolute Relative	
use_h_converge	*flag*	Option for Hessian convergence.
h_converge	*number*	Blank, or any positive value.
h_converge_type	Absolute Relative	
max_fisher_steps	*integer*	
singularity_tolerance	*number*	
use_model_name	*flag*	Indicates whether to specify a custom name for the model (true) or to use the system-generated name (false). Default is false.

Table 117. glmmnode properties (continued).

glmmnode Properties	Values	Property description
model_name	*string*	If use_model_name is true, specifies the model name to use.
confidence	onProbability onIncrease	Basis for computing scoring confidence value: highest predicted probability, or difference between highest and second highest predicted probabilities.
score_category_probabilities	*flag*	If true, produces predicted probabilities for categorical targets. Default is false.
max_categories	*integer*	If score_category_probabilities is true, specifies maximum number of categories to save.
score_propensity	*flag*	If true, produces propensity scores for flag target fields that indicate likelihood of "true" outcome for field.
emeans	*structure*	For each categorical field from the fixed effects list, specifies whether to produce estimated marginal means.
covariance_list	*structure*	For each continuous field from the fixed effects list, specifies whether to use the mean or a custom value when computing estimated marginal means.
mean_scale	Original Transformed	Specifies whether to compute estimated marginal means based on the original scale of the target (default) or on the link function transformation.
comparison_adjustment_method	LSD SEQBONFERRONI SEQSIDAK	Adjustment method to use when performing hypothesis tests with multiple contrasts.

kmeansnode Properties

The K-Means node clusters the data set into distinct groups (or clusters). The method defines a fixed number of clusters, iteratively assigns records to clusters, and adjusts the cluster centers until further refinement can no longer improve the model. Instead of trying to predict an outcome, *k*-means uses a process known as unsupervised learning to uncover patterns in the set of input fields.

Example

```
node = stream.create("kmeans", "My node")
# "Fields" tab
node.setPropertyValue("custom_fields", True)
node.setPropertyValue("inputs", ["Cholesterol", "BP", "Drug", "Na", "K", "Age"])
# "Model" tab
node.setPropertyValue("use_model_name", True)
node.setPropertyValue("model_name", "Kmeans_allinputs")
node.setPropertyValue("num_clusters", 9)
node.setPropertyValue("gen_distance", True)
node.setPropertyValue("cluster_label", "Number")
node.setPropertyValue("label_prefix", "Kmeans_")
node.setPropertyValue("optimize", "Speed")
# "Expert" tab
```

```
node.setPropertyValue("mode", "Expert")
node.setPropertyValue("stop_on", "Custom")
node.setPropertyValue("max_iterations", 10)
node.setPropertyValue("tolerance", 3.0)
node.setPropertyValue("encoding_value", 0.3)
```

Table 118. kmeansnode properties

kmeansnode Properties	Values	Property description
inputs	[*field1 ... fieldN*]	K-means models perform cluster analysis on a set of input fields but do not use a target field. Weight and frequency fields are not used. See the topic "Common Modeling Node Properties" on page 155 for more information.
num_clusters	*number*	
gen_distance	*flag*	
cluster_label	String Number	
label_prefix	*string*	
mode	Simple Expert	
stop_on	Default Custom	
max_iterations	*number*	
tolerance	*number*	
encoding_value	*number*	
optimize	Speed Memory	Use to specify whether model building should be optimized for speed or for memory.

knnnode Properties

The *k*-Nearest Neighbor (KNN) node associates a new case with the category or value of the *k* objects nearest to it in the predictor space, where *k* is an integer. Similar cases are near each other and dissimilar cases are distant from each other.

Example

```
node = stream.create("knn", "My node")
# Objectives tab
node.setPropertyValue("objective", "Custom")
# Settings tab - Neighbors panel
node.setPropertyValue("automatic_k_selection", False)
node.setPropertyValue("fixed_k", 2)
node.setPropertyValue("weight_by_importance", True)
# Settings tab - Analyze panel
node.setPropertyValue("save_distances", True)
```

Table 119. knnnode properties

knnnode Properties	Values	Property description
analysis	PredictTarget IdentifyNeighbors	
objective	Balance Speed Accuracy Custom	
normalize_ranges	*flag*	
use_case_labels	*flag*	Check box to enable next option.
case_labels_field	*field*	
identify_focal_cases	*flag*	Check box to enable next option.
focal_cases_field	*field*	
automatic_k_selection	*flag*	
fixed_k	*integer*	Enabled only if automatic_k_selectio is False.
minimum_k	*integer*	Enabled only if automatic_k_selectio is True.
maximum_k	*integer*	
distance_computation	Euclidean CityBlock	
weight_by_importance	*flag*	
range_predictions	Mean Median	
perform_feature_selection	*flag*	
forced_entry_inputs	[*field1 ... fieldN*]	
stop_on_error_ratio	*flag*	
number_to_select	*integer*	
minimum_change	*number*	
validation_fold_assign_by_field	*flag*	
number_of_folds	*integer*	Enabled only if validation_fold_assign_by_field is False
set_random_seed	*flag*	
random_seed	*number*	
folds_field	*field*	Enabled only if validation_fold_assign_by_field is True
all_probabilities	*flag*	
save_distances	*flag*	
calculate_raw_propensities	*flag*	
calculate_adjusted_propensities	*flag*	
adjusted_propensity_partition	Test Validation	

kohonennode Properties

The Kohonen node generates a type of neural network that can be used to cluster the data set into distinct groups. When the network is fully trained, records that are similar should be close together on the output map, while records that are different will be far apart. You can look at the number of observations captured by each unit in the model nugget to identify the strong units. This may give you a sense of the appropriate number of clusters.

Example

```
node = stream.create("kohonen", "My node")
# "Model" tab
node.setPropertyValue("use_model_name", False)
node.setPropertyValue("model_name", "Symbolic Cluster")
node.setPropertyValue("stop_on", "Time")
node.setPropertyValue("time", 1)
node.setPropertyValue("set_random_seed", True)
node.setPropertyValue("random_seed", 12345)
node.setPropertyValue("optimize", "Speed")
# "Expert" tab
node.setPropertyValue("mode", "Expert")
node.setPropertyValue("width", 3)
node.setPropertyValue("length", 3)
node.setPropertyValue("decay_style", "Exponential")
node.setPropertyValue("phase1_neighborhood", 3)
node.setPropertyValue("phase1_eta", 0.5)
node.setPropertyValue("phase1_cycles", 10)
node.setPropertyValue("phase2_neighborhood", 1)
node.setPropertyValue("phase2_eta", 0.2)
node.setPropertyValue("phase2_cycles", 75)
```

Table 120. kohonennode properties

kohonennode Properties	Values	Property description
inputs	[*field1 ... fieldN*]	Kohonen models use a list of input fields, but no target. Frequency and weight fields are not used. See the topic "Common Modeling Node Properties" on page 155 for more information.
continue	*flag*	
show_feedback	*flag*	
stop_on	Default Time	
time	*number*	
optimize	Speed Memory	Use to specify whether model building should be optimized for speed or for memory.
cluster_label	*flag*	
mode	Simple Expert	
width	*number*	
length	*number*	
decay_style	Linear Exponential	
phase1_neighborhood	*number*	

Table 120. kohonennode properties (continued)

kohonennode Properties	Values	Property description
phase1_eta	*number*	
phase1_cycles	*number*	
phase2_neighborhood	*number*	
phase2_eta	*number*	
phase2_cycles	*number*	

linearnode Properties

Linear regression models predict a continuous target based on linear relationships between the target and one or more predictors.

Example

```
node = stream.create("linear", "My node")
# Build Options tab - Objectives panel
node.setPropertyValue("objective", "Standard")
# Build Options tab - Model Selection panel
node.setPropertyValue("model_selection", "BestSubsets")
node.setPropertyValue("criteria_best_subsets", "ASE")
# Build Options tab - Ensembles panel
node.setPropertyValue("combining_rule_categorical", "HighestMeanProbability")
```

Table 121. linearnode properties.

linearnode Properties	Values	Property description
target	*field*	Specifies a single target field.
inputs	[*field1 ... fieldN*]	Predictor fields used by the model.
continue_training_existing_model	*flag*	
objective	Standard Bagging Boosting psm	psm is used for very large datasets, and requires a Server connection.
use_auto_data_preparation	*flag*	
confidence_level	*number*	
model_selection	ForwardStepwise BestSubsets None	
criteria_forward_stepwise	AICC Fstatistics AdjustedRSquare ASE	
probability_entry	*number*	
probability_removal	*number*	
use_max_effects	*flag*	
max_effects	*number*	

Table 121. linearnode properties (continued).

linearnode Properties	Values	Property description
use_max_steps	*flag*	
max_steps	*number*	
criteria_best_subsets	AICC AdjustedRSquare ASE	
combining_rule_continuous	Mean Median	
component_models_n	*number*	
use_random_seed	*flag*	
random_seed	*number*	
use_custom_model_name	*flag*	
custom_model_name	*string*	
use_custom_name	*flag*	
custom_name	*string*	
tooltip	*string*	
keywords	*string*	
annotation	*string*	

linearasnode Properties

Linear regression models predict a continuous target based on linear relationships between the target and one or more predictors.

Table 122. linearasnode properties

linearasnode Properties	Values	Property description
target	*field*	Specifies a single target field.
inputs	[*field1 ... fieldN*]	Predictor fields used by the model.
weight_field	*field*	Analysis field used by the model.
custom_fields	*flag*	The default value is TRUE.
intercept	*flag*	The default value is TRUE.
detect_2way_interaction	*flag*	Whether or not to consider two way interaction. The default value is TRUE.
cin	*number*	The interval of confidence used to compute estimates of the model coefficients. Specify a value greater than 0 and less than 100. The default value is 95.
factor_order	ascending descending	The sort order for categorical predictors. The default value is ascending.
var_select_method	ForwardStepwise BestSubsets none	The model selection method to use. The default value is ForwardStepwise.

Table 122. linearasnode properties (continued)

linearasnode Properties	Values	Property description
criteria_for_forward_stepwise	AICC Fstatistics AdjustedRSquare ASE	The statistic used to determine whether an effect should be added to or removed from the model. The default value is AdjustedRSquare.
pin	*number*	The effect that has the smallest p-value less than this specified pin threshold is added to the model. The default value is 0.05.
pout	*number*	Any effects in the model with a p-value greater than this specified pout threshold are removed. The default value is 0.10.
use_custom_max_effects	*flag*	Whether to use max number of effects in the final model. The default value is FALSE.
max_effects	*number*	Maximum number of effects to use in the final model. The default value is 1.
use_custom_max_steps	*flag*	Whether to use the maximum number of steps. The default value is FALSE.
max_steps	*number*	The maximum number of steps before the stepwise algorithm stops. The default value is 1.
criteria_for_best_subsets	AICC AdjustedRSquare ASE	The mode of criteria to use. The default value is AdjustedRSquare.

logregnode Properties

Logistic regression is a statistical technique for classifying records based on values of input fields. It is analogous to linear regression but takes a categorical target field instead of a numeric range.

Multinomial Example

```
node = stream.create("logreg", "My node")
# "Fields" tab
node.setPropertyValue("custom_fields", True)
node.setPropertyValue("target", "Drug")
node.setPropertyValue("inputs", ["BP", "Cholesterol", "Age"])
node.setPropertyValue("partition", "Test")
# "Model" tab
node.setPropertyValue("use_model_name", True)
node.setPropertyValue("model_name", "Log_reg Drug")
node.setPropertyValue("use_partitioned_data", True)
node.setPropertyValue("method", "Stepwise")
node.setPropertyValue("logistic_procedure", "Multinomial")
node.setPropertyValue("multinomial_base_category", "BP")
node.setPropertyValue("model_type", "FullFactorial")
node.setPropertyValue("custom_terms", [["BP", "Sex"], ["Age"], ["Na", "K"]])
node.setPropertyValue("include_constant", False)
# "Expert" tab
node.setPropertyValue("mode", "Expert")
node.setPropertyValue("scale", "Pearson")
node.setPropertyValue("scale_value", 3.0)
```

```
node.setPropertyValue("all_probabilities", True)
node.setPropertyValue("tolerance", "1.0E-7")
# "Convergence..." section
node.setPropertyValue("max_iterations", 50)
node.setPropertyValue("max_steps", 3)
node.setPropertyValue("l_converge", "1.0E-3")
node.setPropertyValue("p_converge", "1.0E-7")
node.setPropertyValue("delta", 0.03)
# "Output..." section
node.setPropertyValue("summary", True)
node.setPropertyValue("likelihood_ratio", True)
node.setPropertyValue("asymptotic_correlation", True)
node.setPropertyValue("goodness_fit", True)
node.setPropertyValue("iteration_history", True)
node.setPropertyValue("history_steps", 3)
node.setPropertyValue("parameters", True)
node.setPropertyValue("confidence_interval", 90)
node.setPropertyValue("asymptotic_covariance", True)
node.setPropertyValue("classification_table", True)
# "Stepping" options
node.setPropertyValue("min_terms", 7)
node.setPropertyValue("use_max_terms", True)
node.setPropertyValue("max_terms", 10)
node.setPropertyValue("probability_entry", 3)
node.setPropertyValue("probability_removal", 5)
node.setPropertyValue("requirements", "Containment")
```

Binomial Example

```
node = stream.create("logreg", "My node")
# "Fields" tab
node.setPropertyValue("custom_fields", True)
node.setPropertyValue("target", "Cholesterol")
node.setPropertyValue("inputs", ["BP", "Drug", "Age"])
node.setPropertyValue("partition", "Test")
# "Model" tab
node.setPropertyValue("use_model_name", False)
node.setPropertyValue("model_name", "Log_reg Cholesterol")
node.setPropertyValue("multinomial_base_category", "BP")
node.setPropertyValue("use_partitioned_data", True)
node.setPropertyValue("binomial_method", "Forwards")
node.setPropertyValue("logistic_procedure", "Binomial")
node.setPropertyValue("binomial_categorical_input", "Sex")
node.setKeyedPropertyValue("binomial_input_contrast", "Sex", "Simple")
node.setKeyedPropertyValue("binomial_input_category", "Sex", "Last")
node.setPropertyValue("include_constant", False)
# "Expert" tab
node.setPropertyValue("mode", "Expert")
node.setPropertyValue("scale", "Pearson")
node.setPropertyValue("scale_value", 3.0)
node.setPropertyValue("all_probabilities", True)
node.setPropertyValue("tolerance", "1.0E-7")
# "Convergence..." section
node.setPropertyValue("max_iterations", 50)
node.setPropertyValue("l_converge", "1.0E-3")
node.setPropertyValue("p_converge", "1.0E-7")
# "Output..." section
node.setPropertyValue("binomial_output_display", "at_each_step")
node.setPropertyValue("binomial_goodness_of_fit", True)
node.setPropertyValue("binomial_iteration_history", True)
node.setPropertyValue("binomial_parameters", True)
```

```
node.setPropertyValue("binomial_ci_enable", True)
node.setPropertyValue("binomial_ci", 85)
# "Stepping" options
node.setPropertyValue("binomial_removal_criterion", "LR")
node.setPropertyValue("binomial_probability_removal", 0.2)
```

Table 123. logregnode properties.

logregnode Properties	**Values**	**Property description**
target	*field*	Logistic regression models require a single target field and one or more input fields. Frequency and weight fields are not used. See the topic "Common Modeling Node Properties" on page 155 for more information.
logistic_procedure	Binomial Multinomial	
include_constant	*flag*	
mode	Simple Expert	
method	Enter Stepwise Forwards Backwards BackwardsStepwise	
binomial_method	Enter Forwards Backwards	
model_type	MainEffects FullFactorial Custom	When FullFactorial is specified as the model type, stepping methods will not be run, even if specified. Instead, Enter will be the method used. If the model type is set to Custom but no custom fields are specified, a main-effects model will be built.
custom_terms	[*[BP Sex][BP][Age]*]	
multinomial_base_category	*string*	Specifies how the reference category is determined.
binomial_categorical_input	*string*	
binomial_input_contrast	Indicator Simple Difference Helmert Repeated Polynomial Deviation	Keyed property for categorical input that specifies how the contrast is determined.
binomial_input_category	First Last	Keyed property for categorical input that specifies how the reference category is determined.

Table 123. logregnode properties (continued).

logregnode Properties	Values	Property description
scale	None UserDefined Pearson Deviance	
scale_value	*number*	
all_probabilities	*flag*	
tolerance	1.0E-5 1.0E-6 1.0E-7 1.0E-8 1.0E-9 1.0E-10	
min_terms	*number*	
use_max_terms	*flag*	
max_terms	*number*	
entry_criterion	Score LR	
removal_criterion	LR Wald	
probability_entry	*number*	
probability_removal	*number*	
binomial_probability_entry	*number*	
binomial_probability_removal	*number*	
requirements	HierarchyDiscrete HierarchyAll Containment None	
max_iterations	*number*	
max_steps	*number*	
p_converge	1.0E-4 1.0E-5 1.0E-6 1.0E-7 1.0E-8 0	
l_converge	1.0E-1 1.0E-2 1.0E-3 1.0E-4 1.0E-5 0	
delta	*number*	
iteration_history	*flag*	
history_steps	*number*	
summary	*flag*	
likelihood_ratio	*flag*	
asymptotic_correlation	*flag*	
goodness_fit	*flag*	

Table 123. logregnode properties (continued).

logregnode Properties	Values	Property description
parameters	*flag*	
confidence_interval	*number*	
asymptotic_covariance	*flag*	
classification_table	*flag*	
stepwise_summary	*flag*	
info_criteria	*flag*	
monotonicity_measures	*flag*	
binomial_output_display	at_each_step at_last_step	
binomial_goodness_of_fit	*flag*	
binomial_parameters	*flag*	
binomial_iteration_history	*flag*	
binomial_classification_plots	*flag*	
binomial_ci_enable	*flag*	
binomial_ci	*number*	
binomial_residual	outliers all	
binomial_residual_enable	*flag*	
binomial_outlier_threshold	*number*	
binomial_classification_cutoff	*number*	
binomial_removal_criterion	LR Wald Conditional	
calculate_variable_importance	*flag*	
calculate_raw_propensities	*flag*	

neuralnetnode Properties

Caution: A newer version of the Neural Net modeling node, with enhanced features, is available in this release and is described in the next section (*neuralnetwork*). Although you can still build and score a model with the previous version, we recommend updating your scripts to use the new version. Details of the previous version are retained here for reference.

Example

```
node = stream.create("neuralnet", "My node")
# "Fields" tab
node.setPropertyValue("custom_fields", True)
node.setPropertyValue("targets", ["Drug"])
node.setPropertyValue("inputs", ["Age", "Na", "K", "Cholesterol", "BP"])
# "Model" tab
node.setPropertyValue("use_partitioned_data", True)
node.setPropertyValue("method", "Dynamic")
node.setPropertyValue("train_pct", 30)
node.setPropertyValue("set_random_seed", True)
node.setPropertyValue("random_seed", 12345)
node.setPropertyValue("stop_on", "Time")
node.setPropertyValue("accuracy", 95)
```

```
node.setPropertyValue("cycles", 200)
node.setPropertyValue("time", 3)
node.setPropertyValue("optimize", "Speed")
# "Multiple Method Expert Options" section
node.setPropertyValue("m_topologies", "5 30 5; 2 20 3, 1 10 1")
node.setPropertyValue("m_non_pyramids", False)
node.setPropertyValue("m_persistence", 100)
```

Table 124. neuralnetnode properties

neuralnetnode Properties	**Values**	**Property description**
targets	[*field1 ... fieldN*]	The Neural Net node expects one or more target fields and one or more input fields. Frequency and weight fields are ignored. See the topic "Common Modeling Node Properties" on page 155 for more information.
method	Quick Dynamic Multiple Prune ExhaustivePrune RBFN	
prevent_overtrain	*flag*	
train_pct	*number*	
set_random_seed	*flag*	
random_seed	*number*	
mode	Simple Expert	
stop_on	Default Accuracy Cycles Time	Stopping mode.
accuracy	*number*	Stopping accuracy.
cycles	*number*	Cycles to train.
time	*number*	Time to train (minutes).
continue	*flag*	
show_feedback	*flag*	
binary_encode	*flag*	
use_last_model	*flag*	
gen_logfile	*flag*	
logfile_name	*string*	
alpha	*number*	
initial_eta	*number*	
high_eta	*number*	
low_eta	*number*	
eta_decay_cycles	*number*	
hid_layers	One Two Three	

Table 124. neuralnetnode properties (continued)

neuralnetnode Properties	Values	Property description
hl_units_one	*number*	
hl_units_two	*number*	
hl_units_three	*number*	
persistence	*number*	
m_topologies	*string*	
m_non_pyramids	*flag*	
m_persistence	*number*	
p_hid_layers	One Two Three	
p_hl_units_one	*number*	
p_hl_units_two	*number*	
p_hl_units_three	*number*	
p_persistence	*number*	
p_hid_rate	*number*	
p_hid_pers	*number*	
p_inp_rate	*number*	
p_inp_pers	*number*	
p_overall_pers	*number*	
r_persistence	*number*	
r_num_clusters	*number*	
r_eta_auto	*flag*	
r_alpha	*number*	
r_eta	*number*	
optimize	Speed Memory	Use to specify whether model building should be optimized for speed or for memory.
calculate_variable_importance	*flag*	Note: The sensitivity_analysis property used in previous releases is deprecated in favor of this property. The old property is still supported, but calculate_variable_importance is recommended.
calculate_raw_propensities	*flag*	
calculate_adjusted_propensities	*flag*	
adjusted_propensity_partition	Test Validation	

neuralnetworknode Properties

The Neural Net node uses a simplified model of the way the human brain processes information. It works by simulating a large number of interconnected simple processing units that resemble abstract versions of neurons. Neural networks are powerful general function estimators and require minimal statistical or mathematical knowledge to train or apply.

Example

```
node = stream.create("neuralnetwork", "My node")
# Build Options tab - Objectives panel
node.setPropertyValue("objective", "Standard")
# Build Options tab - Ensembles panel
node.setPropertyValue("combining_rule_categorical", "HighestMeanProbability")
```

Table 125. neuralnetworknode properties

neuralnetworknode Properties	**Values**	**Property description**
targets	[*field1 ... fieldN*]	Specifies target fields.
inputs	[*field1 ... fieldN*]	Predictor fields used by the model.
splits	[*field1 ... fieldN*	Specifies the field or fields to use for split modeling.
use_partition	*flag*	If a partition field is defined, this option ensures that only data from the training partition is used to build the model.
continue	*flag*	Continue training existing model.
objective	Standard Bagging Boosting psm	psm is used for very large datasets, and requires a Server connection.
method	MultilayerPerceptron RadialBasisFunction	
use_custom_layers	*flag*	
first_layer_units	*number*	
second_layer_units	*number*	
use_max_time	*flag*	
max_time	*number*	
use_max_cycles	*flag*	
max_cycles	*number*	
use_min_accuracy	*flag*	
min_accuracy	*number*	
combining_rule_categorical	Voting HighestProbability HighestMeanProbability	
combining_rule_continuous	Mean Median	
component_models_n	*number*	
overfit_prevention_pct	*number*	
use_random_seed	*flag*	
random_seed	*number*	
missing_values	listwiseDeletion missingValueImputation	
use_model_name	*boolean*	

Table 125. neuralnetworknode properties (continued)

neuralnetworknode Properties	Values	Property description
model_name	*string*	
confidence	onProbability onIncrease	
score_category_probabilities	*flag*	
max_categories	*number*	
score_propensity	*flag*	
use_custom_name	*flag*	
custom_name	*string*	
tooltip	*string*	
keywords	*string*	
annotation	*string*	

questnode Properties

The QUEST node provides a binary classification method for building decision trees, designed to reduce the processing time required for large C&R Tree analyses while also reducing the tendency found in classification tree methods to favor inputs that allow more splits. Input fields can be numeric ranges (continuous), but the target field must be categorical. All splits are binary.

Example

```
node = stream.create("quest", "My node")
node.setPropertyValue("custom_fields", True)
node.setPropertyValue("target", "Drug")
node.setPropertyValue("inputs", ["Age", "Na", "K", "Cholesterol", "BP"])
node.setPropertyValue("model_output_type", "InteractiveBuilder")
node.setPropertyValue("use_tree_directives", True)
node.setPropertyValue("max_surrogates", 5)
node.setPropertyValue("split_alpha", 0.03)
node.setPropertyValue("use_percentage", False)
node.setPropertyValue("min_parent_records_abs", 40)
node.setPropertyValue("min_child_records_abs", 30)
node.setPropertyValue("prune_tree", True)
node.setPropertyValue("use_std_err", True)
node.setPropertyValue("std_err_multiplier", 3)
```

Table 126. questnode properties

questnode Properties	Values	Property description
target	*field*	QUEST models require a single target and one or more input fields. A frequency field can also be specified. See the topic "Common Modeling Node Properties" on page 155 for more information.
continue_training_existing_model	*flag*	
objective	Standard Boosting Bagging psm	psm is used for very large datasets, and requires a Server connection.

Table 126. questnode properties (continued)

questnode Properties	**Values**	**Property description**
model_output_type	Single InteractiveBuilder	
use_tree_directives	*flag*	
tree_directives	*string*	
use_max_depth	Default Custom	
max_depth	*integer*	Maximum tree depth, from 0 to 1000. Used only if use_max_depth = Custom.
prune_tree	*flag*	Prune tree to avoid overfitting.
use_std_err	*flag*	Use maximum difference in risk (in Standard Errors).
std_err_multiplier	*number*	Maximum difference.
max_surrogates	*number*	Maximum surrogates.
use_percentage	*flag*	
min_parent_records_pc	*number*	
min_child_records_pc	*number*	
min_parent_records_abs	*number*	
min_child_records_abs	*number*	
use_costs	*flag*	
costs	*structured*	Structured property.
priors	Data Equal Custom	
custom_priors	*structured*	Structured property.
adjust_priors	*flag*	
trails	*number*	Number of component models for boosting or bagging.
set_ensemble_method	Voting HighestProbability HighestMeanProbability	Default combining rule for categorical targets.
range_ensemble_method	Mean Median	Default combining rule for continuous targets.
large_boost	*flag*	Apply boosting to very large data sets.
split_alpha	*number*	Significance level for splitting.
train_pct	*number*	Overfit prevention set.
set_random_seed	*flag*	Replicate results option.
seed	*number*	
calculate_variable_importance	*flag*	
calculate_raw_propensities	*flag*	
calculate_adjusted_propensities	*flag*	
adjusted_propensity_partition	Test Validation	

regressionnode Properties

Linear regression is a common statistical technique for summarizing data and making predictions by fitting a straight line or surface that minimizes the discrepancies between predicted and actual output values.

Note: The Regression node is due to be replaced by the Linear node in a future release. We recommend using Linear models for linear regression from now on.

Example

```
node = stream.create("regression", "My node")
# "Fields" tab
node.setPropertyValue("custom_fields", True)
node.setPropertyValue("target", "Age")
node.setPropertyValue("inputs", ["Na", "K"])
node.setPropertyValue("partition", "Test")
node.setPropertyValue("use_weight", True)
node.setPropertyValue("weight_field", "Drug")
# "Model" tab
node.setPropertyValue("use_model_name", True)
node.setPropertyValue("model_name", "Regression Age")
node.setPropertyValue("use_partitioned_data", True)
node.setPropertyValue("method", "Stepwise")
node.setPropertyValue("include_constant", False)
# "Expert" tab
node.setPropertyValue("mode", "Expert")
node.setPropertyValue("complete_records", False)
node.setPropertyValue("tolerance", "1.0E-3")
# "Stepping..." section
node.setPropertyValue("stepping_method", "Probability")
node.setPropertyValue("probability_entry", 0.77)
node.setPropertyValue("probability_removal", 0.88)
node.setPropertyValue("F_value_entry", 7.0)
node.setPropertyValue("F_value_removal", 8.0)
# "Output..." section
node.setPropertyValue("model_fit", True)
node.setPropertyValue("r_squared_change", True)
node.setPropertyValue("selection_criteria", True)
node.setPropertyValue("descriptives", True)
node.setPropertyValue("p_correlations", True)
node.setPropertyValue("collinearity_diagnostics", True)
node.setPropertyValue("confidence_interval", True)
node.setPropertyValue("covariance_matrix", True)
node.setPropertyValue("durbin_watson", True)
```

Table 127. regressionnode properties

regressionnode Properties	**Values**	**Property description**
target	*field*	Regression models require a single target field and one or more input fields. A weight field can also be specified. See the topic "Common Modeling Node Properties" on page 155 for more information.

Table 127. regressionnode properties (continued)

regressionnode Properties	**Values**	**Property description**
method	Enter Stepwise Backwards Forwards	
include_constant	*flag*	
use_weight	*flag*	
weight_field	*field*	
mode	Simple Expert	
complete_records	*flag*	
tolerance	1.0E-1 1.0E-2 1.0E-3 1.0E-4 1.0E-5 1.0E-6 1.0E-7 1.0E-8 1.0E-9 1.0E-10 1.0E-11 1.0E-12	Use double quotes for arguments.
stepping_method	useP useF	useP : use probability of F useF: use F value
probability_entry	*number*	
probability_removal	*number*	
F_value_entry	*number*	
F_value_removal	*number*	
selection_criteria	*flag*	
confidence_interval	*flag*	
covariance_matrix	*flag*	
collinearity_diagnostics	*flag*	
regression_coefficients	*flag*	
exclude_fields	*flag*	
durbin_watson	*flag*	
model_fit	*flag*	
r_squared_change	*flag*	
p_correlations	*flag*	
descriptives	*flag*	
calculate_variable_importance	*flag*	

sequencenode Properties

The Sequence node discovers association rules in sequential or time-oriented data. A sequence is a list of item sets that tends to occur in a predictable order. For example, a customer who purchases a razor and aftershave lotion may purchase shaving cream the next time he shops. The Sequence node is based on the CARMA association rules algorithm, which uses an efficient two-pass method for finding sequences.

Example

```
node = stream.create("sequence", "My node")
# "Fields" tab
node.setPropertyValue("id_field", "Age")
node.setPropertyValue("contiguous", True)
node.setPropertyValue("use_time_field", True)
node.setPropertyValue("time_field", "Date1")
node.setPropertyValue("content_fields", ["Drug", "BP"])
node.setPropertyValue("partition", "Test")
# "Model" tab
node.setPropertyValue("use_model_name", True)
node.setPropertyValue("model_name", "Sequence_test")
node.setPropertyValue("use_partitioned_data", False)
node.setPropertyValue("min_supp", 15.0)
node.setPropertyValue("min_conf", 14.0)
node.setPropertyValue("max_size", 7)
node.setPropertyValue("max_predictions", 5)
# "Expert" tab
node.setPropertyValue("mode", "Expert")
node.setPropertyValue("use_max_duration", True)
node.setPropertyValue("max_duration", 3.0)
node.setPropertyValue("use_pruning", True)
node.setPropertyValue("pruning_value", 4.0)
node.setPropertyValue("set_mem_sequences", True)
node.setPropertyValue("mem_sequences", 5.0)
node.setPropertyValue("use_gaps", True)
node.setPropertyValue("min_item_gap", 20.0)
node.setPropertyValue("max_item_gap", 30.0)
```

Table 128. sequencenode properties

sequencenode Properties	Values	Property description
id_field	*field*	To create a Sequence model, you need to specify an ID field, an optional time field, and one or more content fields. Weight and frequency fields are not used. See the topic "Common Modeling Node Properties" on page 155 for more information.
time_field	*field*	
use_time_field	*flag*	
content_fields	[*field1 ... fieldn*]	
contiguous	*flag*	
min_supp	*number*	
min_conf	*number*	
max_size	*number*	
max_predictions	*number*	

Table 128. sequencenode properties (continued)

sequencenode Properties	Values	Property description
mode	Simple Expert	
use_max_duration	*flag*	
max_duration	*number*	
use_gaps	*flag*	
min_item_gap	*number*	
max_item_gap	*number*	
use_pruning	*flag*	
pruning_value	*number*	
set_mem_sequences	*flag*	
mem_sequences	*integer*	

slrmnode Properties

The Self-Learning Response Model (SLRM) node enables you to build a model in which a single new case, or small number of new cases, can be used to reestimate the model without having to retrain the model using all data.

Example

```
node = stream.create("slrm", "My node")
node.setPropertyValue("target", "Offer")
node.setPropertyValue("target_response", "Response")
node.setPropertyValue("inputs", ["Cust_ID", "Age", "Ave_Bal"])
```

Table 129. slrmnode properties

slrmnode Properties	Values	Property description
target	*field*	The target field must be a nominal or flag field. A frequency field can also be specified. See the topic "Common Modeling Node Properties" on page 155 for more information.
target_response	*field*	Type must be flag.
continue_training_existing_model	*flag*	
target_field_values	*flag*	Use all: Use all values from source. Specify: Select values required.
target_field_values_specify	*[field1 ... fieldN]*	
include_model_assessment	*flag*	
model_assessment_random_seed	*number*	Must be a real number.
model_assessment_sample_size	*number*	Must be a real number.
model_assessment_iterations	*number*	Number of iterations.
display_model_evaluation	*flag*	
max_predictions	*number*	

Table 129. slrmnode properties (continued)

slrmnode Properties	Values	Property description
randomization	*number*	
scoring_random_seed	*number*	
sort	Ascending Descending	Specifies whether the offers with the highest or lowest scores will be displayed first.
model_reliability	*flag*	
calculate_variable_importance	*flag*	

statisticsmodelnode Properties

The Statistics Model node enables you to analyze and work with your data by running IBM SPSS Statistics procedures that produce PMML. This node requires a licensed copy of IBM SPSS Statistics.

The properties for this node are described under "statisticsmodelnode Properties" on page 288.

stpnode Properties

The Spatio-Temporal Prediction (STP) node uses data that contains location data, input fields for prediction (predictors), a time field, and a target field. Each location has numerous rows in the data that represent the values of each predictor at each time of measurement. After the data is analyzed, it can be used to predict target values at any location within the shape data that is used in the analysis.

Table 130. stpnode properties

stpnode properties	Data type	Property description
Fields tab		
target	*field*	This is the target field.
location	*field*	The location field for the model. Only geospatial fields are allowed.
location_label	*field*	The categorical field to be used in the output to label the locations chosen in location
time_field	*field*	The time field for the model. Only fields with continuous measurement are allowed, and the storage type must be time, date, timestamp, or integer.
inputs	*[field1 ... fieldN]*	A list of input fields.
Time Intervals tab		

Table 130. stpnode properties (continued)

stpnode properties	Data type	Property description
interval_type_timestamp	Years Quarters Months Weeks Days Hours Minutes Seconds	
interval_type_date	Years Quarters Months Weeks Days	
interval_type_time	Hours Minutes Seconds	Limits the number of days per week that are taken into account when creating the time index that STP uses for calculation
interval_type_integer	Periods (Time index fields only, Integer storage)	The interval to which the data set will be converted. The selection available is dependent on the storage type of the field that is chosen as the time_field for the model.
period_start	*integer*	
start_month	January February March April May June July August September October November December	The month the model will start to index from (for example, if set to March but the first record in the data set is January, the model will skip the first two records and start indexing at March.
week_begins_on	Sunday Monday Tuesday Wednesday Thursday Friday Saturday	The starting point for the time index created by STP from the data
days_per_week	*integer*	Minimum 1, maximum 7, in increments of 1
hours_per_day	*integer*	The number of hours the model accounts for in a day. If this is set to 10, the model will start indexing at the day_begins_at time and continue indexing for 10 hours, then skip to the next value matching the day_begins_at value, etc.

Table 130. stpnode properties (continued)

stpnode properties	**Data type**	**Property description**
day_begins_at	00:00 01:00 02:00 03:00 ... 23:00	Sets the hour value that the model starts indexing from.
interval_increment	1 2 3 4 5 6 10 12 15 20 30	This increment setting is for minutes or seconds. This determines where the model creates indexes from the data. So with an increment of 30 and interval type seconds, the model will create an index from the data every 30 seconds.
data_matches_interval	*Boolean*	If set to N, the conversion of the data to the regular interval_type occurs before the model is built. If your data is already in the correct format, and the interval_type and any associated settings match your data, set this to Y to prevent the conversion or aggregation of your data. Setting this to Y disables all of the Aggregation controls.
agg_range_default	Sum Mean Min Max Median 1stQuartile 3rdQuartile	This determines the default aggregation method used for continuous fields. Any continuous fields which are not specifically included in the custom aggregation will be aggregated using the method specified here.
custom_agg	[[field, aggregation method],[]..] Demo: [['x5' 'FirstQuartile']['x4' 'Sum']]	Structured property: Script parameter: custom_agg For example: set :stpnode.custom_agg = [[field1 function] [field2 function]] Where function is the aggregation function to be used with that field.
Basics tab		
include_intercept	*flag*	

Table 130. stpnode properties (continued)

stpnode properties	Data type	Property description
max_autoregressive_lag	*integer*	Minimum 1, maximum 5, in increments of 1. This is the number of previous records required for a prediction. So if set to 5, for example, then the previous 5 records are used to create a new forecast. The number of records specified here from the build data are incorporated into the model and, therefore, the user does not need to provide the data again when scoring the model.
estimation_method	Parametric Nonparametric	The method for modeling the spatial covariance matrix
parametric_model	Gaussian Exponential PoweredExponential	Order parameter for Parametric spatial covariance model
exponential_power	*number*	Power level for PoweredExponential model. Minimum 1, maximum 2.
Advanced tab		
max_missing_values	*integer*	The maximum percentage of records with missing values allowed in the model.
significance	*number*	The significance level for hypotheses testing in the model build. Specifies the significance value for all the tests in STP model estimation, including two Goodness of Fit tests, effect F-tests, and coefficient t-tests.
Output tab		
model_specifications	*flag*	
temporal_summary	*flag*	
location_summary	*flag*	Determines whether the Location Summary table is included in the model output.
model_quality	*flag*	
test_mean_structure	*flag*	
mean_structure_coefficients	*flag*	
autoregressive_coefficients	*flag*	
test_decay_space	*flag*	
parametric_spatial_covariance	*flag*	
correlations_heat_map	*flag*	
correlations_map	*flag*	
location_clusters	*flag*	
similarity_threshold	*number*	The threshold at which output clusters are considered similar enough to be merged into a single cluster.

Table 130. stpnode properties (continued)

stpnode properties	Data type	Property description
max_number_clusters	*integer*	The upper limit for the number of clusters which can be included in the model output.
Model Options tab		
use_model_name	*flag*	
model_name	*string*	
uncertainty_factor	*number*	Minimum 0, maximum 100. Determines the increase in uncertainty (error) applied to predictions in the future. It is the upper and lower bound for the predictions.

svmnode Properties

The Support Vector Machine (SVM) node enables you to classify data into one of two groups without overfitting. SVM works well with wide data sets, such as those with a very large number of input fields.

Example

```
node = stream.create("svm", "My node")
# Expert tab
node.setPropertyValue("mode", "Expert")
node.setPropertyValue("all_probabilities", True)
node.setPropertyValue("kernel", "Polynomial")
node.setPropertyValue("gamma", 1.5)
```

Table 131. svmnode properties.

svmnode Properties	Values	Property description
all_probabilities	*flag*	
stopping_criteria	1.0E-1 1.0E-2 1.0E-3 (default) 1.0E-4 1.0E-5 1.0E-6	Determines when to stop the optimization algorithm.
regularization	*number*	Also known as the C parameter.
precision	*number*	Used only if measurement level of target field is Continuous.
kernel	RBF(default) Polynomial Sigmoid Linear	Type of kernel function used for the transformation.
rbf_gamma	*number*	Used only if kernel is RBF.
gamma	*number*	Used only if kernel is Polynomial or Sigmoid.
bias	*number*	
degree	*number*	Used only if kernel is Polynomial.

Table 131. svmnode properties (continued).

svmnode Properties	Values	Property description
calculate_variable_importance	*flag*	
calculate_raw_propensities	*flag*	
calculate_adjusted_ propensities	*flag*	
adjusted_propensity_partition	Test Validation	

tcmnode Properties

Temporal causal modeling attempts to discover key causal relationships in time series data. In temporal causal modeling, you specify a set of target series and a set of candidate inputs to those targets. The procedure then builds an autoregressive time series model for each target and includes only those inputs that have the most significant causal relationship with the target.

Table 132. tcmnode properties

tcmnode Properties	Values	Property description
custom_fields	*Boolean*	
dimensionlist	[*dimension1 ... dimensionN*]	
data_struct	Multiple Single	
metric_fields	*fields*	
both_target_and_input	[*f1 ... fN*]	
targets	[*f1 ... fN*]	
candidate_inputs	[*f1 ... fN*]	
forced_inputs	[*f1 ... fN*]	
use_timestamp	Timestamp Period	
input_interval	None Unknown Year Quarter Month Week Day Hour Hour_nonperiod Minute Minute_nonperiod Second Second_nonperiod	
period_field	*string*	
period_start_value	*integer*	
num_days_per_week	*integer*	

Table 132. tcmnode properties (continued)

tcmnode Properties	**Values**	**Property description**
start_day_of_week	Sunday Monday Tuesday Wednesday Thursday Friday Saturday	
num_hours_per_day	*integer*	
start_hour_of_day	*integer*	
timestamp_increments	*integer*	
cyclic_increments	*integer*	
cyclic_periods	*list*	
output_interval	None Year Quarter Month Week Day Hour Minute Second	
is_same_interval	Same Notsame	
cross_hour	*Boolean*	
aggregate_and_distribute	*list*	
aggregate_default	Mean Sum Mode Min Max	
distribute_default	Mean Sum	
group_default	Mean Sum Mode Min Max	
missing_imput	Linear_interp Series_mean K_mean K_meridian Linear_trend None	
k_mean_param	*integer*	
k_median_param	*integer*	
missing_value_threshold	*integer*	
conf_level	*integer*	
max_num_predictor	*integer*	
max_lag	*integer*	

Table 132. tcmnode properties (continued)

tcmnode Properties	**Values**	**Property description**
epsilon	*number*	
threshold	*integer*	
is_re_est	*Boolean*	
num_targets	*integer*	
percent_targets	*integer*	
fields_display	*list*	
series_display	*list*	
network_graph_for_target	*Boolean*	
sign_level_for_target	*number*	
fit_and_outlier_for_target	*Boolean*	
sum_and_para_for_target	*Boolean*	
impact_diag_for_target	*Boolean*	
impact_diag_type_for_target	Effect Cause Both	
impact_diag_level_for_target	*integer*	
series_plot_for_target	*Boolean*	
res_plot_for_target	*Boolean*	
top_input_for_target	*Boolean*	
forecast_table_for_target	*Boolean*	
same_as_for_target	*Boolean*	
network_graph_for_series	*Boolean*	
sign_level_for_series	*number*	
fit_and_outlier_for_series	*Boolean*	
sum_and_para_for_series	*Boolean*	
impact_diagram_for_series	*Boolean*	
impact_diagram_type_for_series	Effect Cause Both	
impact_diagram_level_for_series	*integer*	
series_plot_for_series	*Boolean*	
residual_plot_for_series	*Boolean*	
forecast_table_for_series	*Boolean*	
outlier_root_cause_analysis	*Boolean*	
causal_levels	*integer*	
outlier_table	Interactive Pivot Both	
rmsp_error	*Boolean*	
bic	*Boolean*	
r_square	*Boolean*	
outliers_over_time	*Boolean*	

Table 132. tcmnode properties (continued)

tcmnode Properties	Values	Property description
series_transormation	*Boolean*	
use_estimation_period	*Boolean*	
estimation_period	Times Observation	
observations	*list*	
observations_type	Latest Earliest	
observations_num	*integer*	
observations_exclude	*integer*	
extend_records_into_future	*Boolean*	
forecastperiods	*integer*	
max_num_distinct_values	*integer*	
display_targets	FIXEDNUMBER PERCENTAGE	
goodness_fit_measure	ROOTMEAN BIC RSQUARE	
top_input_for_series	*Boolean*	
aic	*Boolean*	
rmse	*Boolean*	

timeseriesnode Properties

The Time Series node estimates exponential smoothing, univariate Autoregressive Integrated Moving Average (ARIMA), and multivariate ARIMA (or transfer function) models for time series data and produces forecasts of future performance. A Time Series node must always be preceded by a Time Intervals node.

Example

```
node = stream.create("timeseries", "My node")
node.setPropertyValue("method", "Exsmooth")
node.setPropertyValue("exsmooth_model_type", "HoltsLinearTrend")
node.setPropertyValue("exsmooth_transformation_type", "None")
```

Table 133. timeseriesnode properties

timeseriesnode Properties	Values	Property description
targets	*field*	The Time Series node forecasts one or more targets, optionally using one or more input fields as predictors. Frequency and weight fields are not used. See the topic "Common Modeling Node Properties" on page 155 for more information.
continue	*flag*	

Table 133. timeseriesnode properties (continued)

timeseriesnode Properties	**Values**	**Property description**
method	ExpertModeler Exsmooth Arima Reuse	
expert_modeler_method	*flag*	
consider_seasonal	*flag*	
detect_outliers	*flag*	
expert_outlier_additive	*flag*	
expert_outlier_level_shift	*flag*	
expert_outlier_innovational	*flag*	
expert_outlier_level_shift	*flag*	
expert_outlier_transient	*flag*	
expert_outlier_seasonal_additive	*flag*	
expert_outlier_local_trend	*flag*	
expert_outlier_additive_patch	*flag*	
exsmooth_model_type	Simple HoltsLinearTrend BrownsLinearTrend DampedTrend SimpleSeasonal WintersAdditive WintersMultiplicative	
exsmooth_transformation_type	None SquareRoot NaturalLog	
arima_p	*integer*	
arima_d	*integer*	
arima_q	*integer*	
arima_sp	*integer*	
arima_sd	*integer*	
arima_sq	*integer*	
arima_transformation_type	None SquareRoot NaturalLog	
arima_include_constant	*flag*	
tf_arima_p. *fieldname*	*integer*	For transfer functions.
tf_arima_d. *fieldname*	*integer*	For transfer functions.
tf_arima_q. *fieldname*	*integer*	For transfer functions.
tf_arima_sp. *fieldname*	*integer*	For transfer functions.
tf_arima_sd. *fieldname*	*integer*	For transfer functions.
tf_arima_sq. *fieldname*	*integer*	For transfer functions.
tf_arima_delay. *fieldname*	*integer*	For transfer functions.

Table 133. timeseriesnode properties (continued)

timeseriesnode Properties	Values	Property description
tf_arima_transformation_type. *fieldname*	None SquareRoot NaturalLog	For transfer functions.
arima_detect_outlier_mode	None Automatic	
arima_outlier_additive	*flag*	
arima_outlier_level_shift	*flag*	
arima_outlier_innovational	*flag*	
arima_outlier_transient	*flag*	
arima_outlier_seasonal_additive	*flag*	
arima_outlier_local_trend	*flag*	
arima_outlier_additive_patch	*flag*	
conf_limit_pct	*real*	
max_lags	*integer*	
events	*fields*	
scoring_model_only	*flag*	Use for models with very large numbers (tens of thousands) of time series.

treeas Properties

The Tree-AS node is only available if you have a connection to IBM SPSS Analytic Server. This node is similar to the existing CHAID node; however, the Tree-AS node is designed to process big data to create a single tree and displays the resulting model in the output viewer that was added in SPSS Modeler version 17. The node generates a decision tree by using chi-square statistics (CHAID) to identify optimal splits. This use of CHAID can generate nonbinary trees, meaning that some splits have more than two branches. Target and input fields can be numeric range (continuous) or categorical. Exhaustive CHAID is a modification of CHAID that does a more thorough job of examining all possible splits but takes longer to compute.

Table 134. treeas properties

treeas Properties	Values	Property description
target	*field*	In the Tree-AS node, CHAID models require a single target and one or more input fields. A frequency field can also be specified. See the topic "Common Modeling Node Properties" on page 155 for more information.
method	chaid exhaustive_chaid	
max_depth	*integer*	Maximum tree depth, from 0 to 20. The default value is 5.
num_bins	*integer*	Only used if the data is made up of continuous inputs. Set the number of equal frequency bins to be used for the inputs; options are: 2, 4, 5, 10, 20, 25, 50, or 100.

Table 134. treeas properties (continued)

treeas Properties	Values	Property description
record_threshold	*integer*	The number of records at which the model will switch from using p-values to Effect sizes while building the tree. The default is 1,000,000; increase or decrease this in increments of 10,000.
split_alpha	*number*	Significance level for splitting. The value must be between 0.01 and 0.99.
merge_alpha	*number*	Significance level for merging. The value must be between 0.01 and 0.99.
bonferroni_adjustment	*flag*	Adjust significance values using Bonferroni method.
effect_size_threshold_cont	*number*	Set the Effect size threshold when splitting nodes and merging categories when using a continuous target. The value must be between 0.01 and 0.99.
effect_size_threshold_cat	*number*	Set the Effect size threshold when splitting nodes and merging categories when using a categorical target. The value must be between 0.01 and 0.99.
split_merged_categories	*flag*	Allow resplitting of merged categories.
grouping_sig_level	*number*	Used to determine how groups of nodes are formed or how unusual nodes are identified.
chi_square	pearson likelihood_ratio	Method used to calculate the chi-square statistic: Pearson or Likelihood Ratio
minimum_record_use	use_percentage use_absolute	
min_parent_records_pc	*number*	Default value is 2. Minimum 1, maximum 100, in increments of 1. Parent branch value must be higher than child branch.
min_child_records_pc	*number*	Default value is 1. Minimum 1, maximum 100, in increments of 1.
min_parent_records_abs	*number*	Default value is 100. Minimum 1, maximum 100, in increments of 1. Parent branch value must be higher than child branch.
min_child_records_abs	*number*	Default value is 50. Minimum 1, maximum 100, in increments of 1.
epsilon	*number*	Minimum change in expected cell frequencies..
max_iterations	*number*	Maximum iterations for convergence.
use_costs	*flag*	
costs	*structured*	Structured property. The format is a list of 3 values: the actual value, the predicted value, and the cost if that prediction is wrong. For example: tree.setPropertyValue("costs", [["drugA", "drugB", 3.0], ["drugX", "drugY", 4.0]])

Table 134. treeas properties (continued)

treeas Properties	Values	Property description
default_cost_increase	none linear square custom	**Note:** only enabled for ordinal targets. Set default values in the costs matrix.
calculate_conf	*flag*	
display_rule_id	*flag*	Adds a field in the scoring output that indicates the ID for the terminal node to which each record is assigned.

twostepnode Properties

The TwoStep node uses a two-step clustering method. The first step makes a single pass through the data to compress the raw input data into a manageable set of subclusters. The second step uses a hierarchical clustering method to progressively merge the subclusters into larger and larger clusters. TwoStep has the advantage of automatically estimating the optimal number of clusters for the training data. It can handle mixed field types and large data sets efficiently.

Example

```
node = stream.create("twostep", "My node")
node.setPropertyValue("custom_fields", True)
node.setPropertyValue("inputs", ["Age", "K", "Na", "BP"])
node.setPropertyValue("partition", "Test")
node.setPropertyValue("use_model_name", False)
node.setPropertyValue("model_name", "TwoStep_Drug")
node.setPropertyValue("use_partitioned_data", True)
node.setPropertyValue("exclude_outliers", True)
node.setPropertyValue("cluster_label", "String")
node.setPropertyValue("label_prefix", "TwoStep_")
node.setPropertyValue("cluster_num_auto", False)
node.setPropertyValue("max_num_clusters", 9)
node.setPropertyValue("min_num_clusters", 3)
node.setPropertyValue("num_clusters", 7)
```

Table 135. twostepnode properties

twostepnode Properties	Values	Property description
inputs	[*field1 ... fieldN*]	TwoStep models use a list of input fields, but no target. Weight and frequency fields are not recognized. See the topic "Common Modeling Node Properties" on page 155 for more information.
standardize	*flag*	
exclude_outliers	*flag*	
percentage	*number*	
cluster_num_auto	*flag*	
min_num_clusters	*number*	
max_num_clusters	*number*	
num_clusters	*number*	

Table 135. twostepnode properties (continued)

twostepnode Properties	Values	Property description
cluster_label	String Number	
label_prefix	*string*	
distance_measure	Euclidean Loglikelihood	
clustering_criterion	AIC BIC	

twostepAS Properties

TwoStep Cluster is an exploratory tool that is designed to reveal natural groupings (or clusters) within a data set that would otherwise not be apparent. The algorithm that is employed by this procedure has several desirable features that differentiate it from traditional clustering techniques, such as handling of categorical and continuous variables, automatic selection of number of clusters, and scalability.

Table 136. twostepAS properties

twostepAS Properties	Values	Property description
inputs	[*f1 ... fN*]	TwoStepAS models use a list of input fields, but no target. Weight and frequency fields are not recognized.
use_predefined_roles	Boolean	Default=True
use_custom_field_assignments	Boolean	Default=False
cluster_num_auto	Boolean	Default=True
min_num_clusters	integer	Default=2
max_num_clusters	integer	Default=15
num_clusters	integer	Default=5
clustering_criterion	AIC BIC	
automatic_clustering_method	use_clustering_criterion_setting Distance_jump Minimum Maximum	
feature_importance_method	use_clustering_criterion_setting effect_size	
use_random_seed	Boolean	
random_seed	integer	
distance_measure	Euclidean Loglikelihood	
include_outlier_clusters	Boolean	Default=True
num_cases_in_feature_tree_leaf_is_less_than	integer	Default=10
top_perc_outliers	integer	Default=5

Table 136. twostepAS properties (continued)

twostepAS Properties	**Values**	**Property description**
initial_dist_change_threshold	integer	Default=0
leaf_node_maximum_branches	integer	Default=8
non_leaf_node_maximum_branches	integer	Default=8
max_tree_depth	integer	Default=3
adjustment_weight_on_measurement_level	integer	Default=6
memory_allocation_mb	number	Default=512
delayed_split	Boolean	Default=True
fields_to_standardize	[*f1 ... fN*]	
adaptive_feature_selection	Boolean	Default=True
featureMisPercent	integer	Default=70
coefRange	number	Default=0.05
percCasesSingleCategory	integer	Default=95
numCases	integer	Default=24
include_model_specifications	Boolean	Default=True
include_record_summary	Boolean	Default=True
include_field_transformations	Boolean	Default=True
excluded_inputs	Boolean	Default=True
evaluate_model_quality	Boolean	Default=True
show_feature_importance bar chart	Boolean	Default=True
show_feature_importance_ word_cloud	Boolean	Default=True
show_outlier_clusters interactive_table_and_chart	Boolean	Default=True
show_outlier_clusters_pivot_table	Boolean	Default=True
across_cluster_feature_importance	Boolean	Default=True
across_cluster_profiles_pivot_table	Boolean	Default=True
withinprofiles	Boolean	Default=True
cluster_distances	Boolean	Default=True
cluster_label	String Number	
label_prefix	String	

Chapter 14. Model Nugget Node Properties

Model nugget nodes share the same common properties as other nodes. See the topic "Common Node Properties" on page 69 for more information.

applyanomalydetectionnode Properties

Anomaly Detection modeling nodes can be used to generate an Anomaly Detection model nugget. The scripting name of this model nugget is *applyanomalydetectionnode*. For more information on scripting the modeling node itself, "anomalydetectionnode Properties" on page 155

Table 137. applyanomalydetectionnode properties.

applyanomalydetectionnode Properties	**Values**	**Property description**
anomaly_score_method	FlagAndScore FlagOnly ScoreOnly	Determines which outputs are created for scoring.
num_fields	*integer*	Fields to report.
discard_records	*flag*	Indicates whether records are discarded from the output or not.
discard_anomalous_records	*flag*	Indicator of whether to discard the anomalous or *non*-anomalous records. The default is off, meaning that *non*-anomalous records are discarded. Otherwise, if on, anomalous records will be discarded. This property is enabled only if the discard_records property is enabled.

applyapriorinode Properties

Apriori modeling nodes can be used to generate an Apriori model nugget. The scripting name of this model nugget is *applyapriorinode*. For more information on scripting the modeling node itself, "apriorinode Properties" on page 157

Table 138. applyapriorinode properties.

applyapriorinode Properties	**Values**	**Property description**
max_predictions	*number (integer)*	
ignore_unmatached	*flag*	
allow_repeats	*flag*	
check_basket	NoPredictions Predictions NoCheck	
criterion	Confidence Support RuleSupport Lift Deployability	

applyassociationrulesnode Properties

The Association Rules modeling node can be used to generate an association rules model nugget. The scripting name of this model nugget is *applyassociationrulesnode*. For more information on scripting the modeling node itself, see "associationrulesnode Properties" on page 158.

Table 139. applyassociationrulesnode properties

applyassociationrulesnode properties	Data type	Property description
max_predictions	*integer*	The maximum number of rules that can be applied to each input to the score.
criterion	Confidence Rulesupport Lift Conditionsupport Deployability	Select the measure used to determine the strength of rules.
allow_repeats	*Boolean*	Determine whether rules with the same prediction are included in the score.
check_input	NoPredictions Predictions NoCheck	

applyautoclassifiernode Properties

Auto Classifier modeling nodes can be used to generate an Auto Classifier model nugget. The scripting name of this model nugget is *applyautoclassifiernode*.For more information on scripting the modeling node itself, "autoclassifiernode Properties" on page 160

Table 140. applyautoclassifiernode properties.

applyautoclassifiernode Properties	Values	Property description
flag_ensemble_method	Voting ConfidenceWeightedVoting RawPropensityWeightedVoting HighestConfidence AverageRawPropensity	Specifies the method used to determine the ensemble score. This setting applies only if the selected target is a flag field.
flag_voting_tie_selection	Random HighestConfidence RawPropensity	If a voting method is selected, specifies how ties are resolved. This setting applies only if the selected target is a flag field.
set_ensemble_method	Voting ConfidenceWeightedVoting HighestConfidence	Specifies the method used to determine the ensemble score. This setting applies only if the selected target is a set field.
set_voting_tie_selection	Random HighestConfidence	If a voting method is selected, specifies how ties are resolved. This setting applies only if the selected target is a nominal field.

applyautoclusternode Properties

Auto Cluster modeling nodes can be used to generate an Auto Cluster model nugget. The scripting name of this model nugget is *applyautoclusternode*. No other properties exist for this model nugget. For more information on scripting the modeling node itself, "autoclusternode Properties" on page 162

applyautonumericnode Properties

Auto Numeric modeling nodes can be used to generate an Auto Numeric model nugget. The scripting name of this model nugget is *applyautonumericnode*.For more information on scripting the modeling node itself, "autonumericnode Properties" on page 164

Table 141. applyautonumericnode properties.

applyautonumericnode Properties	**Values**	**Property description**
calculate_standard_error	*flag*	

applybayesnetnode Properties

Bayesian network modeling nodes can be used to generate a Bayesian network model nugget. The scripting name of this model nugget is *applybayesnetnode*. For more information on scripting the modeling node itself, "bayesnetnode Properties" on page 165.

Table 142. applybayesnetnode properties.

applybayesnetnode Properties	**Values**	**Property description**
all_probabilities	*flag*	
raw_propensity	*flag*	
adjusted_propensity	*flag*	
calculate_raw_propensities	*flag*	
calculate_adjusted_propensities	*flag*	

applyc50node Properties

C5.0 modeling nodes can be used to generate a C5.0 model nugget. The scripting name of this model nugget is *applyc50node*. For more information on scripting the modeling node itself, "c50node Properties" on page 167.

Table 143. applyc50node properties.

applyc50node Properties	**Values**	**Property description**
sql_generate	Never NoMissingValues	Used to set SQL generation options during rule set execution.
calculate_conf	*flag*	Available when SQL generation is enabled; this property includes confidence calculations in the generated tree.
calculate_raw_propensities	*flag*	
calculate_adjusted_propensities	*flag*	

applycarmanode Properties

CARMA modeling nodes can be used to generate a CARMA model nugget. The scripting name of this model nugget is *applycarmanode*. No other properties exist for this model nugget. For more information on scripting the modeling node itself, "carmanode Properties" on page 168.

applycartnode Properties

C&R Tree modeling nodes can be used to generate a C&R Tree model nugget. The scripting name of this model nugget is *applycartnode*. For more information on scripting the modeling node itself, "cartnode Properties" on page 169.

Table 144. applycartnode properties.

applycartnode Properties	Values	Property description
sql_generate	Never MissingValues NoMissingValues	Used to set SQL generation options during rule set execution.
calculate_conf	*flag*	Available when SQL generation is enabled; this property includes confidence calculations in the generated tree.
display_rule_id	*flag*	Adds a field in the scoring output that indicates the ID for the terminal node to which each record is assigned.
calculate_raw_propensities	*flag*	
calculate_adjusted_propensities	*flag*	

applychaidnode Properties

CHAID modeling nodes can be used to generate a CHAID model nugget. The scripting name of this model nugget is *applychaidnode*. For more information on scripting the modeling node itself, "chaidnode Properties" on page 171.

Table 145. applychaidnode properties.

applychaidnode Properties	Values	Property description
sql_generate	Never MissingValues	
calculate_conf	*flag*	
display_rule_id	*flag*	Adds a field in the scoring output that indicates the ID for the terminal node to which each record is assigned.
calculate_raw_propensities	*flag*	
calculate_adjusted_propensities	*flag*	

applycoxregnode Properties

Cox modeling nodes can be used to generate a Cox model nugget. The scripting name of this model nugget is *applycoxregnode*. For more information on scripting the modeling node itself, "coxregnode Properties" on page 173.

Table 146. applycoxregnode properties.

applycoxregnode Properties	Values	Property description
future_time_as	Intervals Fields	
time_interval	*number*	
num_future_times	*integer*	
time_field	*field*	

Table 146. applycoxregnode properties (continued).

applycoxregnode Properties	Values	Property description
past_survival_time	*field*	
all_probabilities	*flag*	
cumulative_hazard	*flag*	

applydecisionlistnode Properties

Decision List modeling nodes can be used to generate a Decision List model nugget. The scripting name of this model nugget is *applydecisionlistnode*. For more information on scripting the modeling node itself, "decisionlistnode Properties" on page 175.

Table 147. applydecisionlistnode properties.

applydecisionlistnode Properties	Values	Property description
enable_sql_generation	*flag*	When true, IBM SPSS Modeler will try to push back the Decision List model to SQL.
calculate_raw_propensities	*flag*	
calculate_adjusted_propensities	*flag*	

applydiscriminantnode Properties

Discriminant modeling nodes can be used to generate a Discriminant model nugget. The scripting name of this model nugget is *applydiscriminantnode*. For more information on scripting the modeling node itself, "discriminantnode Properties" on page 176.

Table 148. applydiscriminantnode properties.

applydiscriminantnode Properties	Values	Property description
calculate_raw_propensities	*flag*	
calculate_adjusted_propensities	*flag*	

applyfactornode Properties

PCA/Factor modeling nodes can be used to generate a PCA/Factor model nugget. The scripting name of this model nugget is *applyfactornode*. No other properties exist for this model nugget. For more information on scripting the modeling node itself, "factornode Properties" on page 178.

applyfeatureselectionnode Properties

Feature Selection modeling nodes can be used to generate a Feature Selection model nugget. The scripting name of this model nugget is *applyfeatureselectionnode*. For more information on scripting the modeling node itself, "featureselectionnode Properties" on page 179.

Table 149. applyfeatureselectionnode properties.

applyfeatureselectionnode Properties	Values	Property description
selected_ranked_fields		Specifies which ranked fields are checked in the model browser.
selected_screened_fields		Specifies which screened fields are checked in the model browser.

applygeneralizedlinearnode Properties

Generalized Linear (genlin) modeling nodes can be used to generate a Generalized Linear model nugget. The scripting name of this model nugget is *applygeneralizedlinearnode*. For more information on scripting the modeling node itself, "genlinnode Properties" on page 181.

Table 150. applygeneralizedlinearnode properties.

applygeneralizedlinearnode Properties	Values	Property description
calculate_raw_propensities	*flag*	
calculate_adjusted_propensities	*flag*	

applyglmmnode Properties

GLMM modeling nodes can be used to generate a GLMM model nugget. The scripting name of this model nugget is *applyglmmnode*. For more information on scripting the modeling node itself, "glmmnode Properties" on page 184.

Table 151. applyglmmnode properties.

applyglmmnode Properties	Values	Property description
confidence	onProbability onIncrease	Basis for computing scoring confidence value: highest predicted probability, or difference between highest and second highest predicted probabilities.
score_category_probabilities	*flag*	If set to True, produces the predicted probabilities for categorical targets. A field is created for each category. Default is False.
max_categories	*integer*	Maximum number of categories for which to predict probabilities. Used only if score_category_probabilities is True.
score_propensity	*flag*	If set to True, produces raw propensity scores (likelihood of "True" outcome) for models with flag targets. If partitions are in effect, also produces adjusted propensity scores based on the testing partition. Default is False.

applykmeansnode Properties

K-Means modeling nodes can be used to generate a K-Means model nugget. The scripting name of this model nugget is *applykmeansnode*. No other properties exist for this model nugget. For more information on scripting the modeling node itself, "kmeansnode Properties" on page 187.

applyknnnode Properties

KNN modeling nodes can be used to generate a KNN model nugget. The scripting name of this model nugget is *applyknnnode*. For more information on scripting the modeling node itself, "knnnode Properties" on page 188.

Table 152. applyknnnode properties.

applyknnnode Properties	Values	Property description
all_probabilities	*flag*	

Table 152. applyknnnode properties (continued).

applyknnnode Properties	Values	Property description
save_distances	*flag*	

applykohonennode Properties

Kohonen modeling nodes can be used to generate a Kohonen model nugget. The scripting name of this model nugget is *applykohonennode*. No other properties exist for this model nugget. For more information on scripting the modeling node itself, "c50node Properties" on page 167.

applylinearnode Properties

Linear modeling nodes can be used to generate a Linear model nugget. The scripting name of this model nugget is *applylinearnode*. For more information on scripting the modeling node itself, "linearnode Properties" on page 191.

Table 153. applylinearnode Properties.

linear Properties	Values	Property description
use_custom_name	*flag*	
custom_name	*string*	
enable_sql_generation	*flag*	

applylinearasnode Properties

Linear-AS modeling nodes can be used to generate a Linear-AS model nugget. The scripting name of this model nugget is *applylinearasnode*. For more information on scripting the modeling node itself, "linearasnode Properties" on page 192.

Table 154. applylinearasnode Properties

applylinearasnode Property	Values	Property description
enable_sql_generation	udf native	The default value is udf.

applylogregnode Properties

Logistic Regression modeling nodes can be used to generate a Logistic Regression model nugget. The scripting name of this model nugget is *applylogregnode*. For more information on scripting the modeling node itself, "logregnode Properties" on page 193.

Table 155. applylogregnode properties.

applylogregnode Properties	Values	Property description
calculate_raw_propensities	*flag*	
calculate_conf	*flag*	
enable_sql_generation	*flag*	

applyneuralnetnode Properties

Neural Net modeling nodes can be used to generate a Neural Net model nugget. The scripting name of this model nugget is *applyneuralnetnode*. For more information on scripting the modeling node itself, "neuralnetnode Properties" on page 197.

Caution: A newer version of the Neural Net nugget, with enhanced features, is available in this release and is described in the next section (*applyneuralnetwork*). Although the previous version is still available, we recommend updating your scripts to use the new version. Details of the previous version are retained here for reference, but support for it will be removed in a future release.

Table 156. applyneuralnetnode properties.

applyneuralnetnode Properties	Values	Property description
calculate_conf	*flag*	Available when SQL generation is enabled; this property includes confidence calculations in the generated tree.
enable_sql_generation	*flag*	
nn_score_method	Difference SoftMax	
calculate_raw_propensities	*flag*	
calculate_adjusted_propensities	*flag*	

applyneuralnetworknode Properties

Neural Network modeling nodes can be used to generate a Neural Network model nugget. The scripting name of this model nugget is *applyneuralnetworknode*. For more information on scripting the modeling node itself, see in .

Table 157. applyneuralnetworknode properties

applyneuralnetworknode Properties	Values	Property description
use_custom_name	*flag*	
custom_name	*string*	
confidence	onProbability onIncrease	
score_category_probabilities	*flag*	
max_categories	*number*	
score_propensity	*flag*	

applyquestnode Properties

QUEST modeling nodes can be used to generate a QUEST model nugget. The scripting name of this model nugget is *applyquestnode*. For more information on scripting the modeling node itself, "questnode Properties" on page 201.

Table 158. applyquestnode properties.

applyquestnode Properties	Values	Property description
sql_generate	Never MissingValues NoMissingValues	
calculate_conf	*flag*	

Table 158. applyquestnode properties (continued).

applyquestnode Properties	Values	Property description
display_rule_id	*flag*	Adds a field in the scoring output that indicates the ID for the terminal node to which each record is assigned.
calculate_raw_propensities	*flag*	
calculate_adjusted_propensities	*flag*	

applyr Properties

R Building nodes can be used to generate an R model nugget. The scripting name of this model nugget is *applyr*. For more information on scripting the modeling node itself, "buildr Properties" on page 166.

Table 159. applyr properties

applyr Properties	Values	Property Description
score_syntax	*string*	R scripting syntax for model scoring.
convert_flags	StringsAndDoubles LogicalValues	Option to convert flag fields.
convert_datetime	*flag*	Option to convert variables with date or datetime formats to R date/time formats.
convert_datetime_class	POSIXct POSIXlt	Options to specify to what format variables with date or datetime formats are converted.
convert_missing	*flag*	Option to convert missing values to R NA value.

applyregressionnode Properties

Linear Regression modeling nodes can be used to generate a Linear Regression model nugget. The scripting name of this model nugget is *applyregressionnode*. No other properties exist for this model nugget. For more information on scripting the modeling node itself, "regressionnode Properties" on page 203.

applyselflearningnode Properties

Self-Learning Response Model (SLRM) modeling nodes can be used to generate a SLRM model nugget. The scripting name of this model nugget is *applyselflearningnode*. For more information on scripting the modeling node itself, "slrmnode Properties" on page 206.

Table 160. applyselflearningnode properties.

applyselflearningnode Properties	Values	Property description
max_predictions	*number*	
randomization	*number*	
scoring_random_seed	*number*	
sort	ascending descending	Specifies whether the offers with the highest or lowest scores will be displayed first.
model_reliability	*flag*	Takes account of model reliability option on Settings tab.

applysequencenode Properties

Sequence modeling nodes can be used to generate a Sequence model nugget. The scripting name of this model nugget is *applysequencenode*. No other properties exist for this model nugget. For more information on scripting the modeling node itself, "sequencenode Properties" on page 205.

applysvmnode Properties

SVM modeling nodes can be used to generate an SVM model nugget. The scripting name of this model nugget is *applysvmnode*. For more information on scripting the modeling node itself, "svmnode Properties" on page 211.

Table 161. applysvmnode properties.

applysvmnode Properties	**Values**	**Property description**
all_probabilities	*flag*	
calculate_raw_propensities	*flag*	
calculate_adjusted_propensities	*flag*	

applystpnode Properties

The STP modeling node can be used to generate an associated model nugget, which display the model output in the Output Viewer. The scripting name of this model nugget is *applystpnode*. For more information on scripting the modeling node itself, see "stpnode Properties" on page 207.

Table 162. applystpnode properties

applystpnode properties	**Data type**	**Property description**
uncertainty_factor	*Boolean*	Minimum 0, maximum 100.

applytcmnode Properties

Temporal Causal Modeling (TCM) modeling nodes can be used to generate a TCM model nugget. The scripting name of this model nugget is *applytcmnode*. For more information on scripting the modeling node itself, see "tcmnode Properties" on page 212.

Table 163. applytcmnode properties

applytcmnode Properties	**Values**	**Property description**
ext_future	*boolean*	
ext_future_num	*integer*	
noise_res	*boolean*	
conf_limits	*boolean*	
target_fields	*list*	
target_series	*list*	

applytimeseriesnode Properties

Time Series modeling nodes can be used to generate a Time Series model nugget. The scripting name of this model nugget is *applytimeseriesnode*. For more information on scripting the modeling node itself, "timeseriesnode Properties" on page 215.

Table 164. applytimeseriesnode properties.

applytimeseriesnode Properties	**Values**	**Property description**
calculate_conf	*flag*	
calculate_residuals	*flag*	

applytreeas Properties

Tree-AS modeling nodes can be used to generate a Tree-AS model nugget. The scripting name of this model nugget is *applytreenas*. For more information on scripting the modeling node itself, see "treeas Properties" on page 217.

Table 165. applytreeas properties

applytreeas Properties	**Values**	**Property description**
calculate_conf	*flag*	This property includes confidence calculations in the generated tree.
display_rule_id	*flag*	Adds a field in the scoring output that indicates the ID for the terminal node to which each record is assigned.
enable_sql_generation	udf native	Used to set SQL generation options during stream execution. Choose either to pushback to the database and score using a SPSS Modeler Server scoring adapter (if connected to a database with a scoring adapter installed), or score within SPSS Modeler.

applytwostepnode Properties

TwoStep modeling nodes can be used to generate a TwoStep model nugget. The scripting name of this model nugget is *applytwostepnode*. No other properties exist for this model nugget. For more information on scripting the modeling node itself, "twostepnode Properties" on page 219.

applytwostepAS Properties

TwoStep AS modeling nodes can be used to generate a TwoStep AS model nugget. The scripting name of this model nugget is *applytwostepAS*. No other properties exist for this model nugget. For more information on scripting the modeling node itself, "twostepAS Properties" on page 220.

Chapter 15. Database Modeling Node Properties

IBM SPSS Modeler supports integration with data mining and modeling tools available from database vendors, including Microsoft SQL Server Analysis Services, Oracle Data Mining, IBM DB2® InfoSphere Warehouse, and IBM Netezza® Analytics. You can build and score models using native database algorithms, all from within the IBM SPSS Modeler application. Database models can also be created and manipulated through scripting using the properties described in this section.

For example, the following script excerpt illustrates the creation of a Microsoft Decision Trees model by using the IBM SPSS Modeler scripting interface:

```
stream = modeler.script.stream()
msbuilder = stream.createAt("mstreenode", "MSBuilder", 200, 200)

msbuilder.setPropertyValue("analysis_server_name", 'localhost')
msbuilder.setPropertyValue("analysis_database_name", 'TESTDB')
msbuilder.setPropertyValue("mode", 'Expert')
msbuilder.setPropertyValue("datasource", 'LocalServer')
msbuilder.setPropertyValue("target", 'Drug')
msbuilder.setPropertyValue("inputs", ['Age', 'Sex'])
msbuilder.setPropertyValue("unique_field", 'IDX')
msbuilder.setPropertyValue("custom_fields", True)
msbuilder.setPropertyValue("model_name", 'MSDRUG')

typenode = stream.findByType("type", None)
stream.link(typenode, msbuilder)
results = []
msbuilder.run(results)
msapplier = stream.createModelApplierAt(results[0], "Drug", 200, 300)
tablenode = stream.createAt("table", "Results", 300, 300)
stream.linkBetween(msapplier, typenode, tablenode)
msapplier.setPropertyValue("sql_generate", True)
tablenode.run([])
```

Node Properties for Microsoft Modeling

Microsoft Modeling Node Properties

Common Properties

The following properties are common to the Microsoft database modeling nodes.

Table 166. Common Microsoft node properties

Common Microsoft Node Properties	Values	Property Description
analysis_database_name	*string*	Name of the Analysis Services database.
analysis_server_name	*string*	Name of the Analysis Services host.
use_transactional_data	*flag*	Specifies whether input data is in tabular or transactional format.
inputs	*list*	Input fields for tabular data.
target	*field*	Predicted field (not applicable to MS Clustering or Sequence Clustering nodes).
unique_field	*field*	Key field.

Table 166. Common Microsoft node properties (continued)

Common Microsoft Node Properties	Values	Property Description
msas_parameters	*structured*	Algorithm parameters. See the topic "Algorithm Parameters" on page 237 for more information.
with_drillthrough	*flag*	With Drillthrough option.

MS Decision Tree

There are no specific properties defined for nodes of type mstreenode. See the common Microsoft properties at the start of this section.

MS Clustering

There are no specific properties defined for nodes of type msclusternode. See the common Microsoft properties at the start of this section.

MS Association Rules

The following specific properties are available for nodes of type msassocnode:

Table 167. msassocnode properties

msassocnode Properties	Values	Property Description
id_field	*field*	Identifies each transaction in the data.
trans_inputs	*list*	Input fields for transactional data.
transactional_target	*field*	Predicted field (transactional data).

MS Naive Bayes

There are no specific properties defined for nodes of type msbayesnode. See the common Microsoft properties at the start of this section.

MS Linear Regression

There are no specific properties defined for nodes of type msregressionnode. See the common Microsoft properties at the start of this section.

MS Neural Network

There are no specific properties defined for nodes of type msneuralnetworknode. See the common Microsoft properties at the start of this section.

MS Logistic Regression

There are no specific properties defined for nodes of type mslogisticnode. See the common Microsoft properties at the start of this section.

MS Time Series

There are no specific properties defined for nodes of type mstimeseriesnode. See the common Microsoft properties at the start of this section.

MS Sequence Clustering

The following specific properties are available for nodes of type mssequenceclusternode:

Table 168. mssequenceclusternode properties

mssequenceclusternode Properties	Values	Property Description
id_field	*field*	Identifies each transaction in the data.
input_fields	*list*	Input fields for transactional data.
sequence_field	*field*	Sequence identifier.
target_field	*field*	Predicted field (tabular data).

Algorithm Parameters

Each Microsoft database model type has specific parameters that can be set using the msas_parameters property--for example:

```
stream = modeler.script.stream()
msregressionnode = stream.findByType("msregression", None)
msregressionnode.setPropertyValue("msas_parameters", [["MAXIMUM_INPUT_ATTRIBUTES", 255],
["MAXIMUM_OUTPUT_ATTRIBUTES", 255]])
```

These parameters are derived from SQL Server. To see the relevant parameters for each node:

1. Place a database source node on the canvas.
2. Open the database source node.
3. Select a valid source from the **Data source** drop-down list.
4. Select a valid table from the **Table name** list.
5. Click **OK** to close the database source node.
6. Attach the Microsoft database modeling node whose properties you want to list.
7. Open the database modeling node.
8. Select the **Expert** tab.

The available msas_parameters properties for this node are displayed.

Microsoft Model Nugget Properties

The following properties are for the model nuggets created using the Microsoft database modeling nodes.

MS Decision Tree

Table 169. MS Decision Tree properties.

applymstreenode Properties	Values	Description
analysis_database_name	*string*	This node can be scored directly in a stream. This property is used to identify the name of the Analysis Services database.
analysis_server_name	*string*	Name of the Analysis server host.
datasource	*string*	Name of the SQL Server ODBC data source name (DSN).
sql_generate	*flag*	Enables SQL generation.

MS Linear Regression

Table 170. MS Linear Regression properties.

applymsregressionnode Properties	**Values**	**Description**
analysis_database_name	*string*	This node can be scored directly in a stream. This property is used to identify the name of the Analysis Services database.
analysis_server_name	*string*	Name of the Analysis server host.

MS Neural Network

Table 171. MS Neural Network properties.

applymsneuralnetworknode Properties	**Values**	**Description**
analysis_database_name	*string*	This node can be scored directly in a stream. This property is used to identify the name of the Analysis Services database.
analysis_server_name	*string*	Name of the Analysis server host.

MS Logistic Regression

Table 172. MS Logistic Regression properties.

applymslogisticnode Properties	**Values**	**Description**
analysis_database_name	*string*	This node can be scored directly in a stream. This property is used to identify the name of the Analysis Services database.
analysis_server_name	*string*	Name of the Analysis server host.

MS Time Series

Table 173. MS Time Series properties.

applymstimeseriesnode Properties	**Values**	**Description**
analysis_database_name	*string*	This node can be scored directly in a stream. This property is used to identify the name of the Analysis Services database.
analysis_server_name	*string*	Name of the Analysis server host.
start_from	new_prediction historical_prediction	Specifies whether to make future predictions or historical predictions.
new_step	*number*	Defines starting time period for future predictions.
historical_step	*number*	Defines starting time period for historical predictions.
end_step	*number*	Defines ending time period for predictions.

MS Sequence Clustering

Table 174. MS Sequence Clustering properties.

applymssequenceclusternode Properties	Values	Description
analysis_database_name	*string*	This node can be scored directly in a stream. This property is used to identify the name of the Analysis Services database.
analysis_server_name	*string*	Name of the Analysis server host.

Node Properties for Oracle Modeling

Oracle Modeling Node Properties

The following properties are common to Oracle database modeling nodes.

Table 175. Common Oracle node properties.

Common Oracle Node Properties	Values	Property Description
target	*field*	
inputs	*List of fields*	
partition	*field*	Field used to partition the data into separate samples for the training, testing, and validation stages of model building.
datasource		
username		
password		
epassword		
use_model_name	*flag*	
model_name	*string*	Custom name for new model.
use_partitioned_data	*flag*	If a partition field is defined, this option ensures that only data from the training partition is used to build the model.
unique_field	*field*	
auto_data_prep	*flag*	Enables or disables the Oracle automatic data preparation feature (11g databases only).
costs	*structured*	Structured property in the form: `[[drugA drugB 1.5] [drugA drugC 2.1]]`, where the arguments in [] are actual predicted costs.
mode	`Simple` `Expert`	Causes certain properties to be ignored if set to `Simple`, as noted in the individual node properties.
use_prediction_probability	*flag*	
prediction_probability	*string*	
use_prediction_set	*flag*	

Oracle Naive Bayes

The following properties are available for nodes of type `oranbnode`.

Table 176. oranbnode properties.

oranbnode Properties	Values	Property Description
singleton_threshold	*number*	0.0–1.0.*
pairwise_threshold	*number*	0.0–1.0.*
priors	Data Equal Custom	
custom_priors	*structured*	Structured property in the form: set :oranbnode.custom_priors = [[drugA 1][drugB 2][drugC 3][drugX 4][drugY 5]]

* Property ignored if mode is set to Simple.

Oracle Adaptive Bayes

The following properties are available for nodes of type oraabnnode.

Table 177. oraabnnode properties.

oraabnnode Properties	Values	Property Description
model_type	SingleFeature MultiFeature NaiveBayes	
use_execution_time_limit	*flag*	*
execution_time_limit	*integer*	Value must be greater than 0.*
max_naive_bayes_predictors	*integer*	Value must be greater than 0.*
max_predictors	*integer*	Value must be greater than 0.*
priors	Data Equal Custom	
custom_priors	*structured*	Structured property in the form: set :oraabnnode.custom_priors = [[drugA 1][drugB 2][drugC 3][drugX 4][drugY 5]]

* Property ignored if mode is set to Simple.

Oracle Support Vector Machines

The following properties are available for nodes of type orasvmnode.

Table 178. orasvmnode properties.

orasvmnode Properties	Values	Property Description
active_learning	Enable Disable	
kernel_function	Linear Gaussian System	
normalization_method	zscore minmax none	

Table 178. orasvmnode properties (continued).

orasvmnode Properties	Values	Property Description
kernel_cache_size	*integer*	Gaussian kernel only. Value must be greater than 0.*
convergence_tolerance	*number*	Value must be greater than 0.*
use_standard_deviation	*flag*	Gaussian kernel only.*
standard_deviation	*number*	Value must be greater than 0.*
use_epsilon	*flag*	Regression models only.*
epsilon	*number*	Value must be greater than 0.*
use_complexity_factor	*flag*	*
complexity_factor	*number*	*
use_outlier_rate	*flag*	One-Class variant only.*
outlier_rate	*number*	One-Class variant only. 0.0–1.0.*
weights	Data Equal Custom	
custom_weights	*structured*	Structured property in the form: set :orasvmnode.custom_weights = [[drugA 1][drugB 2][drugC 3][drugX 4][drugY 5]]

* Property ignored if mode is set to Simple.

Oracle Generalized Linear Models

The following properties are available for nodes of type oraglmnode.

Table 179. oraglmnode properties.

oraglmnode Properties	Values	Property Description
normalization_method	zscore minmax none	
missing_value_handling	ReplaceWithMean UseCompleteRecords	
use_row_weights	*flag*	*
row_weights_field	*field*	*
save_row_diagnostics	*flag*	*
row_diagnostics_table	*string*	*
coefficient_confidence	*number*	*
use_reference_category	*flag*	*
reference_category	*string*	*
ridge_regression	Auto Off On	*
parameter_value	*number*	*
vif_for_ridge	*flag*	*

* Property ignored if mode is set to Simple.

Oracle Decision Tree

The following properties are available for nodes of type oradecisiontreenode.

Table 180. oradecisiontreenode properties.

oradecisiontreenode Properties	**Values**	**Property Description**
use_costs	*flag*	
impurity_metric	Entropy Gini	
term_max_depth	*integer*	2–20.*
term_minpct_node	*number*	0.0–10.0.*
term_minpct_split	*number*	0.0–20.0.*
term_minrec_node	*integer*	Value must be greater than 0.*
term_minrec_split	*integer*	Value must be greater than 0.*
display_rule_ids	*flag*	*

* Property ignored if mode is set to Simple.

Oracle O-Cluster

The following properties are available for nodes of type oraoclusternode.

Table 181. oraoclusternode properties.

oraoclusternode Properties	**Values**	**Property Description**
max_num_clusters	*integer*	Value must be greater than 0.
max_buffer	*integer*	Value must be greater than 0.*
sensitivity	*number*	0.0–1.0.*

* Property ignored if mode is set to Simple.

Oracle KMeans

The following properties are available for nodes of type orakmeansnode.

Table 182. orakmeansnode properties.

orakmeansnode Properties	**Values**	**Property Description**
num_clusters	*integer*	Value must be greater than 0.
normalization_method	zscore minmax none	
distance_function	Euclidean Cosine	
iterations	*integer*	0–20.*
conv_tolerance	*number*	0.0–0.5.*

Table 182. orakmeansnode properties (continued).

orakmeansnode Properties	**Values**	**Property Description**
split_criterion	Variance Size	Default is Variance.*
num_bins	*integer*	Value must be greater than 0.*
block_growth	*integer*	1–5.*
min_pct_attr_support	*number*	0.0–1.0.*

* Property ignored if mode is set to Simple.

Oracle NMF

The following properties are available for nodes of type oranmfnode.

Table 183. oranmfnode properties.

oranmfnode Properties	**Values**	**Property Description**
normalization_method	minmax none	
use_num_features	*flag*	*
num_features	*integer*	0–1. Default value is estimated from the data by the algorithm.*
random_seed	*number*	*
num_iterations	*integer*	0–500.*
conv_tolerance	*number*	0.0–0.5.*
display_all_features	*flag*	*

* Property ignored if mode is set to Simple.

Oracle Apriori

The following properties are available for nodes of type oraapriorinode.

Table 184. oraapriorinode properties.

oraapriorinode Properties	**Values**	**Property Description**
content_field	*field*	
id_field	*field*	
max_rule_length	*integer*	2–20.
min_confidence	*number*	0.0–1.0.
min_support	*number*	0.0–1.0.
use_transactional_data	*flag*	

Oracle Minimum Description Length (MDL)

There are no specific properties defined for nodes of type oramdlnode. See the common Oracle properties at the start of this section.

Oracle Attribute Importance (AI)

The following properties are available for nodes of type oraainode.

Table 185. oraainode properties.

oraainode Properties	Values	Property Description
custom_fields	*flag*	If true, allows you to specify target, input, and other fields for the current node. If false, the current settings from an upstream Type node are used.
selection_mode	ImportanceLevel ImportanceValue TopN	
select_important	*flag*	When selection_mode is set to ImportanceLevel, specifies whether to select important fields.
important_label	*string*	Specifies the label for the "important" ranking.
select_marginal	*flag*	When selection_mode is set to ImportanceLevel, specifies whether to select marginal fields.
marginal_label	*string*	Specifies the label for the "marginal" ranking.
important_above	*number*	0.0–1.0.
select_unimportant	*flag*	When selection_mode is set to ImportanceLevel, specifies whether to select unimportant fields.
unimportant_label	*string*	Specifies the label for the "unimportant" ranking.
unimportant_below	*number*	0.0–1.0.
importance_value	*number*	When selection_mode is set to ImportanceValue, specifies the cutoff value to use. Accepts values from 0 to 100.
top_n	*number*	When selection_mode is set to TopN, specifies the cutoff value to use. Accepts values from 0 to 1000.

Oracle Model Nugget Properties

The following properties are for the model nuggets created using the Oracle models.

Oracle Naive Bayes

There are no specific properties defined for nodes of type applyoranbnode.

Oracle Adaptive Bayes

There are no specific properties defined for nodes of type applyoraabnnode.

Oracle Support Vector Machines

There are no specific properties defined for nodes of type applyorasvmnode.

Oracle Decision Tree

The following properties are available for nodes of type applyoradecisiontreenode.

Table 186. applyoradecisiontreenode properties

applyoradecisiontreenode Properties	Values	Property Description
use_costs	*flag*	
display_rule_ids	*flag*	

Oracle O-Cluster

There are no specific properties defined for nodes of type `applyoraoclusternode`.

Oracle KMeans

There are no specific properties defined for nodes of type `applyorakmeansnode`.

Oracle NMF

The following property is available for nodes of type `applyoranmfnode`:

Table 187. applyoranmfnode properties

applyoranmfnode Properties	**Values**	**Property Description**
`display_all_features`	*flag*	

Oracle Apriori

This model nugget cannot be applied in scripting.

Oracle MDL

This model nugget cannot be applied in scripting.

Node Properties for IBM DB2 Modeling

IBM DB2 Modeling Node Properties

The following properties are common to IBM InfoSphere Warehouse (ISW) database modeling nodes.

Table 188. Common ISW node properties.

Common ISW node Properties	**Values**	**Property Description**
`inputs`	*List of fields*	
`datasource`		
`username`		
`password`		
`epassword`		
`enable_power_options`	*flag*	
`power_options_max_memory`	*integer*	Value must be greater than 32.
`power_options_cmdline`	*string*	
`mining_data_custom_sql`	*string*	
`logical_data_custom_sql`	*string*	
`mining_settings_custom_sql`		

ISW Decision Tree

The following properties are available for nodes of type `db2imtreenode`.

Table 189. db2imtreenode properties.

db2imtreenode Properties	Values	Property Description
target	*field*	
perform_test_run	*flag*	
use_max_tree_depth	*flag*	
max_tree_depth	*integer*	Value greater than 0.
use_maximum_purity	*flag*	
maximum_purity	*number*	Number between 0 and 100.
use_minimum_internal_cases	*flag*	
minimum_internal_cases	*integer*	Value greater than 1.
use_costs	*flag*	
costs	*structured*	Structured property in the form: `[[drugA drugB 1.5] [drugA drugC 2.1]]`, where the arguments in [] are actual predicted costs.

ISW Association

The following properties are available for nodes of type `db2imassocnode`.

Table 190. db2imassocnode properties.

db2imassocnode Properties	Values	Property Description
use_transactional_data	*flag*	
id_field	*field*	
content_field	*field*	
data_table_layout	basic limited_length	
max_rule_size	*integer*	Value must be greater than 2.
min_rule_support	*number*	0–100%
min_rule_confidence	*number*	0–100%
use_item_constraints	*flag*	
item_constraints_type	Include Exclude	
use_taxonomy	*flag*	
taxonomy_table_name	*string*	The name of the DB2 table to store taxonomy details.
taxonomy_child_column_name	*string*	The name of the child column in the taxonomy table. The child column contains the item names or category names.
taxonomy_parent_column_name	*string*	The name of the parent column in the taxonomy table. The parent column contains the category names.
load_taxonomy_to_table	*flag*	Controls if taxonomy information stored in IBM SPSS Modeler should be uploaded to the taxonomy table at model build time. Note that the taxonomy table is dropped if it already exists. Taxonomy information is stored with the model build node and can be edited using the **Edit Categories** and **Edit Taxonomy** buttons.

ISW Sequence

The following properties are available for nodes of type db2imsequencenode.

Table 191. db2imsequencenode properties.

db2imsequencenode Properties	Values	Property Description
id_field	*field*	
group_field	*field*	
content_field	*field*	
max_rule_size	*integer*	Value must be greater than 2.
min_rule_support	*number*	0–100%
min_rule_confidence	*number*	0–100%
use_item_constraints	*flag*	
item_constraints_type	Include Exclude	
use_taxonomy	*flag*	
taxonomy_table_name	*string*	The name of the DB2 table to store taxonomy details.
taxonomy_child_column_name	*string*	The name of the child column in the taxonomy table. The child column contains the item names or category names.
taxonomy_parent_column_name	*string*	The name of the parent column in the taxonomy table. The parent column contains the category names.
load_taxonomy_to_table	*flag*	Controls if taxonomy information stored in IBM SPSS Modeler should be uploaded to the taxonomy table at model build time. Note that the taxonomy table is dropped if it already exists. Taxonomy information is stored with the model build node and can be edited using the **Edit Categories** and **Edit Taxonomy** buttons.

ISW Regression

The following properties are available for nodes of type db2imregnode.

Table 192. db2imregnode properties.

db2imregnode Properties	Values	Property Description
target	*field*	
regression_method	transform linear polynomial rbf	See next table for properties that apply only if regression_method is set to rbf.
perform_test_run	*field*	
limit_rsquared_value	*flag*	
max_rsquared_value	*number*	Value between 0.0 and 1.0.
use_execution_time_limit	*flag*	
execution_time_limit_mins	*integer*	Value greater than 0.
use_max_degree_polynomial	*flag*	
max_degree_polynomial	*integer*	
use_intercept	*flag*	
use_auto_feature_selection_method	*flag*	

Table 192. db2imregnode properties (continued).

db2imregnode Properties	**Values**	**Property Description**
auto_feature_selection_method	normal adjusted	
use_min_significance_level	*flag*	
min_significance_level	*number*	
use_min_significance_level	*flag*	

The following properties apply only if regression_method is set to rbf.

Table 193. db2imregnode properties if regression_method is set to rbf.

db2imregnode Properties	Values	Property Description
use_output_sample_size	*flag*	If true, auto-set the value to the default.
output_sample_size	*integer*	Default is 2. Minimum is 1.
use_input_sample_size	*flag*	If true, auto-set the value to the default.
input_sample_size	*integer*	Default is 2. Minimum is 1.
use_max_num_centers	*flag*	If true, auto-set the value to the default.
max_num_centers	*integer*	Default is 20. Minimum is 1.
use_min_region_size	*flag*	If true, auto-set the value to the default.
min_region_size	*integer*	Default is 15. Minimum is 1.
use_max_data_passes	*flag*	If true, auto-set the value to the default.
max_data_passes	*integer*	Default is 5. Minimum is 2.
use_min_data_passes	*flag*	If true, auto-set the value to the default.
min_data_passes	*integer*	Default is 5. Minimum is 2.

ISW Clustering

The following properties are available for nodes of type db2imclusternode.

Table 194. db2imclusternode properties.

db2imclusternode Properties	**Values**	**Property Description**
cluster_method	demographic kohonen birch	
kohonen_num_rows	*integer*	
kohonen_num_columns	*integer*	

Table 194. db2imclusternode properties (continued).

db2imclusternode Properties	Values	Property Description
kohonen_passes	*integer*	
use_num_passes_limit	*flag*	
use_num_clusters_limit	*flag*	
max_num_clusters	*integer*	Value greater than 1.
birch_dist_measure	log_likelihood euclidean	Default is log_likelihood.
birch_num_cfleaves	*integer*	Default is 1000.
birch_num_refine_passes	*integer*	Default is 3; minimum is 1.
use_execution_time_limit	*flag*	
execution_time_limit_mins	*integer*	Value greater than 0.
min_data_percentage	*number*	0–100%
use_similarity_threshold	*flag*	
similarity_threshold	*number*	Value between 0.0 and 1.0.

ISW Naive Bayes

The following properties are available for nodes of type db2imnbsnode.

Table 195. db2imnbnode properties.

db2imnbnode Properties	Values	Property Description
perform_test_run	*flag*	
probability_threshold	*number*	Default is 0.001. Minimum value is 0; maximum value is 1.000
use_costs	*flag*	
costs	*structured*	Structured property in the form: [[drugA drugB 1.5] [drugA drugC 2.1]], where the arguments in [] are actual predicted costs.

ISW Logistic Regression

The following properties are available for nodes of type db2imlognode.

Table 196. db2imlognode properties.

db2imlognode Properties	Values	Property Description
perform_test_run	*flag*	
use_costs	*flag*	
costs	*structured*	Structured property in the form: [[drugA drugB 1.5] [drugA drugC 2.1]], where the arguments in [] are actual predicted costs.

ISW Time Series

Note: The input fields parameter is not used for this node. If the input fields parameter is found in the script a warning is displayed to say that the node has *time* and *targets* as incoming fields, but no input fields.

The following properties are available for nodes of type `db2imtimeseriesnode`.

Table 197. db2imtimeseriesnode properties.

db2imtimeseriesnode Properties	**Values**	**Property Description**
`time`	*field*	Integer, time, or date allowed.
`targets`	*list of fields*	

`forecasting_algorithm`	`arima`
	`exponential_ smoothing`
	`seasonal_trend_ decomposition`	

`forecasting_end_time`	`auto`
	`integer`
	`date`
	`time`	

`use_records_all`	*boolean*	If false, `use_records_start` and `use_records_end` must be set.
`use_records_start`	*integer / time / date*	Depends on type of time field
`use_records_end`	*integer / time / date*	Depends on type of time field

`interpolation_method`	`none`
	`linear`
	`exponential_splines`
	`cubic_splines`	

IBM DB2 Model Nugget Properties

The following properties are for the model nuggets created using the IBM DB2 ISW models.

ISW Decision Tree

There are no specific properties defined for nodes of type `applydb2imtreenode`.

ISW Association

This model nugget cannot be applied in scripting.

ISW Sequence

This model nugget cannot be applied in scripting.

ISW Regression

There are no specific properties defined for nodes of type `applydb2imregnode`.

ISW Clustering

There are no specific properties defined for nodes of type `applydb2imclusternode`.

ISW Naive Bayes

There are no specific properties defined for nodes of type applydb2imnbnode.

ISW Logistic Regression

There are no specific properties defined for nodes of type applydb2imlognode.

ISW Time Series

This model nugget cannot be applied in scripting.

Node Properties for IBM Netezza Analytics Modeling

Netezza Modeling Node Properties

The following properties are common to IBM Netezza database modeling nodes.

Table 198. Common Netezza node properties.

Common Netezza Node Properties	Values	Property Description
custom_fields	*flag*	If true, allows you to specify target, input, and other fields for the current node. If false, the current settings from an upstream Type node are used.
inputs	*[field1 ... fieldN]*	Input or predictor fields used by the model.
target	*field*	Target field (continuous or categorical).
record_id	*field*	Field to be used as unique record identifier.
use_upstream_connection	*flag*	If true (default), the connection details specified in an upstream node. Not used if move_data_to_connection is specified.
move_data_connection	*flag*	If true, moves the data to the database specified by connection. Not used if use_upstream_connection is specified.
connection	*structured*	The connection string for the Netezza database where the model is stored. Structured property in the form: ['odbc' '<dsn>' '<username>' '<psw>' '<catname>' '<conn_attribs>' [true|false]] where: <dsn> is the data source name <username> and <psw> are the username and password for the database <catname> is the catalog name <conn_attribs> are the connection attributes true | false indicates whether the password is needed.
table_name	*string*	Name of database table where model is to be stored.
use_model_name	*flag*	If true, uses the name specified by model_name as the name of the model, otherwise model name is created by the system.
model_name	*string*	Custom name for new model.
include_input_fields	*flag*	If true, passes all input fields downstream, otherwise passes only record_id and fields generated by model.

Netezza Decision Tree

The following properties are available for nodes of type netezzadectreenode.

Table 199. netezzadectreenode properties.

netezzadectreenode Properties	Values	Property Description
impurity_measure	Entropy Gini	The measurement of impurity, used to evaluate the best place to split the tree.
max_tree_depth	*integer*	Maximum number of levels to which tree can grow. Default is 62 (the maximum possible).
min_improvement_splits	*number*	Minimum improvement in impurity for split to occur. Default is 0.01.
min_instances_split	*integer*	Minimum number of unsplit records remaining before split can occur. Default is 2 (the minimum possible).
weights	*structured*	Relative weightings for classes. Structured property in the form: set :netezza_dectree.weights = [[drugA 0.3][drugB 0.6]] Default is weight of 1 for all classes.
pruning_measure	Acc wAcc	Default is Acc (accuracy). Alternative wAcc (weighted accuracy) takes class weights into account while applying pruning.
prune_tree_options	allTrainingData partitionTrainingData useOtherTable	Default is to use allTrainingData to estimate model accuracy. Use partitionTrainingData to specify a percentage of training data to use, or useOtherTable to use a training data set from a specified database table.
perc_training_data	*number*	If prune_tree_options is set to partitionTrainingData, specifies percentage of data to use for training.
prune_seed	*integer*	Random seed to be used for replicating analysis results when prune_tree_options is set to partitionTrainingData; default is 1.
pruning_table	*string*	Table name of a separate pruning dataset for estimating model accuracy.
compute_probabilities	*flag*	If true, produces a confidence level (probability) field as well as the prediction field.

Netezza K-Means

The following properties are available for nodes of type netezzakmeansnode.

Table 200. netezzakmeansnode properties.

netezzakmeansnode Properties	Values	Property Description
distance_measure	Euclidean Manhattan Canberra maximum	Method to be used for measuring distance between data points.

Table 200. netezzakmeansnode properties (continued).

netezzakmeansnode Properties	**Values**	**Property Description**
num_clusters	*integer*	Number of clusters to be created; default is 3.
max_iterations	*integer*	Number of algorithm iterations after which to stop model training; default is 5.
rand_seed	*integer*	Random seed to be used for replicating analysis results; default is 12345.

Netezza Bayes Net

The following properties are available for nodes of type netezzabayesnode.

Table 201. netezzabayesnode properties.

netezzabayesnode Properties	**Values**	**Property Description**
base_index	*integer*	Numeric identifier assigned to first input field for internal management; default is 777.
sample_size	*integer*	Size of sample to take if number of attributes is very large; default is 10,000.
display_additional_information	*flag*	If true, displays additional progress information in a message dialog box.
type_of_prediction	best neighbors nn-neighbors	Type of prediction algorithm to use: best (most correlated neighbor), neighbors (weighted prediction of neighbors), or nn-neighbors (non null-neighbors).

Netezza Naive Bayes

The following properties are available for nodes of type netezzanaivebayesnode.

Table 202. netezzanaivebayesnode properties.

netezzanaivebayesnode Properties	**Values**	**Property Description**
compute_probabilities	*flag*	If true, produces a confidence level (probability) field as well as the prediction field.
use_m_estimation	*flag*	If true, uses m-estimation technique for avoiding zero probabilities during estimation.

Netezza KNN

The following properties are available for nodes of type netezzaknnnode.

Table 203. netezzaknnnode properties.

netezzaknnnode Properties	**Values**	**Property Description**
weights	*structured*	Structured property used to assign weights to individual classes. Example: set :netezzaknnnode.weights = [[drugA 0.3][drugB 0.6]]
distance_measure	Euclidean Manhattan Canberra Maximum	Method to be used for measuring the distance between data points.

Table 203. netezzaknnnode properties (continued).

netezzaknnnode Properties	**Values**	**Property Description**
num_nearest_neighbors	*integer*	Number of nearest neighbors for a particular case; default is 3.
standardize_measurements	*flag*	If true, standardizes measurements for continuous input fields before calculating distance values.
use_coresets	*flag*	If true, uses core set sampling to speed up calculation for large data sets.

Netezza Divisive Clustering

The following properties are available for nodes of type netezzadivclusternode.

Table 204. netezzadivclusternode properties.

netezzadivclusternode Properties	**Values**	**Property Description**
distance_measure	Euclidean Manhattan Canberra Maximum	Method to be used for measuring the distance between data points.
max_iterations	*integer*	Maximum number of algorithm iterations to perform before model training stops; default is 5.
max_tree_depth	*integer*	Maximum number of levels to which data set can be subdivided; default is 3.
rand_seed	*integer*	Random seed, used to replicate analyses; default is 12345.
min_instances_split	*integer*	Minimum number of records that can be split, default is 5.
level	*integer*	Hierarchy level to which records are to be scored; default is -1.

Netezza PCA

The following properties are available for nodes of type netezzapcanode.

Table 205. netezzapcanode properties.

netezzapcanode Properties	**Values**	**Property Description**
center_data	*flag*	If true (default), performs data centering (also known as "mean subtraction") before the analysis.
perform_data_scaling	*flag*	If true, performs data scaling before the analysis. Doing so can make the analysis less arbitrary when different variables are measured in different units.
force_eigensolve	*flag*	If true, uses less accurate but faster method of finding principal components.
pc_number	*integer*	Number of principal components to which data set is to be reduced; default is 1.

Netezza Regression Tree

The following properties are available for nodes of type netezzaregtreenode.

Table 206. netezzaregtreenode properties.

netezzaregtreenode Properties	**Values**	**Property Description**
max_tree_depth	*integer*	Maximum number of levels to which the tree can grow below the root node; default is 10.
split_evaluation_measure	Variance	Class impurity measure, used to evaluate the best place to split the tree; default (and currently only option) is Variance.
min_improvement_splits	*number*	Minimum amount to reduce impurity before new split is created in tree.
min_instances_split	*integer*	Minimum number of records that can be split.
pruning_measure	mse r2 pearson spearman	Method to be used for pruning.
prune_tree_options	allTrainingData partitionTrainingData useOtherTable	Default is to use allTrainingData to estimate model accuracy. Use partitionTrainingData to specify a percentage of training data to use, or useOtherTable to use a training data set from a specified database table.
perc_training_data	*number*	If prune_tree_options is set to PercTrainingData, specifies percentage of data to use for training.
prune_seed	*integer*	Random seed to be used for replicating analysis results when prune_tree_options is set to PercTrainingData; default is 1.
pruning_table	*string*	Table name of a separate pruning dataset for estimating model accuracy.
compute_probabilities	*flag*	If true, specifies that variances of assigned classes should be included in output.

Netezza Linear Regression

The following properties are available for nodes of type netezzalineregressionnode.

Table 207. netezzalineregressionnode properties.

netezzalineregressionnode Properties	**Values**	**Property Description**
use_svd	*flag*	If true, uses Singular Value Decomposition matrix instead of original matrix, for increased speed and numerical accuracy.
include_intercept	*flag*	If true (default), increases overall accuracy of solution.
calculate_model_diagnostics	*flag*	If true, calculates diagnostics on the model.

Netezza Time Series

The following properties are available for nodes of type netezzatimeseriesnode.

Table 208. netezzatimeseriesnode properties.

netezzatimeseriesnode Properties	**Values**	**Property Description**
time_points	*field*	Input field containing the date or time values for the time series.
time_series_ids	*field*	Input field containing time series IDs; used if input contains more than one time series.
model_table	*field*	Name of database table where Netezza time series model will be stored.
description_table	*field*	Name of input table that contains time series names and descriptions.
seasonal_adjustment_table	*field*	Name of output table where seasonally adjusted values computed by exponential smoothing or seasonal trend decomposition algorithms will be stored.
algorithm_name	SpectralAnalysis or spectral ExponentialSmoothing or esmoothing ARIMA SeasonalTrendDecomposition or std	Algorithm to be used for time series modeling.
trend_name	N A DA M DM	Trend type for exponential smoothing: N - none A - additive DA - damped additive M - multiplicative DM - damped multiplicative
seasonality_type	N A M	Seasonality type for exponential smoothing: N - none A - additive M - multiplicative
interpolation_method	linear cubicspline exponentialspline	Interpolation method to be used.
timerange_setting	SD SP	Setting for time range to use: SD - system-determined (uses full range of time series data) SP - user-specified via earliest_time and latest_time

Table 208. netezzatimeseriesnode properties (continued).

netezzatimeseriesnode Properties	**Values**	**Property Description**
earliest_time latest_time	*integer* *date* *time* *timestamp*	Start and end values, if timerange_setting is SP. Format should follow time_points value. For example, if the time_points field contains a date, this should also be a date. Example: set NZ_DT1.timerange_setting = 'SP' set NZ_DT1.earliest_time = '1921-01-01' set NZ_DT1.latest_time = '2121-01-01'
arima_setting	SD SP	Setting for the ARIMA algorithm (used only if algorithm_name is set to ARIMA): SD - system-determined SP - user-specified If arima_setting = SP, use the following parameters to set the seasonal and non-seasonal values. Example (non-seasonal only): set NZ_DT1.algorithm_name = 'arima' set NZ_DT1.arima_setting = 'SP' set NZ_DT1.p_symbol = 'lesseq' set NZ_DT1.p = '4' set NZ_DT1.d_symbol = 'lesseq' set NZ_DT1.d = '2' set NZ_DT1.q_symbol = 'lesseq' set NZ_DT1.q = '4'
p_symbol d_symbol q_symbol sp_symbol sd_symbol sq_symbol	less eq lesseq	ARIMA - operator for parameters p, d, q, sp, sd, and sq: less - less than eq - equals lesseq - less than or equal to
p	*integer*	ARIMA - non-seasonal degrees of autocorrelation.
q	*integer*	ARIMA - non-seasonal derivation value.
d	*integer*	ARIMA - non-seasonal number of moving average orders in the model.
sp	*integer*	ARIMA - seasonal degrees of autocorrelation.
sq	*integer*	ARIMA - seasonal derivation value.

Table 208. netezzatimeseriesnode properties (continued).

netezzatimeseriesnode Properties	**Values**	**Property Description**
sd	*integer*	ARIMA - seasonal number of moving average orders in the model.
advanced_setting	SD SP	Determines how advanced settings are to be handled: SD - system-determined SP - user-specified via period , units_period and forecast_setting. Example: set NZ_DT1.advanced_setting = 'SP' set NZ_DT1.period = 5 set NZ_DT1.units_period = 'd'
period	*integer*	Length of seasonal cycle, specified in conjunction with units_period. Not applicable for spectral analysis.
units_period	ms s min h d wk q y	Units in which period is expressed: ms - milliseconds s - seconds min - minutes h - hours d - days wk - weeks q - quarters y - years For example, for a weekly time series use 1 for period and wk for units_period.
forecast_setting	forecasthorizon forecasttimes	Specifies how forecasts are to be made.
forecast_horizon	*integer* *date* *time* *timestamp*	If forecast_setting = forecasthorizon, specifies end point value for forecasting. Format should follow time_points value. For example, if the time_points field contains a date, this should also be a date.
forecast_times	*integer* *date* *time* *timestamp*	If forecast_setting = forecasttimes, specifies values to use for making forecasts. Format should follow time_points value. For example, if the time_points field contains a date, this should also be a date.
include_history	*flag*	Indicates if historical values are to be included in output.

Table 208. netezzatimeseriesnode properties (continued).

netezzatimeseriesnode Properties	**Values**	**Property Description**
include_interpolated_values	*flag*	Indicates if interpolated values are to be included in output. Not applicable if include_history is false.

Netezza Generalized Linear

The following properties are available for nodes of type netezzaglmnode.

Table 209. netezzaglmnode properties.

netezzaglmnode Properties	**Values**	**Property Description**
dist_family	bernoulli gaussian poisson negativebinomial wald gamma	Distribution type; default is bernoulli.
dist_params	*number*	Distribution parameter value to use. Only applicable if distribution is Negativebinomial.
trials	*integer*	Only applicable if distribution is Binomial. When target response is a number of events occurring in a set of trials, target field contains number of events, and trials field contains number of trials.
model_table	*field*	Name of database table where Netezza generalized linear model will be stored.
maxit	*integer*	Maximum number of iterations the algorithm should perform; default is 20.
eps	*number*	Maximum error value (in scientific notation) at which algorithm should stop finding best fit model. Default is -3, meaning 1E-3, or 0.001.
tol	*number*	Value (in scientific notation) below which errors are treated as having a value of zero. Default is -7, meaning that error values below 1E-7 (or 0.0000001) are counted as insignificant.

Table 209. netezzaglmnode properties (continued).

netezzaglmnode Properties	**Values**	**Property Description**
link_func	identity inverse invnegative invsquare sqrt power oddspower log clog loglog cloglog logit probit gaussit cauchit canbinom cangeom cannegbinom	Link function to use; default is logit.
link_params	*number*	Link function parameter value to use. Only applicable if link_function is power or oddspower.
interaction	[[[*colnames1*],[*levels1*]], [[*colnames2*],[*levels2*]], ...,[[*colnamesN*],[*levelsN*]],]	Specifies interactions between fields. *colnames* is a list of input fields, and *level* is always 0 for each field. Example: [[["K","BP","Sex","K"],[0,0,0,0]], [["Age","Na"],[0,0]]]
intercept	*flag*	If true, includes the intercept in the model.

Netezza Model Nugget Properties

The following properties are common to Netezza database model nuggets.

Table 210. Common Netezza model nugget properties

Common Netezza Model Nugget Properties	**Values**	**Property Description**
connection	*string*	The connection string for the Netezza database where the model is stored.
table_name	*string*	Name of database table where model is stored.

Other model nugget properties are the same as those for the corresponding modeling node.

The script names of the model nuggets are as follows.

Table 211. Script names of Netezza model nuggets

Model Nugget	**Script Name**
Decision Tree	applynetezzadectreenode
K-Means	applynetezzakmeansnode
Bayes Net	applynetezzabayesnode
Naive Bayes	applynetezzanaivebayesnode

Table 211. Script names of Netezza model nuggets (continued)

Model Nugget	Script Name
KNN	`applynetezzaknnnode`
Divisive Clustering	`applynetezzadivclusternode`
PCA	`applynetezzapcanode`
Regression Tree	`applynetezzaregtreenode`
Linear Regression	`applynetezzalineregressionnode`
Time Series	`applynetezzatimeseriesnode`
Generalized Linear	`applynetezzaglmnode`

Chapter 16. Output Node Properties

Output node properties differ slightly from those of other node types. Rather than referring to a particular node option, output node properties store a reference to the output object. This is useful in taking a value from a table and then setting it as a stream parameter.

This section describes the scripting properties available for output nodes.

analysisnode Properties

The Analysis node evaluates predictive models' ability to generate accurate predictions. Analysis nodes perform various comparisons between predicted values and actual values for one or more model nuggets. They can also compare predictive models to each other.

Example

```
node = stream.create("analysis", "My node")
# "Analysis" tab
node.setPropertyValue("coincidence", True)
node.setPropertyValue("performance", True)
node.setPropertyValue("confidence", True)
node.setPropertyValue("threshold", 75)
node.setPropertyValue("improve_accuracy", 3)
node.setPropertyValue("inc_user_measure", True)
# "Define User Measure..."
node.setPropertyValue("user_if", "@TARGET = @PREDICTED")
node.setPropertyValue("user_then", "101")
node.setPropertyValue("user_else", "1")
node.setPropertyValue("user_compute", ["Mean", "Sum"])
node.setPropertyValue("by_fields", ["Drug"])
# "Output" tab
node.setPropertyValue("output_format", "HTML")
node.setPropertyValue("full_filename", "C:/output/analysis_out.html")
```

Table 212. analysisnode properties.

analysisnode properties	**Data type**	**Property description**
output_mode	Screen File	Used to specify target location for output generated from the output node.
use_output_name	*flag*	Specifies whether a custom output name is used.
output_name	*string*	If use_output_name is true, specifies the name to use.
output_format	Text (*.txt*) HTML (*.html*) Output (*.cou*)	Used to specify the type of output.
by_fields	*list*	
full_filename	*string*	If disk, data, or HTML output, the name of the output file.
coincidence	*flag*	

Table 212. analysisnode properties (continued).

analysisnode properties	Data type	Property description
performance	*flag*	
evaluation_binary	*flag*	
confidence	*flag*	
threshold	*number*	
improve_accuracy	*number*	
inc_user_measure	*flag*	
user_if	*expr*	
user_then	*expr*	
user_else	*expr*	
user_compute	[Mean Sum Min Max SDev]	

dataauditnode Properties

The Data Audit node provides a comprehensive first look at the data, including summary statistics, histograms and distribution for each field, as well as information on outliers, missing values, and extremes. Results are displayed in an easy-to-read matrix that can be sorted and used to generate full-size graphs and data preparation nodes.

Example

```
filenode = stream.createAt("variablefile", "File", 100, 100)
filenode.setPropertyValue("full_filename", "$CLEO_DEMOS/DRUG1n")
node = stream.createAt("dataaudit", "My node", 196, 100)
stream.link(filenode, node)
node.setPropertyValue("custom_fields", True)
node.setPropertyValue("fields", ["Age", "Na", "K"])
node.setPropertyValue("display_graphs", True)
node.setPropertyValue("basic_stats", True)
node.setPropertyValue("advanced_stats", True)
node.setPropertyValue("median_stats", False)
node.setPropertyValue("calculate", ["Count", "Breakdown"])
node.setPropertyValue("outlier_detection_method", "std")
node.setPropertyValue("outlier_detection_std_outlier", 1.0)
node.setPropertyValue("outlier_detection_std_extreme", 3.0)
node.setPropertyValue("output_mode", "Screen")
```

Table 213. dataauditnode properties.

dataauditnode properties	Data type	Property description
custom_fields	*flag*	
fields	*[field1 ... fieldN]*	
overlay	*field*	
display_graphs	*flag*	Used to turn the display of graphs in the output matrix on or off.
basic_stats	*flag*	
advanced_stats	*flag*	
median_stats	*flag*	

Table 213. dataauditnode properties (continued).

dataauditnode properties	Data type	Property description
calculate	Count Breakdown	Used to calculate missing values. Select either, both, or neither calculation method.
outlier_detection_method	std iqr	Used to specify the detection method for outliers and extreme values.
outlier_detection_std_outlier	*number*	If outlier_detection_method is std, specifies the number to use to define outliers.
outlier_detection_std_extreme	*number*	If outlier_detection_method is std, specifies the number to use to define extreme values.
outlier_detection_iqr_outlier	*number*	If outlier_detection_method is iqr, specifies the number to use to define outliers.
outlier_detection_iqr_extreme	*number*	If outlier_detection_method is iqr, specifies the number to use to define extreme values.
use_output_name	*flag*	Specifies whether a custom output name is used.
output_name	*string*	If use_output_name is true, specifies the name to use.
output_mode	Screen File	Used to specify target location for output generated from the output node.
output_format	Formatted (*.tab*) Delimited (*.csv*) HTML (*.html*) Output (*.cou*)	Used to specify the type of output.
paginate_output	*flag*	When the output_format is HTML, causes the output to be separated into pages.
lines_per_page	*number*	When used with paginate_output, specifies the lines per page of output.
full_filename	*string*	

matrixnode Properties

The Matrix node creates a table that shows relationships between fields. It is most commonly used to show the relationship between two symbolic fields, but it can also show relationships between flag fields or numeric fields.

Example

```
node = stream.create("matrix", "My node")
# "Settings" tab
node.setPropertyValue("fields", "Numerics")
node.setPropertyValue("row", "K")
```

```
node.setPropertyValue("column", "Na")
node.setPropertyValue("cell_contents", "Function")
node.setPropertyValue("function_field", "Age")
node.setPropertyValue("function", "Sum")
# "Appearance" tab
node.setPropertyValue("sort_mode", "Ascending")
node.setPropertyValue("highlight_top", 1)
node.setPropertyValue("highlight_bottom", 5)
node.setPropertyValue("display", ["Counts", "Expected", "Residuals"])
node.setPropertyValue("include_totals", True)
# "Output" tab
node.setPropertyValue("full_filename", "C:/output/matrix_output.html")
node.setPropertyValue("output_format", "HTML")
node.setPropertyValue("paginate_output", True)
node.setPropertyValue("lines_per_page", 50)
```

Table 214. matrixnode properties.

matrixnode properties	**Data type**	**Property description**
fields	Selected Flags Numerics	
row	*field*	
column	*field*	
include_missing_values	*flag*	Specifies whether user-missing (blank) and system missing (null) values are included in the row and column output.
cell_contents	CrossTabs Function	
function_field	*string*	
function	Sum Mean Min Max SDev	
sort_mode	Unsorted Ascending Descending	
highlight_top	*number*	If non-zero, then true.
highlight_bottom	*number*	If non-zero, then true.
display	[Counts Expected Residuals RowPct ColumnPct TotalPct]	
include_totals	*flag*	
use_output_name	*flag*	Specifies whether a custom output name is used.
output_name	*string*	If use_output_name is true, specifies the name to use.

Table 214. matrixnode properties (continued).

matrixnode properties	Data type	Property description
output_mode	Screen File	Used to specify target location for output generated from the output node.
output_format	Formatted (*.tab*) Delimited (*.csv*) HTML (*.html*) Output (*.cou*)	Used to specify the type of output. Both the Formatted and Delimited formats can take the modifier transposed, which transposes the rows and columns in the table.
paginate_output	*flag*	When the output_format is HTML, causes the output to be separated into pages.
lines_per_page	*number*	When used with paginate_output, specifies the lines per page of output.
full_filename	*string*	

meansnode Properties

The Means node compares the means between independent groups or between pairs of related fields to test whether a significant difference exists. For example, you could compare mean revenues before and after running a promotion or compare revenues from customers who did not receive the promotion with those who did.

Example

```
node = stream.create("means", "My node")
node.setPropertyValue("means_mode", "BetweenFields")
node.setPropertyValue("paired_fields", [["OPEN_BAL", "CURR_BAL"]])
node.setPropertyValue("label_correlations", True)
node.setPropertyValue("output_view", "Advanced")
node.setPropertyValue("output_mode", "File")
node.setPropertyValue("output_format", "HTML")
node.setPropertyValue("full_filename", "C:/output/means_output.html")
```

Table 215. meansnode properties.

meansnode properties	Data type	Property description
means_mode	BetweenGroups BetweenFields	Specifies the type of means statistic to be executed on the data.
test_fields	[field1 ... fieldn]	Specifies the test field when means_mode is set to BetweenGroups.
grouping_field	*field*	Specifies the grouping field.
paired_fields	[[field1 field2] [field3 field4] ...]	Specifies the field pairs to use when means_mode is set to BetweenFields.
label_correlations	*flag*	Specifies whether correlation labels are shown in output. This setting applies only when means_mode is set to BetweenFields.
correlation_mode	Probability Absolute	Specifies whether to label correlations by probability or absolute value.

Table 215. meansnode properties (continued).

meansnode properties	Data type	Property description
weak_label	*string*	
medium_label	*string*	
strong_label	*string*	
weak_below_probability	*number*	When correlation_mode is set to Probability, specifies the cutoff value for weak correlations. This must be a value between 0 and 1—for example, 0.90.
strong_above_probability	*number*	Cutoff value for strong correlations.
weak_below_absolute	*number*	When correlation_mode is set to Absolute, specifies the cutoff value for weak correlations. This must be a value between 0 and 1—for example, 0.90.
strong_above_absolute	*number*	Cutoff value for strong correlations.
unimportant_label	*string*	
marginal_label	*string*	
important_label	*string*	
unimportant_below	*number*	Cutoff value for low field importance. This must be a value between 0 and 1—for example, 0.90.
important_above	*number*	
use_output_name	*flag*	Specifies whether a custom output name is used.
output_name	*string*	Name to use.
output_mode	Screen File	Specifies the target location for output generated from the output node.
output_format	Formatted (*.tab*) Delimited (*.csv*) HTML (*.html*) Output (*.cou*)	Specifies the type of output.
full_filename	*string*	
output_view	Simple Advanced	Specifies whether the simple or advanced view is displayed in the output.

reportnode Properties

The Report node creates formatted reports containing fixed text as well as data and other expressions derived from the data. You specify the format of the report using text templates to define the fixed text and data output constructions. You can provide custom text formatting by using HTML tags in the template and by setting options on the Output tab. You can include data values and other conditional output by using CLEM expressions in the template.

Example

```
node = stream.create("report", "My node")
node.setPropertyValue("output_format", "HTML")
node.setPropertyValue("full_filename", "C:/report_output.html")
node.setPropertyValue("lines_per_page", 50)
node.setPropertyValue("title", "Report node created by a script")
node.setPropertyValue("highlights", False)
```

Table 216. reportnode properties.

reportnode properties	**Data type**	**Property description**
output_mode	Screen File	Used to specify target location for output generated from the output node.
output_format	HTML (*.html*) Text (*.txt*) Output (*.cou*)	Used to specify the type of output.
use_output_name	*flag*	Specifies whether a custom output name is used.
output_name	*string*	If use_output_name is true, specifies the name to use.
text	*string*	
full_filename	*string*	
highlights	*flag*	
title	*string*	
lines_per_page	*number*	

routputnode Properties

The R Output node enables you to analyze data and the results of model scoring using your own custom R script. The output of the analysis can be text or graphical. The output is added to the **Output** tab of the manager pane; alternatively, the output can be redirected to a file.

Table 217. routputnode properties

routputnode properties	**Data type**	**Property description**
syntax	*string*	
convert_flags	StringsAndDoubles LogicalValues	
convert_datetime	*flag*	
convert_datetime_class	POSIXct POSIXlt	
convert_missing	*flag*	
output_name	Auto Custom	
custom_name	*string*	
output_to	Screen File	

Table 217. routputnode properties (continued)

routputnode properties	Data type	Property description
output_type	Graph Text	
full_filename	*string*	
graph_file_type	HTML COU	
text_file_type	HTML TEXT COU	

setglobalsnode Properties

The Set Globals node scans the data and computes summary values that can be used in CLEM expressions. For example, you can use this node to compute statistics for a field called *age* and then use the overall mean of *age* in CLEM expressions by inserting the function `@GLOBAL_MEAN(age)`.

Example

```
node = stream.create("setglobals", "My node")
node.setKeyedPropertyValue("globals", "Na", ["Max", "Sum", "Mean"])
node.setKeyedPropertyValue("globals", "K", ["Max", "Sum", "Mean"])
node.setKeyedPropertyValue("globals", "Age", ["Max", "Sum", "Mean", "SDev"])
node.setPropertyValue("clear_first", False)
node.setPropertyValue("show_preview", True)
```

Table 218. setglobalsnode properties.

setglobalsnode properties	Data type	Property description
globals	[Sum Mean Min Max SDev]	Structured property where fields to be set must be referenced with the following syntax: `node.setKeyedPropertyValue( "globals", "Age", ["Max", "Sum", "Mean", "SDev"])`
clear_first	*flag*	
show_preview	*flag*	

simevalnode Properties

The Simulation Evaluation node evaluates a specified predicted target field, and presents distribution and correlation information about the target field.

Table 219. simevalnode properties.

simevalnode properties	Data type	Property description
target	*field*	
iteration	*field*	
presorted_by_iteration	*boolean*	

Table 219. simevalnode properties (continued).

simevalnode properties	Data type	Property description
max_iterations	*number*	
tornado_fields	*[field1...fieldN]*	
plot_pdf	*boolean*	
plot_cdf	*boolean*	
show_ref_mean	*boolean*	
show_ref_median	*boolean*	
show_ref_sigma	*boolean*	
num_ref_sigma	*number*	
show_ref_pct	*boolean*	
ref_pct_bottom	*number*	
ref_pct_top	*number*	
show_ref_custom	*boolean*	
ref_custom_values	*[number1...numberN]*	
category_values	Category Probabilities Both	
category_groups	Categories Iterations	
create_pct_table	*boolean*	
pct_table	Quartiles Intervals Custom	
pct_intervals_num	*number*	
pct_custom_values	*[number1...numberN]*	

simfitnode Properties

The Simulation Fitting node examines the statistical distribution of the data in each field and generates (or updates) a Simulation Generate node, with the best fitting distribution assigned to each field. The Simulation Generate node can then be used to generate simulated data.

Table 220. simfitnode properties.

simfitnode properties	Data type	Property description
build	Node XMLExport Both	
use_source_node_name	*boolean*	
source_node_name	*string*	The custom name of the source node that is either being generated or updated.
use_cases	All LimitFirstN	
use_case_limit	*integer*	

Table 220. simfitnode properties (continued).

simfitnode properties	Data type	Property description
fit_criterion	AndersonDarling KolmogorovSmirnov	
num_bins	*integer*	
parameter_xml_filename	*string*	
generate_parameter_import	*boolean*	

statisticsnode Properties

The Statistics node provides basic summary information about numeric fields. It calculates summary statistics for individual fields and correlations between fields.

Example

```
node = stream.create("statistics", "My node")
# "Settings" tab
node.setPropertyValue("examine", ["Age", "BP", "Drug"])
node.setPropertyValue("statistics", ["Mean", "Sum", "SDev"])
node.setPropertyValue("correlate", ["BP", "Drug"])
# "Correlation Labels..." section
node.setPropertyValue("label_correlations", True)
node.setPropertyValue("weak_below_absolute", 0.25)
node.setPropertyValue("weak_label", "lower quartile")
node.setPropertyValue("strong_above_absolute", 0.75)
node.setPropertyValue("medium_label", "middle quartiles")
node.setPropertyValue("strong_label", "upper quartile")
# "Output" tab
node.setPropertyValue("full_filename", "c:/output/statistics_output.html")
node.setPropertyValue("output_format", "HTML")
```

Table 221. statisticsnode properties.

statisticsnode properties	Data type	Property description
use_output_name	*flag*	Specifies whether a custom output name is used.
output_name	*string*	If use_output_name is true, specifies the name to use.
output_mode	Screen File	Used to specify target location for output generated from the output node.
output_format	Text (*.txt*) HTML (*.html*) Output (*.cou*)	Used to specify the type of output.
full_filename	*string*	
examine	*list*	
correlate	*list*	
statistics	[Count Mean Sum Min Max Range Variance SDev SErr Median Mode]	

Table 221. statisticsnode properties (continued).

statisticsnode properties	Data type	Property description
correlation_mode	Probability Absolute	Specifies whether to label correlations by probability or absolute value.
label_correlations	*flag*	
weak_label	*string*	
medium_label	*string*	
strong_label	*string*	
weak_below_probability	*number*	When correlation_mode is set to Probability, specifies the cutoff value for weak correlations. This must be a value between 0 and 1—for example, 0.90.
strong_above_probability	*number*	Cutoff value for strong correlations.
weak_below_absolute	*number*	When correlation_mode is set to Absolute, specifies the cutoff value for weak correlations. This must be a value between 0 and 1—for example, 0.90.
strong_above_absolute	*number*	Cutoff value for strong correlations.

statisticsoutputnode Properties

The Statistics Output node allows you to call an IBM SPSS Statistics procedure to analyze your IBM SPSS Modeler data. A wide variety of IBM SPSS Statistics analytical procedures is available. This node requires a licensed copy of IBM SPSS Statistics.

The properties for this node are described under "statisticsoutputnode Properties" on page 288.

tablenode Properties

The Table node displays the data in table format, which can also be written to a file. This is useful anytime that you need to inspect your data values or export them in an easily readable form.

Example

```
node = stream.create("table", "My node")
node.setPropertyValue("highlight_expr", "Age > 30")
node.setPropertyValue("output_format", "HTML")
node.setPropertyValue("transpose_data", True)
node.setPropertyValue("full_filename", "C:/output/table_output.htm")
node.setPropertyValue("paginate_output", True)
node.setPropertyValue("lines_per_page", 50)
```

Table 222. tablenode properties.

tablenode properties	Data type	Property description
full_filename	*string*	If disk, data, or HTML output, the name of the output file.
use_output_name	*flag*	Specifies whether a custom output name is used.
output_name	*string*	If use_output_name is true, specifies the name to use.
output_mode	Screen File	Used to specify target location for output generated from the output node.
output_format	Formatted (*.tab*) Delimited (*.csv*) HTML (*.html*) Output (*.cou*)	Used to specify the type of output.
transpose_data	*flag*	Transposes the data before export so that rows represent fields and columns represent records.
paginate_output	*flag*	When the output_format is HTML, causes the output to be separated into pages.
lines_per_page	*number*	When used with paginate_output, specifies the lines per page of output.
highlight_expr	*string*	
output	*string*	A read-only property that holds a reference to the last table built by the node.
value_labels	*[[Value LabelString]* *[Value LabelString] ...]*	Used to specify labels for value pairs.
display_places	*integer*	Sets the number of decimal places for the field when displayed (applies only to fields with REAL storage). A value of –1 will use the stream default.
export_places	*integer*	Sets the number of decimal places for the field when exported (applies only to fields with REAL storage). A value of –1 will use the stream default.
decimal_separator	DEFAULT PERIOD COMMA	Sets the decimal separator for the field (applies only to fields with REAL storage).

Table 222. tablenode properties (continued).

tablenode properties	Data type	Property description
date_format	"DDMMYY" "MMDDYY" "YYMMDD" "YYYYMMDD" "YYYYDDD" DAY MONTH "DD-MM-YY" "DD-MM-YYYY" "MM-DD-YY" "MM-DD-YYYY" "DD-MON-YY" "DD-MON-YYYY" "YYYY-MM-DD" "DD.MM.YY" "DD.MM.YYYY" "MM.DD.YYYY" "DD.MON.YY" "DD.MON.YYYY" "DD/MM/YY" "DD/MM/YYYY" "MM/DD/YY" "MM/DD/YYYY" "DD/MON/YY" "DD/MON/YYYY" MON YYYY q Q YYYY ww WK YYYY	Sets the date format for the field (applies only to fields with DATE or TIMESTAMP storage).
time_format	"HHMMSS" "HHMM" "MMSS" "HH:MM:SS" "HH:MM" "MM:SS" "(H)H:(M)M:(S)S" "(H)H:(M)M" "(M)M:(S)S" "HH.MM.SS" "HH.MM" "MM.SS" "(H)H.(M)M.(S)S" "(H)H.(M)M" "(M)M.(S)S"	Sets the time format for the field (applies only to fields with TIME or TIMESTAMP storage).
column_width	*integer*	Sets the column width for the field. A value of –1 will set column width to Auto.
justify	AUTO CENTER LEFT RIGHT	Sets the column justification for the field.

transformnode Properties

The Transform node allows you to select and visually preview the results of transformations before applying them to selected fields.

Example

```
node = stream.create("transform", "My node")
node.setPropertyValue("fields", ["AGE", "INCOME"])
node.setPropertyValue("formula", "Select")
node.setPropertyValue("formula_log_n", True)
node.setPropertyValue("formula_log_n_offset", 1)
```

Table 223. transformnode properties.

transformnode properties	**Data type**	**Property description**
fields	[*field1... fieldn*]	The fields to be used in the transformation.
formula	All Select	Indicates whether all or selected transformations should be calculated.
formula_inverse	*flag*	Indicates if the inverse transformation should be used.
formula_inverse_offset	*number*	Indicates a data offset to be used for the formula. Set as 0 by default, unless specified by user.
formula_log_n	*flag*	Indicates if the $\log_n$ transformation should be used.
formula_log_n_offset	*number*	
formula_log_10	*flag*	Indicates if the $\log_{10}$ transformation should be used.
formula_log_10_offset	*number*	
formula_exponential	*flag*	Indicates if the exponential transformation (e^x) should be used.
formula_square_root	*flag*	Indicates if the square root transformation should be used.
use_output_name	*flag*	Specifies whether a custom output name is used.
output_name	*string*	If use_output_name is true, specifies the name to use.
output_mode	Screen File	Used to specify target location for output generated from the output node.
output_format	HTML (*.html*) Output (*.cou*)	Used to specify the type of output.
paginate_output	*flag*	When the output_format is HTML, causes the output to be separated into pages.
lines_per_page	*number*	When used with paginate_output, specifies the lines per page of output.
full_filename	*string*	Indicates the file name to be used for the file output.

Chapter 17. Export Node Properties

Common Export Node Properties

The following properties are common to all export nodes.

Table 224. Common export node properties

Property	Values	Property description
`publish_path`	*string*	Enter the rootname name to be used for the published image and parameter files.
`publish_metadata`	*flag*	Specifies if a metadata file is produced that describes the inputs and outputs of the image and their data models.
`publish_use_parameters`	*flag*	Specifies if stream parameters are included in the *.par file.
`publish_parameters`	*string list*	Specify the parameters to be included.
`execute_mode`	`export_data` `publish`	Specifies whether the node executes without publishing the stream, or if the stream is automatically published when the node is executed.

asexport Properties

The Analytic Server export enables you to run a stream on Hadoop Distributed File System (HDFS).

Example

```
node = stream.create("asexport", "My node")
node.setPropertyValue("data_source", "Drug1n")
node.setPropertyValue("export_mode", "overwrite")
```

Table 225. asexport properties.

asexport properties	Data type	Property description
`data_source`	*string*	The name of the data source.
`export_mode`	*string*	Specifies whether to **`append`** exported data to the existing data source, or to **`overwrite`** the existing data source.

cognosexportnode Properties

The IBM Cognos BI Export node exports data in a format that can be read by Cognos BI databases.

For this node, you must define a Cognos connection and an ODBC connection.

Cognos connection

The properties for the Cognos connection are as follows.

Table 226. cognosexportnode properties

cognosexportnode properties	**Data type**	**Property description**
cognos_connection	*["string","flag","string","string","string"]*	A list property containing the connection details for the Cognos server. The format is: ["Cognos_server_URL", login_mode, "namespace", "username", "password"] where: Cognos_server_URL is the URL of the Cognos server containing the source. login_mode indicates whether anonymous login is used, and is either true or false; if set to true, the following fields should be set to "". namespace specifies the security authentication provider used to log on to the server. username and password are those used to log on to the Cognos server. Instead of login_mode, the following modes are also available: • anonymousMode. For example: ['Cognos_server_url', 'anonymousMode', "namespace", "username", "password"] • credentialMode. For example: ['Cognos_server_url', 'credentialMode', "namespace", "username", "password"] • storedCredentialMode. For example: ['Cognos_server_url', 'storedCredentialMode', "stored_credential_name"] Where stored_credential_name is the name of a Cognos credential in the repository.
cognos_package_name	*string*	The path and name of the Cognos package to which you are exporting data, for example: /Public Folders/MyPackage
cognos_datasource	*string*	
cognos_export_mode	Publish ExportFile	
cognos_filename	*string*	

ODBC connection

The properties for the ODBC connection are identical to those listed for databaseexportnode in the next section, with the exception that the datasource property is not valid.

databaseexportnode Properties

The Database export node writes data to an ODBC-compliant relational data source. In order to write to an ODBC data source, the data source must exist and you must have write permission for it.

Example

```
'''
Assumes a datasource named "MyDatasource" has been configured
'''
stream = modeler.script.stream()
db_exportnode = stream.createAt("databaseexport", "DB Export", 200, 200)
applynn = stream.findByType("applyneuralnetwork", None)
stream.link(applynn, db_exportnode)

# Export tab
db_exportnode.setPropertyValue("username", "user")
db_exportnode.setPropertyValue("datasource", "MyDatasource")
db_exportnode.setPropertyValue("password", "password")
db_exportnode.setPropertyValue("table_name", "predictions")
db_exportnode.setPropertyValue("write_mode", "Create")
db_exportnode.setPropertyValue("generate_import", True)
db_exportnode.setPropertyValue("drop_existing_table", True)
db_exportnode.setPropertyValue("delete_existing_rows", True)
db_exportnode.setPropertyValue("default_string_size", 32)

# Schema dialog
db_exportnode.setKeyedPropertyValue("type", "region", "VARCHAR(10)")
db_exportnode.setKeyedPropertyValue("export_db_primarykey", "id", True)
db_exportnode.setPropertyValue("use_custom_create_table_command", True)
db_exportnode.setPropertyValue("custom_create_table_command", "My SQL Code")

# Indexes dialog
db_exportnode.setPropertyValue("use_custom_create_index_command", True)
db_exportnode.setPropertyValue("custom_create_index_command", "CREATE BITMAP INDEX <index-name>
 ON <table-name> <(index-columns)>")
db_exportnode.setKeyedPropertyValue("indexes", "MYINDEX", ["fields", ["id", "region"]])
```

Table 227. databaseexportnode properties.

databaseexportnode properties	Data type	Property description
datasource	*string*	
username	*string*	
password	*string*	
epassword	*string*	This slot is read-only during execution. To generate an encoded password, use the Password Tool available from the Tools menu. See the topic "Generating an Encoded Password" on page 51 for more information.
table_name	*string*	
write_mode	Create Append Merge	

Table 227. databaseexportnode properties (continued).

databaseexportnode properties	Data type	Property description
map	*string*	Maps a stream field name to a database column name (valid only if write_mode is Merge). For a merge, all fields must be mapped in order to be exported. Field names that do not exist in the database are added as new columns.
key_fields	*list*	Specifies the stream field that is used for key; map property shows what this corresponds to in the database.
join	Database Add	
drop_existing_table	*flag*	
delete_existing_rows	*flag*	
default_string_size	*integer*	
type		Structured property used to set the schema type.
generate_import	*flag*	
use_custom_create_table_command	*flag*	Use the *custom_create_table* slot to modify the standard CREATE TABLE SQL command.
custom_create_table_command	*string*	Specifies a string command to use in place of the standard CREATE TABLE SQL command.
use_batch	*flag*	The following properties are advanced options for database bulk-loading. A True value for Use_batch turns off row-by-row commits to the database.
batch_size	*number*	Specifies the number of records to send to the database before committing to memory.
bulk_loading	Off ODBC External	Specifies the type of bulk-loading. Additional options for ODBC and External are listed below.
not_logged	*flag*	
odbc_binding	Row Column	Specify row-wise or column-wise binding for bulk-loading via ODBC.
loader_delimit_mode	Tab Space Other	For bulk-loading via an external program, specify type of delimiter. Select Other in conjunction with the loader_other_delimiter property to specify delimiters, such as the comma (,).
loader_other_delimiter	*string*	

Table 227. databaseexportnode properties (continued).

databaseexportnode properties	Data type	Property description
specify_data_file	*flag*	A True flag activates the data_file property below, where you can specify the filename and path to write to when bulk-loading to the database.
data_file	*string*	
specify_loader_program	*flag*	A True flag activates the loader_program property below, where you can specify the name and location of an external loader script or program.
loader_program	*string*	
gen_logfile	*flag*	A True flag activates the logfile_name below, where you can specify the name of a file on the server to generate an error log.
logfile_name	*string*	
check_table_size	*flag*	A True flag allows table checking to ensure that the increase in database table size corresponds to the number of rows exported from IBM SPSS Modeler.
loader_options	*string*	Specify additional arguments, such as -comment and -specialdir, to the loader program.
export_db_primarykey	*flag*	Specifies whether a given field is a primary key.
use_custom_create_index_command	*flag*	If true, enables custom SQL for all indexes.
custom_create_index_command	*string*	Specifies the SQL command used to create indexes when custom SQL is enabled. (This value can be overridden for specific indexes as indicated below.)
indexes.INDEXNAME.fields		Creates the specified index if necessary and lists field names to be included in that index.
INDEXNAME "use_custom_create_⌂index_command"	*flag*	Used to enable or disable custom SQL for a specific index. See examples after the following table.
INDEXNAME "custom_create_index_command"	*string*	Specifies the custom SQL used for the specified index. See examples after the following table.
indexes.INDEXNAME.remove	*flag*	If True, removes the specified index from the set of indexes.
table_space	*string*	Specifies the table space that will be created.
use_partition	*flag*	Specifies that the distribute hash field will be used.

Table 227. databaseexportnode properties (continued).

databaseexportnode properties	Data type	Property description
partition_field	*string*	Specifies the contents of the distribute hash field.

Note: For some databases, you can specify that database tables are created for export with compression (for example, the equivalent of `CREATE TABLE MYTABLE (...) COMPRESS YES;` in SQL). The properties `use_compression` and `compression_mode` are provided to support this feature, as follows.

Table 228. databaseexportnode properties using compression features.

databaseexportnode properties	Data type	Property description
use_compression	*Boolean*	If set to `True`, creates tables for export with compression.
compression_mode	`Row` `Page`	Sets the level of compression for SQL Server databases.

	`Default`
	`Direct_Load_Operations`
	`All_Operations`
	`Basic`
	`OLTP`
	`Query_High`
	`Query_Low`
	`Archive_High`
	`Archive_Low`
		Sets the level of compression for Oracle databases. Note that the values `OLTP`, `Query_High`, `Query_Low`, `Archive_High`, and `Archive_Low` require a minimum of Oracle 11gR2.

Example showing how to change the `CREATE INDEX` command for a specific index:

```
db_exportnode.setKeyedPropertyValue("indexes", "MYINDEX", ["use_custom_create_index_command",
 True])db_exportnode.setKeyedPropertyValue("indexes", "MYINDEX", ["custom_create_index_command",
 "CREATE BITMAP INDEX <index-name> ON <table-name> <(index-columns)>"])
```

Alternatively, this can be done via a hash table:

```
db_exportnode.setKeyedPropertyValue("indexes", "MYINDEX", ["fields":["id", "region"],
 "use_custom_create_index_command":True, "custom_create_index_command":"CREATE INDEX <index-name> ON
 <table-name> <(index-columns)>"])
```

datacollectionexportnode Properties

The IBM SPSS Data Collection export node outputs data in the format used by IBM SPSS Data Collection market research software. The IBM SPSS Data Collection Data Library must be installed to use this node.

Example

```
stream = modeler.script.stream()
datacollectionexportnode = stream.createAt("datacollectionexport", "Data Collection", 200, 200)
datacollectionexportnode.setPropertyValue("metadata_file", "c:\\museums.mdd")
datacollectionexportnode.setPropertyValue("merge_metadata", "Overwrite")
datacollectionexportnode.setPropertyValue("casedata_file", "c:\\museumdata.sav")
datacollectionexportnode.setPropertyValue("generate_import", True)
datacollectionexportnode.setPropertyValue("enable_system_variables", True)
```

Table 229. datacollectionexportnode properties

datacollectionexportnode properties	Data type	Property description
metadata_file	*string*	The name of the metadata file to export.
merge_metadata	Overwrite MergeCurrent	
enable_system_variables	*flag*	Specifies whether the exported *.mdd* file should include IBM SPSS Data Collection system variables.
casedata_file	*string*	The name of the *.sav* file to which case data is exported.
generate_import	*flag*	

excelexportnode Properties

The Excel export node outputs data in the Microsoft Excel .xlsx file format. Optionally, you can choose to launch Excel automatically and open the exported file when the node is executed.

Example

```
stream = modeler.script.stream()
excelexportnode = stream.createAt("excelexport", "Excel", 200, 200)
excelexportnode.setPropertyValue("full_filename", "C:/output/myexport.xlsx")
excelexportnode.setPropertyValue("excel_file_type", "Excel2007")
excelexportnode.setPropertyValue("inc_field_names", True)
excelexportnode.setPropertyValue("inc_labels_as_cell_notes", False)
excelexportnode.setPropertyValue("launch_application", True)
excelexportnode.setPropertyValue("generate_import", True)
```

Table 230. excelexportnode properties

excelexportnode properties	Data type	Property description
full_filename	*string*	
excel_file_type	Excel2007	
export_mode	Create Append	
inc_field_names	*flag*	Specifies whether field names should be included in the first row of the worksheet.
start_cell	*string*	Specifies starting cell for export.
worksheet_name	*string*	Name of the worksheet to be written.
launch_application	*flag*	Specifies whether Excel should be invoked on the resulting file. Note that the path for launching Excel must be specified in the Helper Applications dialog box (Tools menu, Helper Applications).
generate_import	*flag*	Specifies whether an Excel Import node should be generated that will read the exported data file.

outputfilenode Properties

The Flat File export node outputs data to a delimited text file. It is useful for exporting data that can be read by other analysis or spreadsheet software.

Example

```
stream = modeler.script.stream()
outputfile = stream.createAt("outputfile", "File Output", 200, 200)
outputfile.setPropertyValue("full_filename", "c:/output/flatfile_output.txt")
outputfile.setPropertyValue("write_mode", "Append")
outputfile.setPropertyValue("inc_field_names", False)
outputfile.setPropertyValue("use_newline_after_records", False)
outputfile.setPropertyValue("delimit_mode", "Tab")
outputfile.setPropertyValue("other_delimiter", ",")
outputfile.setPropertyValue("quote_mode", "Double")
outputfile.setPropertyValue("other_quote", "*")
outputfile.setPropertyValue("decimal_symbol", "Period")
outputfile.setPropertyValue("generate_import", True)
```

Table 231. outputfilenode properties

outputfilenode properties	**Data type**	**Property description**
full_filename	*string*	Name of output file.
write_mode	Overwrite Append	
inc_field_names	*flag*	
use_newline_after_records	*flag*	
delimit_mode	Comma Tab Space Other	
other_delimiter	*char*	
quote_mode	None Single Double Other	
other_quote	*flag*	
generate_import	*flag*	
encoding	StreamDefault SystemDefault "UTF-8"	

sasexportnode Properties

The SAS export node outputs data in SAS format, to be read into SAS or a SAS-compatible software package. Three SAS file formats are available: SAS for Windows/OS2, SAS for UNIX, or SAS Version 7/8.

Example

```
stream = modeler.script.stream()
sasexportnode = stream.createAt("sasexport", "SAS Export", 200, 200)
sasexportnode.setPropertyValue("full_filename", "c:/output/SAS_output.sas7bdat")
sasexportnode.setPropertyValue("format", "SAS8")
sasexportnode.setPropertyValue("export_names", "NamesAndLabels")
sasexportnode.setPropertyValue("generate_import", True)
```

Table 232. sasexportnode properties

sasexportnode properties	**Data type**	**Property description**
format	Windows UNIX SAS7 SAS8	Variant property label fields.
full_filename	*string*	
export_names	NamesAndLabels NamesAsLabels	Used to map field names from IBM SPSS Modeler upon export to IBM SPSS Statistics or SAS variable names.
generate_import	*flag*	

statisticsexportnode Properties

The Statistics Export node outputs data in IBM SPSS Statistics *.sav* or *.zsav* format. The *.sav* or *.zsav* files can be read by IBM SPSS Statistics Base and other products. This is also the format used for cache files in IBM SPSS Modeler.

The properties for this node are described under "statisticsexportnode Properties" on page 289.

tm1export Node Properties

The IBM Cognos TM1 Export node exports data in a format that can be read by Cognos TM1 databases.

Table 233. tm1export node properties.

tm1export node properties	**Data type**	**Property description**
pm_host	*string*	The host name. For example: TM1_export.setPropertyValue("pm_host", 'http://9.191.86.82:9510/pmhub/pm')

Table 233. tm1export node properties (continued).

tm1export node properties	Data type	Property description
tm1_connection	*["field","field", ... ,"field"]*	A list property containing the connection details for the TM1 server. The format is: ["TM1_Server_Name", "tm1_ username", "tm1_password"] For example: TM1_export.setPropertyValue("tm1_connection", ['Planning Sample', "admin" "apple"])
selected_cube	*field*	The name of the cube to which you are exporting data. For example: TM1_export.setPropertyValue("selected_cube", "plan_BudgetPlan")
spssfield_tm1element_mapping	*list*	The tm1 element to be mapped to must be part of the column dimension for selected cube view. The format is: [["param1", "value"],...,["paramN","value"]] For example: TM1_export.setPropertyValue("spssfield_ tm1element_mapping", [["plan_version","plan_version"], ["plan_department","plan_department"]])

xmlexportnode Properties

The XML export node outputs data to a file in XML format. You can optionally create an XML source node to read the exported data back into the stream.

Example

```
stream = modeler.script.stream()
xmlexportnode = stream.createAt("xmlexport", "XML Export", 200, 200)
xmlexportnode.setPropertyValue("full_filename", "c:/export/data.xml")
xmlexportnode.setPropertyValue("map", [["/catalog/book/genre", "genre"], ["/catalog/book/title", "title"]])
```

Table 234. xmlexportnode properties

xmlexportnode properties	Data type	Property description
full_filename	*string*	(required) Full path and file name of XML export file.
use_xml_schema	*flag*	Specifies whether to use an XML schema (XSD or DTD file) to control the structure of the exported data.
full_schema_filename	*string*	Full path and file name of XSD or DTD file to use. Required if use_xml_schema is set to true.
generate_import	*flag*	Generates an XML source node that will read the exported data file back into the stream.
records	*string*	XPath expression denoting the record boundary.
map	*string*	Maps field name to XML structure.

Chapter 18. IBM SPSS Statistics Node Properties

statisticsimportnode Properties

The Statistics File node reads data from the *.sav* or *.zsav* file format used by IBM SPSS Statistics, as well as cache files saved in IBM SPSS Modeler, which also use the same format.

Example

```
stream = modeler.script.stream()
statisticsimportnode = stream.createAt("statisticsimport", "SAV Import", 200, 200)
statisticsimportnode.setPropertyValue("full_filename", "C:/data/drug1n.sav")
statisticsimportnode.setPropertyValue("import_names", True)
statisticsimportnode.setPropertyValue("import_data", True)
```

Table 235. statisticsimportnode properties.

statisticsimportnode properties	**Data type**	**Property description**
full_filename	*string*	The complete filename, including path.
password	*string*	The password. The password parameter must be set before the file_encrypted parameter.
file_encrypted	*flag*	Whether or not the file is password protected.
import_names	NamesAndLabels LabelsAsNames	Method for handling variable names and labels.
import_data	DataAndLabels LabelsAsData	Method for handling values and labels.
use_field_format_for_storage	*Boolean*	Specifies whether to use IBM SPSS Statistics field format information when importing.

statisticstransformnode Properties

The Statistics Transform node runs a selection of IBM SPSS Statistics syntax commands against data sources in IBM SPSS Modeler. This node requires a licensed copy of IBM SPSS Statistics.

Example

```
stream = modeler.script.stream()
statisticstransformnode = stream.createAt("statisticstransform", "Transform", 200, 200)
statisticstransformnode.setPropertyValue("syntax", "COMPUTE NewVar = Na + K.")
statisticstransformnode.setKeyedPropertyValue("new_name", "NewVar", "Mixed Drugs")
statisticstransformnode.setPropertyValue("check_before_saving", True)
```

Table 236. statisticstransformnode properties

statisticstransformnode properties	**Data type**	**Property description**
syntax	*string*	

Table 236. statisticstransformnode properties (continued)

statisticstransformnode properties	Data type	Property description
check_before_saving	*flag*	Validates the entered syntax before saving the entries. Displays an error message if the syntax is invalid.
default_include	*flag*	See the topic "filternode Properties" on page 123 for more information.
include	*flag*	See the topic "filternode Properties" on page 123 for more information.
new_name	*string*	See the topic "filternode Properties" on page 123 for more information.

statisticsmodelnode Properties

The Statistics Model node enables you to analyze and work with your data by running IBM SPSS Statistics procedures that produce PMML. This node requires a licensed copy of IBM SPSS Statistics.

Example

```
stream = modeler.script.stream()
statisticsmodelnode = stream.createAt("statisticsmodel", "Model", 200, 200)
statisticsmodelnode.setPropertyValue("syntax", "COMPUTE NewVar = Na + K.")
statisticsmodelnode.setKeyedPropertyValue("new_name", "NewVar", "Mixed Drugs")
```

statisticsmodelnode properties	Data type	Property description
syntax	*string*	
default_include	*flag*	See the topic "filternode Properties" on page 123 for more information.
include	*flag*	See the topic "filternode Properties" on page 123 for more information.
new_name	*string*	See the topic "filternode Properties" on page 123 for more information.

statisticsoutputnode Properties

The Statistics Output node allows you to call an IBM SPSS Statistics procedure to analyze your IBM SPSS Modeler data. A wide variety of IBM SPSS Statistics analytical procedures is available. This node requires a licensed copy of IBM SPSS Statistics.

Example

```
stream = modeler.script.stream()
statisticsoutputnode = stream.createAt("statisticsoutput", "Output", 200, 200)
statisticsoutputnode.setPropertyValue("syntax", "SORT CASES BY Age(A) Sex(A) BP(A) Cholesterol(A)")
statisticsoutputnode.setPropertyValue("use_output_name", False)
statisticsoutputnode.setPropertyValue("output_mode", "File")
statisticsoutputnode.setPropertyValue("full_filename", "Cases by Age, Sex and Medical History")
statisticsoutputnode.setPropertyValue("file_type", "HTML")
```

Table 237. statisticsoutputnode properties

statisticsoutputnode properties	**Data type**	**Property description**
mode	Dialog Syntax	Selects "IBM SPSS Statistics dialog" option or Syntax Editor
syntax	*string*	
use_output_name	*flag*	
output_name	*string*	
output_mode	Screen File	
full_filename	*string*	
file_type	HTML SPV SPW	

statisticsexportnode Properties

The Statistics Export node outputs data in IBM SPSS Statistics *.sav* or *.zsav* format. The *.sav* or *.zsav* files can be read by IBM SPSS Statistics Base and other products. This is also the format used for cache files in IBM SPSS Modeler.

Example

```
stream = modeler.script.stream()
statisticsexportnode = stream.createAt("statisticsexport", "Export", 200, 200)
statisticsexportnode.setPropertyValue("full_filename", "c:/output/SPSS_Statistics_out.sav")
statisticsexportnode.setPropertyValue("field_names", "Names")
statisticsexportnode.setPropertyValue("launch_application", True)
statisticsexportnode.setPropertyValue("generate_import", True)
```

Table 238. statisticsexportnode properties.

statisticsexportnode properties	**Data type**	**Property description**
full_filename	*string*	
file_type	sav zsav	Save file in *sav* or *zsav* format. For example: `statisticsexportnode.setPropertyValue("file_type","sav")`
encrypt_file	*flag*	Whether or not the file is password protected.
password	*string*	The password.
launch_application	*flag*	
export_names	NamesAndLabels NamesAsLabels	Used to map field names from IBM SPSS Modeler upon export to IBM SPSS Statistics or SAS variable names.
generate_import	*flag*	

Chapter 19. SuperNode Properties

Properties that are specific to SuperNodes are described in the following tables. Note that common node properties also apply to SuperNodes.

Table 239. Terminal supernode properties

Property name	Property type/List of values	Property description
execute_method	Script Normal	
script	*string*	

SuperNode Parameters

You can use scripts to create or set SuperNode parameters using the general format:

```
mySuperNode.setParameterValue("minvalue", 30)
```

You can retrieve the parameter value with:

```
value mySuperNode.getParameterValue("minvalue")
```

Finding Existing SuperNodes

You can find SuperNodes in streams using the findByType() function:

```
source_supernode = modeler.script.stream().findByType("source_super", None)
process_supernode = modeler.script.stream().findByType("process_super", None)
terminal_supernode = modeler.script.stream().findByType("terminal_super", None)
```

Setting Properties for Encapsulated Nodes

You can set properties for specific nodes encapsulated within a SuperNode by accessing the child diagram within the SuperNode. For example, suppose you have a source SuperNode with an encapsulated Variable File node to read in the data. You can pass the name of the file to read (specified using the full_filename property) by accessing the child diagram and finding the relevant node as follows:

```
childDiagram = source_supernode.getChildDiagram()
varfilenode = childDiagram.findByType("variablefile", None)
varfilenode.setPropertyValue("full_filename", "c:/mydata.txt")
```

Creating SuperNodes

If you want to create a SuperNode and its content from scratch, you can do that in a similar way by creating the SuperNode, accessing the child diagram, and creating the nodes you want. You must also ensure that the nodes within the SuperNode diagram are also linked to the input- and/or output connector nodes. For example, if you want to create a process SuperNode:

```
process_supernode = modeler.script.stream().createAt("process_super", "My SuperNode", 200, 200)
childDiagram = process_supernode.getChildDiagram()
filternode = childDiagram.createAt("filter", "My Filter", 100, 100)
childDiagram.linkFromInputConnector(filternode)
childDiagram.linkToOutputConnector(filternode)
```

Appendix A. Node names reference

This section provides a reference for the scripting names of the nodes in IBM SPSS Modeler.

Model Nugget Names

Model nuggets (also known as generated models) can be referenced by type, just like node and output objects. The following tables list the model object reference names.

Note these names are used specifically to reference model nuggets in the Models palette (in the upper right corner of the IBM SPSS Modeler window). To reference model nodes that have been added to a stream for purposes of scoring, a different set of names prefixed with `apply...` are used. See the topic Model Nugget Node Properties for more information.

Note: Under normal circumstances, referencing models by both name *and* type is recommended to avoid confusion.

Table 240. Model Nugget Names (Modeling Palette).

Model name	Model
anomalydetection	Anomaly
apriori	Apriori
autoclassifier	Auto Classifier
autocluster	Auto Cluster
autonumeric	Auto Numeric
bayesnet	Bayesian network
c50	C5.0
carma	Carma
cart	C&R Tree
chaid	CHAID
coxreg	Cox regression
decisionlist	Decision List
discriminant	Discriminant
factor	PCA/Factor
featureselection	Feature Selection
genlin	Generalized linear regression
glmm	GLMM
kmeans	K-Means
knn	*k*-nearest neighbor
kohonen	Kohonen
linear	Linear
logreg	Logistic regression
neuralnetwork	Neural Net
quest	QUEST
regression	Linear regression

Table 240. Model Nugget Names (Modeling Palette) (continued).

Model name	Model
sequence	Sequence
slrm	Self-learning response model
statisticsmodel	IBM SPSS Statistics model
svm	Support vector machine
timeseries	Time Series
twostep	TwoStep

Table 241. Model Nugget Names (Database Modeling Palette).

Model name	Model
db2imcluster	IBM ISW Clustering
db2imlog	IBM ISW Logistic Regression
db2imnb	IBM ISW Naive Bayes
db2imreg	IBM ISW Regression
db2imtree	IBM ISW Decision Tree
msassoc	MS Association Rules
msbayes	MS Naive Bayes
mscluster	MS Clustering
mslogistic	MS Logistic Regression
msneuralnetwork	MS Neural Network
msregression	MS Linear Regression
mssequencecluster	MS Sequence Clustering
mstimeseries	MS Time Series
mstree	MS Decision Tree
netezzabayes	Netezza Bayes Net
netezzadectree	Netezza Decision Tree
netezzadivcluster	Netezza Divisive Clustering
netezzaglm	Netezza Generalized Linear
netezzakmeans	Netezza K-Means
netezzaknn	Netezza KNN
netezzalineregression	Netezza Linear Regression
netezzanaivebayes	Netezza Naive Bayes
netezzapca	Netezza PCA
netezzaregtree	Netezza Regression Tree
netezzatimeseries	Netezza Time Series
oraabn	Oracle Adaptive Bayes
oraai	Oracle AI
oradecisiontree	Oracle Decision Tree
oraglm	Oracle GLM
orakmeans	Oracle *k*-Means
oranb	Oracle Naive Bayes

Table 241. Model Nugget Names (Database Modeling Palette) (continued).

Model name	Model
oranmf	Oracle NMF
oraocluster	Oracle O-Cluster
orasvm	Oracle SVM

Avoiding Duplicate Model Names

When using scripts to manipulate generated models, be aware that allowing duplicate model names can result in ambiguous references. To avoid this, it is a good idea to require unique names for generated models when scripting.

To set options for duplicate model names:

1. From the menus choose:
   Tools > **User Options**
2. Click the **Notifications** tab.
3. Select **Replace previous model** to restrict duplicate naming for generated models.

The behavior of script execution can vary between SPSS Modeler and IBM SPSS Collaboration and Deployment Services when there are ambiguous model references. The SPSS Modeler client includes the option "Replace previous model", which automatically replaces models that have the same name (for example, where a script iterates through a loop to produce a different model each time). However, this option is not available when the same script is run in IBM SPSS Collaboration and Deployment Services. You can avoid this situation either by renaming the model generated in each iteration to avoid ambiguous references to models, or by clearing the current model (for example, adding a `clear generated palette` statement) before the end of the loop.

Output Type Names

The following table lists all output object types and the nodes that create them. For a complete list of the export formats available for each type of output object, see the properties description for the node that creates the output type, available in Graph Node Common Properties and Output Node Properties.

Table 242. Output object types and the nodes that create them.

Output object type	Node
analysisoutput	Analysis
collectionoutput	Collection
dataauditoutput	Data Audit
distributionoutput	Distribution
evaluationoutput	Evaluation
histogramoutput	Histogram
matrixoutput	Matrix
meansoutput	Means
multiplotoutput	Multiplot
plotoutput	Plot
qualityoutput	Quality
reportdocumentoutput	This object type is not from a node; it's the output created by a project report

Table 242. Output object types and the nodes that create them (continued).

Output object type	**Node**
reportoutput	Report
statisticsprocedureoutput	Statistics Output
statisticsoutput	Statistics
tableoutput	Table
timeplotoutput	Time Plot
weboutput	Web

Appendix B. Migrating from legacy scripting to Python scripting

Legacy script migration overview

This section provides a summary of the differences between Python and legacy scripting in IBM SPSS Modeler, and provides information about how to migrate your legacy scripts to Python scripts. In this section you will find a list of standard SPSS Modeler legacy commands and the equivalent Python commands.

General differences

Legacy scripting owes much of its design to OS command scripts. Legacy scripting is line oriented, and although there are some block structures, for example `if...then...else...endif` and `for...endfor`, indentation is generally not significant.

In Python scripting, indentation is significant and lines belonging to the same logical block must be indented by the same level.

Note: You must take care when copying and pasting Python code. A line that is indented using tabs might look the same in the editor as a line that is indented using spaces. However, the Python script will generate an error because the lines are not considered as equally indented.

The scripting context

The scripting context defines the environment that the script is being executed in, for example the stream or SuperNode that executes the script. In legacy scripting the context is implicit, which means, for example, that any node references in a stream script are assumed to be within the stream that executes the script.

In Python scripting, the scripting context is provided explicitly via the `modeler.script` module. For example, a Python stream script can access the stream that executes the script with the following code:

```
s = modeler.script.stream()
```

Stream related functions can then be invoked through the returned object.

Commands versus functions

Legacy scripting is command oriented. This mean that each line of script typically starts with the command to be run followed by the parameters, for example:

```
connect 'Type':typenode to :filternode
rename :derivenode as "Compute Total"
```

Python uses functions that are usually invoked through an object (a module, class or object) that defines the function, for example:

```
stream = modeler.script.stream()
typenode = stream.findByType("type", "Type)
filternode = stream.findByType("filter", None)
stream.link(typenode, filternode)
derive.setLabel("Compute Total")
```

Literals and comments

Some literal and comment commands that are commonly used in IBM SPSS Modeler have equivalent commands in Python scripting. This might help you to convert your existing SPSS Modeler Legacy scripts to Python scripts for use in IBM SPSS Modeler 17.

Table 243. Legacy scripting to Python scripting mapping for literals and comments.

Legacy scripting	Python scripting
Integer, for example `4`	Same
Float, for example `0.003`	Same
Single quoted strings, for example `'Hello'`	Same **Note:** String literals containing non-ASCII characters must be prefixed by a `u` to ensure that they are represented as Unicode.
Double quoted strings, for example `"Hello again"`	Same **Note:** String literals containing non-ASCII characters must be prefixed by a `u` to ensure that they are represented as Unicode.

Long strings, for example
`"""This is a string`
`that spans multiple`
`lines"""`
	Same

Lists, for example `[1 2 3]`	`[1, 2, 3]`
Variable reference, for example `set x = 3`	`x = 3`

Line continuation (\), for example
`set x = [1 2 \`
`  3 4]`
	`x = [ 1, 2,\`
	`  3, 4]`

Block comment, for example
`/* This is a long comment`
`over a line. */`
	`""" This is a long comment`
	`over a line. """`

Line comment, for example `set x = 3  # make x 3`	`x = 3  # make x 3`
`undef`	`None`
`true`	`True`
`false`	`False`

Operators

Some operator commands that are commonly used in IBM SPSS Modeler have equivalent commands in Python scripting. This might help you to convert your existing SPSS Modeler Legacy scripts to Python scripts for use in IBM SPSS Modeler 17.

Table 244. Legacy scripting to Python scripting mapping for operators.

Legacy scripting	Python scripting

`NUM1 + NUM2`
`LIST + ITEM`
`LIST1 + LIST2`
	`NUM1 + NUM2`
	`LIST.append(ITEM)`
	`LIST1.extend(LIST2)`

`NUM1 – NUM2` `LIST - ITEM`	`NUM1 – NUM2` `LIST.remove(ITEM)`
`NUM1 * NUM2`	`NUM1 * NUM2`
`NUM1 / NUM2`	`NUM1 / NUM2`

Table 244. Legacy scripting to Python scripting mapping for operators (continued).

Legacy scripting	Python scripting
= ==	==
/= /==	!=
X ** Y	X ** Y
X < Y X <= Y X > Y X >= Y	X < Y X <= Y X > Y X >= Y
X div Y X rem Y X mod Y	X // Y X % Y X % Y
and or not(EXPR)	and or not EXPR

Conditionals and looping

Some conditional and looping commands that are commonly used in IBM SPSS Modeler have equivalent commands in Python scripting. This might help you to convert your existing SPSS Modeler Legacy scripts to Python scripts for use in IBM SPSS Modeler 17.

Table 245. Legacy scripting to Python scripting mapping for conditionals and looping.

Legacy scripting	Python scripting

for VAR from INT1 to INT2
...
endfor
	for VAR in range(INT1, INT2):
	...
	or
	VAR = INT1
	while VAR <= INT2:
	...
	VAR += 1

for VAR in LIST ... endfor	for VAR in LIST: ...
for VAR in_fields_to NODE ... endfor	for VAR in NODE.getInputDataModel(): ...
for VAR in_fields_at NODE ... endfor	for VAR in NODE.getOutputDataModel(): ...

if...then
...
elseif...then
...
else
...
endif
	if ...:
	...
	elif ...:
	...
	else:
	...

with TYPE OBJECT ... endwith	No equivalent
var VAR1	Variable declaration is not required

Variables

In legacy scripting, variables are declared before they are referenced, for example:

```
var mynode
set mynode = create typenode at 96 96
```

In Python scripting, variables are created when they are first referenced, for example:

```
mynode = stream.createAt("type", "Type", 96, 96)
```

In legacy scripting, references to variables must be explicitly removed using the ^ operator, for example:

```
var mynode
set mynode = create typenode at 96 96
set ^mynode.direction."Age" = Input
```

Like most scripting languages, this is not necessary is Python scripting, for example:

```
mynode = stream.createAt("type", "Type", 96, 96)
mynode.setKeyedPropertyValue("direction","Age","Input")
```

Node, output and model types

In legacy scripting, the different object types (node, output, and model) typically have the type appended to the type of object. For example, the Derive node has the type `derivenode`:

```
set feature_name_node = create derivenode at 96 96
```

The IBM SPSS Modeler API in Python does not include the `node` suffix, so the Derive node has the type `derive`, for example:

```
feature_name_node = stream.createAt("derive", "Feature", 96, 96)
```

The only difference in type names in legacy and Python scripting is the lack of the type suffix.

Property names

Property names are the same in both legacy and Python scripting. For example, in the Variable File node, the property that defines the file location is `full_filename` in both scripting environments.

Node references

Many legacy scripts use an implicit search to find and access the node to be modified. For example, the following commands search the current stream for a Type node with the label "Type", then set the direction (or modeling role) of the "Age" field to Input and the "Drug" field to be Target, that is the value to be predicted:

```
set 'Type':typenode.direction."Age" = Input
set 'Type':typenode.direction."Drug" = Target
```

In Python scripting, node objects have to be located explicitly before calling the function to set the property value, for example:

```
typenode = stream.findByType("type", "Type")
typenode.setKeyedPropertyValue("direction", "Age", "Input")
typenode.setKeyedPropertyValue("direction", "Drug", "Target")
```

Note: In this case, "Target" must be in string quotes.

Python scripts can alternatively use the `ModelingRole` enumeration in the `modeler.api` package.

Although the Python scripting version can be more verbose, it leads to better runtime performance because the search for the node is usually only done once. In the legacy scripting example, the search for the node is done for each command.

Finding nodes by ID is also supported (the node ID is visible in the Annotations tab of the node dialog). For example, in legacy scripting:

```
# id65EMPB9VL87 is the ID of a Type node
set @id65EMPB9VL87.direction."Age" = Input
```

The following script shows the same example in Python scripting:

```
typenode = stream.findByID("id65EMPB9VL87")
typenode.setKeyedPropertyValue("direction", "Age", "Input")
```

Getting and setting properties

Legacy scripting uses the `set` command to assign a value. The term following the `set` command can be a property definition. The following script shows two possible script formats for setting a property:

```
set <node reference>.<property> = <value>
set <node reference>.<keyed-property>.<key> = <value>
```

In Python scripting, the same result is achieved by using the functions `setPropertyValue()` and `setKeyedPropertyValue()`, for example:

```
object.setPropertyValue(property, value)
object.setKeyedPropertyValue(keyed-property, key, value)
```

In legacy scripting, accessing property values can be achieved using the `get` command, for example:

```
var n v
set n = get node :filternode
set v = ^n.name
```

In Python scripting, the same result is achieved by using the function `getPropertyValue()`, for example:

```
n = stream.findByType("filter", None)
v = n.getPropertyValue("name")
```

Editing streams

In legacy scripting, the `create` command is used to create a new node, for example:

```
var agg select
set agg = create aggregatenode at 96 96
set select = create selectnode at 164 96
```

In Python scripting, streams have various methods for creating nodes, for example:

```
stream = modeler.script.stream()
agg = stream.createAt("aggregate", "Aggregate", 96, 96)
select = stream.createAt("select", "Select", 164, 96)
```

In legacy scripting, the `connect` command is used to create links between nodes, for example:

```
connect ^agg to ^select
```

In Python scripting, the `link` method is used to create links between nodes, for example:

```
stream.link(agg, select)
```

In legacy scripting, the `disconnect` command is used to remove links between nodes, for example:

```
disconnect ^agg from ^select
```

In Python scripting, the `unlink` method is used to remove links between nodes, for example:

```
stream.unlink(agg, select)
```

In legacy scripting, the `position` command is used to position nodes on the stream canvas or between other nodes, for example:

```
position ^agg at 256 256
position ^agg between ^myselect and ^mydistinct
```

In Python scripting, the same result is achieved by using two separate methods; `setXYPosition` and `setPositionBetween`. For example:

```
agg.setXYPosition(256, 256)
agg.setPositionBetween(myselect, mydistinct)
```

Node operations

Some node operation commands that are commonly used in IBM SPSS Modeler have equivalent commands in Python scripting. This might help you to convert your existing SPSS Modeler Legacy scripts to Python scripts for use in IBM SPSS Modeler 17.

Table 246. Legacy scripting to Python scripting mapping for node operations.

Legacy scripting	Python scripting
`create` *nodespec* `at x y`	*stream*`.create(`*type*`, `*name*`)` *stream*`.createAt(`*type*`, `*name*`, x, y)` *stream*`.createBetween(`*type*`, `*name*`, preNode, postNode)` *stream*`.createModelApplier(`*model*`, `*name*`)`
`connect` *fromNode* `to` *toNode*	*stream*`.link(`*fromNode*`, `*toNode*`)`
`delete` *node*	*stream*`.delete(`*node*`)`
`disable` *node*	*stream*`.setEnabled(`*node*`, False)`
`enable` *node*	*stream*`.setEnabled(`*node*`, True)`
`disconnect` *fromNode* `from` *toNode*	*stream*`.unlink(`*fromNode*`, `*toNode*`)` *stream*`.disconnect(`*node*`)`
`duplicate` *node*	*node*`.duplicate()`
`execute` *node*	*stream*`.runSelected(`*nodes*`, `*results*`)` *stream*`.runAll(`*results*`)`
`flush` *node*	*node*`.flushCache()`
`position` *node* `at x y`	*node*`.setXYPosition(x, y)`
`position` *node* `between` *node1* `and` *node2*	*node*`.setPositionBetween(`*node1*`, `*node2*`)`
`rename` *node* `as` *name*	*node*`.setLabel(`*name*`)`

Looping

In legacy scripting, there are two main looping options that are supported:

- *Counted* loops, where an index variable moves between two integer bounds.
- *Sequence* loops that loop through a sequence of values, binding the current value to the loop variable.

The following script is an example of a counted loop in legacy scripting:

```
for i from 1 to 10
 println ^i
endfor
```

The following script is an example of a sequence loop in legacy scripting:

```
var items
set items = [a b c d]

for i in items
 println ^i
endfor
```

There are also other types of loops that can be used:

- Iterating through the models in the models palette, or through the outputs in the outputs palette.
- Iterating through the fields coming into or out of a node.

Python scripting also supports different types of loops. The following script is an example of a counted loop in Python scripting:

```
i = 1
while i <= 10:
 print i
 i += 1
```

The following script is an example of a sequence loop in Python scripting:

```
items = ["a", "b", "c", "d"]
for i in items:
 print i
```

The sequence loop is very flexible, and when it is combined with IBM SPSS Modeler API methods it can support the majority of legacy scripting use cases. The following example shows how to use a sequence loop in Python scripting to iterate through the fields that come out of a node:

```
node = modeler.script.stream().findByType("filter", None)
for column in node.getOutputDataModel().columnIterator():
 print column.getColumnName()
```

Executing streams

During stream execution, model or output objects that are generated are added to one of the object managers. In legacy scripting, the script must either locate the built objects from the object manager, or access the most recently generated output from the node that generated the output.

Stream execution in Python is different, in that any model or output objects that are generated from the execution are returned in a list that is passed to the execution function. This makes it simpler to access the results of the stream execution.

Legacy scripting supports three stream execution commands:

- `execute_all` executes all executable terminal nodes in the stream.
- `execute_script` executes the stream script regardless of the setting of the script execution.
- `execute` *`node`* executes the specified node.

Python scripting supports a similar set of functions:

- *`stream`*`.runAll(`*`results-list`*`)` executes all executable terminal nodes in the stream.
- *`stream`*`.runScript(`*`results-list`*`)` executes the stream script regardless of the setting of the script execution.
- *`stream`*`.runSelected(`*`node-array`*`, `*`results-list`*`)` executes the specified set of nodes in the order that they are supplied.
- *`node`*`.run(`*`results-list`*`)` executes the specified node.

In legacy script, a stream execution can be terminated using the `exit` command with an optional integer code, for example:

```
exit 1
```

In Python scripting, the same result can be achieved with the following script:

```
modeler.script.exit(1)
```

Accessing objects through the file system and repository

In legacy scripting, you can open an existing stream, model or output object using the `open` command, for example:

```
var s
set s = open stream "c:/my streams/modeling.str"
```

In Python scripting, there is the `TaskRunner` class that is accessible from the session and can be used to perform similar tasks, for example:

```
taskrunner = modeler.script.session().getTaskRunner()
s = taskrunner.openStreamFromFile("c:/my streams/modeling.str", True)
```

To save an object in legacy scripting, you can use the `save` command, for example:

```
save stream s as "c:/my streams/new_modeling.str"
```

The equivalent Python script approach would be using the `TaskRunner` class, for example:

```
taskrunner.saveStreamToFile(s, "c:/my streams/new_modeling.str")
```

IBM SPSS Collaboration and Deployment Services Repository based operations are supported in legacy scripting through the `retrieve` and `store` commands, for example:

```
var s
set s = retrieve stream "/my repository folder/my_stream.str"
store stream ^s as "/my repository folder/my_stream_copy.str"
```

In Python scripting, the equivalent functionality would be accessed through the Repository object that is associated with the session, for example:

```
session = modeler.script.session()
repo = session.getRepository()
s = repo.retrieveStream("/my repository folder/my_stream.str", None, None, True)
repo.storeStream(s, "/my repository folder/my_stream_copy.str", None)
```

Note: Repository access requires that the session has been configured with a valid repository connection.

Stream operations

Some stream operation commands that are commonly used in IBM SPSS Modeler have equivalent commands in Python scripting. This might help you to convert your existing SPSS Modeler Legacy scripts to Python scripts for use in IBM SPSS Modeler 17.

Table 247. Legacy scripting to Python scripting mapping for stream operations.

Legacy scripting	Python scripting
`create stream` *DEFAULT_FILENAME*	*taskrunner*`.createStream(`*name*`, `*autoConnect*`, `*autoManage*`)`
`close stream`	*stream*`.close()`
`clear stream`	*stream*`.clear()`
`get stream` *stream*	No equivalent
`load stream` *path*	No equivalent
`open stream` *path*	*taskrunner*`.openStreamFromFile(`*path*`, `*autoManage*`)`
`save` *stream* `as` *path*	*taskrunner*`.saveStreamToFile(`*stream*`, `*path*`)`

Table 247. Legacy scripting to Python scripting mapping for stream operations (continued).

Legacy scripting	Python scripting
`retreive stream path`	`repository.retreiveStream(path, version, label, autoManage)`
`store stream as path`	`repository.storeStream(stream, path, label)`

Model operations

Some model operation commands that are commonly used in IBM SPSS Modeler have equivalent commands in Python scripting. This might help you to convert your existing SPSS Modeler Legacy scripts to Python scripts for use in IBM SPSS Modeler 17.

Table 248. Legacy scripting to Python scripting mapping for model operations.

Legacy scripting	Python scripting
`open model path`	`taskrunner.openModelFromFile(path, autoManage)`
`save model as path`	`taskrunner.saveModelToFile(model, path)`
`retrieve model path`	`repository.retrieveModel(path, version, label, autoManage)`
`store model as path`	`repository.storeModel(model, path, label)`

Document output operations

Some document output operation commands that are commonly used in IBM SPSS Modeler have equivalent commands in Python scripting. This might help you to convert your existing SPSS Modeler Legacy scripts to Python scripts for use in IBM SPSS Modeler 17.

Table 249. Legacy scripting to Python scripting mapping for document output operations.

Legacy scripting	Python scripting
`open output path`	`taskrunner.openDocumentFromFile(path, autoManage)`
`save output as path`	`taskrunner.saveDocumentToFile(output, path)`
`retrieve output path`	`repository.retrieveDocument(path, version, label, autoManage)`
`store output as path`	`repository.storeDocument(output, path, label)`

Other differences between legacy scripting and Python scripting

Legacy scripts provide support for manipulating IBM SPSS Modeler projects. Python scripting does not currently support this.

Legacy scripting provides some support for loading *state* objects (combinations of streams and models). State objects have been deprecated since IBM SPSS Modeler 8.0. Python scripting does not support state objects.

Python scripting offers the following additional features that are not available in legacy scripting:

- Class and function definitions
- Error handling
- More sophisticated input/output support
- External and third party modules

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