Technical Paper

Build Your First Web-based Report Using the SAS® 9.2 Business Intelligence Clients

A practical introduction to SAS® Information Map Studio and SAS® Web Report Studio for new and experienced users

Table of Contents

Overview

As the primary reporting component of the SAS Intelligence Platform, SAS® Web Report Studio provides an intuitive user interface that enables users at all technical skill levels to create, view, and explore centrally stored, Web-based reports.

Typically, SAS Web Report Studio reports are built using SAS Information Maps, which provide a simplified layer between nontechnical business users and the complexities of databases and query languages. SAS® Information Map Studio provides a graphical user interface for building information maps.

Using sample data that is shipped with SAS, this paper explains, step by step, how to create an information map in SAS Information Map Studio. It also shows you how to use that information map to build a report and demonstrates how you can refine the report after results are displayed.

Intended Audience

Because SAS Web Report Studio and SAS Information Map Studio have been redesigned, this paper is appropriate both for new users and for experienced users who want to quickly familiarize themselves with the new interfaces.

Before You Begin

By the time that you are ready to perform the tasks that are discussed in this paper, administrators at your site should have installed and configured all the necessary components for the SAS Intelligence Platform. This process should include starting the necessary servers.

To perform all of the tasks in this paper, you must be able to start SAS Information Map Studio and log on to SAS Web Report Studio. In SAS Web Report Studio, you should be in the Advanced Report Creation role. As an alternative, you can be in the Basic Report Creation role with the Create Cascade Prompts capability specifically assigned.

## About the Sample Data

The two sample tables used in this paper are INVOICE and PRODUCT. In Windows environments, these tables are located by default in `C:\Program Files\SAS\SASFoundation\9.2\core\sample`. In UNIX environments, the default location is `/usr/local/SAS/samples`. In order for you to follow along, these tables must be registered in the metadata and you must be authorized to access them.

Create the Information Map

First, start SAS Information Map Studio. You should see the following main window.
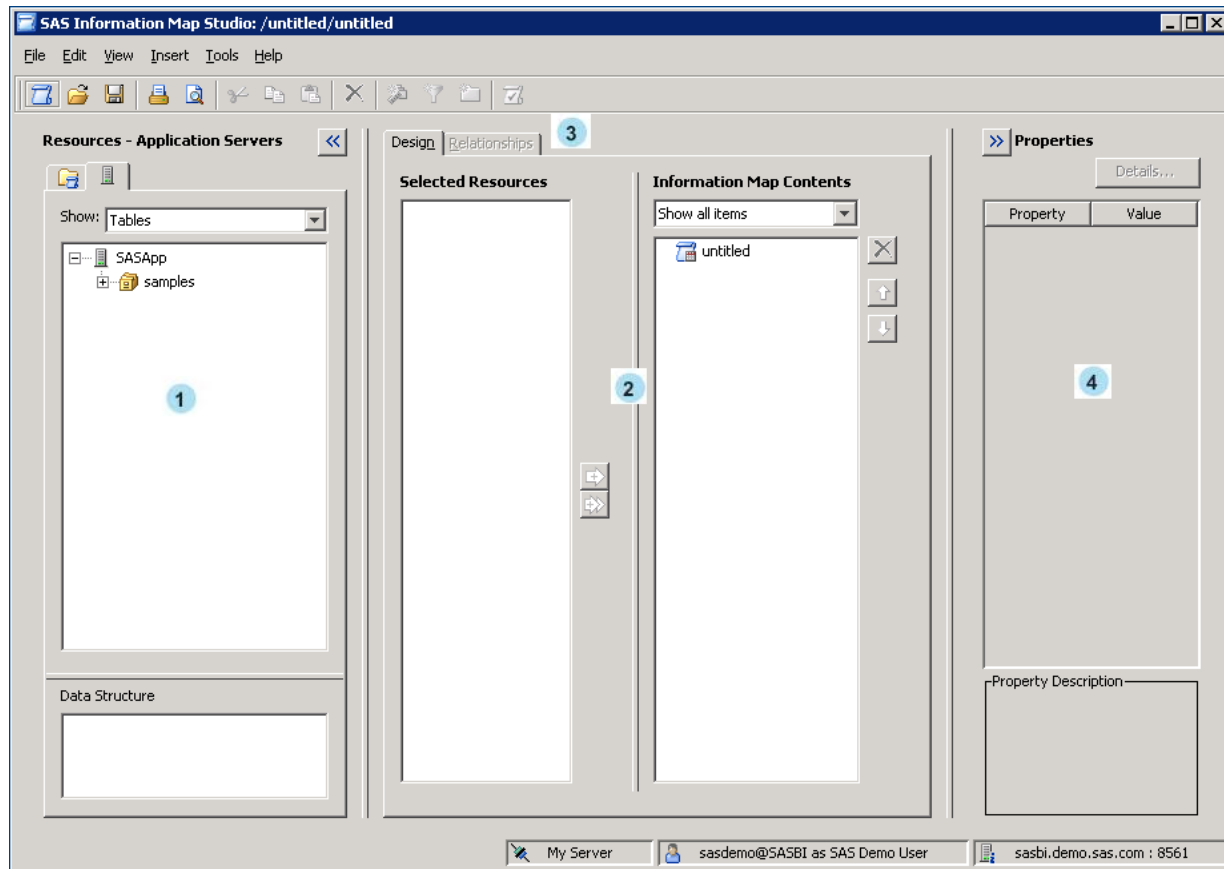
In this section, you will perform tasks mainly in the following four areas:

- **Resources** pane—Provides access to existing information maps and to resources that you need for creating new information maps. Use this pane to select the two sample tables.

- **Design** tab—Displays the currently selected resources and has two panes: **Selected Resources** and **Information Map Contents**. Drag the selected sample tables from the **Resources** pane to the **Selected Resources** pane. From the **Selected Resources** pane, add selected data items to the **Information Map Contents** pane. The data items that are listed in the **Information Map Contents** pane will be used in the query.

- **Relationships** tab—Displays relational data sources (after you select some resources), their columns, and the relationships between them. Use the **Relationships** tab to define a relationship between your two selected data sources.

- **Properties** pane—Displays the properties of items that are selected in the **Resources** pane, on the **Design** tab, and on the **Relationships** tab. Use the **Properties** pane to rename all of the selected data items and also to change the value-generation method for two data items.

2

After opening SAS Information Map Studio, you will perform these nine major steps:

1. Select two relational tables as data sources.

2. Define a relationship between the two data sources.

3. Add data items from the data sources to the information map.

4. Change the names of the selected data items.

5. Change the value-generation method for two selected data items (**Customer Name** and **Product**).

6. Create a new data item.

7. Create a prompted filter.

8. Run a test query.

9. Save the information map.

## Step 1: Select Relational Tables as Data Sources

Your first task is to select the tables that contain the data that you want to analyze in your report. After you select the tables, they become the data sources for your information map.

1. Select **Resources ► Application Servers** in the **Resources** pane.

2. From the **Show** drop-down list, select **Tables**.

3. Navigate to the location of the **INVOICE** and **PRODUCT** tables and then select them as shown below:
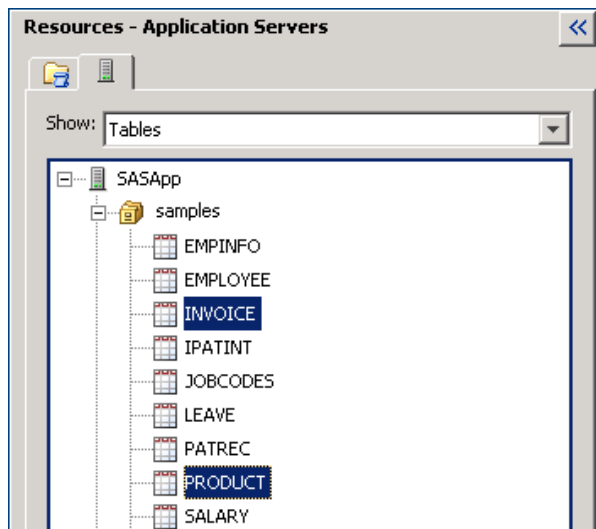
> **Tip:** When the **INVOICE** and **PRODUCT** tables are selected, notice that their data structures appear in the **Data Structure** pane, as shown here:

3
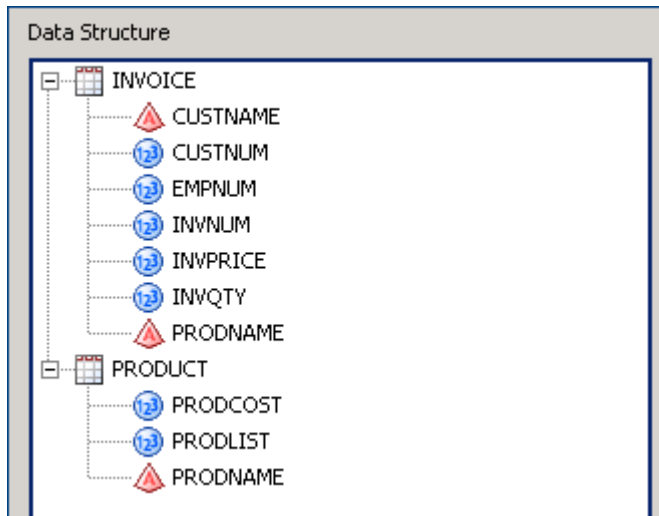
4. Double-click **INVOICE** and **PRODUCT**, or drag them to the **Selected Resources** pane on the **Design** tab. Expand the data sources so that their contents are visible. The **Design** tab should now appear as follows:
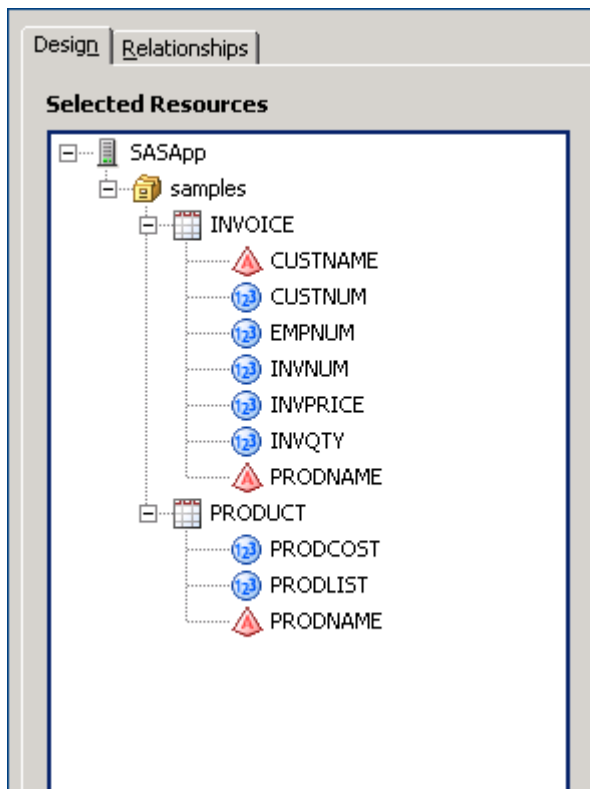

Tip: After you select the two tables, click the double arrows button () in the upper right corner of the **Resources** pane to collapse the **pane**. Collapsing the pane gives you more workspace.

Step 2: Define a Relationship between the Data Sources

Because you are using more than one data source, it is necessary to define a relationship between those sources so that they can be used together in your query. Define a relationship as follows:

1. On the **Relationships** tab, click **PRODNAME** in the **INVOICE** data source and drag the mouse pointer to **PRODNAME** in the **PRODUCT** data source. A line is drawn between the two columns to show the relationship that you created, as shown in the following display:
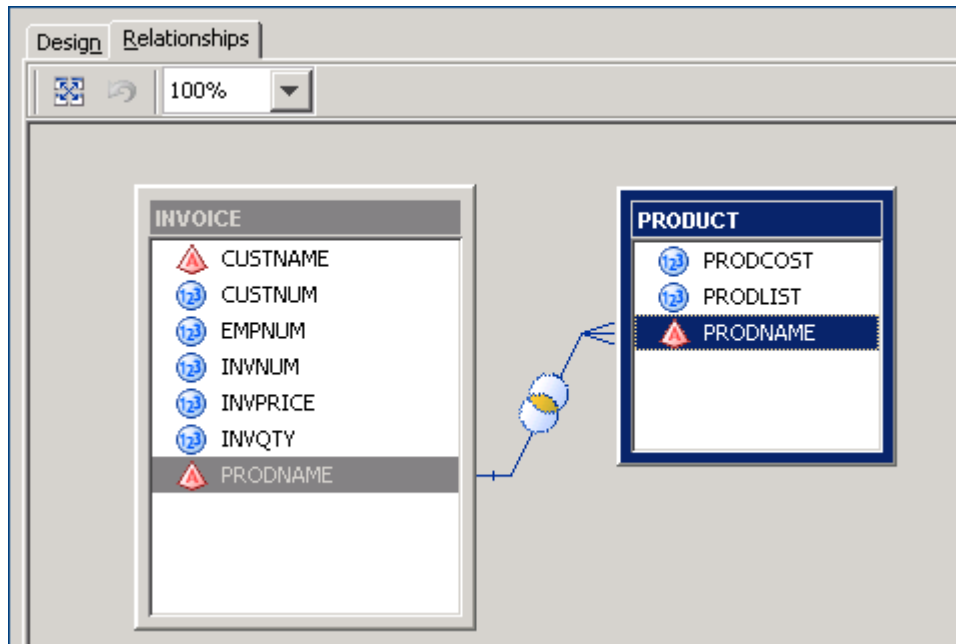
The default relationship returns all the rows in first data source that have one or more matching rows in the second data source. Also by default, one row in the first data source can be associated with one-to-many rows in the second data source.

2. Select the **Design** tab when you are done.

Step 3: Add Data Items from the Data Sources to the Information Map

Data source columns that you select to use in the information map are called *data items*.[1] To select data items, display the **Design** tab in the **Selected Resources** pane, and then double-click or use the arrow key to add the following data items to the **Information Map Contents** pane:

*   From the **INVOICE** data source, select **CUSTNAME**, **INVNUM**, **INVPRICE**, and **PRODNAME**.

*   From the **PRODUCT** data source, select **PRODCOST** and **PRODLIST**.

After you select the data items, the **Information Map Contents** pane appears as follows:

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[1] Data items also can be based on expressions that you define, as discussed in "Create a New Data Item".
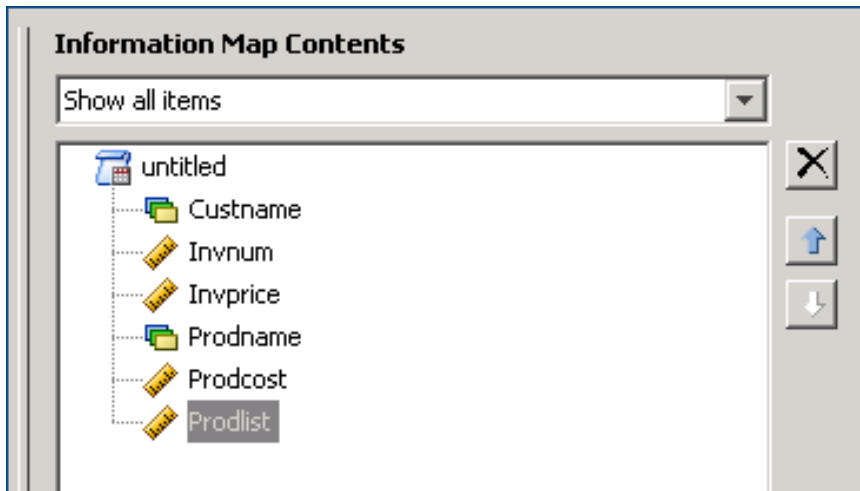
Step 4: Change the Names of the Data Items

One of the advantages of using information maps is that they hide obscure and complex data structures from the report creators and viewers. In this sample, you will change the names of the data items to more meaningful, user-friendly names.

In the **Information Map Contents** pane, select **Custname**. Notice that properties for this data item are displayed in the **Properties** pane to the right.
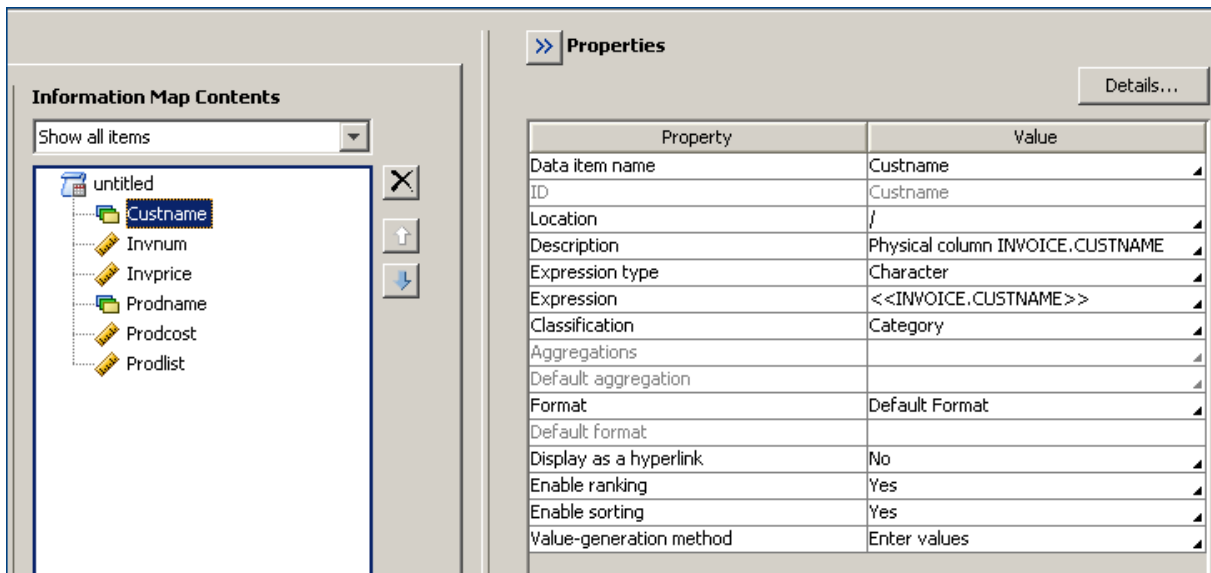
One way to change the name of a selected data item is to type a new name in the **Value** field for the **Data item name** property. When you select the **Value** field, the entire property row is highlighted. To replace the existing name, just begin typing. In this example, the value **Custname** is changed to **Customer Name**.

Property	Value
Data item name	Customer Name
ID	Custname

The following table lists the new values that you should enter for each data item.

Data item name property	
Original Value	New Value
Custname	Customer Name
Invnum	Invoice Number
Invprice	Invoice Amount
Prodname	Product
Prodcost	Cost
Prodlist	Retail Price

Step 5: Change the Value-Generation Method for `Customer Name` and `Product`

A data item's *value-generation method* determines how an application, such as SAS Web Report Studio, obtains values for a filter that is based on that data item. The default value-generation method does not provide a list of filter values.

When you create the sample report, it must show a list of values for the **Customer Name** and **Product** data items. To show this list, change the value-generation method for these data items as follows.

1. In the **Information Map Contents** pane, press the CTRL key and select **Customer Name** and **Product.**

2. In the **Properties** pane, click in the **Value-generation method** field to display the **Value-Generation Method** box in the Data Item Properties dialog box.

3. Select **User selects values from the dynamic list**.
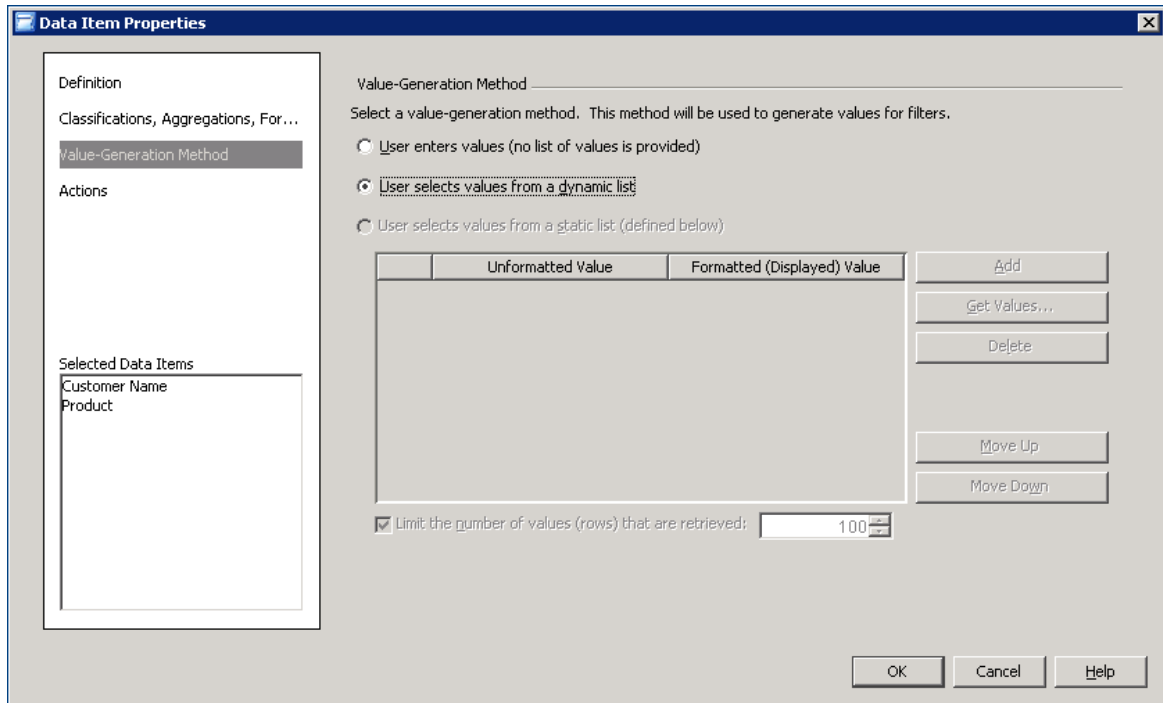
4. Click **OK** to return to the main window.

Step 6: Create a New Data Item

Create a new data item named **Discount**, so that your report can include the discount percentage, if any, for each invoice.

1. Click the **New Data Item** icon ( ) on the toolbar to open the Data Item Properties dialog box.

2. On the **Definition** tab, type **Discount** as the name of the new data item.

3. Click **Edit** to open the Expression Editor dialog box and then create this expression:

    (<<root.Prodlist>> - <<root.Invprice>>) / <<root.Invprice>>

    You can type the expression, or you can construct the expression by selecting data items from the **Business Data** list (or the **Physical Data** list[2]) on the **Data Sources** tab and clicking **Add to Expression** to insert the selected data item into the **Expression Text** field. The following display shows **Invoice Amount** selected.

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[2] The **Physical Data** list displays the data sources that are used to create the information map. The **Business Data** list displays the data items that are contained in the information map. The **Business Data** list might include data items that only exist in the information map. For more information, see the SAS Information Map Studio Help.

4. Click **OK** to return to the Data Item Properties dialog box.

5. Display the **Classifications, Aggregations, Formats** tab, and change the following three settings (accept the defaults for any settings that are not mentioned):

   a. For **Aggregate functions**, deselect **Defined in expression (additive)** and leave **Defined in expression (non-additive)** selected.

   b. For **Format** type, select **Numeric**.

   c. For **Format** name, select **PERCENT** with a width of **6**.

When you are done, your **Classifications, Aggregations, Formats** tab should look like this:
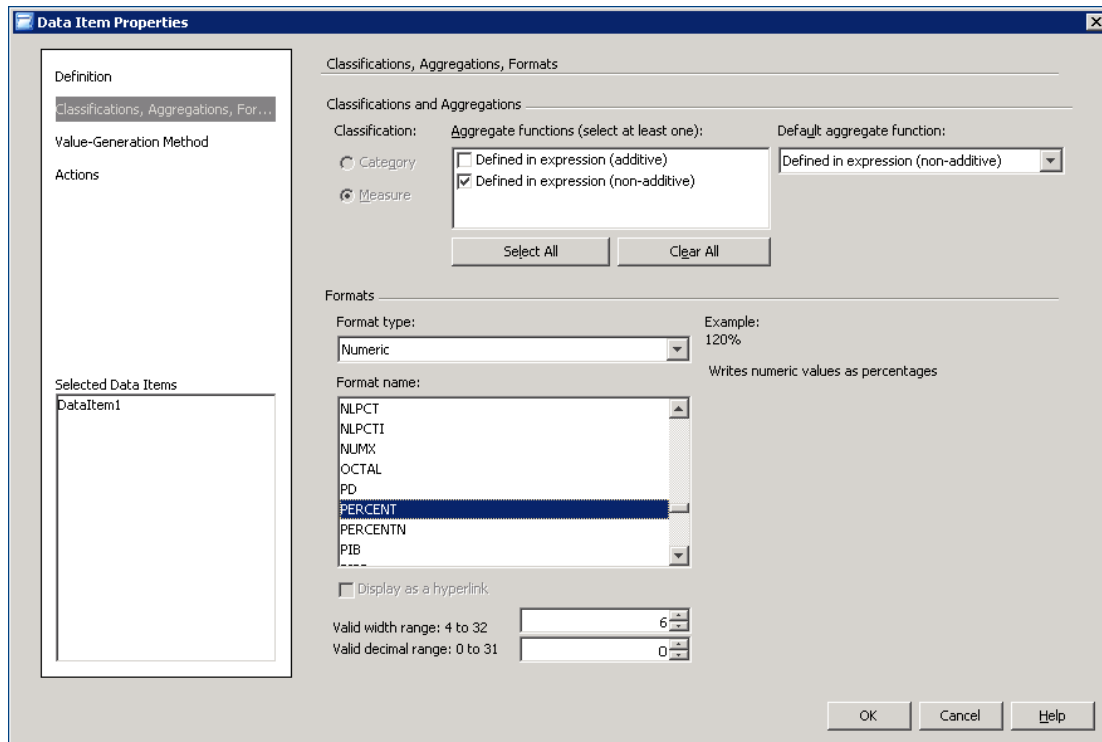
6. Click **OK** to finish creating your new data item, which is now listed with the other data items in the **Information Map Contents** pane.
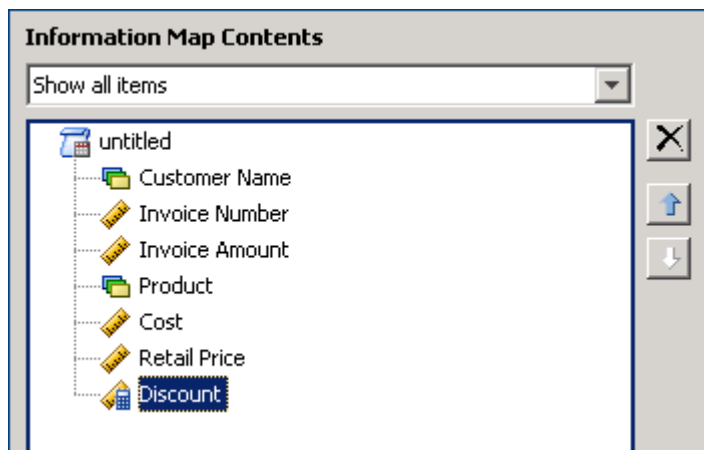
Step 7: Create a Prompted Filter

The report should enable users to view results for specific products. You can create the prompt in SAS Web Report Studio, but for this sample, create the prompt in the information map.

1. Click the **New Filter** icon ( ) on the toolbar to open the New Filter dialog box, and then specify these settings:

    a.   For **Filter name**, type **Product Filter**.

    b.   For **Data item**, select **Product**.

    c.   For **Condition**, select **Is equal to**.

    d.   For **Value(s)**, select **Prompt user for value(s).**

At this point, the New Filter dialog box should look like this:

2.   Click **New** to open the New Prompt dialog box, and then specify the following settings on the **General** tab (accept the defaults for any settings that are not mentioned):

    a.   For **Name**, type **Prompt for Product**.

    b.   For **Displayed text,** type **Select one or more products to subset the query results**.

The **General** tab should now look like this:

3. Click the **Prompt Type and Values** tab, and change the following two settings (accept the defaults for any settings that are not mentioned):

    a. For **Method for populating prompt**, select **User selects values from a dynamic list**.

    b. For **Number of values**, select **Multiple values**.

The **Prompt Type and Values** tab should now look like this:

4. Click **OK** to return to the New Filter dialog box, which should now look like the following display:

5. Click **OK** to finish creating the prompted filter for **Product**, which is then added to the **Information Map Contents** pane.

Step 8: Run a Test Query

Before saving and closing an information map, you should run at least one test query to make sure that you get the results that you expect.

1. Click the **Run a test query** icon ( ) on the toolbar to open the Test the Information Map dialog box.

2. Move all the data items and the **Product Filter** into the **Selected items** list.
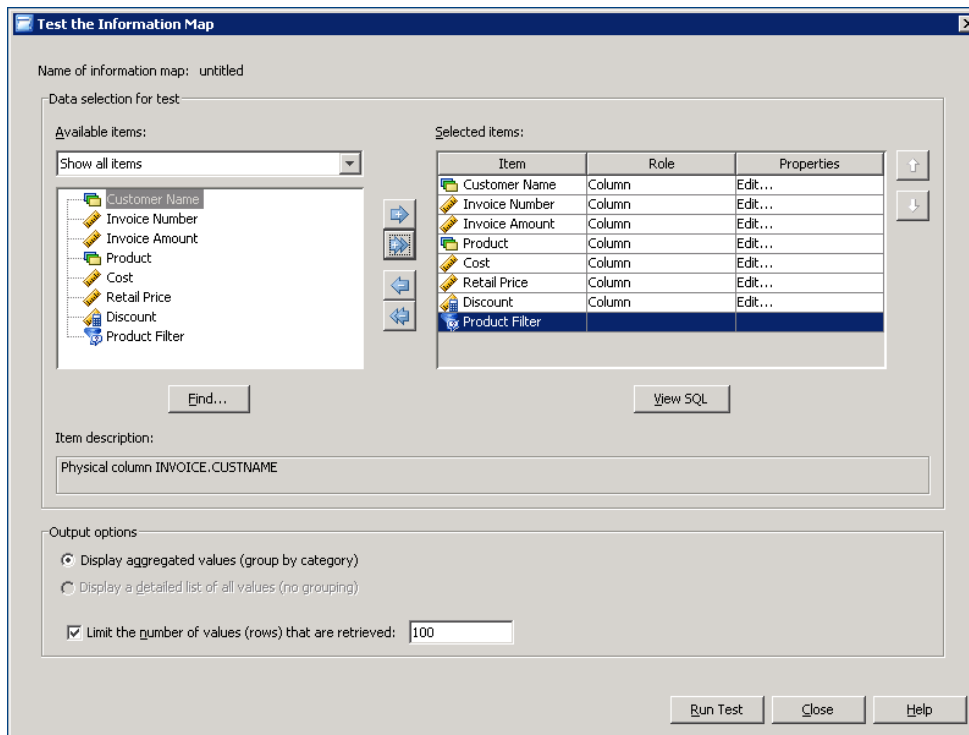
3. Click **Run Test**. Because the product filter is designed to prompt for values, the Prompt Value Specification dialog box appears.
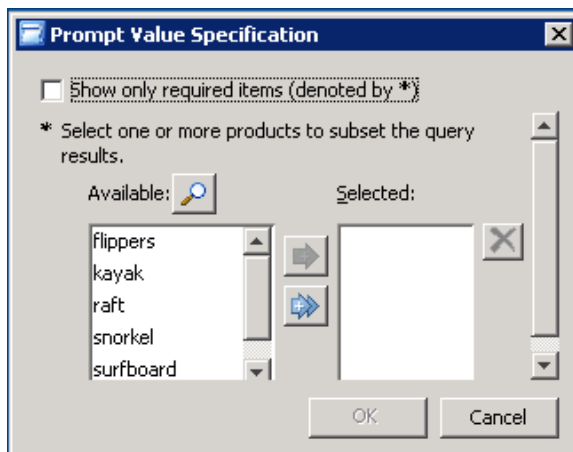
4. Select one or more of the products from the **Available** list, and then click **OK**.
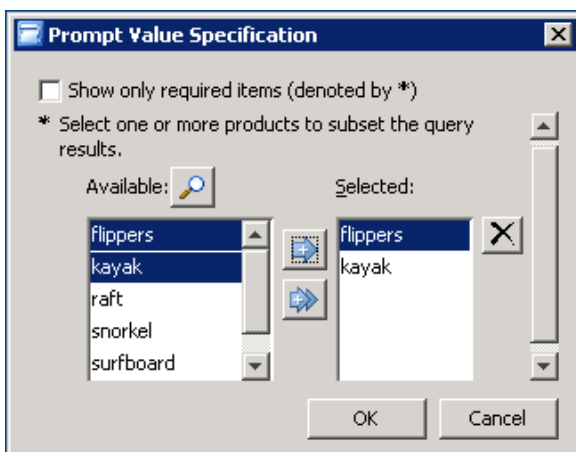
Here are the query results, which are subset to include just flippers and kayaks. Also notice that the new **Discount** column shows which invoice amounts reflect a discount from the regular retail price.

|	Customer Name	Invoice ...	Invoice Am...	Product	Cost	Retail Price	Discount
1	Beach Land	290	$19	flippers	$16	$20	5%
2	Coast Shop	340	$19	flippers	$16	$20	5%
3	Del Mar	830	$37	flippers	$32	$40	8%
4	Del Mar	400	$230	kayak	$190	$240	4%
5	New Waves	910	$40	flippers	$32	$40	0%
6	Surf Mart	1090	$38	flippers	$32	$40	5%

Step 9: Save the Information Map

When you are satisfied that the results look good, save the information map. Go back to the main SAS Information Map Studio window and perform these steps:

1. Click the **Save** icon (🖫) on the toolbar to open the Save an Information Map dialog box.

2. Navigate to the location in which you want to save the map.

   Tip: Your administrator might have a preferred storage location for resources such as information maps.

3.   For the **Name**, type **Invoice Map** as shown in the following display.
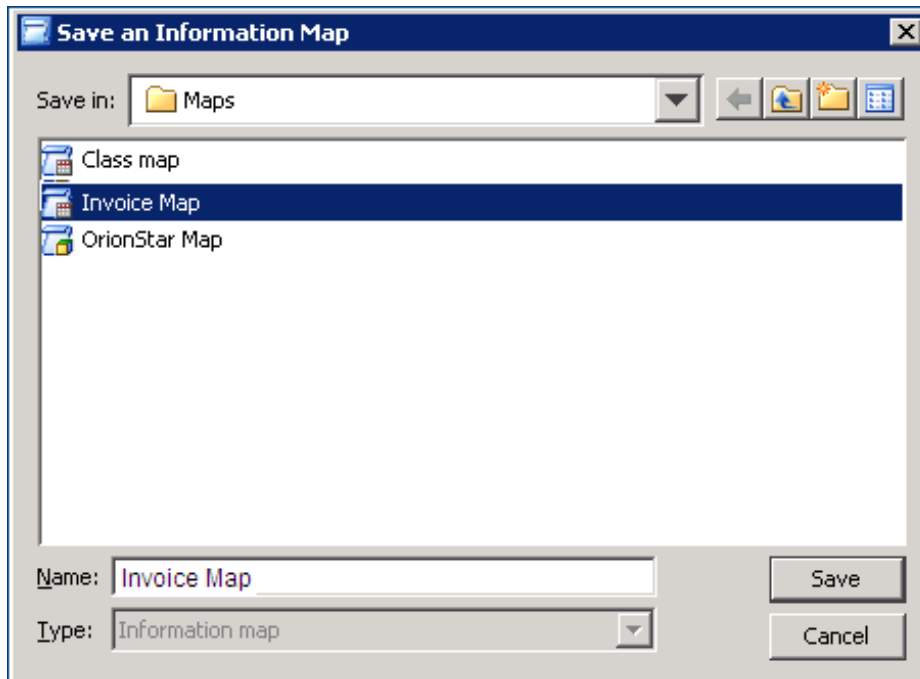

4.   Click **Save** to save the information map.

Now, you are ready to use this information map to create a report.

Create the Report

Your administrator should have provided you with a URL for logging on to SAS Web Report Studio. After you log on to SAS Web Report Studio, click the **New report** link in the **Getting Started** box in order to access the Edit mode, which is shown in the next display.
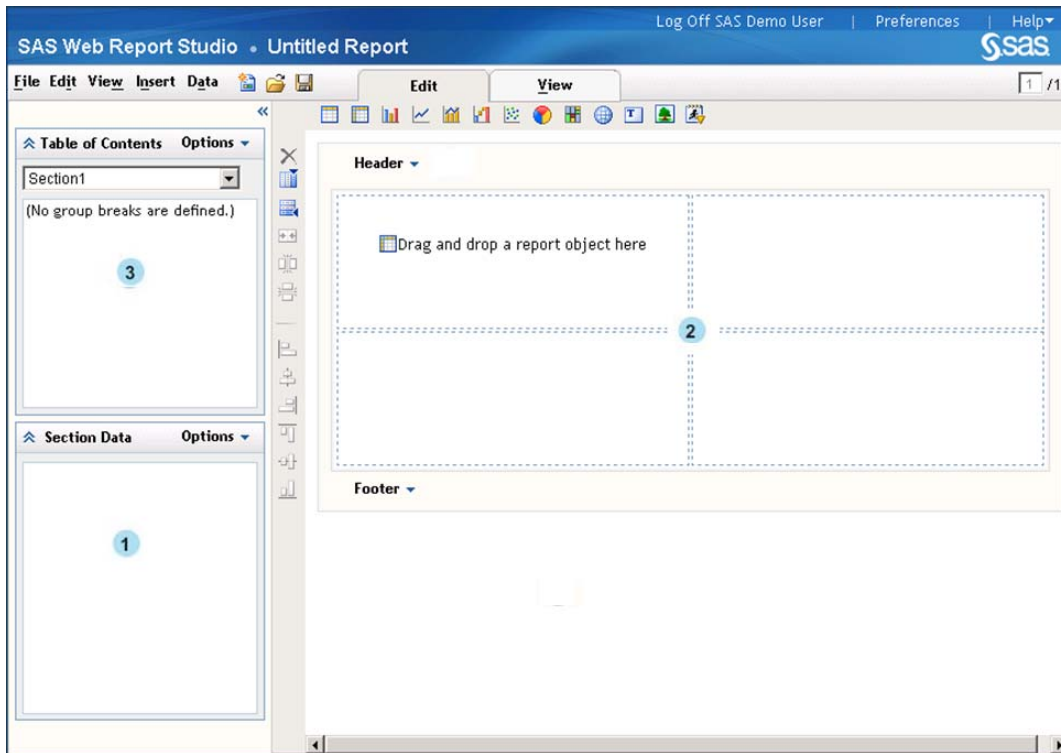
In this section, you will perform report-building tasks in the following main areas:

1. **Section Data** pane—Used to manage data. In this pane, use the **Options** menu to open the Select Data dialog box and the Section Filter dialog box.

2. Layout grid—The area in which you place tables, graphs, geographical maps, stored processes, text, and images for your report. In this example, insert a list table and bar chart for the sample report.

3. **Table of Contents** pane—Used to manage sections and group breaks. In this example, insert a group break on **Product**. (When the report is displayed, use **Table of Contents** to display results for each product.)

After you log on to SAS Web Report Studio, you will perform these six major steps:

1. Select data items from the Invoice Map.

2. Create a cascading prompt.

3. Define a group break by product.

4. Insert a table and a graph.

5. Save the report.

6. View results and refine the display.

Step 1: Select Data Items from the Invoice Map

Your first task is to select the data items from the information map that you just created. The selected data items are used to obtain results for your report.

1. From the `Section Data` pane, select **Options ► Select Data** to open the Select Data dialog box.

2. From the `Invoice Map`, select the data items so that they appear in the order shown below.

    Note: If the `Invoice Map` is not selected, then click the `Change Source` button and navigate to its location.
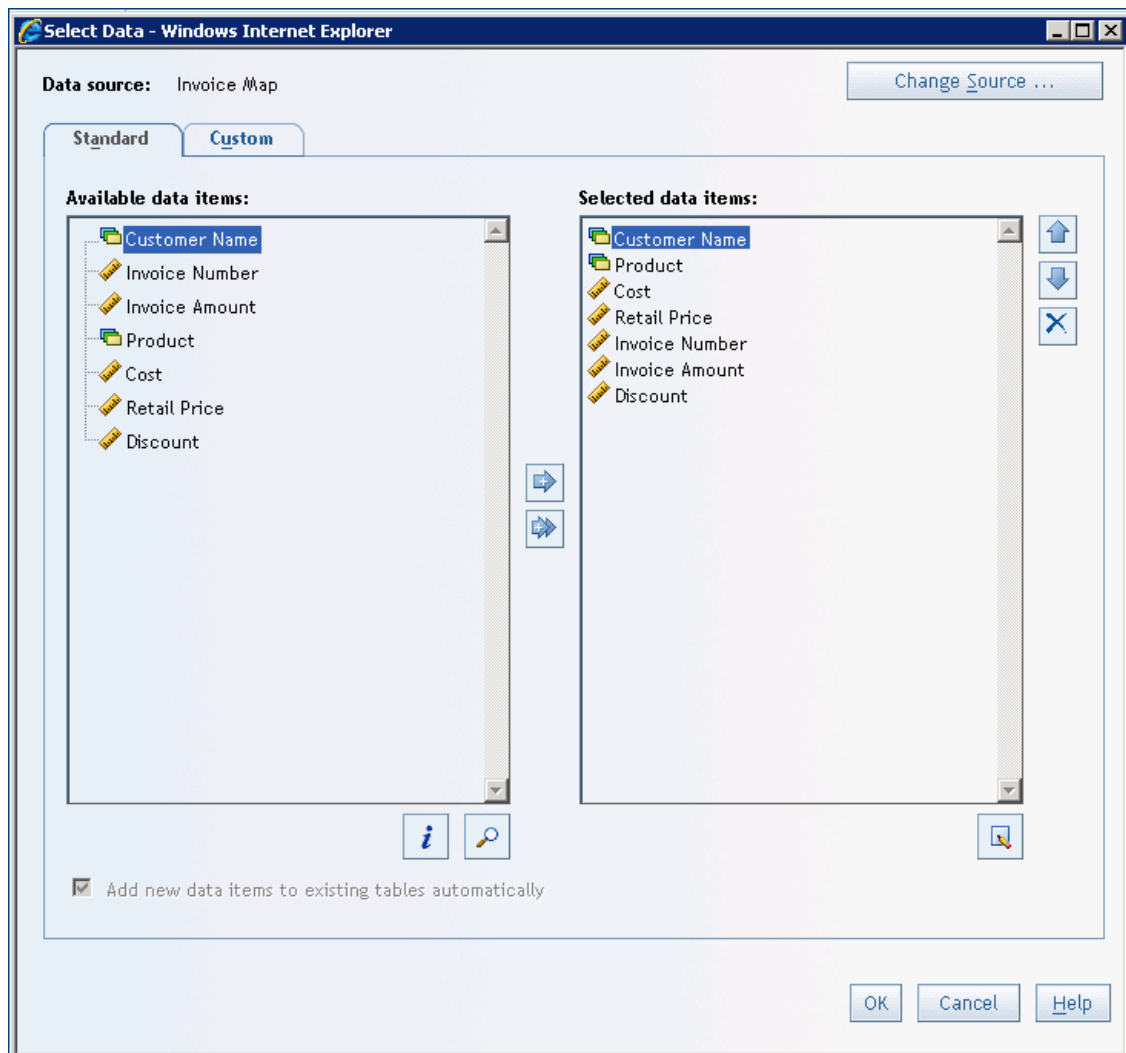

Keep in mind that the order in which you select data items affects default assignments in tables and graphs. For example, in bar charts, the first measure is assigned to bar height and the first category is assigned to bars. All other data items are hidden.

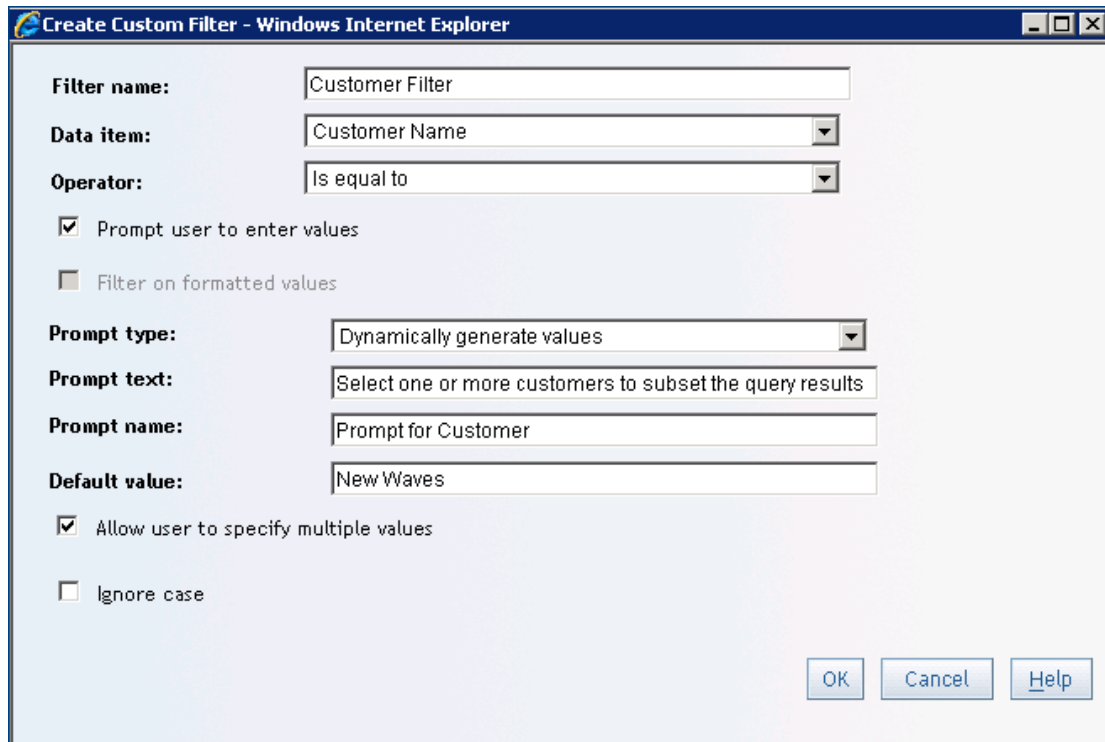## Step 2: Create a Cascading Prompt

When you create a set of prompts, you sometimes want the values of one prompt to depend on the value that is selected for another prompt. In that case, set up dependencies between the prompts.

1. Select **Options ► Section Filters** to open the Section Filters dialog box. The filter that you created in the **Invoice Map** is shown in the **Apply predefined filters** box. By default, the filter is not selected. Select **Product Filter** now so that it can be used in the report.
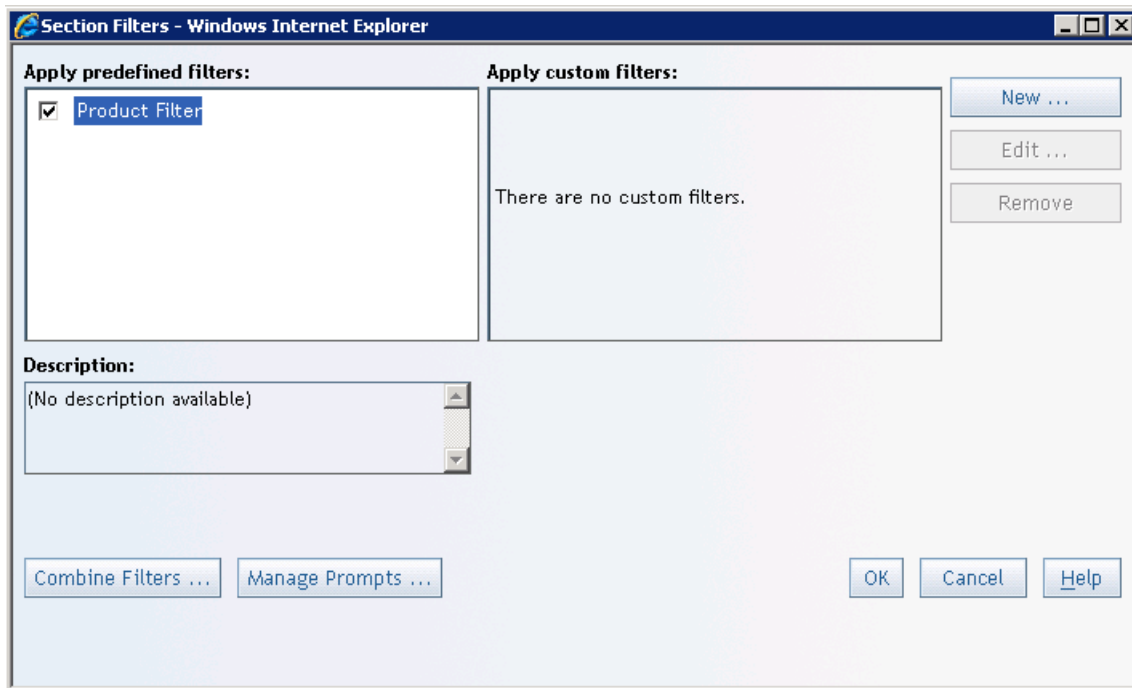
2. Click **New** to open the Create Custom Filter dialog box and then specify the following settings and accept the defaults for all other settings:

    a. For **Filter name**, type **Customer Filter**.

    b. For **Data item**, select **Customer Name**.

3. Select the **Prompt user to enter values** check box. When you select this option, the fields on the dialog box change to enable you to specify the prompt criteria. For the prompt criteria, specify these settings and accept the defaults for all other settings:

    a. For **Prompt text**, type **Select one or more customers to subset the query results**.
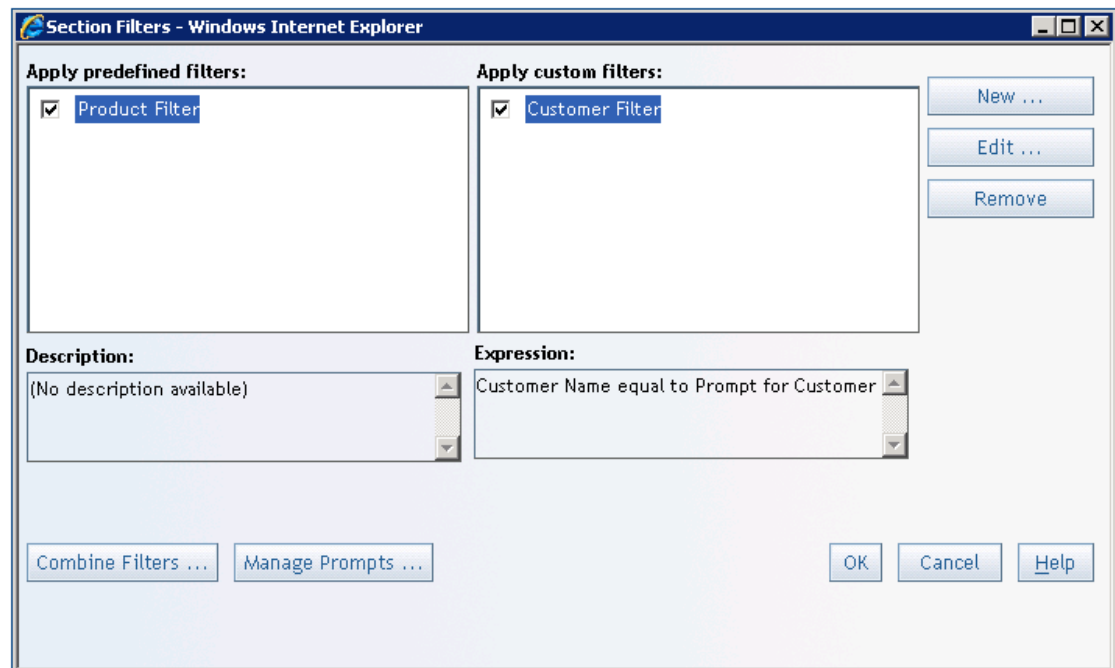
    b. For **Prompt name**, type **Prompt for Customer**.

    c. For the **Default value**, type **New Waves**.

    The Create Custom Filter dialog box should now look like this:

4. Click **OK** to return to the Section Filters dialog box, which should now look like this:

5. From the Section Filters dialog box, click **Manage Prompts** to open the Manage Prompts dialog box. Only filters that are selected for the report are available in this dialog box.

    The **Dependency** list contains all selected filters. The **Prompt** list contains only those prompts that support dynamic-value generation. For this exercise, the **Prompt for Customer** should depend on the values selected for the **Prompt for Product**, so specify these settings:

    a. From the **Prompt** drop-down list, select **Prompt for Customer**.

    b. From the **Dependency** list, select **Product Filter**.

    c. Click **Add**.

    The Manage Prompts dialog box should now look like this:

6. Click **OK** to return to the Section Filters dialog box, and then click **OK** to return to the report layout.

Step 3: Define a Group Break by Product

Each report section can be divided by one or more group breaks. Each group break causes the data to be grouped for each distinct value of a selected category. This report should be grouped by product.

1. In the **Table of Contents** pane, select **Options ▶ Group Breaks**.

2. In the Group Breaks dialog box, specify these settings and accept the defaults for all other settings.

     a.   From the **Break by values of** list, select **Product**.

     b.   Edit the formatting so that the font size is **14** and the text color is **blue**.

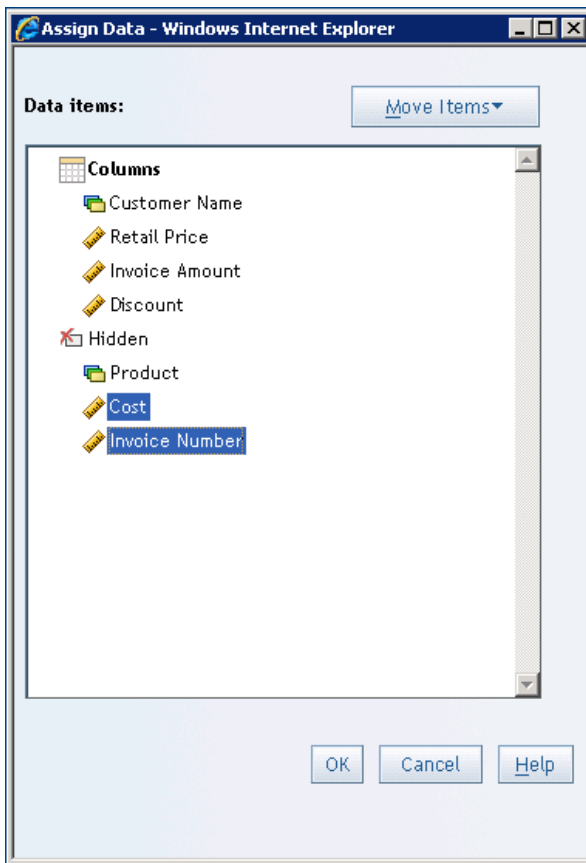3.   Click **OK** to return to the report layout.

Step 4: Insert a Table and a Graph

SAS Web Report Studio provides a variety of ways in which to display results, including two types of tables and seven types of graphs. This sample report contains a list table and a bar chart.

1.   Select the Insert list (⊞) tool and drag it into the first cell in the layout grid as the table placeholder.

2.   Right-click the table placeholder and select **Assign Data** from the shortcut menu.
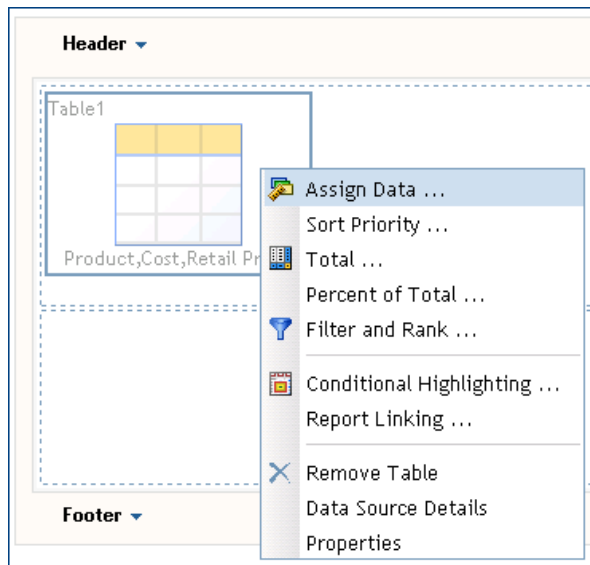
3. By default, the data items are added to the table in the order in which they were selected for the report. In the Assign Data dialog box, drag **Cost** and **Invoice Number** to the **Hidden** assignment. **Product** is already hidden because it is being used as the group break category.

4. Click **OK** to return to the report layout.

5. Right-click the table placeholder again, select **Properties**, and on the **Text** tab, change the heading size to **12** and the cell size to **10**. Accept the defaults for all other settings.

6. Click **OK** to return to the report layout.

7. Select the Insert bar chart tool () and drag it into the cell beneath the list table.

8. Right-click the bar chart placeholder, select **Properties**, and then specify these settings (accept the defaults for all other settings):

    a. On the **General** tab, change the **Graph size** to **Fixed size** and **Custom**.

        Tip: This setting enables report viewers to drag and resize the bar chart.

    b. On the **Axis** tab, change the label and value font size to **12**.

9. Click **OK** to return to the report layout.

Step 5: Save the Report

1. Select **File ► Save** to open the Save As dialog box.

2. For **Name**, type **Customer Invoice Report**.

3. For **Type**, accept **Data is automatically refreshed**.

4. Navigate to the location where you want to save the report.

   Tip: Your administrator might have a preferred storage location for resources such as reports.

5. Click **Save** to save the report and return to the report layout.

Step 6: View Results and Refine the Display

Before putting a report into production, it is wise to view the output and make any necessary adjustments. In this section, you will perform these tasks after the report is displayed:

- Add a data item to the section query.

- Display results for each group break.

- Hide filter information.

- Increase the report viewing area.

However, first you must display the Customer Invoice Report:

1. From the report layout, click the **View** tab, which automatically opens to a prompt window. (Recall that the report has a **Prompt for Customer** that depends on a **Prompt for Product**.)

2. Select **flippers**, **snorkel**, and **surfboard**, and then click **Apply**. Only customers who have purchased flippers, snorkels, and surfboards are displayed for the Prompt for Customer.

3. Select all of the available customers, and then click **View Report** to see the following display.
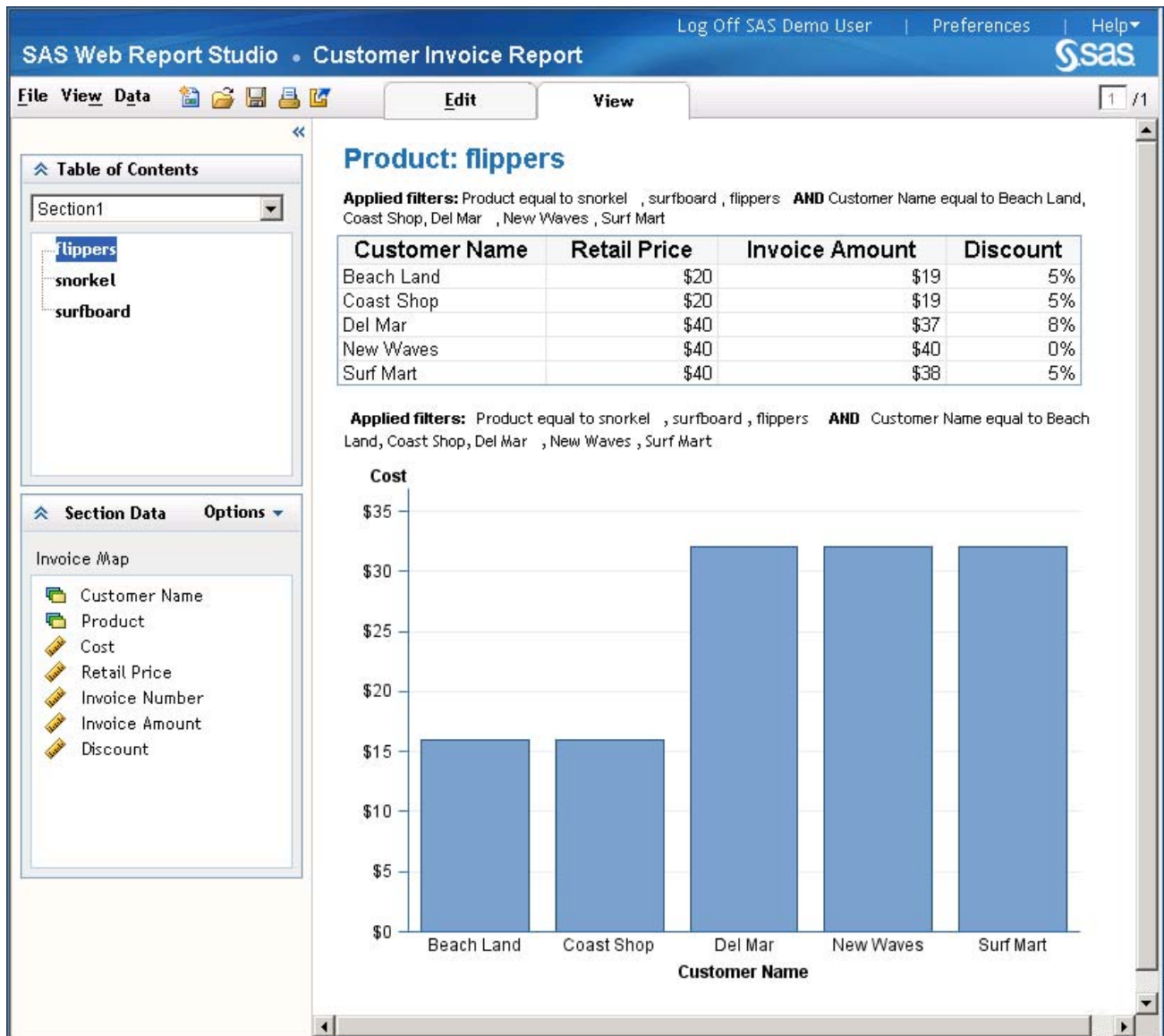
Tip: To enter different prompt values after the report is displayed, select **Data ► Refresh** to reopen the prompt window.

Add a data item to the section query

The report does not currently include the `Invoice Number` data item. To add the data item while viewing the report, select the data item in the `Section Data` pane and drag it to a valid location. Valid locations are highlighted as soon as you begin to drag the data item onto the report as shown in the following display.
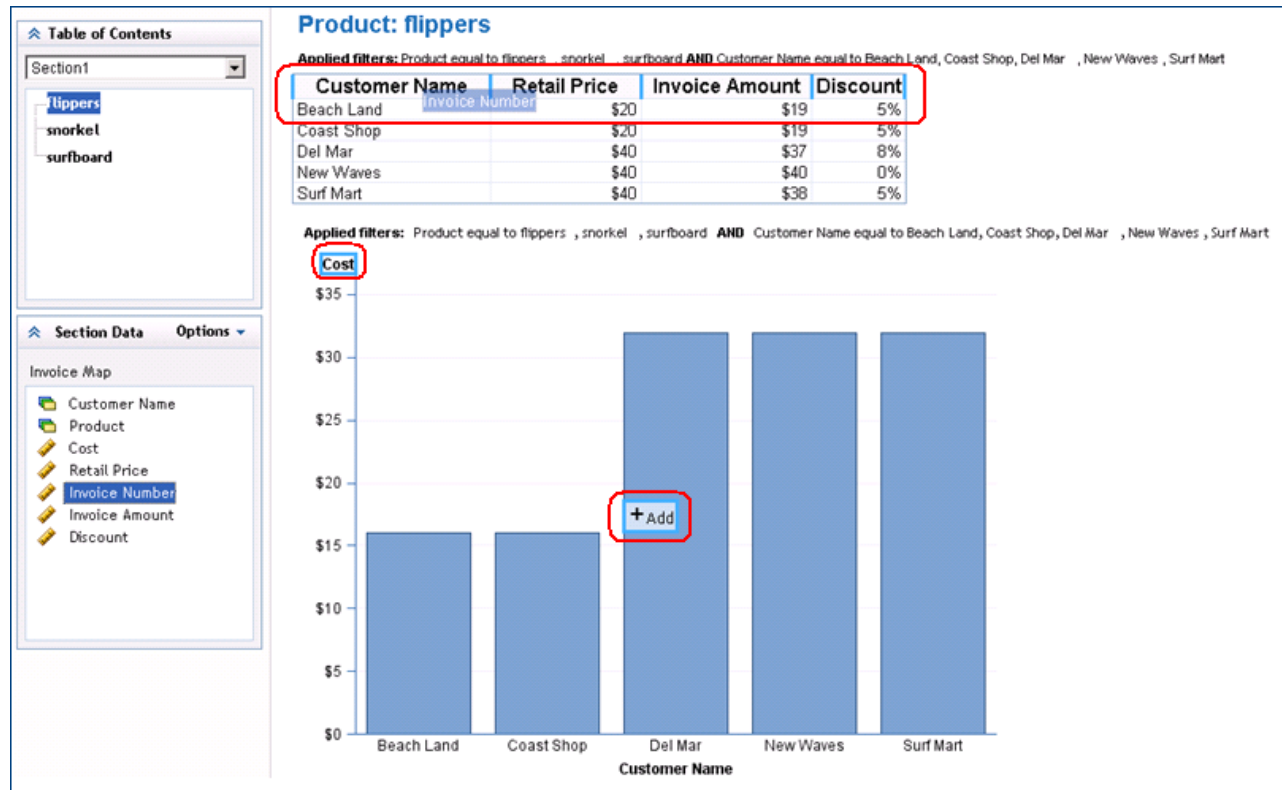
Display results for each group break

Because the report is grouped by product, use the `Table of Contents` pane to display results for each product. For example, select `surfboard` in the `Table of Contents` pane to see results for that product.
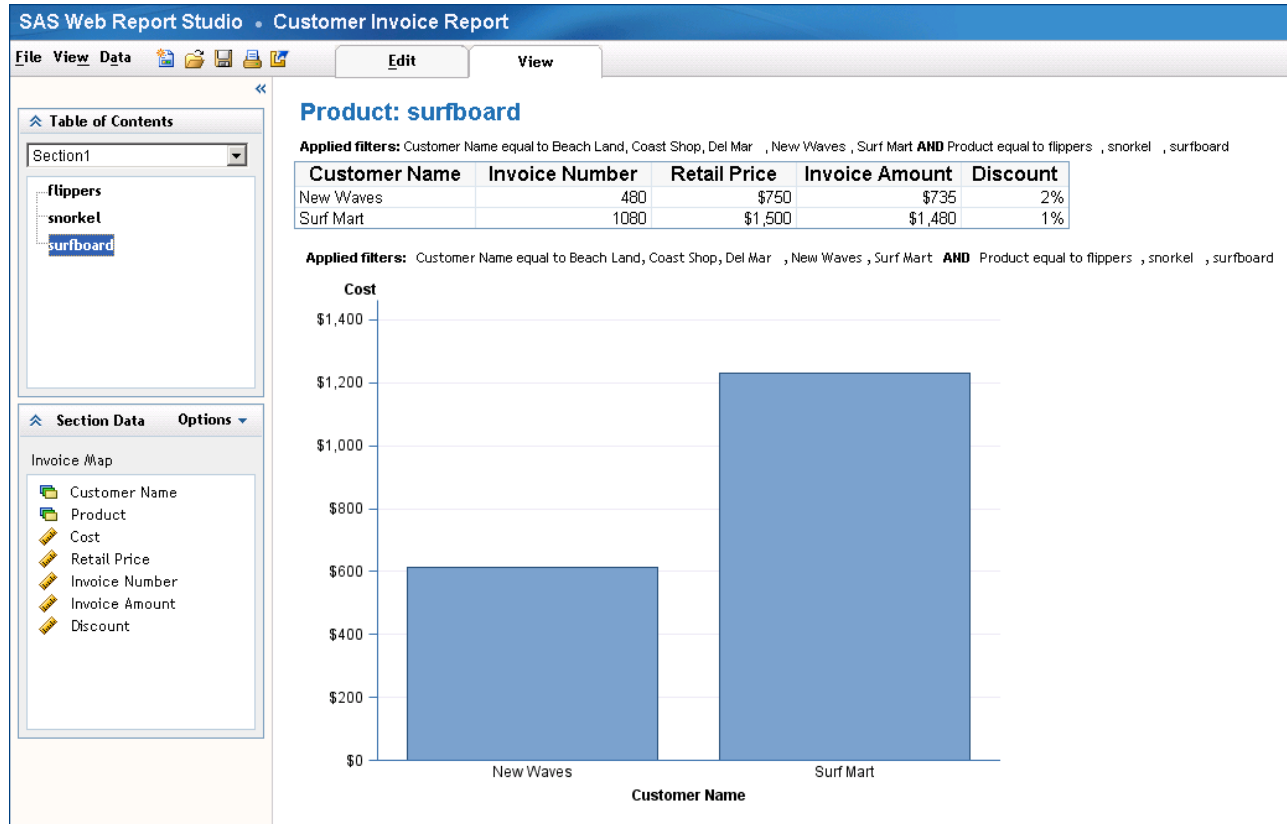
Hide filter information

By default, applied filter information is displayed. To hide the filter information, select **View ► Applied Filters** to deselect the option. In the following display, the `Applied Filters` box is no longer visible.
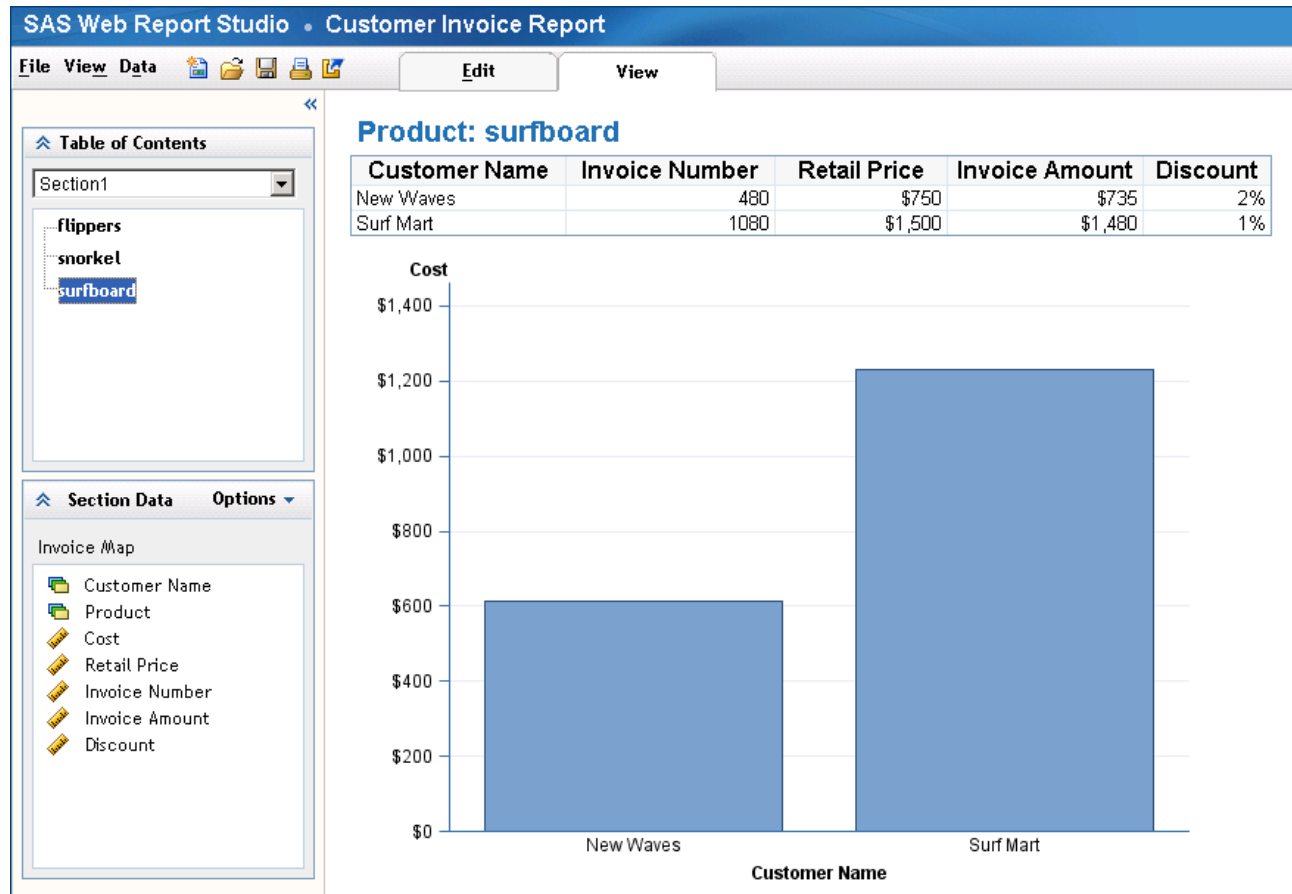
Increase the report viewing area

The **Table of Contents** and the **Section Data** panes are contained within a **Data** panel that can be collapsed horizontally to increase the report viewing area. To collapse the **Data** panel, click the horizontal double arrows («) or select **View ► Data Panel**.
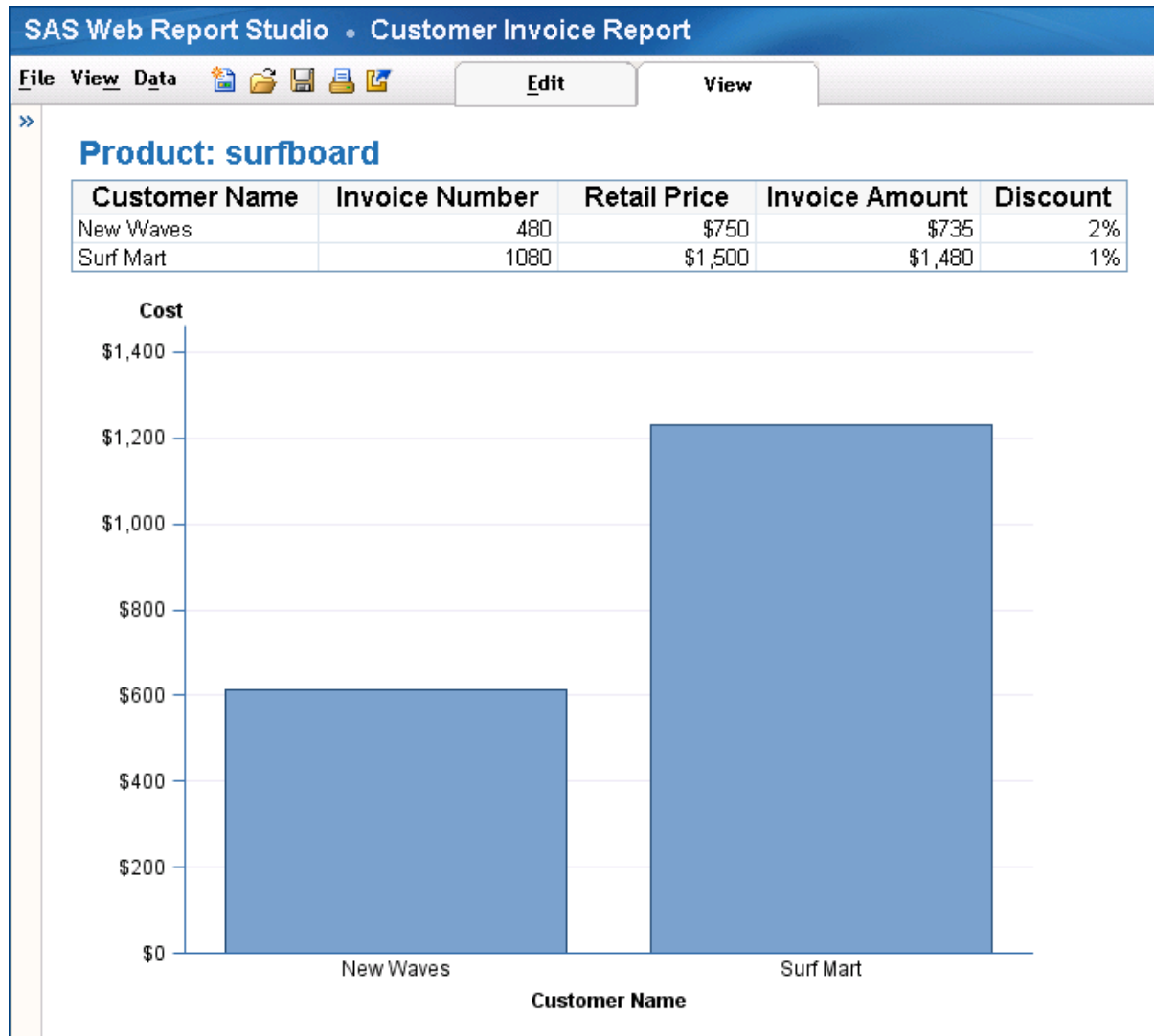
Summary

The business intelligence components of the SAS Intelligence Platform enable users with various needs and skill levels to create, produce, and share their own reports and analyses. Through easy-to-use interfaces, users can obtain their own answers to business questions. Meanwhile, the information technology staff retains control over the quality and consistency of the data.

This paper introduced you to two major components of the platform:

- SAS Information Map Studio, which enables business analysts and information architects to organize data in ways that are meaningful to business users, while shielding the end users from the complexities of underlying data structures

- SAS Web Report Studio, which is a Web-based query and reporting tool that enables users at any skill level to create, view, and organize reports

Resources

Patillo, Sherry and Rick Styll. 2007. *"What's New in SAS® Web Report Studio 4.2"*. Cary, NC: SAS Institute Inc. Available at support.sas.com/resources/papers/sgf2008/webreport42.pdf.

SAS Institute Inc. 2009a. *SAS® 9.2 Intelligence Overview*. Cary, NC: SAS Institute Inc. Available at support.sas.com/documentation/cdl/en/biov/60947/HTML/default/titlepage.htm.

SAS Institute Inc. 2009b. *SAS® 9.2 Intelligence Platform Web Application Administration Guide*. Cary, NC: SAS Institute Inc. Available at support.sas.com/documentation/cdl/en/biwaag/61238/HTML/default/titlepage.htm.

SAS Institute Inc. 2009c. *SAS® 9.2 Intelligence Platform Data Administration Guide*. Cary, NC: SAS Institute Inc. Available at support.sas.com/documentation/cdl/en/bidsag/61236/HTML/default/titlepage.htm.

SAS Institute Inc. 2009d. *SAS® Information Map Studio 4.2 Getting Started with SAS® Information Maps*. Cary, NC: SAS Institute Inc. Available at support.sas.com/documentation/cdl/en/imsgs/61225/HTML/default/titlepage.htm.

SAS Institute Inc. 2009e. *SAS® Web Report Studio 4.2 User's Guide*. Cary, NC: SAS Institute Inc. Available at support.sas.com/documentation/cdl/en/citug/61084/HTML/default/titlepage.htm.