Paper 309-2008

What's New in SAS® Web Report Studio 4.2

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ABSTRACT

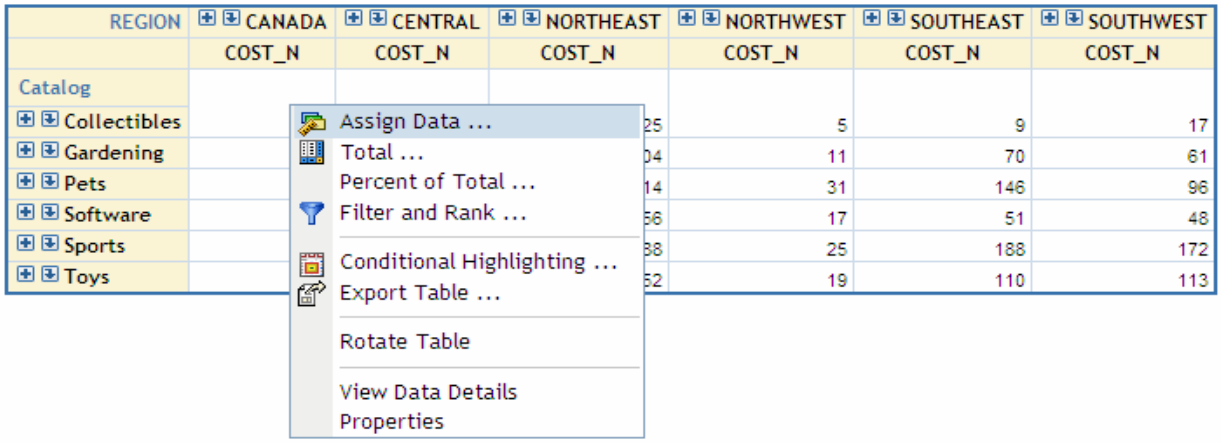
The latest revision of SAS® Web Report Studio, the zero download query, analysis and reporting tool included with the SAS® Enterprise BI Server, is full of enhancements based on feedback from customers like you. You will love the new desktop like experience on the Web. Many of the new capabilities will be demonstrated for you, so you can experience why this new release is important to you and your organization.

INTRODUCTION

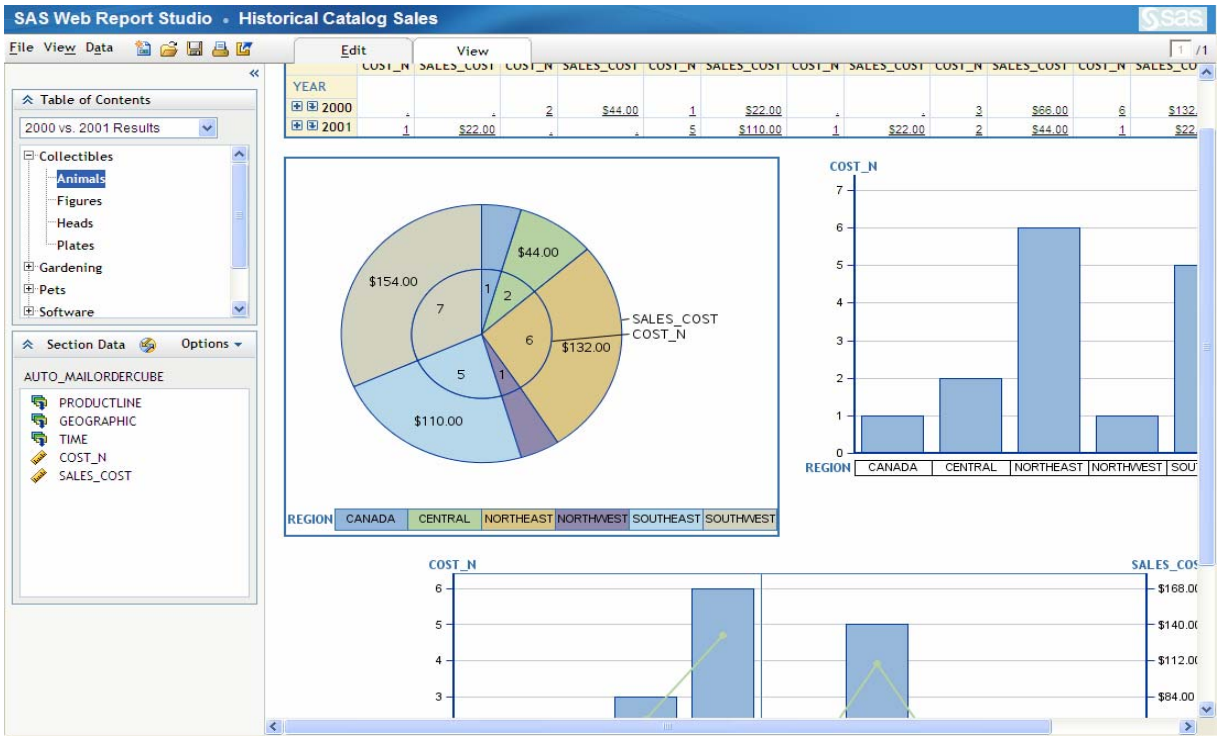
Web Report Studio is a web-based reporting tool with many capabilities added over the course of three major releases. The upcoming release adds many new features driven by requests from users. This paper organizes the key capabilities in Web Report Studio 4.2 into categories. Virtually all features affect the user interface, and the first section describes key UI enhancements that are designed to improve the user experience. New prompting makes reporting more flexible for consumers and can minimize the number of reports needed. OLAP cubes enable fast navigation of your data, and enhancements will get you the specific rollups you need. Visualization helps you understand report information quickly, and Web Report Studio 4.2 includes a number of graph enhancements, such as annotated reference lines. Report linking has been enhanced to let users navigate from high level information, now including geographical maps, to specific report sections and even SAS stored processes. Web Report Studio users will be able to better leverage the expertise of SAS programmers and many useful enhancements, such as comments, have been made to encourage collaboration. Data driven hyperlinks in tables allow report consumers to click on text or images that go to another URL, such as a product page or an email client so users can take action. Further, administrators will be able to customize the capabilities exposed in WRS for a group of users, and a built-in scheduler simplifies configuration for single instance deployments. These and many other enhancements in Web Report Studio 4.2 will help your organization better leverage information and intelligence by making SAS BI more pervasive.

USER INTERFACE ENHANCEMENTS

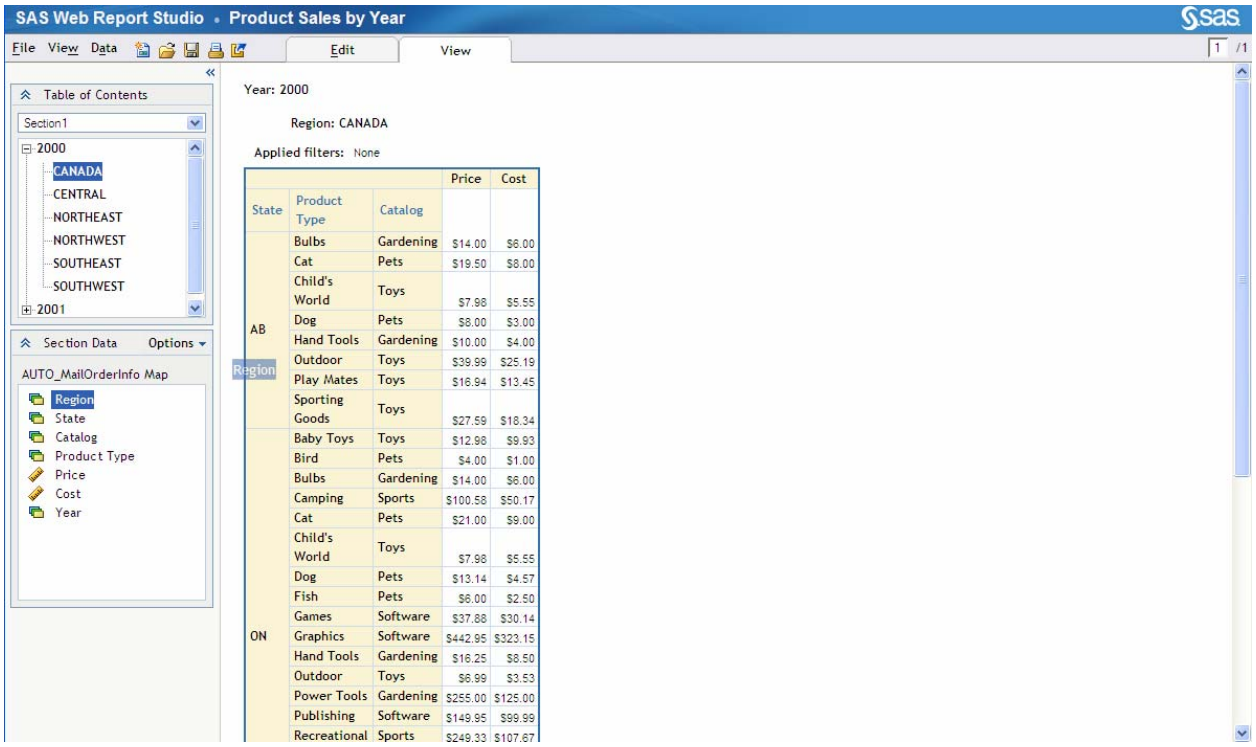
The updated Web Report Studio 4.2 user interface gives users a more traditional desktop application experience. The user is given a wider range of controls that allow more efficient interaction, better feedback, and an improved overall user experience. Standard operations such as exporting, filtering, and totaling are now selected from context-sensitive pop-up menus that are available when clicking on the right mouse button as shown below.



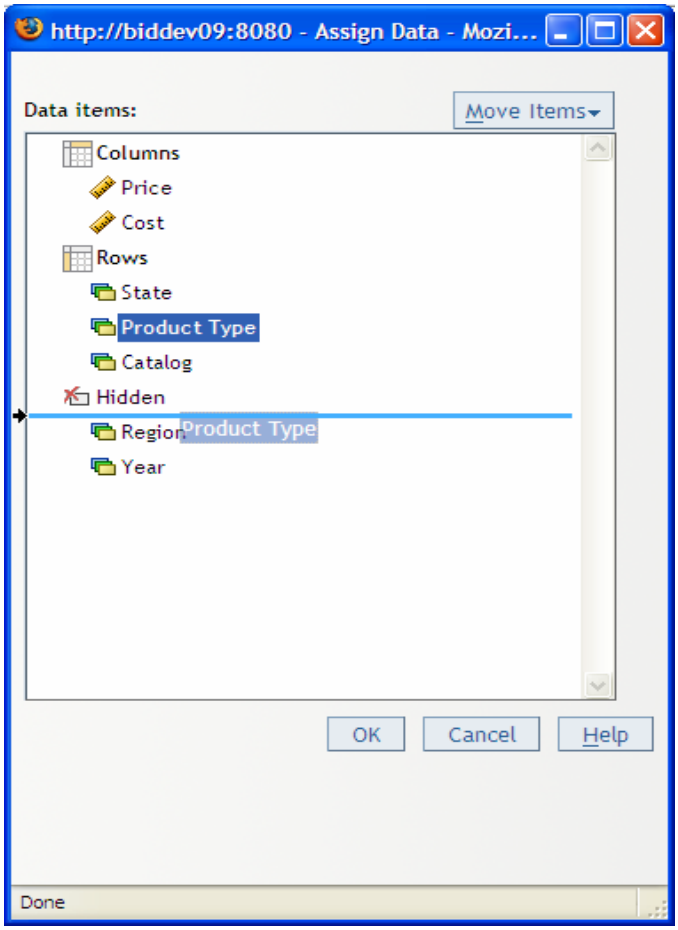
The static left-hand side pane remains fixed when users scroll through report content, improving their ability to interact with reports. From this left-hand side pane, users can perform numerous operations such as creating and navigating through the table of contents, updating report data selections, defining filters, and formatting data. For users wanting more of the report content area visible, the left-hand side pane can be collapsed.



Users can interact directly with page elements by doing inline edits of report elements. They can update table and graph assignments at runtime by dragging data values from the left-hand side pane onto visible table and graph elements. Note the drag of Region from the left-hand side pane onto the table below.

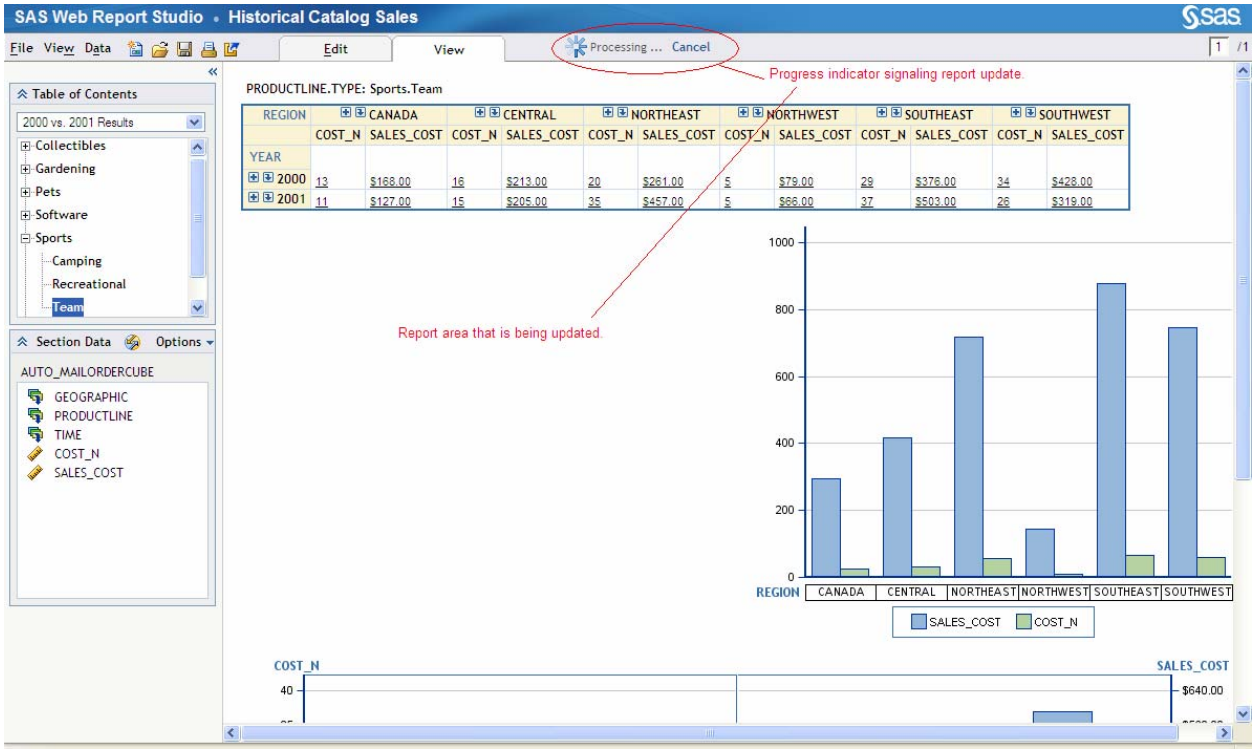


Drag-and-drop operations are also available in both the Assign Data dialog box and on a live table element. In the following screenshot, data item Product Type is being moved from rows to hidden.

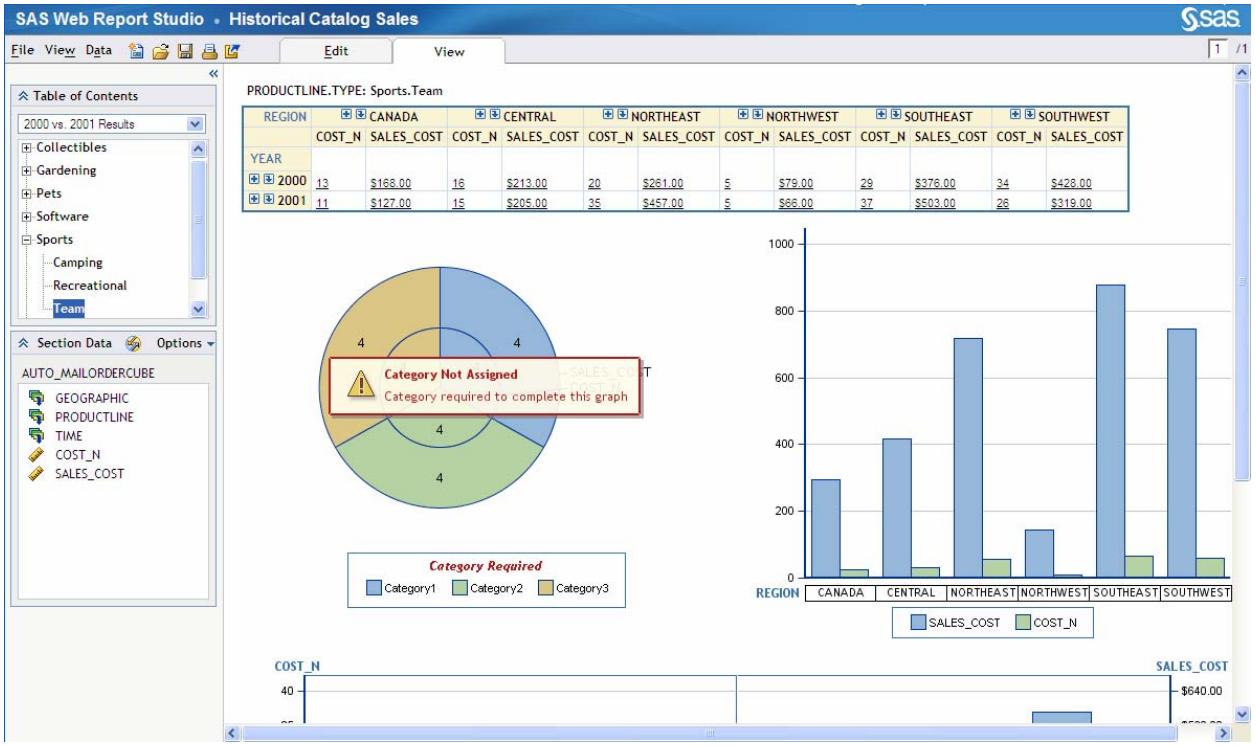


Calendar controls are available for date selection when doing prompting, filtering, and report scheduling operations.

In Web Report Studio 4.2, the report content area is refreshed using a partial page loading algorithm. If a user action on one table or graph element does not affect the data values on another table or graph, then only the updated element is redrawn after completion of an inline editing operation. The entire page does not reload. Notice the blank area in the following report along with the corresponding progress indicator. In this workflow, a pie chart that was positioned in the blank report area was updated independently of the other tables and graphs on the report page. Only the area of the report that contained the pie chart is being redrawn, while the other tables and graphs remain static on the page.



When users perform an operation on a report element, more detailed feedback is presented directly on the page, and the entire page is not redrawn. In the following screenshot, the pie chart failed to load. Notice that the other report elements are presented on the page while appropriate feedback is given for the pie chart rendering failure.



PROMPTING

DYNAMIC AND CASCADING PROMPTS (RELATIONAL)

In Web Report Studio 3.1, if you are prompted for a country and then a city, you will see cities for all countries, not just the cities in the countries you selected in the first prompt. This cannot only lead to pick lists with many values to scroll, you can get empty results. With cascading prompts a user selection in one prompt filter will subset the optional values in a subsequent prompt, and so on. For information maps based on tables, prompt dependencies can be created in both SAS® Information Map Studio and SAS Web Report Studio providing for cascading prompts, also referred to as nested prompts.

HIERARCHICAL PROMPTS (OLAP)

When building reports based on OLAP cubes in Web Report Studio 3.1, you could not have prompts that would enable repot consumers to more quickly get the specific information they need by filtering the data before viewing the report. SAS® Web Report Studio 4.2 allows report authors to use prompts created in information maps based on OLAP cubes. For information consumer's who prefer to simply open and view existing reports, this makes OLAP reports consistent with relational reports.

CASE INSENSITIVE FILTERS/PROMPTS

Web Report Studio 4.2 adds the ability to allow report consumers to enter prompt values without regard to the values being capitalized or lowercase. This is quite useful for prompt on descriptive category data items, such as product names and descriptions.

CONTROL ORDER OF PROMPTS

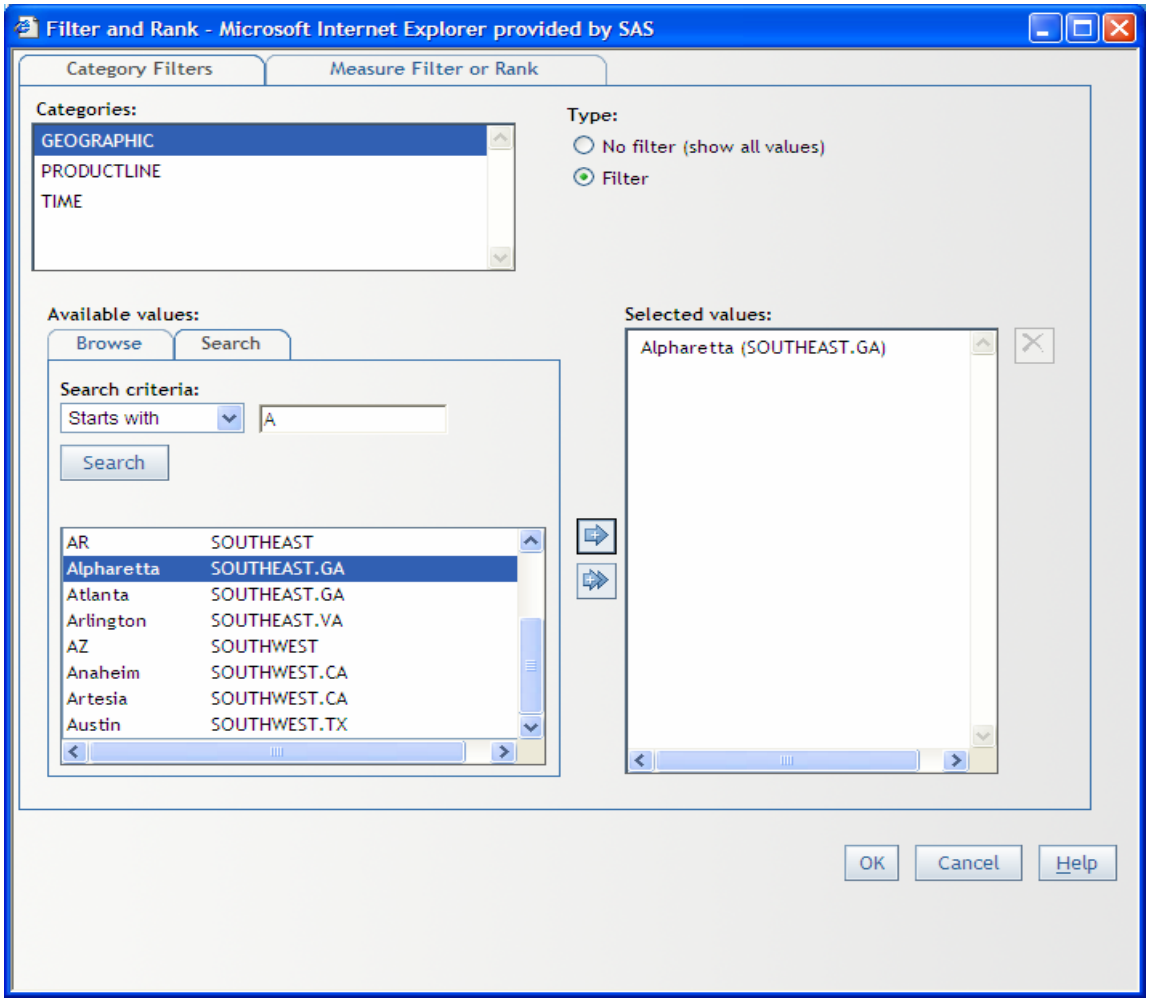
Web Report Studio 3.1 determines the order of prompts based on the order in which a report author selects data items initially. When data items associated with prompts are added later, those new prompts are always added to the bottom. You will be able to reorder the prompts in Web Report Studio 4.2 for easy maintenance. The order of cascading prompts (see above) is determined automatically based on the chain of dependencies.

ALLOW MULTIPLE FILTER CONDITIONS FOR ONE DATA ITEM

What do you do if you need to filter a data item one way or another depending on the situation? This requires a complex condition with at least two different filters on the same data items, perhaps ORs and parentheses to create the complex condition. Web Report Studio 3.1 does allow users to select the same data item more than once to create a more complex condition, but it is not very intuitive. This was required because Web Report Studio 3.1 lets you have only a single data item per data item in the select list. In Web Report Studio 4.2, the user interface has changed to allow multiple filter conditions, including both custom and predefined, to be associated with a single data item. In the following screenshot, two separate filters are created on data item Year.

SEARCH FOR VALUES

Prompts and filters in Web Report Studio 4.2 provide a user with a search facility to easily locate specific values in large lists or hierarchies. For instance, in an employee dimension for an OLAP cube, employee members might move in the hierarchy over time due to promotions, reorganizations, and new assignments. The search capability lets report consumers simply type the whole name or a portion and find any matches to quickly locate the individual. Conditions that are supported when searching include contains (default), is equal to, start with, end with and match pattern. In the following screenshot, a search is being done for all cities starting with A.



OLAP ENHANCEMENTS

IMPROVED TOTALS & SUBTOTALS

Web Report Studio 4.2 enables the user to select to display either visual totals or parent values for OLAP data. When visual totals are selected, the displayed total and/or subtotal values will equal to the sum of the displayed values of each group. The following screenshot shows a table with visual totals specified:

Product > Sports

Year		2001		2002		Total	
		Sum Of Quantity	Sum Of Total Retail Price	Sum Of Quantity	Sum Of Total Retail Price	Sum Of Quantity	Sum Of Total Retail Price
Product Category	Product Group						
Golf	Golf	10491	$1,139,658.16	13117	$1,433,298.75	23608	$2,572,956.91
	Golf Clothes	3550	$397,517.34	4196	$470,637.96	7746	$868,155.30
Subtotal: Golf		14041	$1,537,175.50	17313	$1,903,936.71	31354	$3,441,112.21
Running – Jogging	Jogging	7638	$470,592.37	8463	$525,715.65	16101	$996,308.02
	Running Clothes	11332	$503,280.28	13304	$590,178.41	24636	$1,093,458.69
Subtotal: Running – Jogging		18970	$973,872.65	21767	$1,115,894.06	40737	$2,089,766.71
Subtotal: Sports		33011	$2,511,048.15	39080	$3,019,830.77	72091	$5,530,878.92
Total		33011	$2,511,048.15	39080	$3,019,830.77	72091	$5,530,878.92

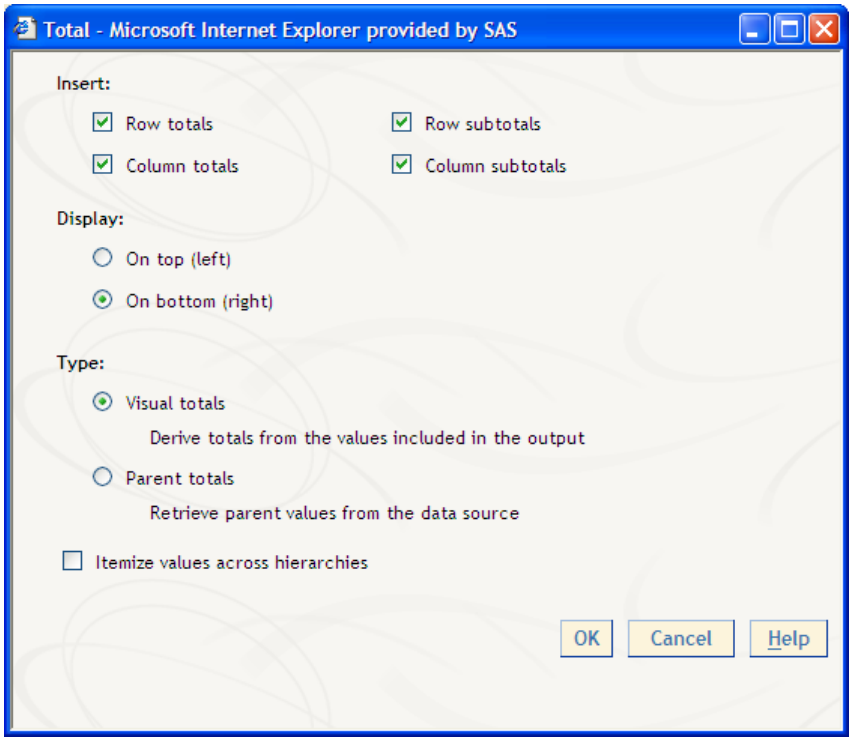
In this view, the user has drilled down from Products into Sports. The subtotal values reflect the sums by year of the various product groups in Sports. The total values consist of both row/column totals for the product groups by year, and a grand total for all product groups by year.

The parent value total is based on the aggregated or pre-summarized detail data from the cube, not the displayed values for each group. The parent value total is not always a sum. It is based on the aggregation of the data values. For example, if a parent value total is being retrieved for data values of Cost which has an aggregation of average, then the parent value total will be the average of all Cost data values.

The parent value total also takes member level security into account when calculating the aggregated value. If you don't have permission to see certain member values, those values will not be present in the final parent value total that is presented. The following screenshot shows the same product data with parent values specified. Notice the presence of the All member. The All member is displayed because it is calculated at cube creation time. It is considered to be the topmost parent value.

All YQM				All YQM				All YQM	
Year				2001		2002			
				Sum Of Quantity	Sum Of Total Retail Price	Sum Of Quantity	Sum Of Total Retail Price	Sum Of Quantity	Sum Of Total Retail Price
All Product	Product Line	Product Category	Product Group						
All Product	Sports	Golf	Golf	10491	$1,139,658.16	13117	$1,433,298.75	55363	$6,017,814.42
			Golf Clothes	3550	$397,517.34	4196	$470,637.96	18529	$2,064,233.94
		Golf		14041	$1,537,175.50	17313	$1,903,936.71	73892	$8,082,048.36
		Running – Jogging	Jogging	7638	$470,592.37	8463	$525,715.65	38408	$2,363,882.48
			Running Clothes	11332	$503,280.28	13304	$590,178.41	57827	$2,557,100.46
		Running – Jogging		18970	$973,872.65	21767	$1,115,894.06	96235	$4,920,982.94
	Sports			126647	$10866392.16	149555	$12543204.28	652172	$55987273.81
All Product				308584	$25912192.83	362094	$29934910.62	1597317	$133196488.48

The total options are controlled from the following totals dialog box:



In addition to the ability to select totaling type, you can control placement of the total line by selecting to display totals on the top, bottom, left, or right. You can also itemize values across hierarchies.

ADDITIONAL DISPLAY OPTIONS

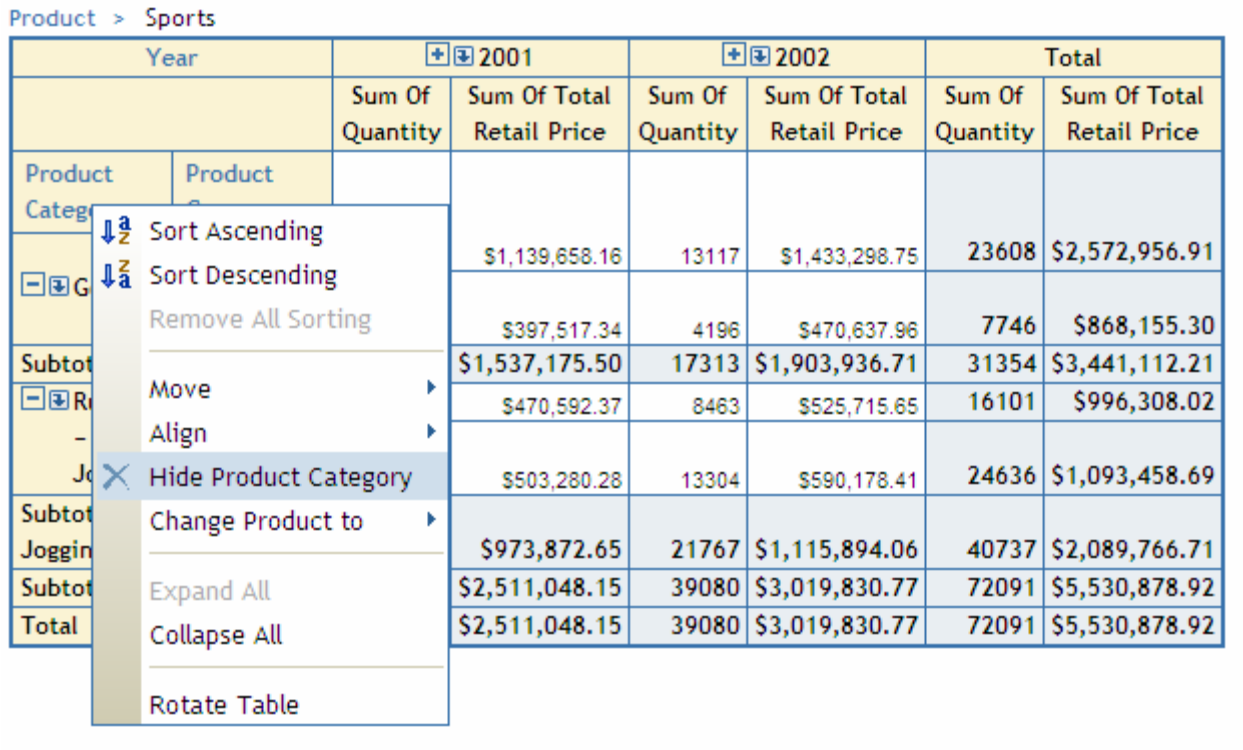
Users will be able to isolate selected members in OLAP data by selecting the Isolate option from a context-menu that is available on the selected member. In the following screenshot, the user is choosing to isolate the year 2001. If this action is selected, the table will redraw with values only for the year 2001.

Product > Sports

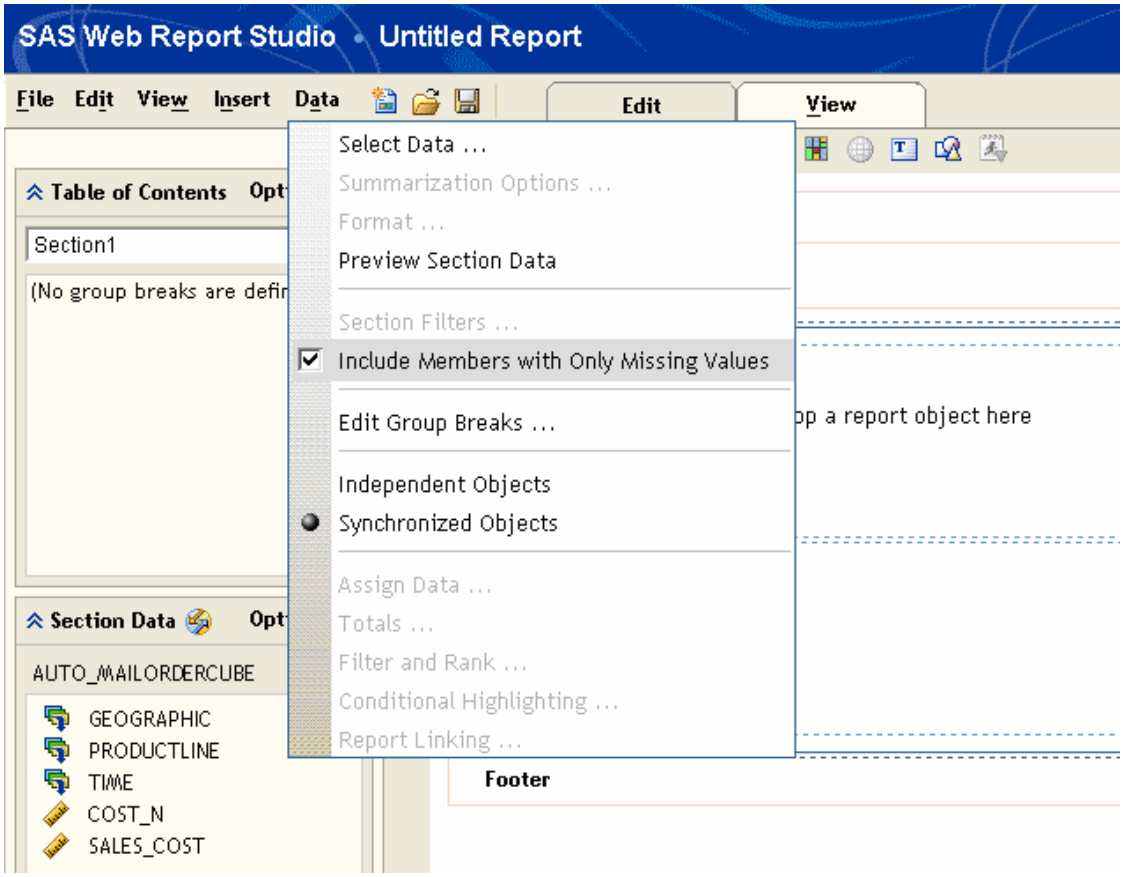
Year		2001		2002		Total	
		Sum Of Quantity	Sum Of Retail Price	Sum Of Quantity	Sum Of Total Retail Price	Sum Of Quantity	Sum Of Total Retail Price
Product Category	Product Group						
Golf	Golf	10491	$1,139,658.16	13117	$1,433,298.75	23608	$2,572,956.91
	Golf Clothes	3550	$397,517.34	4196	$470,637.96	7746	$868,155.30
Subtotal: Golf		14041	$1,537,175.50	17313	$1,903,936.71	31354	$3,441,112.21
Running – Jogging	Jogging	7638	$470,592.37	8463	$525,715.65	16101	$996,308.02
	Running Clothes	11332	$503,280.28	13304	$590,178.41	24636	$1,093,458.69
Subtotal: Running – Jogging		18970	$973,872.65	21767	$1,115,894.06	40737	$2,089,766.71
Subtotal: Sports		33011	$2,511,048.15	39080	$3,019,830.77	72091	$5,530,878.92
Total		33011	$2,511,048.15	39080	$3,019,830.77	72091	$5,530,878.92

Isolate 2001

Users will be able to hide a selected dimension by selecting the Hide option from the context-menu that is available on the selected dimension. In the following screenshot, the user is choosing to hide Product Category. If this action is followed, the table will redraw with Product Category placed in a hidden role.



Users have control over the display of empty rows and columns from the cube. By default, empty rows and columns are not displayed. The option to display empty is available on the Data menu in report edit mode.

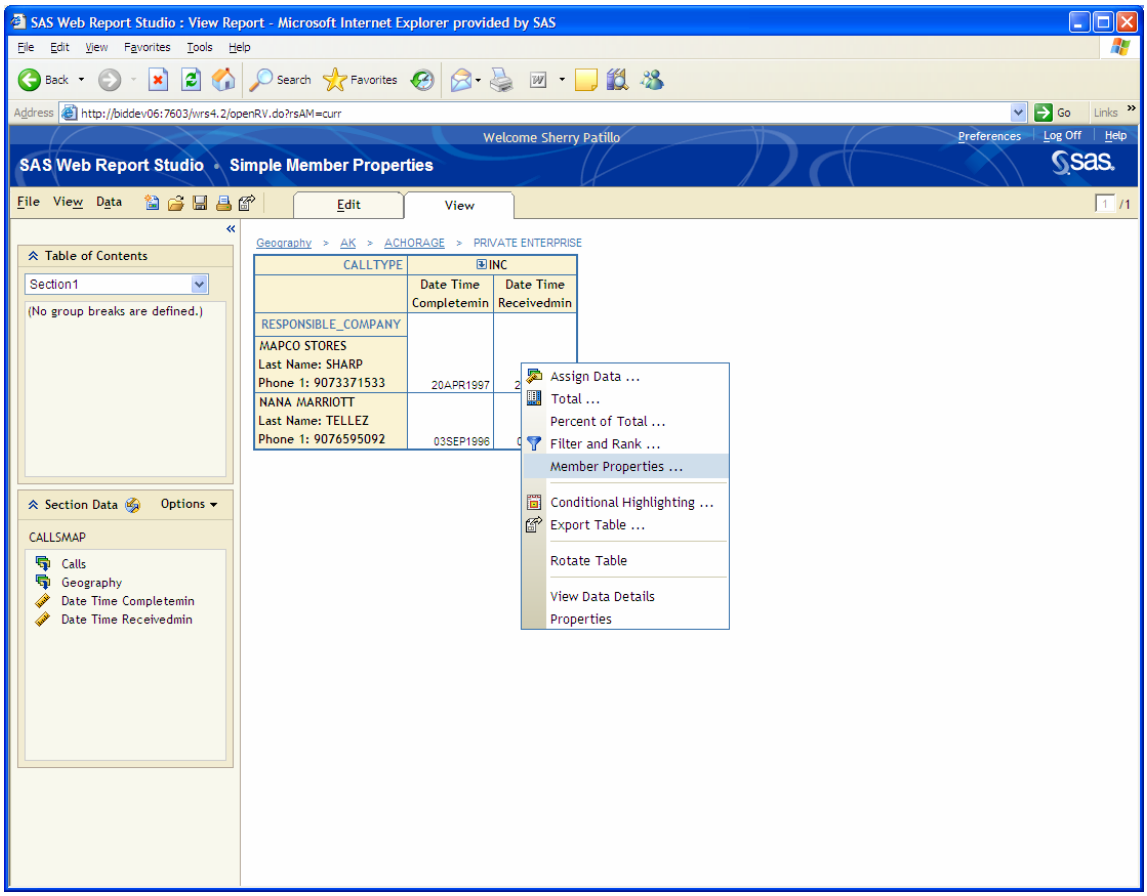


OLAP FILTERS

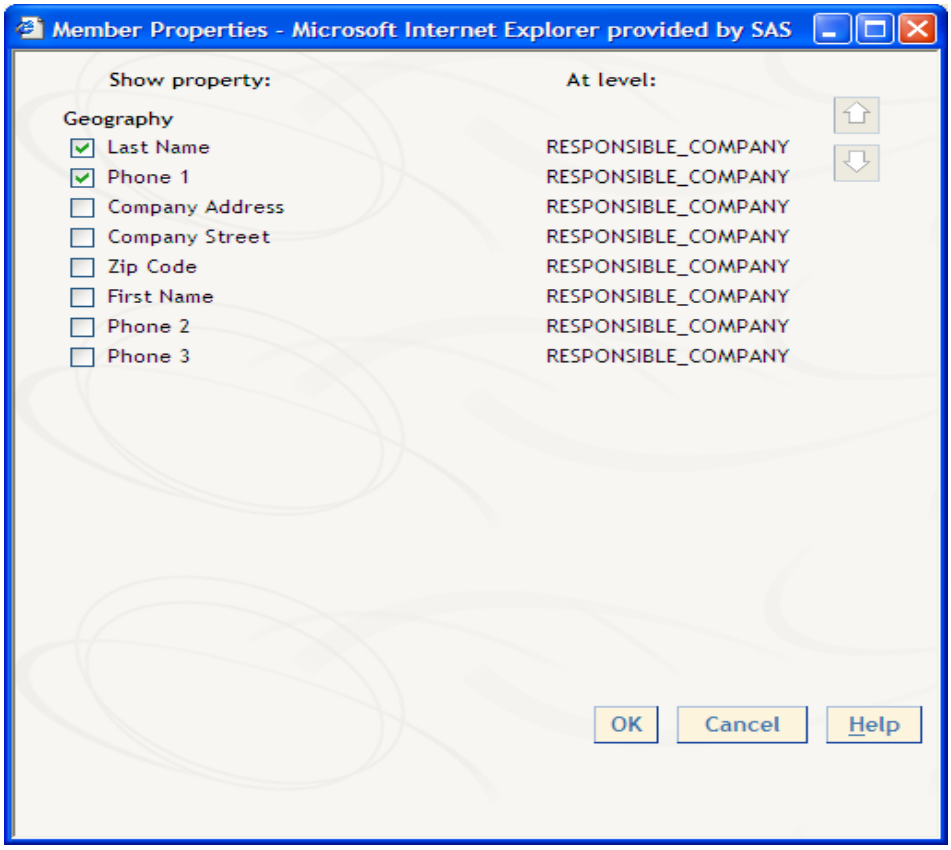
SAS Web Report Studio 4.2 report authors will be able to use OLAP filters that were created in SAS Information Map Studio. See the Hierarchical Prompts sub-section for details.

MEMBER PROPERTIES

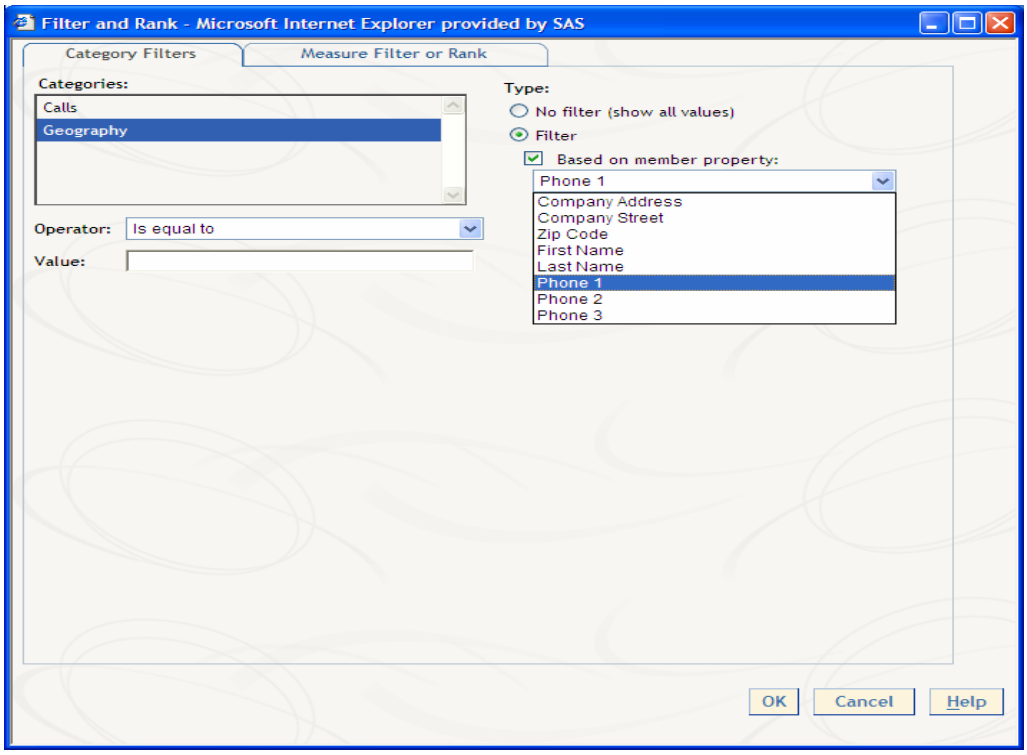
New to this version is the ability to view the attributes of dimension members (member properties). Member properties are attributes associated with a specific level of a hierarchy in a cube. If the cube has member properties enabled, the OLAP table context-menu will have a Member Properties option available.



If selected, a dialog box with all of the available member properties is displayed. From the dialog box, you can select which member properties should display. In the following screenshot, Last Name and Phone 1 have been selected for display.

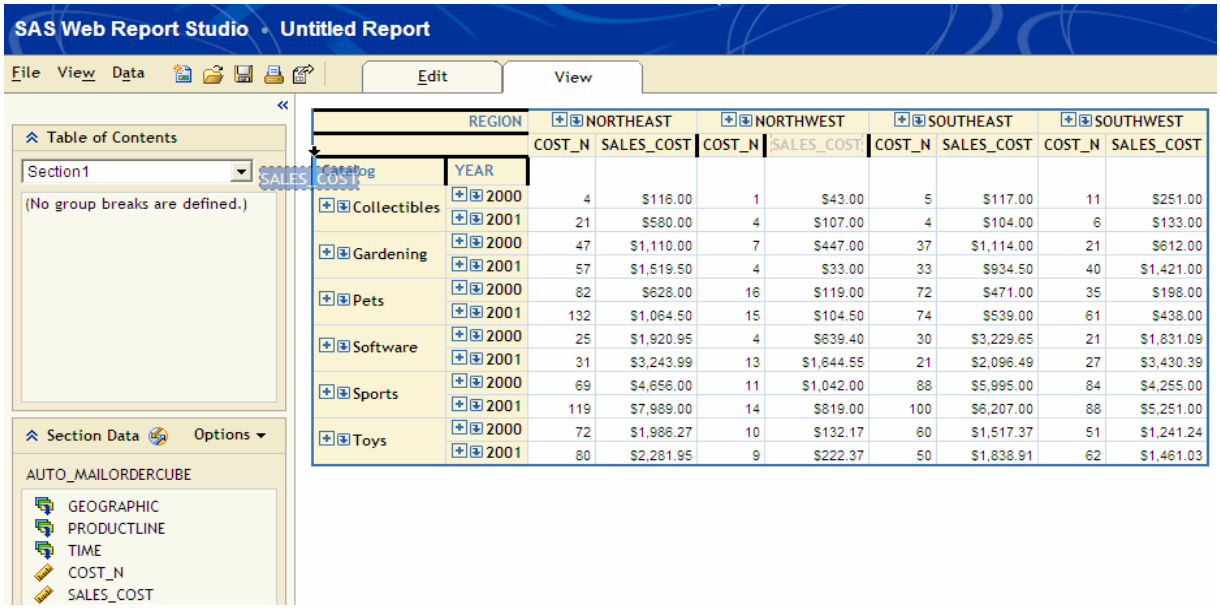


In addition to specifying that the member properties should be displayed, users can also choose to filter on the available values for a member property. This functionality is surfaced on the Filter and Rank dialog box when member properties are available on a cube.



SUPPORT PRECISE MEASURE PLACEMENT

The measure hierarchy can be moved as a whole either up/down on the column axis or right/left on the row axis one position at a time. This movement is allowed independent of the location of the dimensions. The measure hierarchy is moved by repositioning the measure hierarchy in the Assign Data dialog box, or by performing a drag-and-drop operation using a measure. If a single measure is moved, all other measures that are present in the visible measure hierarchy will be moved to the new location. In the following screenshot, measure SALES_COST is being dragged to the left of dimensions Catalog and YEAR. At the completion of the drop operation, both SALES_COST and COST_N will be repositioned to the left of the dimensions since measures move as a whole.



GRAPH ENHANCEMENTS

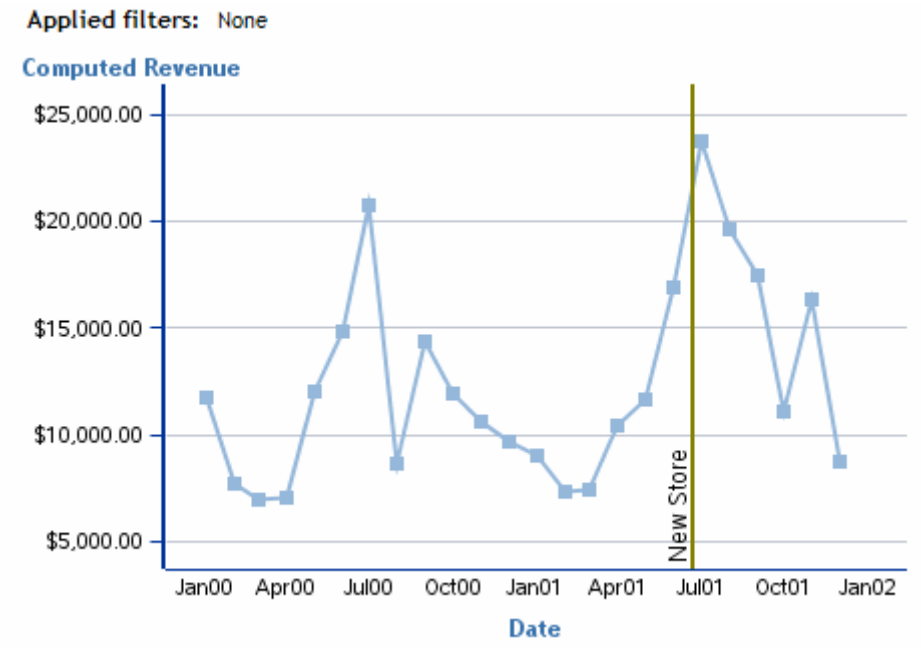
TILE CHART

A tile chart is technically known as a Rectangular Tree Map. One version created by smartmoney.com is called the "Map of the Market" which visualizes the stock market. At the time of this writing, an example can be found at Smart Money Map of the Market or here. The tile chart is designed to view a large quantity of hierarchical-based data in a limited amount of space. Each unique category combination is represented by a rectangular "tile" with size and color determined by response variables. These tiles are placed in a hierarchal arrangement. A bar chart represents data in a similar way where the area of a rectangle represents some quantitative value, though bar charts work well when there are a limited number of nominal values. You have probably seen vertical bar charts with too many distinct values and either a crowded set of labels on the X axis or a legend wit too many items and colors to determine which bar represents what. Tile charts let you home in on what's most relevant in a sea of possibilities by focusing on the largest rectangles of a certain color.

The tree-based nature of the tile chart makes it especially useful for interactive data navigation. Because of the large amount of data displayed, detailed labeling is not useful, so datatips (mouse over context) are very important to see specific values. Drilling down or zooming is also useful to be able to see small sections of the original chart in more detail.

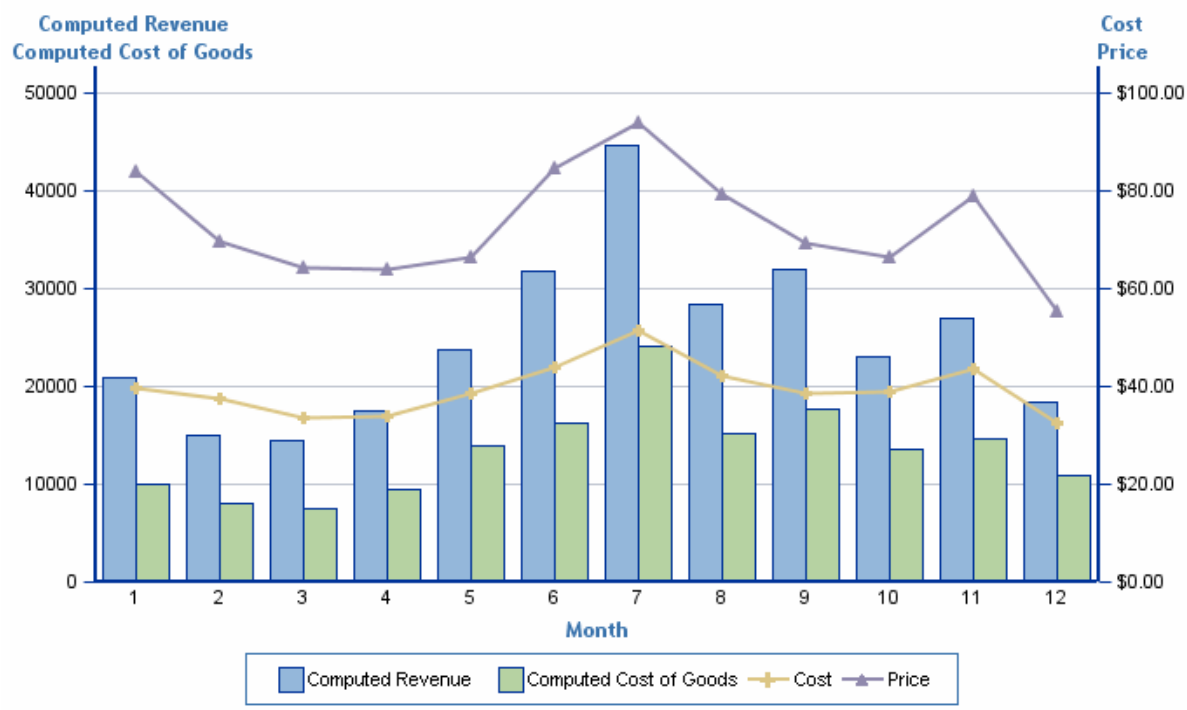
REFERENCE LINES WITH ANNOTATIONS

Context adds clarity, and you can add value to your line, bar, and scatter charts by adding vertical and horizontal reference lines. For instance, on a line chart, you can make visible the occurrence of an event such as new store opening that may explain the changes in the data near that event. Circumstances around that event can be described with a line annotation, and users can set options like line thickness, color, and text placement.



MULTIPLE LINES AND BARS

A frequent request from customers has been to allow multiple lines and/or multiple bars in a bar-line chart. These charts typically have left and right axes with different scales and a bar chart with multiple lines superimposed on it.



NEW GRAPH PROPERTIES

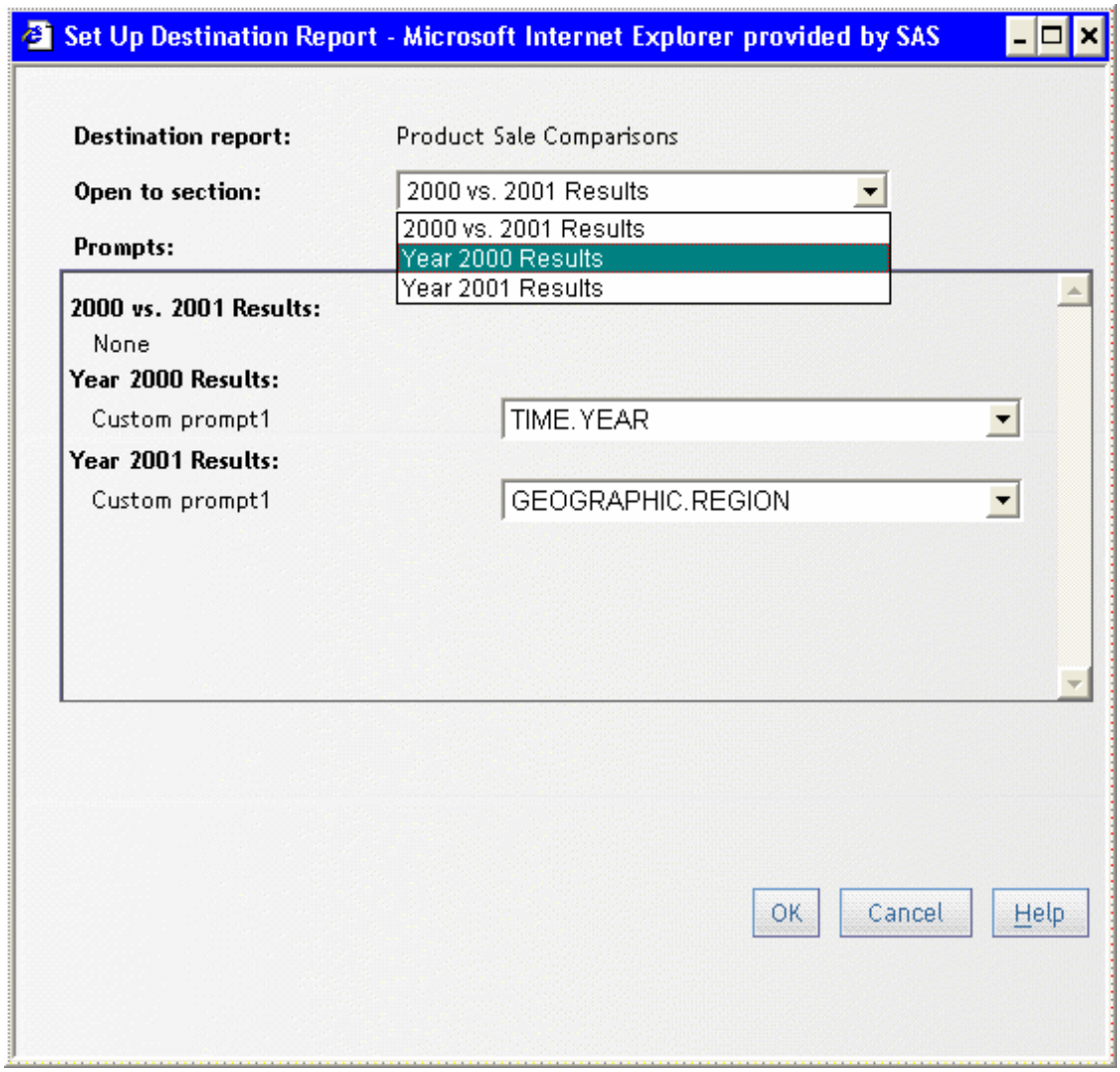
In addition to the key graph enhancements mentioned in the previous sections, several new properties are supported to enable you to control the visual display of information on your reports:

- Custom graph colors
- Option for uniform scale across group breaks
- Option to set scale manually

- Display % on pie
- Diagonal axis label

REPORT LINKING ENHANCEMENTS

Instead of being able to link only to the first section of the destination report, users will be able to select the specific section of a report that will open when a report linking operation is executed. Users will use the following dialog box to set up the section mapping.



Report linking set-up from ESRI spatial map objects is now available in the product. As part of the ESRI report linking user runtime experience, multiple values for a single prompt can be passed into the destination report. In order to accept multiple values, the destination report must be set up to allow this.

LEVERGING THE WORK OF SAS EXPERTS

LIST AND VIEW ODS GENERATED PDF REPORTS

Many customers using Web Report Studio have other SAS tools, such as Enterprise Guide. SAS customer can leverage their investments and leverage the powerful formatting and layout capability of SAS' Output Delivery System by making PDF content from these flexible environments available to all Web Report Studio users.

SURFACE HYPERLINKS IN GRAPHS GENERATED BY STORED PROCESSES

SAS stored process/services often leverage the powerful visualization capabilities of SAS/GRAPH software. When SAS/GRAPH users include hyperlinks in their graph image output, Web Report Studio 3.1 is not able to honor those links. Web Report Studio 4.2 makes these hotspots operable, giving you and many others additional power and flexibility by clicking on visual displays of data and passing values down to another resource to focus and continue your investigation.

LINK TO STORED PROCESSES/SERVICES FROM REPORT TABLES AND GRAPHS

SAS stored processes are services based on SAS programs that enable SAS experts to make their logic available to anyone that needs it, and can include prompts for the consumer to tailor the result to their specific situation. Web Report Studio 3.1 improved the decision making process for business users by enabling the insertion of SAS stored processes in Web Report Studio reports. Web Report Studio 4.2 further leverages the powerful analytical intelligence of SAS stored processes by enabling users to link directly to a stored process from a Web Report Studio report graph or table element.

YOU HAVE YOUR REPORT. NOW WHAT?

Reports alone have limited ability to build consensus or help users take action. What groups do with the information is just as important.

ADD/VIEW REPORT COMMENTS

Most decisions are made by collaborating with peers. In fact one customer told us recently that comments that include conclusions and recommendations based on the information are more important to senior management than the report itself. This customer uses text objects in Web Report Studio 3.1 to annotate reports. In Web Report Studio 4.2, users will be able to create, retrieve, and manage comments associated with a report using the integrated SAS Comment Manager. When a report is selected, users will be given an option to launch the Comment Manager. Report context will be shared with the Comment Manager so that only those comments specific to the report are available for access.

EMAIL LINK TO REPORT WITH PARAMETER VALUES

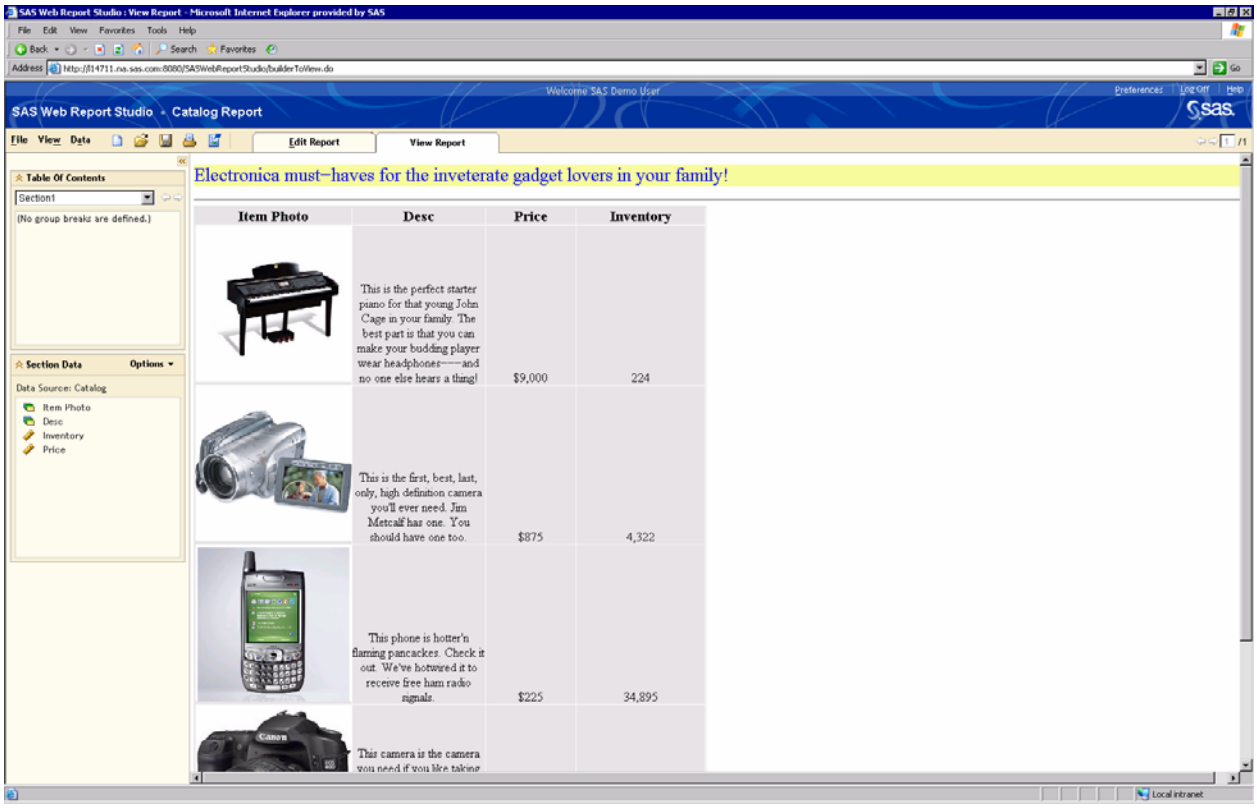
Web Report Studio 4.2 helps you and your peers work the way you like to. We all have grown dependent on email to keep each other informed. In the upcoming release, you will be able to click an option that will launch their email client and pre-populate a URL to the report. It's important that the recipient uses the same filter criteria you do, so any prompt values that you have provided will be included in the URL so the recipient doesn't get different results.

ABILITY TO CALL A REPORT DIRECTLY FROM A URL

The link that is created using the Web Report Studio 4.2 e-mail report capability can be inserted in any valid location that allows Web URLs. When the URL is clicked, the user will be redirected to the Web Report Studio application. If the user's credentials have been authenticated in a currently existing browser session, then the user will be positioned directly on the report specified in the URL. If the user's credentials have not been validated, the user will be prompted to enter credentials. Once entered, the report referenced in the URL will be opened for viewing. In both cases, any parameters that were specified on the URL will be passed to the called report.

DATA DRIVEN HYPERLINKS IN TABLES

If your relational data includes HTML tags, Web Report Studio 3.1render the tags in tables instead of converting them to links, images, and so on. Web Report Studio 4.2 will enable the display of these links and images, which can provide additional value to your report content. A table in Web Report Studio 4.2 could include a linkable image or test, where the image comes from a URL and links to a product page, for instance. Text can be data driven and link to a page, Web application, or perhaps invoke an email client based on a mailto HTML tag. The capability is controlled by the individual responsible for the Information Map. Information Map Studio provides a setting for each category data item that enables the interpretation of the HTML included in the data or constructed in the Information Map Studio expression builder. This lets IT control what can and can not include links.



CUSTOMIZE THE LOOK AND FEEL

The latest of version of SAS Web Report Studio provides theme support for consistent integration with other SAS Web applications. Theme support allows the complete customization of the application. Styles such as colors, images, fonts, and font sizes can be specified in a theme definition which is consumed by the product. In general, theme customization and maintenance will be greatly simplified in the next release for all SAS Web applications. At the time of this writing, SAS customers must customize several tags in cascading style sheet files to re-brand SAS Web applications that support themes, such as the SAS Information Delivery Portal. In SAS 9.2, theme creation and maintenance will be done at a higher level by modifying settings in an abstraction layer. SAS will provide utilities that will create, modify, and deploy the style sheets behind the scenes based on this layer of abstraction.

HOW DO YOU DEAL WITH SO MANY USERS?

CUSTOMIZABLE ROLES TO AUTHORIZE CAPABILITIES

The latest version of Web Report Studio has been upgraded to include customizable roles. A user can be a member of 0 or more roles. Roles map to capabilities. A capability, also known as an application action, defines the operations a user can perform. An example of a capability would be an application action such as export report. An administrator can control a user's application behavior by adjusting the capabilities that are available for a role. The capabilities available to a user are a union of all the capabilities defined within all the roles that the user is a member of.

The product will ship with three out of the box roles. The roles are Report Viewing, Report Creation, and Advanced. A pre-defined set of application specific capabilities will be available for each role. The system administrator can adjust the capabilities in order to configure role definitions that meet the guidelines for a company. The adjustments are made using the SAS® Management Console. The capabilities are grouped within categories in the

SAS Management Console. The following sample table shows a possible configuration of Web Report Studio 4.2 roles and capabilities. The capabilities are grouped within categories (grey background in table):

	SAS® Web Report Studio Roles		
Capability	**Report Viewing**	**Report Creation**	**Advanced**
Basic:	X	X	X
Comments	X	X	X
Print	X	X	X
Open Maps as Reports	X	X	X
Promote WRV to WRS	X	X	X
Refresh Data	X	X	X
Expand And Collapse All	X	X	X
Modify Repository	X	X	X
OLAP Basic Navigation	X	X	X
OLAP Drill To Detail	X	X	X
Output:		X	X
Save	X	X	X
Email		X	X
Export		X	X
Schedule Own Report		X	X
Report Creation:			X
Create Report		X	X
Save Outside My Folder		X	X
Basic Edit Operations		X	X
Aggregate or Detail			X
Select All Data		X	X
Select Data In View		X	X
Advanced Report Creation:			X
Create Cascade Prompts			X
Create Report Links			X
Advanced Edit Operations			X
Advanced Scheduling:			X
Distribute			X
Save Archive			X
Schedule Any Report			X
Schedule Folder			X
Administrative			
Manage Distribution List			

BUILT-IN SCHEDULER

Web Report Studio 3.1 administrators that have set up scheduling are likely familiar with the installation and configuration of the Platform Suite for SAS, from Platform Computing. This is an optional server that is required for Web Report Studio 3.1 users to establish recurring and one time generation of reports unattended. Scheduling also forms the bases of report distribution, also called report bursting. In Web Report Studio 4.2, a built in scheduler is supplied that greatly simplifies the configuration and time required to get scheduling and distribution up and running.

The scheduling service is installed with Web Report Studio 4.2, requiring only a simple configuration step in the SAS Management Console. Platform Suite for SAS will continue to be supported and is recommended for large deployments having a clustered middle tier.

OPERATING ENVIRONMENTS

The following is accurate at the time of this writing and is subject to change prior to Web Report Studio 4.2. Please refer to the SAS support site or ask your SAS representative for the most recent information.

SUPPORTED BROWSERS

Internet Explorer 6.0 enhanced with SP2 on Windows XP Pro (x86, 32-bit)
Internet Explorer 7.0 on Windows XP Pro and Vista (x86, 32 bit), XP Pro x64 (x86-64) and Vista x64 with 32-bit compatibility Firefox 2.0 on Windows XP Pro (x86) and Linux 32-bit (x86)

SUPPORTED APPLICATION SERVERS

Legend:

Shadded background = New platform/product support for SAS 9.2 compared to SAS 9.1.3 SP4
⊗ = not supported
⊗* = not supported by Sun JRE

All platforms supported via 32-bit JREs from Sun, HP, or IBM			
OS Platform	**JBoss 4.20 (embedded Tomcat)**	**BEA WebLogic 9.2**	**IBM WebSphere 6.1.xx**
Windows 32-bit (x86)	✓	✓	✓
z/OS	⊗	⊗	✓
Solaris on SPARC	✓	✓	✓
AIX on Power	✓	✓	✓
HP/UX on Itanium	✓	✓	⊗
Linux 32-bit (x86)	✓	⊗*	✓
Solaris 10 for x64	✓	✓	✓
Linux x64 (x86-64) (32-bit web app server)	✓	⊗*	✓
Windows x64 (x86-64) (32-bit web app server)	✓	⊗*	✓

CONCLUSION

From improved interactions to the surfacing of new functionality, SAS Web Report Studio 4.2 gives you a richer ad-hoc reporting experience on the Web, while maintaining a zero download deployment. This enhanced user experience leverages right mouse context menus, more drag-and-drop, and Asynchronous JavaScript and XML (AJAX) technology to eliminate full page loading, which makes for a more responsive desktop-like experience. Many new enhancements to prompts, OLAP aggregations, visualization, and report linking are provided based on a great deal of user feedback. Report comments and emailing reports enable collaboration, and data-driven links enable users to take next steps. Administrators can customize role-driven capabilities and easily change the look and feel to match their corporate standards. These are just some of the many enhancements in the upcoming release. Web Report Studio 4.2 helps you create and deliver better answers to more people that need them.

RECOMMENDED READING

At the time of this writing, Web Report Studio 4.2 specific and supporting documentation is not yet available. The following SAS 9.1.3 based documents provide relevant background information

- SAS Web Report Studio User's Guide (PDF accessible within the product)
- Part 3 (SAS Web Report Studio Administration), of SAS 9.1.3 Intelligence Platform: Web Application Administration Guide, Second Edition (http://support.sas.com/documentation/configuration/biwaag.pdf)
- SAS Information Map Studio: Creating Your First Information Map (http://support.sas.com/documentation/onlinedoc/91pdf/sasdoc_913/infomap_create_9683.pdf)

- SAS Information Map Studio: Tips and Techniques (http://support.sas.com/documentation/onlinedoc/91pdf/sasdoc_913/infomap31_tips_9310.pdf)
- "Administering SAS Information Map Studio" in SAS Intelligence Platform: Desktop Application Administration Guide (http://support.sas.com/documentation/configuration/bidaag.pdf)

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