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SAS[®] Enterprise BI Server Integration with Microsoft Office

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ABSTRACT

This tutorial presents integration with Microsoft Excel, Word, and PowerPoint via SAS[®] Enterprise BI Server. Learn how to leverage the power of SAS data, analytics, and reporting directly from the familiar environment of Microsoft Office, resulting in better planning using centralized data, analyses, and reports based on SAS data management and analytical capabilities.

INTRODUCTION

End users often want to use Microsoft Excel and other Microsoft Office applications to analyze, view, or present data. However, this approach can result in multiple versions of the truth or introduce errors, because the data is entered manually, or incorrect formulas or analyses are used. A key component of SAS[®] Enterprise BI Server is SAS[®] Add-In for Microsoft Office, which brings the powerful data access, reporting, and analytic capabilities of SAS to the familiar user interfaces of Microsoft's Excel, Word, and PowerPoint applications, and provides centralized information via SAS processes and servers. SAS[®] Add-In for Microsoft Office enables you to access much of the power of SAS directly from Microsoft Office applications. This tutorial introduces you to some of this functionality, which results in improved productivity by SAS programmers, analysts, and end users.

SAS[®] Add-In for Microsoft Office enables you to use the power of SAS in the following ways:

- Access centralized data sources – You can use data sources (including third-party data sources such as Oracle, Teradata, and DB2 that can be accessed via SAS/ACCESS[®] interfaces) as inputs for your analyses. In addition, you can view and analyze data sources that exceed the Excel-imposed row limit directly from Microsoft Excel. You can also access data directly from Excel PivotTables, view all rows in multiple worksheets, and copy data back to SAS servers.
- Perform your own analyses – Using SAS Tasks, you can perform ad hoc analyses to manage, summarize, and analyze Excel data or SAS data, and graph data sources that are much larger than the data sources you could graph in Microsoft Office applications.
- Run custom analyses created by others – You can access SAS programs that are called Stored Processes, which are developed by programmers and business analysts at SAS. The results of both SAS Tasks and SAS Stored Processes can be displayed in Microsoft Excel, Word, or PowerPoint.
- Refresh and distribute results – You can refresh the SAS analyses, graphs, tables, and reports in your Microsoft Excel, Word, and PowerPoint documents on demand or automatically on a schedule that you specify. This gives you various ways to create a mix of standard reports and ad hoc analyses. You can also publish your documents that embed SAS content to a repository that is associated with SAS metadata in order to easily share your reports and analyses with others while keeping the information on a central server.

The following examples highlight some of this functionality.

ACCESS CENTRALIZED DATA SOURCES

When you open Microsoft Excel, Word, or PowerPoint, you should see an integrated SAS menu and a SAS Analysis Tools toolbar. You can use any data source that is accessible to SAS with your analyses. In Excel, you should also see a SAS Data Tools toolbar. Using this toolbar or the menu, you can open, view, and browse these data sources directly in Microsoft Excel (this feature is not available in Microsoft Word or Microsoft PowerPoint).

To open a data source directly in an Excel worksheet:

1. Open Microsoft Excel and select **SAS → Open Data Source → Into Worksheet...** (Figure 1). The Open Data Source window appears (Figure 2), which enables you to select from various types of data sources.

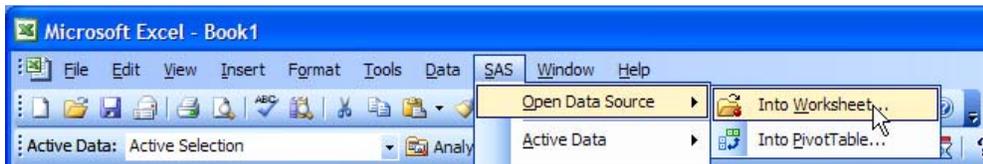


Figure 1. Opening an Open Data Source Window in Microsoft Excel

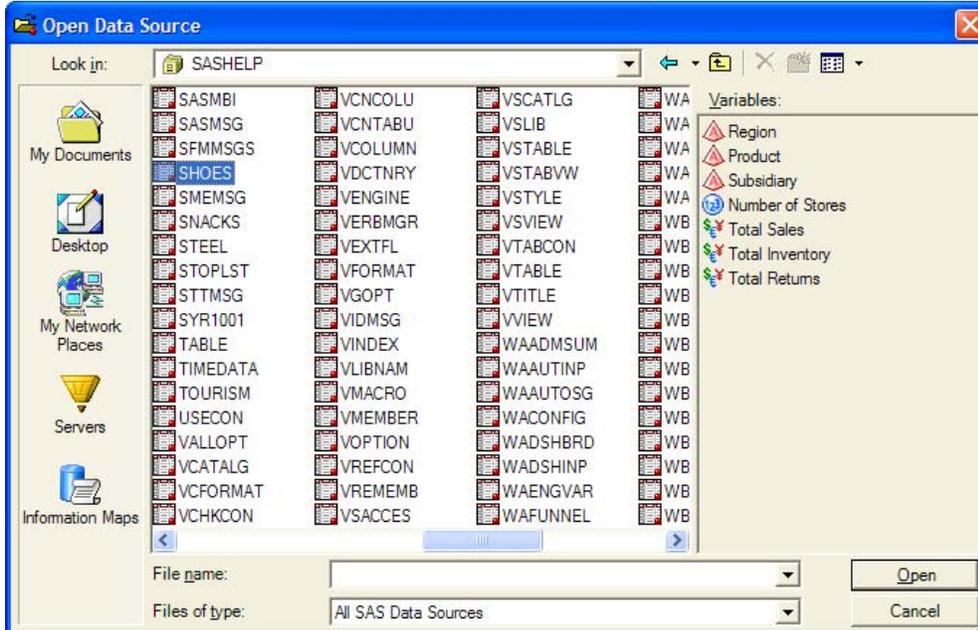


Figure 2. Open Data Source Window

You can open a data source from SAS servers and from the local file system. You can choose many types of data including relational and OLAP data sources, third-party data, and Information Maps (data sources are defined in business terms for easier reporting by the end-user) from SAS servers. In this example, the SHOES data source from the SASHELP library is opened.

2. In the Open Data Source window, click **Open**. The Modify Data Source window appears (Figure 3).

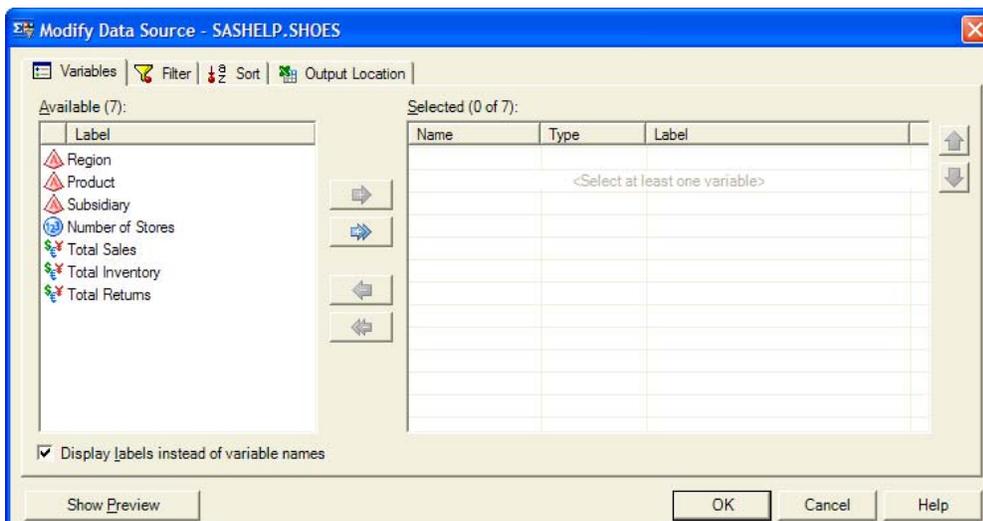


Figure 3. Modify Data Source Window with SASHELP.SHOES Shown

3. Select the variables that you want to view in Excel, the order in which the variables should appear, and whether to use names or labels for column headings.

- Click the double arrows that point to the right of the window and click **OK** to open the entire data source in an Excel worksheet. The results are shown in Figure 4.

Note: SAS Add-In for Microsoft Office enables you to filter or to sort the entire data source using the processing power of the server. If you use Excel's filter or sort features, Excel filters or sorts only the observations that are viewable in the worksheet. These might only be a sub-set of the total number of observations in the data source. SAS Add-In for Microsoft Office does not limit the number of variables that you can filter and sort.

	A	B	C	D	E	F	G	H	I
1		Region	Product	Subsidiary	Number of Stores	Total Sales	Total Inventory	Total Returns	
2	1	Africa	Boot	Addis Ababa	12	\$29,761	\$191,821	\$769	
3	2	Africa	Men's Casual	Addis Ababa	4	\$67,242	\$118,036	\$2,284	
4	3	Africa	Men's Dress	Addis Ababa	7	\$76,793	\$136,273	\$2,433	
5	4	Africa	Sandal	Addis Ababa	10	\$62,819	\$204,284	\$1,861	
6	5	Africa	Slipper	Addis Ababa	14	\$68,641	\$279,795	\$1,771	
7	6	Africa	Sport Shoe	Addis Ababa	4	\$1,690	\$16,634	\$79	
8	7	Africa	Women's Casual	Addis Ababa	2	\$51,541	\$98,641	\$940	
9	8	Africa	Women's Dress	Addis Ababa	12	\$108,942	\$311,017	\$3,233	
10	9	Africa	Boot	Algiers	21	\$21,297	\$73,737	\$710	
11	10	Africa	Men's Casual	Algiers	4	\$63,206	\$100,982	\$2,221	
12	11	Africa	Men's Dress	Algiers	13	\$123,743	\$428,575	\$3,621	
13	12	Africa	Sandal	Algiers	25	\$29,198	\$84,447	\$1,530	
14	13	Africa	Slipper	Algiers	17	\$64,891	\$248,198	\$1,823	
15	14	Africa	Sport Shoe	Algiers	9	\$2,617	\$9,372	\$168	
16	15	Africa	Women's Dress	Algiers	12	\$90,648	\$266,805	\$2,690	
17	16	Africa	Boot	Cairo	20	\$4,846	\$18,965	\$229	
18	17	Africa	Men's Casual	Cairo	25	\$360,209	\$1,063,251	\$9,424	
19	18	Africa	Men's Dress	Cairo	5	\$4,051	\$45,962	\$97	
20	19	Africa	Sandal	Cairo	9	\$10,532	\$50,430	\$598	
21	20	Africa	Slipper	Cairo	9	\$13,732	\$54,117	\$1,216	
22	21	Africa	Sport Shoe	Cairo	3	\$2,259	\$20,815	\$44	
23	22	Africa	Women's Casual	Cairo	14	\$328,474	\$940,851	\$10,124	
24	23	Africa	Women's Dress	Cairo	3	\$14,095	\$51,145	\$745	
25	24	Africa	Boot	Johannesburg	14	\$8,365	\$33,011	\$483	
26	25	Africa	Sandal	Johannesburg	13	\$17,337	\$63,003	\$809	
27	26	Africa	Slipper	Johannesburg	12	\$39,452	\$130,025	\$1,565	
28	27	Africa	Sport Shoe	Johannesburg	8	\$5,172	\$29,368	\$139	
29	28	Africa	Women's Dress	Johannesburg	4	\$42,682	\$120,127	\$966	
30	29	Africa	Boot	Khartoum	24	\$19,282	\$105,370	\$700	
31	30	Africa	Men's Casual	Khartoum	1	\$9,244	\$16,230	\$478	
32	31	Africa	Men's Dress	Khartoum	3	\$18,053	\$51,132	\$1,177	
33	32	Africa	Sandal	Khartoum	18	\$26,427	\$81,825	\$1,281	
34	33	Africa	Slipper	Khartoum	11	\$43,452	\$143,015	\$1,573	
35	34	Africa	Sport Shoe	Khartoum	7	\$2,521	\$27,041	\$84	
36	35	Africa	Women's Casual	Khartoum	1	\$19,582	\$30,727	\$384	
37	36	Africa	Women's Dress	Khartoum	6	\$48,031	\$132,679	\$1,374	
38	37	Africa	Boot	Kinshasa	16	\$13,921	\$70,736	\$553	
39	38	Africa	Men's Dress	Kinshasa	5	\$57,691	\$95,663	\$1,699	
40	39	Africa	Sandal	Kinshasa	10	\$16,662	\$104,438	\$611	
41	40	Africa	Slipper	Kinshasa	11	\$52,807	\$183,937	\$1,440	
42	41	Africa	Sport Shoe	Kinshasa	10	\$4,888	\$27,998	\$162	
43	42	Africa	Women's Casual	Kinshasa	1	\$17,919	\$21,363	\$400	
44	43	Africa	Women's Dress	Kinshasa	3	\$32,928	\$87,119	\$717	

Figure 4. The SASHELP.SHOES Data Set in Microsoft Excel

Note: There is one limitation to using Excel to view data. An Excel worksheet can only display 65,536 rows. SAS Add-In for Microsoft Office enables you to view a sub-set of the rows in a data source, and navigate through the remaining rows by using buttons that are similar to the **Back** and **Forward** buttons that are located on the SAS Data Tools toolbar. (See Figure 5.)



Figure 5. SAS Add-In for Microsoft Office SAS Data Tools Toolbar

PERFORM YOUR OWN ANALYSES USING SAS TASKS

You can perform various analyses using SAS Tasks in SAS Add-In for Microsoft Office. If you've used SAS® Enterprise Guide®, these tasks might look familiar—most of the tasks are found in both applications. You can use these tasks on data that is accessible to the SAS server or on data in Excel. There are various tasks for statistical and other analyses. The following example shows how to create a simple bar chart.

To use SAS Tasks in SAS Add-In for Microsoft Office:

1. Click **SAS → Analyze Data** to open the Analyze Data window (Figure 6).

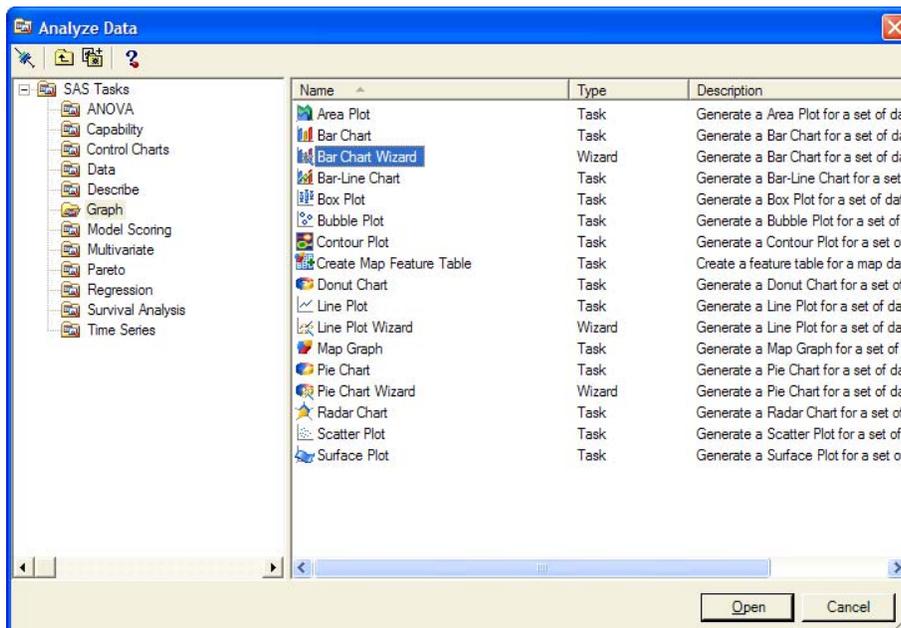


Figure 6. Analyze Data Window in SAS Add-In for Microsoft Office

2. For this example, in the Analyze Data window, click **Graph** in the left panel of the window, and select **Bar Chart Wizard** in the right panel of the window. Because we were just looking at the SASHELP.SHOES data set, it is already the Active Data Source, so the task will run on this data. If a data source had not already been selected, you would be prompted to select a data source. To chart Total Sales for each Region, follow the instructions in the intuitive wizard. The results are shown in Figure 7.

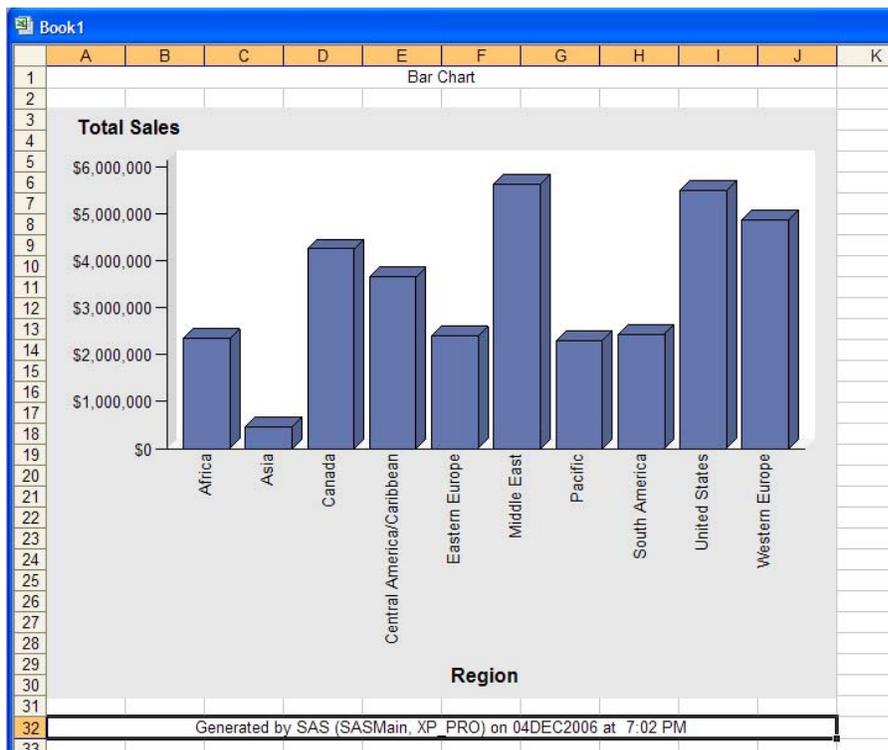


Figure 7. Bar Chart That Shows Total Sales for Each Region

RUN CUSTOM ANALYSES CREATED BY OTHERS

In addition to performing your own analyses, you might want to run analyses that are created by others as Stored Processes.

In SAS Add-In for Microsoft Office:

1. Click **SAS → Reports**. The Reports window opens (Figure 8), which enables you to select a Stored Process.

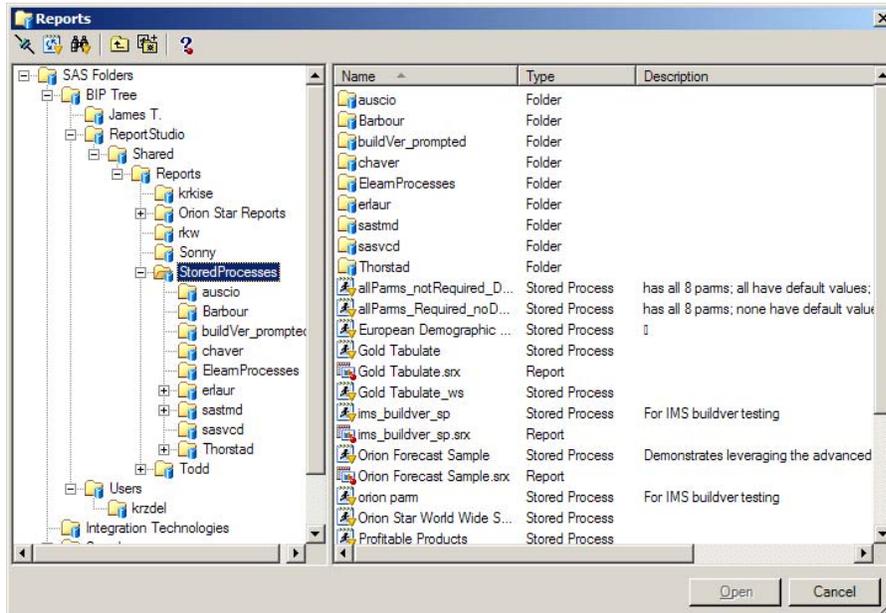


Figure 8. Selecting a Stored Process in the Reports Window in SAS Add-In for Microsoft Office

When you select a Stored Process, you might be prompted to enter values for the custom analysis or report. Figure 9 shows a prompt for a complex Stored Process.

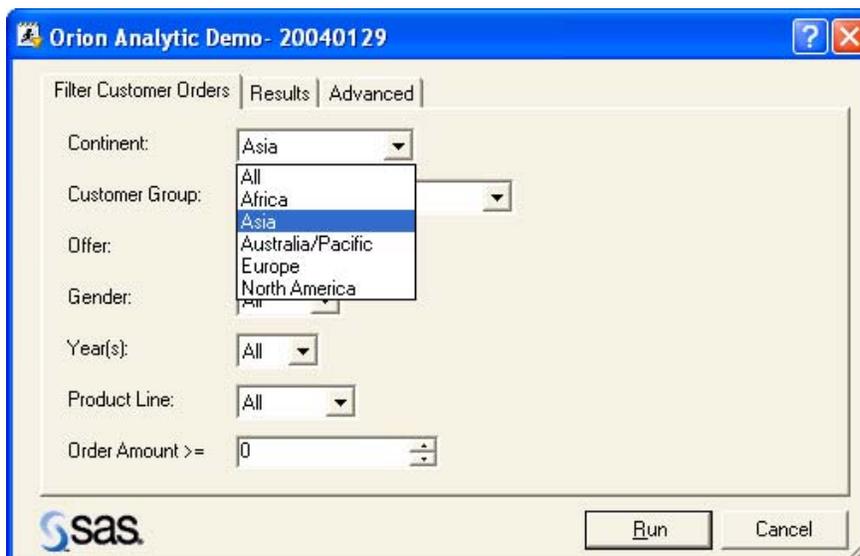


Figure 9. Prompt for Custom Information for the Selected Stored Process

Most stored processes will display results. These results are displayed in Microsoft Word, Microsoft Excel, or Microsoft PowerPoint. Figure 10 shows an example of results from a forecasting report that were created by another analyst in the organization and inserted into an Excel worksheet.

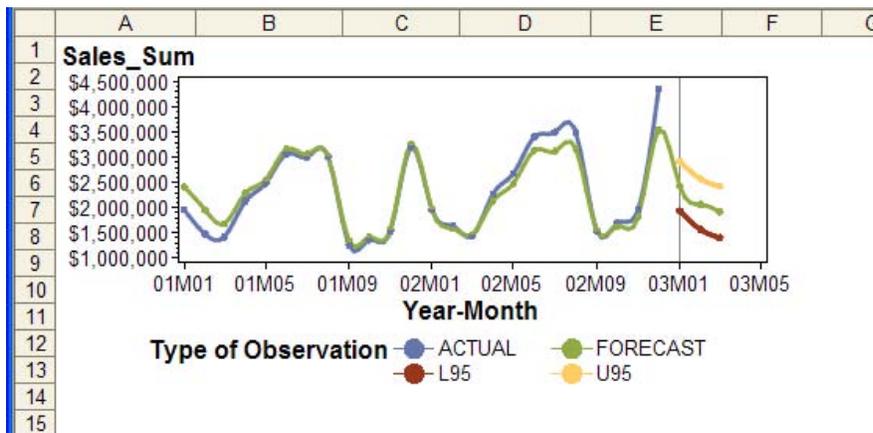


Figure 10. Example of Results from a Forecasting Report

Using SAS Add-In for Microsoft Office, you can easily and efficiently leverage work across your department or organization, and combine analyses and reports that are more complex with other information in one Microsoft Office document.

REFRESH AND DISTRIBUTE RESULTS

Now that you have the desired data, analysis, or report results in your Microsoft Office document, you might want to refresh these results at specific times or on a regular schedule.

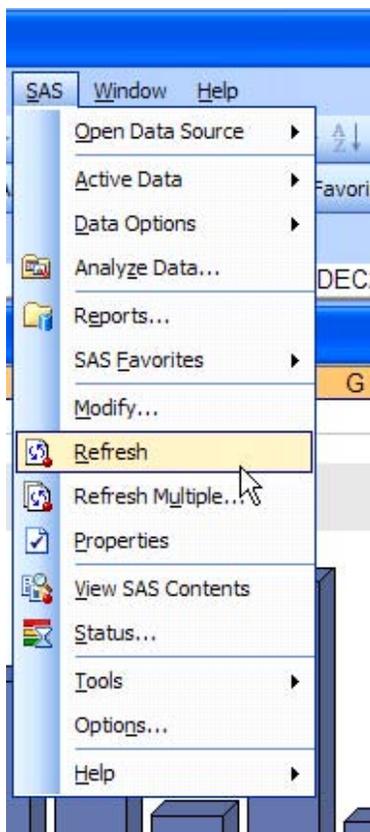


Figure 11. Drop-Down Menu That Shows "Refresh" Selected

Figure 11 shows the resulting drop-down menu when you click the **SAS** menu in Excel.

Click **Refresh** to refresh the data and the results. Click **Modify** to modify your SAS Task analysis or graph, or to re-enter the parameters that you chose for the Stored Process analysis or report. Click **Refresh Multiple** to select which specific results to refresh. If some colleagues share the same server connections, they can also refresh the results in shared documents.

There are a few additional ways to control the ways that you can update your results. You can set the result to Refresh at File Open by right-clicking a result and selecting **Properties**, then click the **Execution** tab. Subsequently, every time you open the document, that result is refreshed, automatically. By default, this mode is set to refresh in the background to enable you to continue working on other tasks. You can also have results refreshed in the foreground.

In addition, you can set the document to refresh on a schedule by clicking **SAS → Tools → Create Schedule**. The schedule will be set by using the Windows scheduler on your PC.

Finally, you can make sure that the document cannot be updated by others by clicking **SAS → Tools → Remove Dynamic Links**. You might want to ensure that the document remains a static snapshot of information at a specific time or that someone does not, inadvertently, update your document or the results of your report.

Combining all these options puts you in control so that you can create a mix of standard and ad hoc reports and analyses.

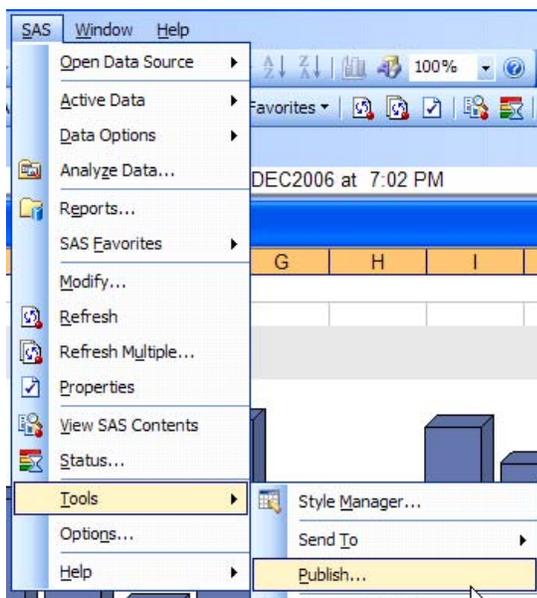


Figure 12. Selections on Drop-Down Menu That Enable Documents to Be Published

Finally, for specific reports or analyses, you can share your documents by publishing them to a central location. Do this by clicking **SAS → Tools → Publish** (Figure 12).

This publishing process makes it easy to share the results with your colleagues. You are able to specify the users and the groups who can view the documents. SAS Add-In for Microsoft Office uses permissions from the SAS Metadata Server that are set up by your System Administrator. Also, you might want the information to be stored on a central server in order to keep sensitive data off laptops or desktops. Publishing your documents in this way also enables administrators or data warehouse personnel in your organization to perform impact analysis on data sources that are used in these documents via SAS® Data Integration Studio.

SEND TO WORD OR POWERPOINT

When working in Excel, SAS Add-In for Microsoft Office offers another powerful and convenient method that you can use to share your results. By clicking **SAS → Tools → Send To**, you can send your data to Microsoft Word or to Microsoft PowerPoint so that you can easily re-use SAS Task or SAS Stored Process results that you have already inserted into Excel (Figure 13).

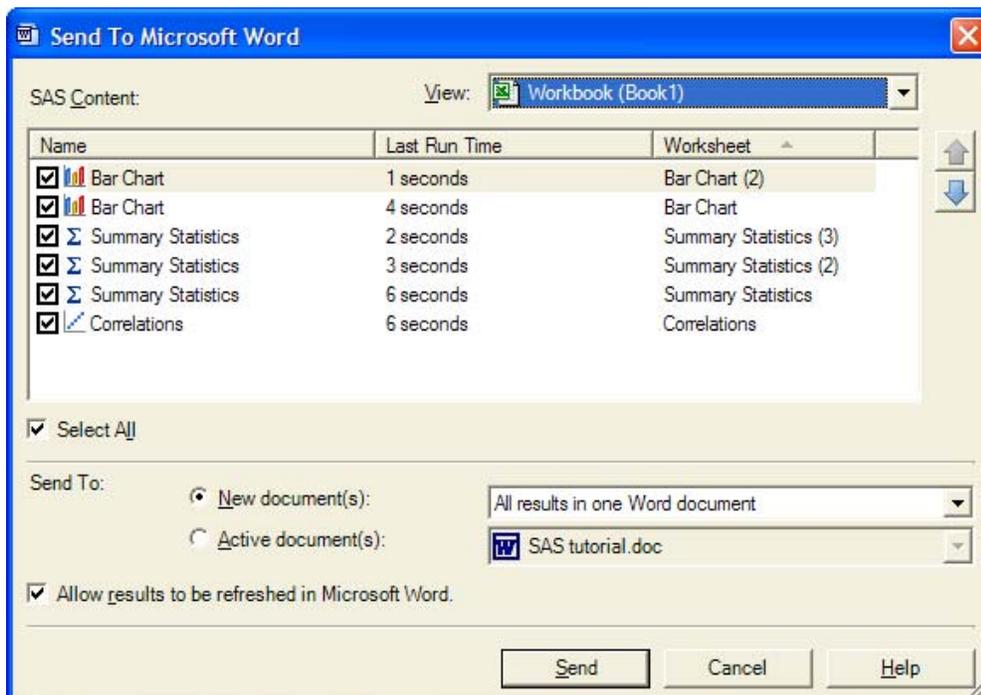


Figure 13. Sending Results from Excel to Word via the Send To Microsoft Word Window

Using this **Send To** feature, you can specify which results you want to send from your Workbook to either Microsoft Word or Microsoft PowerPoint. You can also choose a new document or an active (currently open) document. The check box at the bottom of the window lets you specify whether the results should be static or refreshable in the document or in the presentation.

CONCLUSION

This paper introduced several capabilities of SAS Add-In for Microsoft Office and presented examples to demonstrate the following functionalities:

- access to centralized data
- how to perform your own analyses using SAS Tasks
- how to run custom analyses created by others as SAS Stored Processes
- various methods for updating and distributing results

These capabilities give business users self-sufficient access to SAS analytics, data, and reports from the familiar interfaces of Microsoft Office. A key component of SAS Enterprise BI Server, SAS Add-In for Microsoft Office gives Microsoft Office users *The Power to Know*[®].

CONTACT INFORMATION

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