

Paper 053-2011

Turbocharging Your Microsoft Office Environment with version 4.3 of the SAS® Add-In for Microsoft Office

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ABSTRACT

Some of the most commonly used tools by users of all skill levels across organizations are Microsoft Office tools, such as Word, Excel, and PowerPoint. The SAS® Add-In for Microsoft Office turbocharges these tools, giving users the power to explore and analyze information using SAS software within their familiar Microsoft Office environment. The SAS® integration with Microsoft Office brings a large set of capabilities enabling users to access reports, stored processes, and dashboards; carry out multidimensional OLAP analysis in spreadsheets with auto-charting; run interactive reports for quick what-if analysis; and securely work with data directly. It brings capabilities allowing users to reutilize the work done, thereby increasing user productivity.

This paper highlights the key capabilities provided by the SAS® Add-In 4.3 for Microsoft Office and the application of these capabilities across the Microsoft Office products.

INTRODUCTION

Surveys have shown that nearly 97% of businesses use Microsoft Office. For approximately, 77% of employees in those businesses, Microsoft Office tools are the primary interfaces for their daily job. Based on the roles they perform, their choice of tools can vary from just using Outlook for e-mails, Excel for data analysis, Word for reports, and PowerPoint for presentations. While people use these tools frequently, they may be unable to effectively use these applications to guide their business decisions. This ineffectiveness could be due to many factors, such as the dependency on IT or special groups to generate specific reports for their Microsoft Office interface (which results in a latency of information access). They may have to use unfamiliar business tools (such as a specific Web or desktop client interface) to access the information they need. Such factors result in decreased adoption of the company's business intelligence strategy, ultimately inhibiting the potential ROI of their BI investment.

To increase value derived from a BI investment, companies can use SAS® Add-In for Microsoft Office to enable users to access business critical data with on-demand updates from their familiar Office tools. This paper will discuss some of the key capabilities provided by version 4.3 of the SAS® Add-In for Microsoft Office. These help turbocharge the Microsoft Office environment, by making it easier for users to embrace the power of SAS in a familiar environment (in this case, Word, Excel, PowerPoint, and Outlook). These capabilities also extend the reach of business intelligence to a broader audience, empowering end users with self-service analytics.

THE SAS® ADD-IN FOR MICROSOFT OFFICE

The SAS® Add-In for Microsoft Office enables business users to transparently use the power of SAS for reporting and analytics. Users can access data and reports directly from Microsoft Office through integrated menus and toolbars. The SAS® Add-In for Microsoft Office revolutionizes the world of business intelligence by providing easy access to SAS software's broad and deep set of analytic, reporting, and data access functionality in key Microsoft Office applications (Word, Microsoft Excel, Microsoft PowerPoint, and Microsoft Outlook). The SAS® Add-In for Microsoft Office is designed for business users, analysts, and decision makers who want to view, analyze, and share business intelligence directly from Microsoft Office.

The 4.3 release of the SAS add-in continues to bring the power of SAS business analytics to popular Microsoft applications. In this release, the SAS add-in includes integration with Microsoft Outlook. In addition, the SAS add-in that is available in Excel, Word, and PowerPoint has been enhanced with an improved user interface, new additional tasks, and improved integration with SAS Enterprise Guide and SAS Web Report Studio.

INTEGRATION WITH MICROSOFT OUTLOOK

In the 4.3 version of SAS® Add-In for Microsoft Office, business users can now access SAS reports and dashboards directly in Microsoft Outlook. Instead of having to open a new application, users can check their reports whenever they check e-mails. As a result, now users can answer questions via existing reports without leaving Outlook.

The SAS® Add-In for Microsoft Office version 4.3 integrates with Microsoft Outlook versions 2007 and 2010.

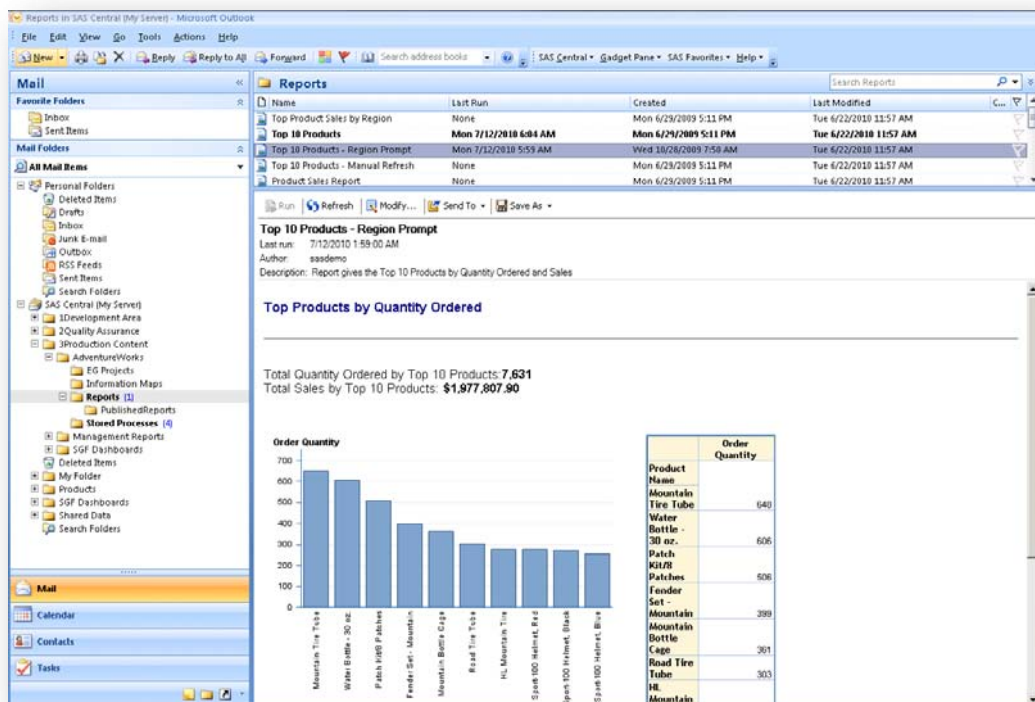
INTERACTIVITY WITH REPORTS INSIDE OUTLOOK

The SAS® Add-In for Microsoft Office 4.3 adds to the Outlook folder structure a new SAS Central folder (default folder name which can be customized) where the user can access SAS Web Report Studio reports and SAS Stored

Processes. Under the SAS Central folder user can view the metadata folders and the reports that are accessible to them.

When the user selects a report, a query is sent to the SAS server for processing, and the results are sent directly back to the Outlook client. As a result, the user sees a report with the most up-to-date information, reducing latency and dependency on IT for updates. Users can add frequently viewed reports to their Favorites List, making often-referenced information easy to find and view.

Running SAS reports in Outlook bypasses the Microsoft Exchange Server, as all processing is done on the SAS servers and not impacting Exchange Server performance.



Basic interactions are supported, such as prompting within a report to dynamically filter the content. Users can also take advantage of Outlook capabilities, such as flagging the report for follow-up or e-mailing the report to a colleague. The colleague's authorization to view the content is validated on the SAS metadata server. Alternatively, the capabilities from the SAS add-in enable users to send add-in output directly to another Microsoft Office application, such as PowerPoint for inclusion in a presentation.

A quick view of key performance indicators (KPIs) can help users keep on top of the information they need to make fact-based decisions quickly. The SAS® Add-In for Microsoft Office brings these KPIs into easy reach via Outlook. The Gadget Pane enables users to view thumbnails of reports and KPIs alongside their regular e-mails. Users can add their favorite indicators to the Gadget Pane to monitor easily important KPIs.

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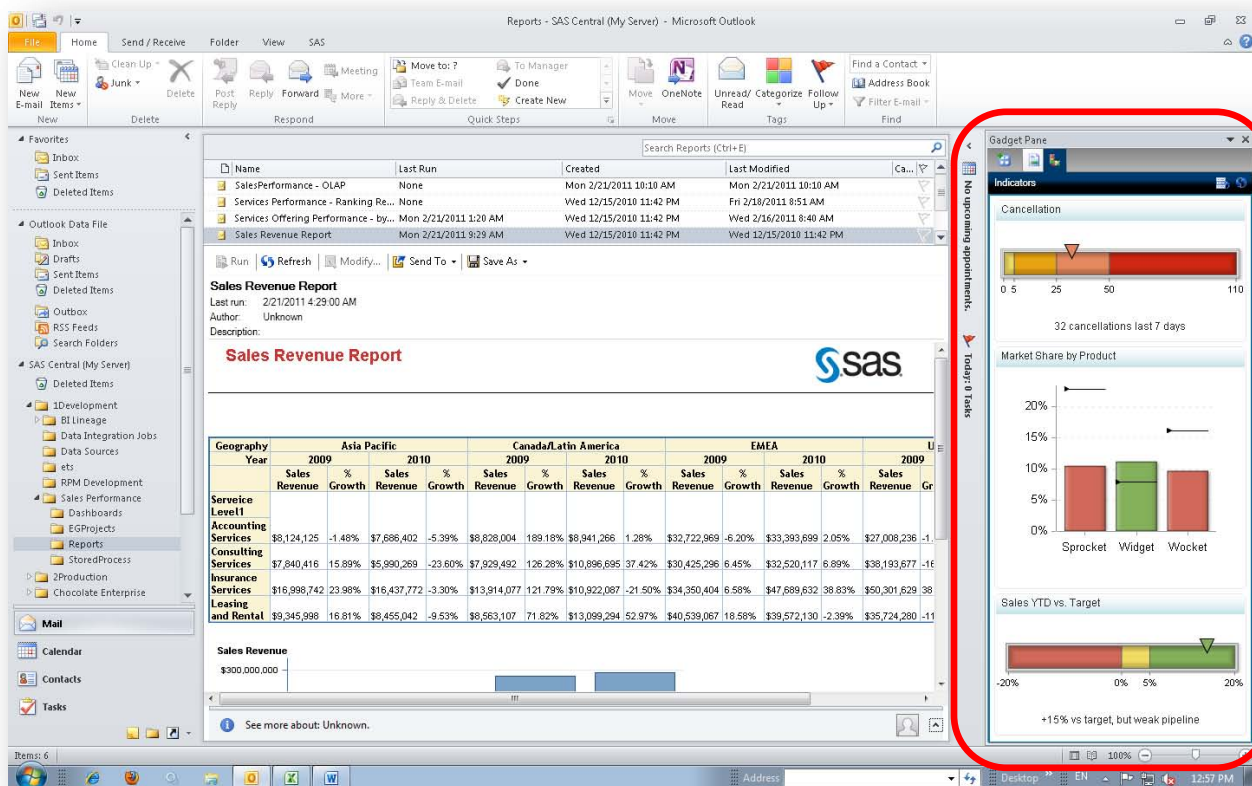


Figure 2a. Gadget Pane in Outlook showing Indicators

The Reports tab (as shown in Figure 2b) offers thumbnail views of favorite reports; from here, users can open these reports in full view by clicking the image. The Gadget Pane can be displayed whenever Outlook is open, so users have immediate access to the information they regularly require. Spending less time searching for information gives them more time to focus on key information, enhancing their productivity.

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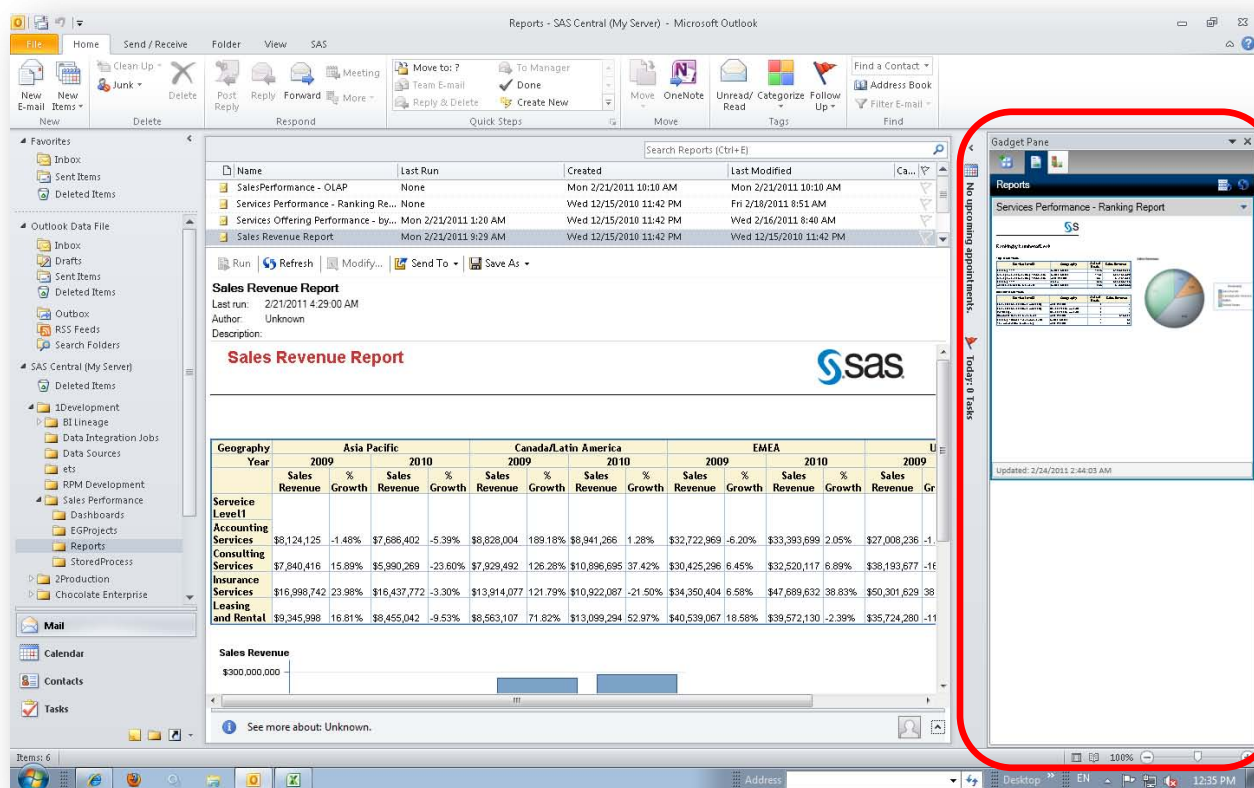


Figure 2b. Gadget Pane in Outlook showing Report thumbnail view

From an administrative point of view, there is limited impact on the Microsoft Exchange Server. The only Exchange Server impact of including the SAS Gadget Pane is for usual Outlook features, such as e-mailing and scheduling a meeting. Because SAS content inside the Microsoft Outlook is provided from the SAS Server, there is no additional overhead on the Microsoft Exchange Server.

EXCELLING WITH EXCEL

By far, Excel is the most widely used interface for data analysis, and it is the default entry point for many users to view and edit their data. Although Excel is good for basic analysis, it does not provide the powerful analytics available in SAS. A disproportionate amount of time is spent waiting for the analytical outputs to be generated by IT or special groups. Users in many cases also have to wait for IT or special groups to provide them the data required for their analysis or help them edit or update data for their own self-analysis. These organizational constraints result in time consuming administrative and support activities rather than useful revenue generating activities.

With the SAS® Add-In for Microsoft Office, users of Excel can seamlessly analyze their information using the power of SAS analytics, and IT can securely deliver the most up-to-date information into the hands of key stakeholders for analysis.

ACCESS CREATE AND UPDATE DATA

Until now, Microsoft Office users using SAS Add-In could only access and view a data tables inside of excel. To edit or update this data or to create new data, users either had to go to a different SAS interface—Base SAS or Enterprise Guide—or to an IT group. In version 4.3 of the SAS® Add-In for Microsoft Office, these obstacles or dependencies are removed. Users can create new data and upload it as SAS data sets to the SAS server. The data can be for

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personal use or the user can upload it to shared libraries for collaboration. This new functionality is made feasible with the data writeback capability provided by SAS inside Excel.

Figure 3 shows the options in Excel that help users add, update, or delete records while accessing SAS data sets inside Excel.

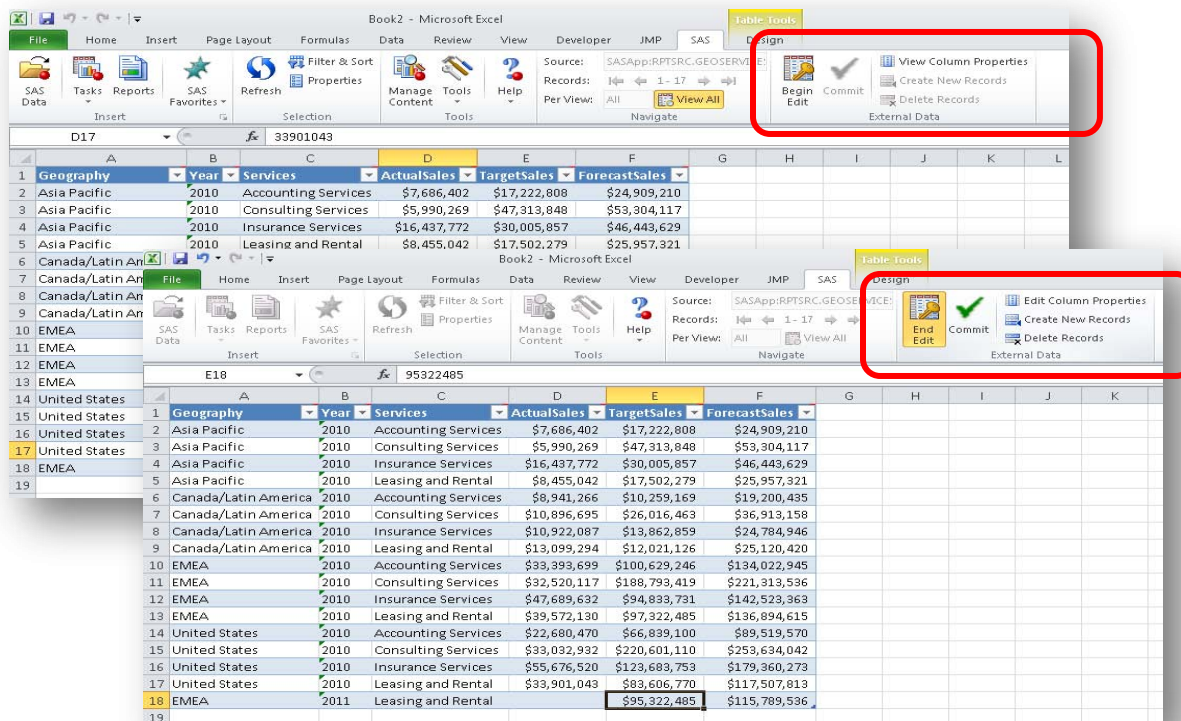


Figure 3: Data Write Back Options in Microsoft Excel

The data writeback feature enables users with sufficient permissions to open an existing data set (or subset of an existing data set), change individual values, and write those updates back to the original data set.

While in Edit mode, the user can edit properties, add or delete records, and change data values. If the user has proper authorization, then these modifications are written back to the original data set by clicking the Commit icon or clicking **End Edit** and committing the changes. Users can also edit column properties for the data set. From the Column Properties window, they can add a new column, duplicate properties of an existing column, delete a column, specify column order, and modify column properties. When finished editing the column properties, the user commits the changes. The changes appear in Microsoft Excel, and the changes are applied also to the data set on the SAS server. Note that changes will be applied only to the data set and not the metadata.

This feature is controlled through role assignment in SAS® Management Console (see Figure 4). The data writeback feature is available only in Microsoft Excel. (It is not available in Microsoft Word or Microsoft PowerPoint.)

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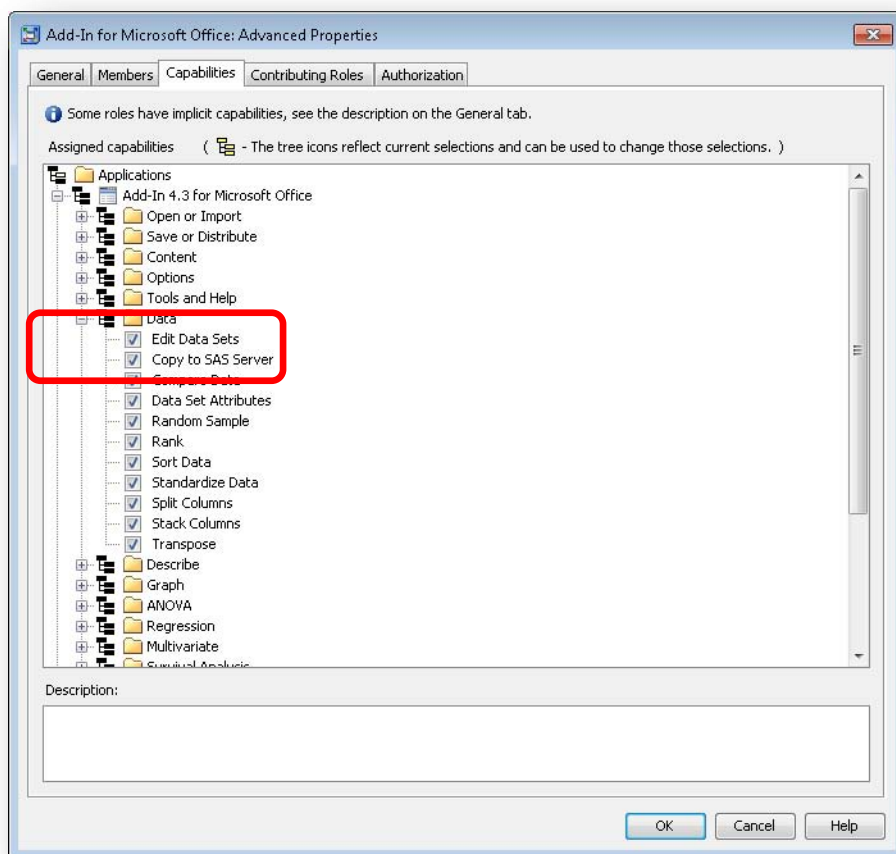


Figure 4: Assigning Capabilities to Role-Based Settings in SAS Management Console

VIEW AND RUN INTERACTIVE REPORTS

In version 4.3, SAS® Add-In for Microsoft Office takes interaction with SAS Reports to the next level. Users can seamlessly open SAS Reports created in other SAS products, such as SAS® Enterprise Guide and SAS® Web Report Studio. Users of the SAS add-in can interact with any report prompts and view the results within the Microsoft Office environment.

By using the **Replicate SAS Content** option, users can also run the same stored process with parameters multiple times inside the same Excel worksheet. When comparing the results, this option reduces the number of clicks that are required to reopen and rerun the same content and at the same time helps users to run the same analysis with different parameters in a single view inside of the Office document to do a quick comparison of different scenarios

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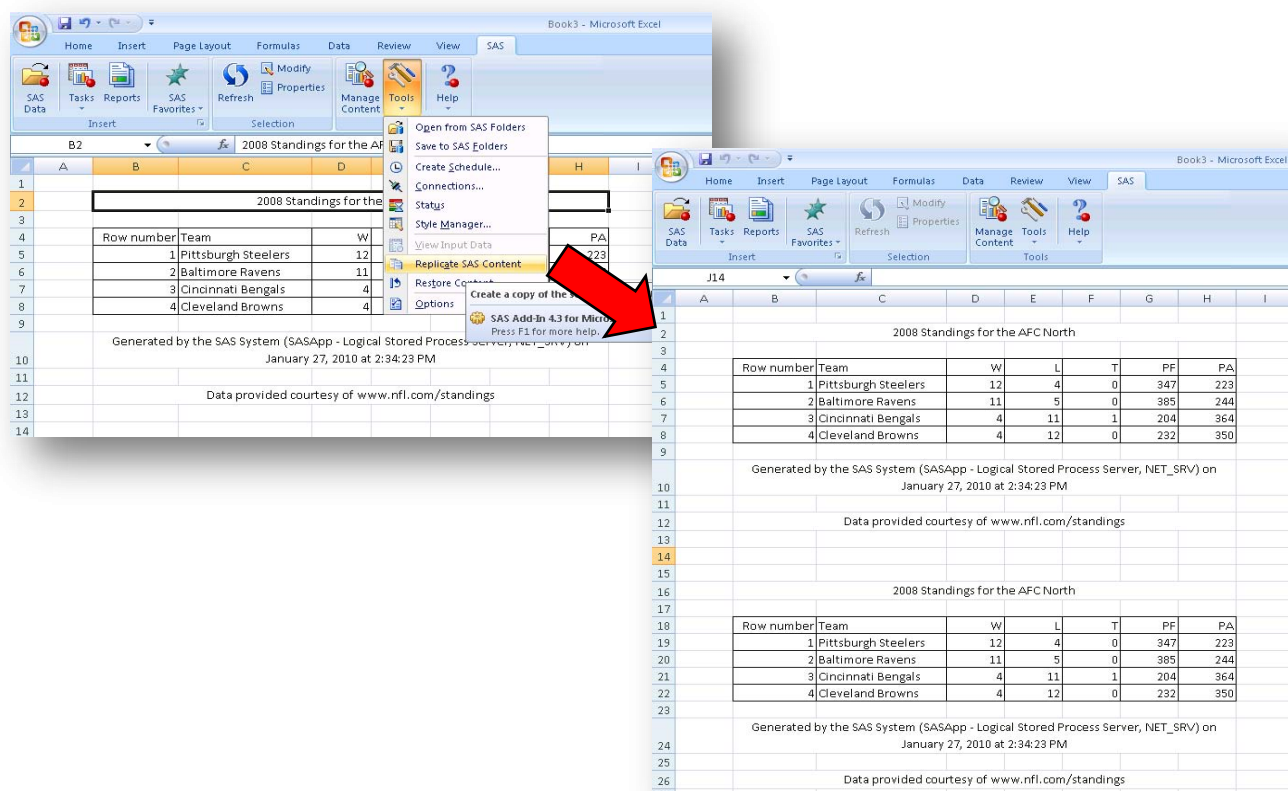


Figure 5: Replicate SAS Content Functionality in Microsoft Excel

Using this option, you can replicate your content (to keep the same look and feel), run a SAS Report multiple times (using different prompts for each run), and compare all the results in a single view.

EXCEL DATA AS INPUT TO ANALYSIS TASKS

With the 4.3 version of SAS® Add-In for Microsoft Office, users have the option to use Microsoft Excel data as input to a SAS task or for a stored process. This enables users to perform what-if analysis by modifying cell values in Excel and running the stored process to view the changing results. Users can have multiple approaches, such as single input or multiple inputs, to a stored process.

EXAMPLE: USING EXCEL DATA AS INPUT FOR A STORED PROCESS

Here is an example where the user runs a stored process that uses Excel data as its input stream. The results are displayed back in Excel.

STEP 1 → Data: Figure 6 shows regional product sales data inside Excel.

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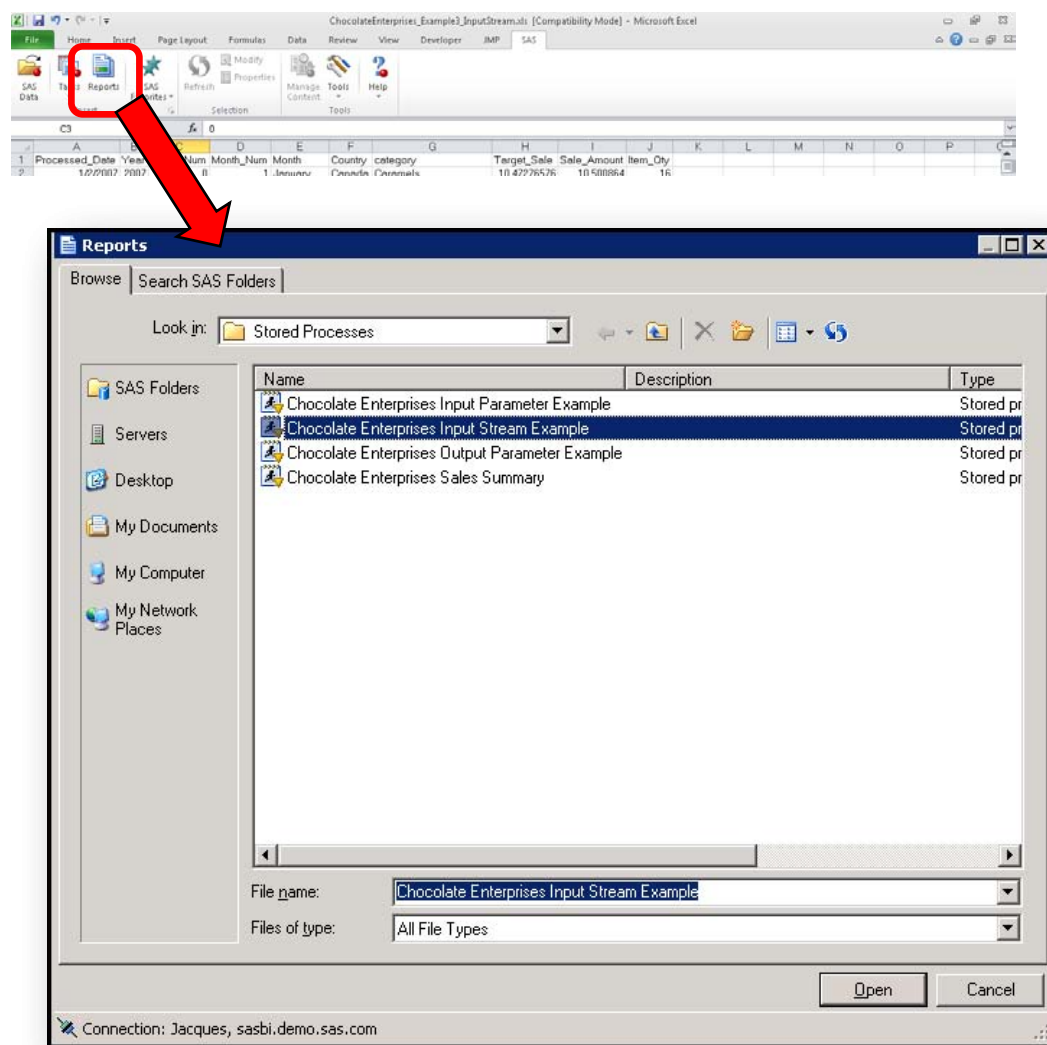
Processed Date	Year	Week Num	Month Num	Month	Country	category	Target_Sale	Sale_Amount	Item_Oty
1/2/2007	2007	0	1	January	Canada	Caramels	10.47276576	10.500864	16
1/2/2007	2007	0	1	January	Canada	Coffee	2.350317202	10.376512	1
1/2/2007	2007	0	1	January	Canada	Truffles	129.1676158	78.75648	6
1/2/2007	2007	0	1	January	Canada	Biscuits	37.73129068	19.032016	29
1/3/2007	2007	0	1	January	Canada	Creams and Granaches	8.674746471	4.594128	7
1/3/2007	2007	0	1	January	Canada	Creams and Granaches	6.166898715	5.906736	9
1/3/2007	2007	0	1	January	Canada	Fruits and Fruit Creams	25.68910057	13.782384	21
1/3/2007	2007	0	1	January	Canada	Fruits and Fruit Creams	29.53659832	15.094982	23
1/3/2007	2007	0	1	January	Canada	Fruits and Fruit Creams	7.732737855	5.250432	8
1/3/2007	2007	0	1	January	Canada	Nuts & Pralines	11.54031718	5.906736	9
1/3/2007	2007	0	1	January	Canada	Platinum Collection	8.243137037	5.906736	9
1/3/2007	2007	0	1	January	Canada	Platinum Collection	10.43711375	7.875648	12
1/3/2007	2007	0	1	January	Canada	Platinum Collection	1.240336352	0.656304	1
1/3/2007	2007	0	1	January	Canada	Solids	6.431324512	4.594128	7
1/3/2007	2007	0	1	January	Canada	Truffles	4.442922201	2.625216	4
1/3/2007	2007	0	1	January	Canada	Chocolate Bars	451.802121	259.896384	3
1/3/2007	2007	0	1	January	Canada	Chocolate Bars	177.0671692	173.264256	2
1/3/2007	2007	0	1	January	Canada	Jelly Bean	31.41767498	29.53368	3
1/3/2007	2007	0	1	January	Canada	Coffee	87.24351965	49.2228	3
1/3/2007	2007	0	1	January	Canada	Coffee	183.6874429	154.887744	4
1/3/2007	2007	0	1	January	Canada	Platinum Collection	60.78410099	39.37824	1
1/3/2007	2007	0	1	January	Canada	Solids	370.054312	236.26944	6
1/3/2007	2007	0	1	January	Canada	Truffles	1948.75344	1004.14512	5
1/3/2007	2007	0	1	January	Canada	Truffles	104.2233672	63.005184	6
1/4/2007	2007	0	1	January	Canada	Creams and Granaches	65.5947952	78.75648	3
1/4/2007	2007	0	1	January	Canada	Chocolate Bars	1635.439542	2079.171072	3
1/4/2007	2007	0	1	January	Canada	Biscuits	9.301218544	19.08912	30
1/4/2007	2007	0	1	January	Canada	Biscuits	7.736392392	21.001728	32
1/4/2007	2007	0	1	January	Canada	Caramels	3.90376085	8.531952	13
1/4/2007	2007	0	1	January	Canada	Caramels	19.7782475	21.650032	33
1/4/2007	2007	0	1	January	Canada	Creams and Granaches	21.29174035	22.97064	35
1/4/2007	2007	0	1	January	Canada	Creams and Granaches	3.063244399	17.063904	26
1/4/2007	2007	0	1	January	Canada	Creams and Granaches	2.04299748	6.56304	10
1/4/2007	2007	0	1	January	Canada	Platinum Collection	0.269999993	6.56304	10
1/4/2007	2007	0	1	January	Canada	Coffee	4.584653009	128.635584	4
1/4/2007	2007	0	1	January	Canada	Coffee	3.597602767	9.188256	2
1/5/2007	2007	0	1	January	Canada	Biscuits	12.44338164	7.875648	12
1/5/2007	2007	0	1	January	Canada	Biscuits	20.32254869	13.12608	20
1/5/2007	2007	0	1	January	Canada	Caramels	20.44246609	15.751296	24
1/5/2007	2007	0	1	January	Canada	Caramels	45.56636234	23.626944	36
1/5/2007	2007	0	1	January	Canada	Caramels	19.19823542	16.4076	25
1/5/2007	2007	0	1	January	Canada	Creams and Granaches	44.19666358	33.471504	51
1/5/2007	2007	0	1	January	Canada	Creams and Granaches	55.52089923	33.471504	51
1/5/2007	2007	0	1	January	Canada	Creams and Granaches	61.15870826	31.502592	48
1/5/2007	2007	0	1	January	Canada	Fruits and Fruit Creams	36.4517482	19.032016	29

Figure 6: Sales Data in Excel

STEP 2 → Stored Process: This example uses a stored process (as shown in Figure 7) that uses Excel data as the input stream and returns an analysis of the data in tabular and graphical format.

To open a stored process, the user clicks the Reports icon (as highlighted in Figure 7) on the SAS Ribbon and browses through the SAS Metadata folders to select the stored process to use.

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**Figure 7: Selecting a Stored Process**

STEP 3 → Input Excel Data: After the stored process is opened, the user is prompted to select data from the Excel document to use as the input stream.

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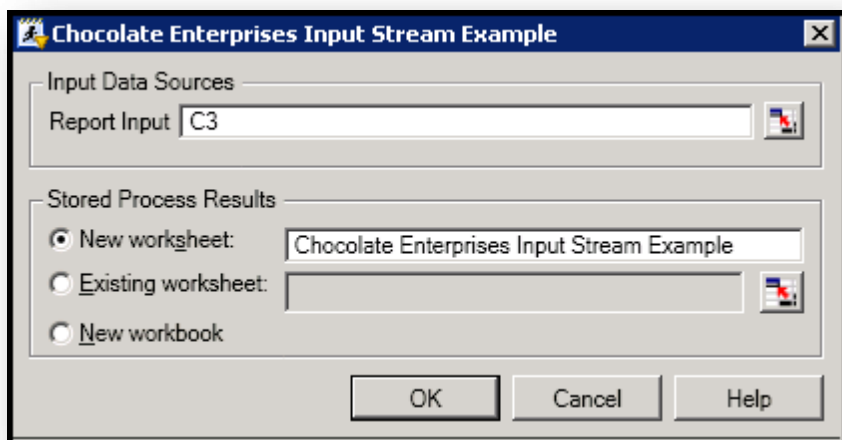


Figure 8: Prompt for Selecting an Input Data Stream

Users can select the entire Excel document as input, or the user can select specific rows from the Excel worksheet.

NOTE: Because the stored process needs to identify columns for the data feed, your data selection must include the row that contains the column names. The stored process uses the values in the first row as the column names in order to identify the dimensions of analysis (Category and Measures).

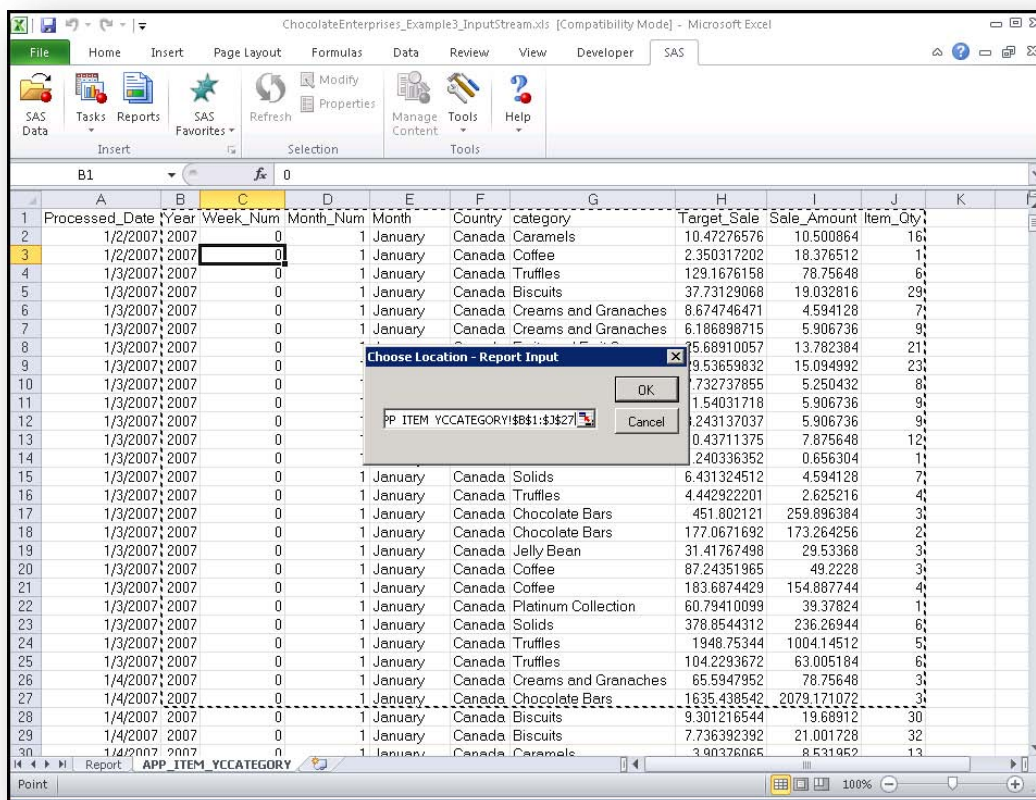


Figure 9: Include Row with Column Names in the Data Selection

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After the data selection is complete, the user clicks **OK** to view the results. The user can choose whether to view the results in the same worksheet as the Excel data or to view them in a separate worksheet.

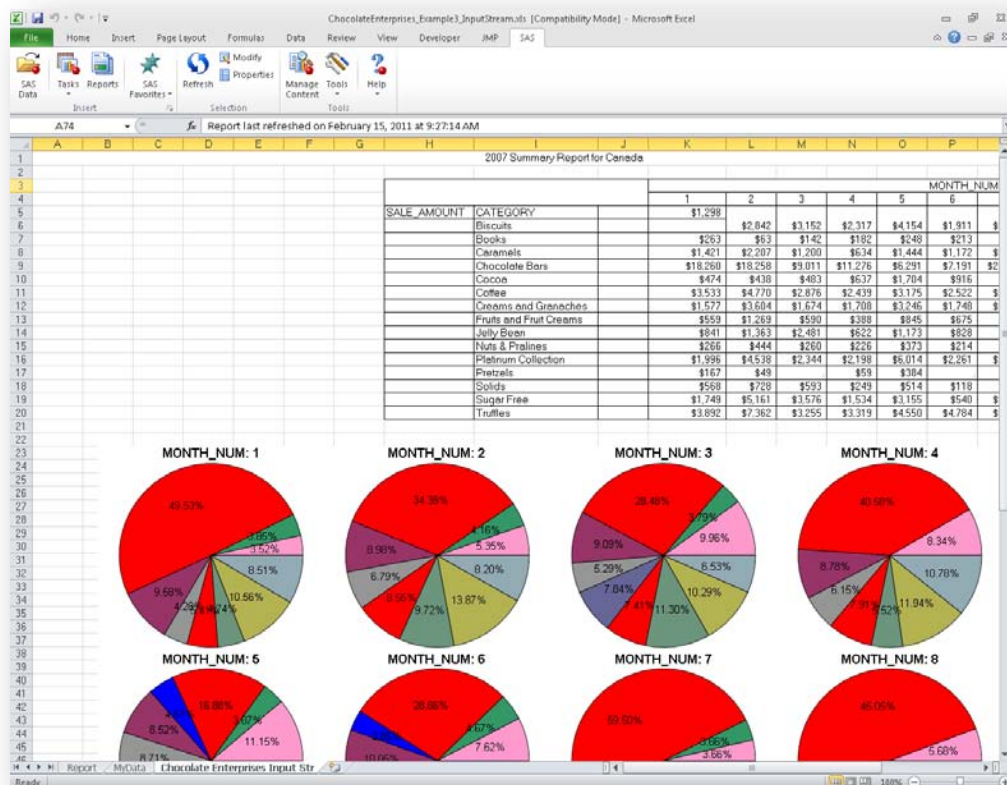


Figure 10: Results in the Same Worksheet as the Excel Data

This capability of the SAS® Add-In for Microsoft Office offers many advantages. It enables users to analyze the data based on various data inputs. Users can also run a simple what-if analysis by modifying the cell values in Excel and viewing the effect by running the same analysis with different values.

EXAMPLE: CREATING A STORED PROCESS WITH STREAMING INPUT DATA

Based on the user's skills and business requirements, the user can either consume stored processes created by others, or the user can create custom stored processes in a simple point-and-click fashion using SAS Enterprise Guide and share the stored process for others' use. This paper does not cover the steps on how to create stored processes, but it provides an overview of what these stored processes are. You are highly recommended to explore some of the suggested information assets at the end of this paper to get more details.

For a stored process to take streaming data as input, the input data must be in the form of an XML stream. The following code sample shows how the basic structure of a stored process should look. You could use this example as a template if you decide to write your own stored process and use it inside Excel.

```
/*ProcessBody;
%STPBEGIN;
OPTIONS VALIDVARNAME=ANY;
/* Libname name (instream) needs to match the fileref name registered in the stored
process metadata: Tab Data → Source → Fileref
Also make sure that the Allow rewinding stream option is selected to allow multiple
passes*/
```

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```

Libname instream xml92;

/* The streamed Excel table name is stored in reserved macro variable &_WEBIN_SASNAME
which is assigned the value EXCEL_TABLE */

/* Your code here. The following is just a simple example */

Data work.outtable;

    Set instream.&_WEBIN_SASNAME;

Run;

/* Optional - Send output table back to client application if you want to display the
input stream data*/

Proc print data=work.outtable noobs;

Run;

%STPEND;

```

DATA EXPLORATION

The SAS® Add-In for Microsoft Office provides an OLAP Viewer to help users leverage OLAP interactive and analysis capabilities in their familiar Excel environment. Using the OLAP Viewer, users can take advantage of analyses created by SAS. These analyses are well beyond standard PivotTable analysis. Users can slice and dice the data, drill into details, create new measures for custom calculations, and create member sets. Users can view the information in a tabular view and also in a highly visual graphical format.

Figure 11 shows the OLAP Viewer inside Excel. The Cube Manager shows the cube's details including measures, dimensions, and hierarchies. With the Cube Manager, users can create new filters, create new calculations, and use conditional highlighting to make data values stand out based on business rules. As new insights are discovered during analysis, the user can save views as bookmarks. The View Manager shows the various dimensions and measures that are used across rows and columns. It also shows any filters that are applied.

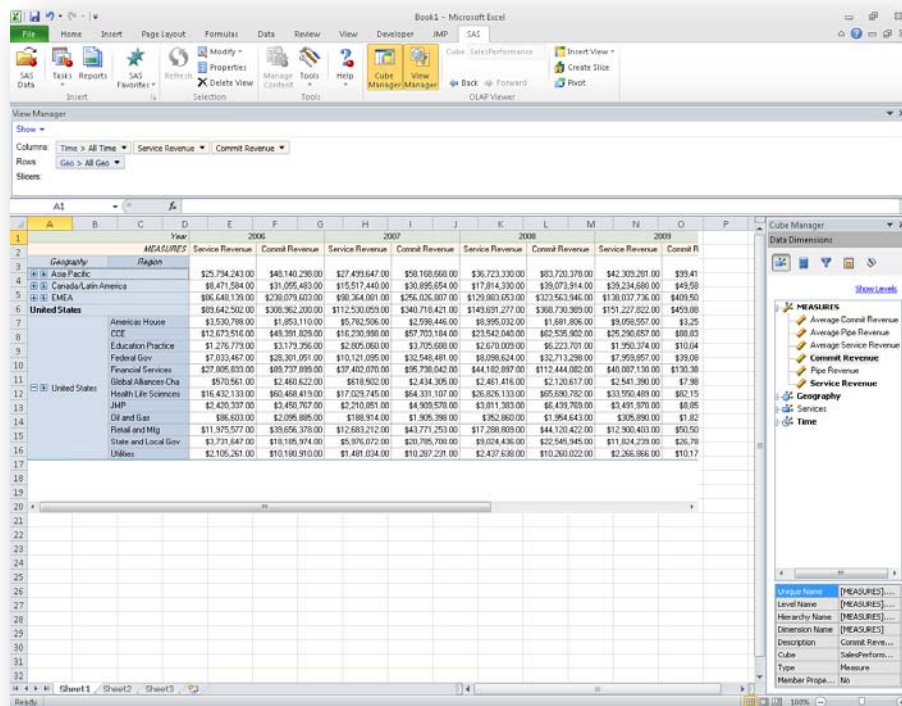


Figure 11: OLAP Viewer in Microsoft Excel

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Using a contextual menu (which means that the appropriate menu is displayed based on where the user clicks), the interface lets users drill through details, define totals and percent of totals, sort the data, and change the dimensions of analysis on the fly. Through such ad hoc analysis, users can quickly filter the data. This functionality makes the data exploration experience highly visual and interactive.

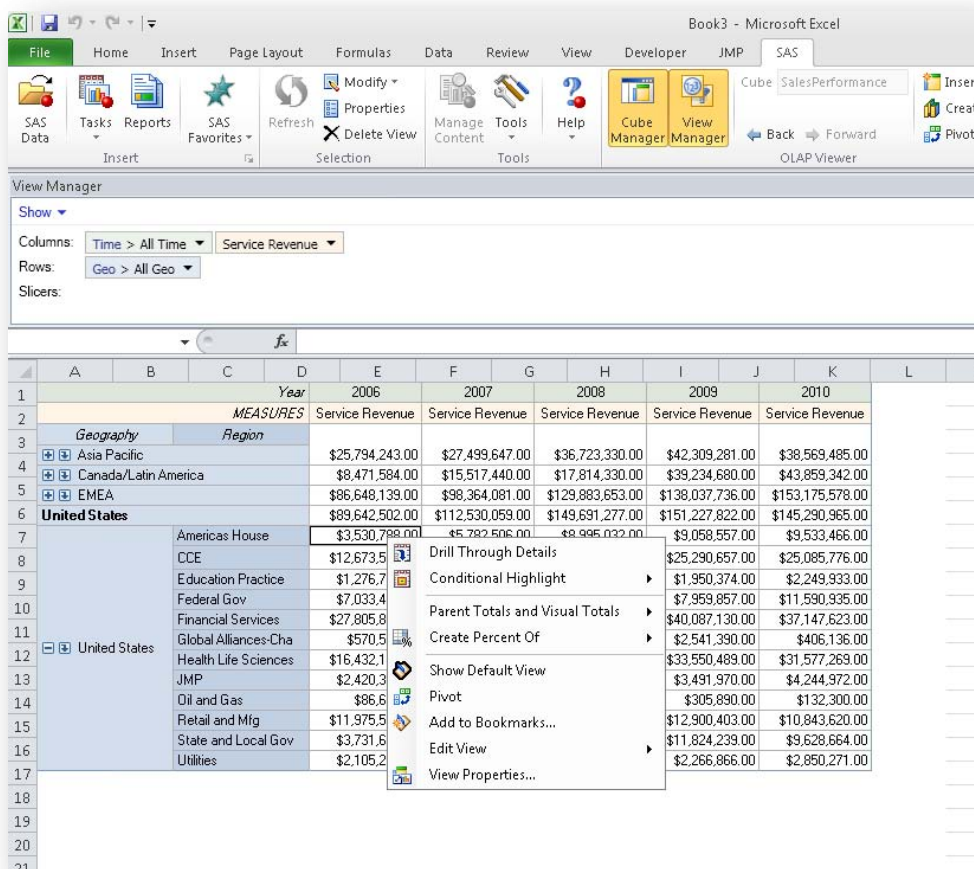


Figure 12: Contextual Menu for a Data Value

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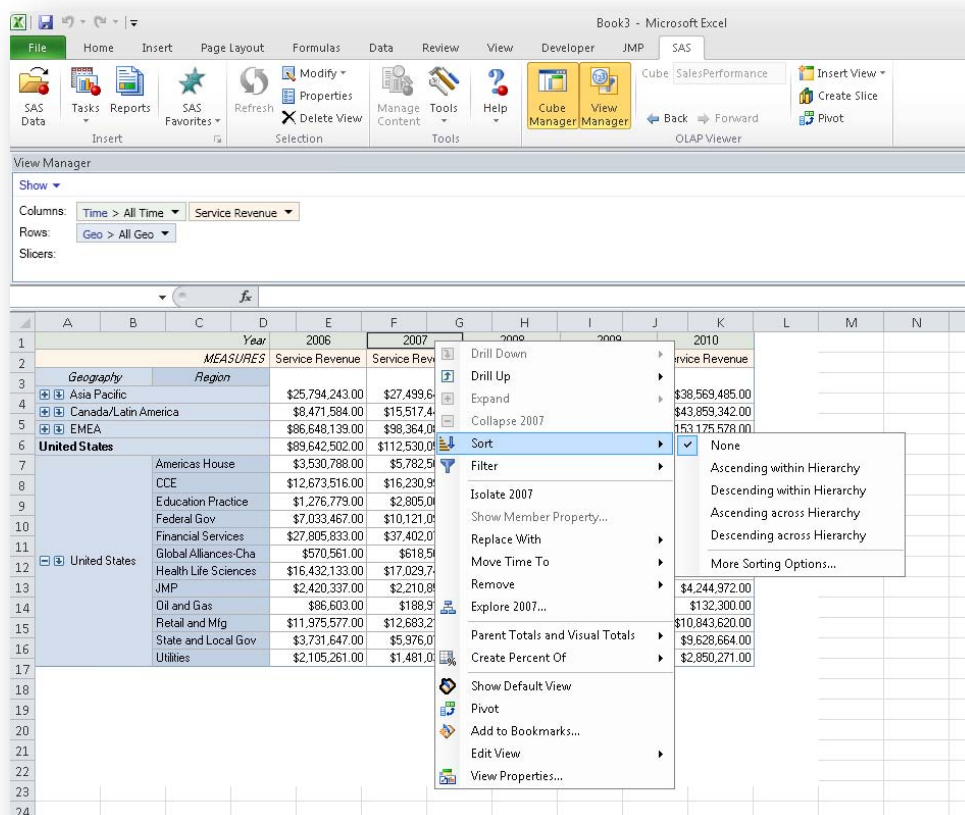
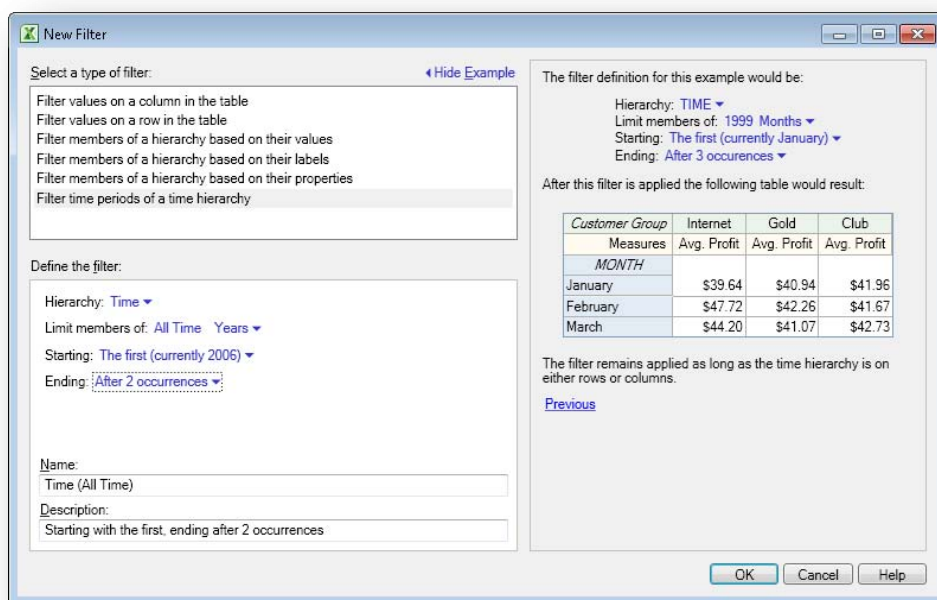


Figure 12: Contextual Menu for a Column Heading

With the OLAP Viewer, users can filter the data in a guided and interactive manner. The filtering user interface provides well-defined samples of various filtering options, so it helps the user understand which options to select to achieve the desired outcome.

Figure 13 shows how a relative filter on the Time hierarchy would work.

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**Figure 13: Example of a Filter**

With the OLAP Viewer, users are not limited to a tabular analysis only. The OLAP Viewer also provides highly visual and interactive ways of exploring data. The auto charting capability generates charts suitable for the active state of analysis based on number of dimensions and measures the users has selected for analysis.

Along with graphical outputs as charts, users can also explore the information in the form of Explorer Tree View. This view can be opened by selecting **Insert View → Explorer**.

Figure 14 shows the explorer view of a cube. This view displays two dimensions with color highlighting based on values of measure.

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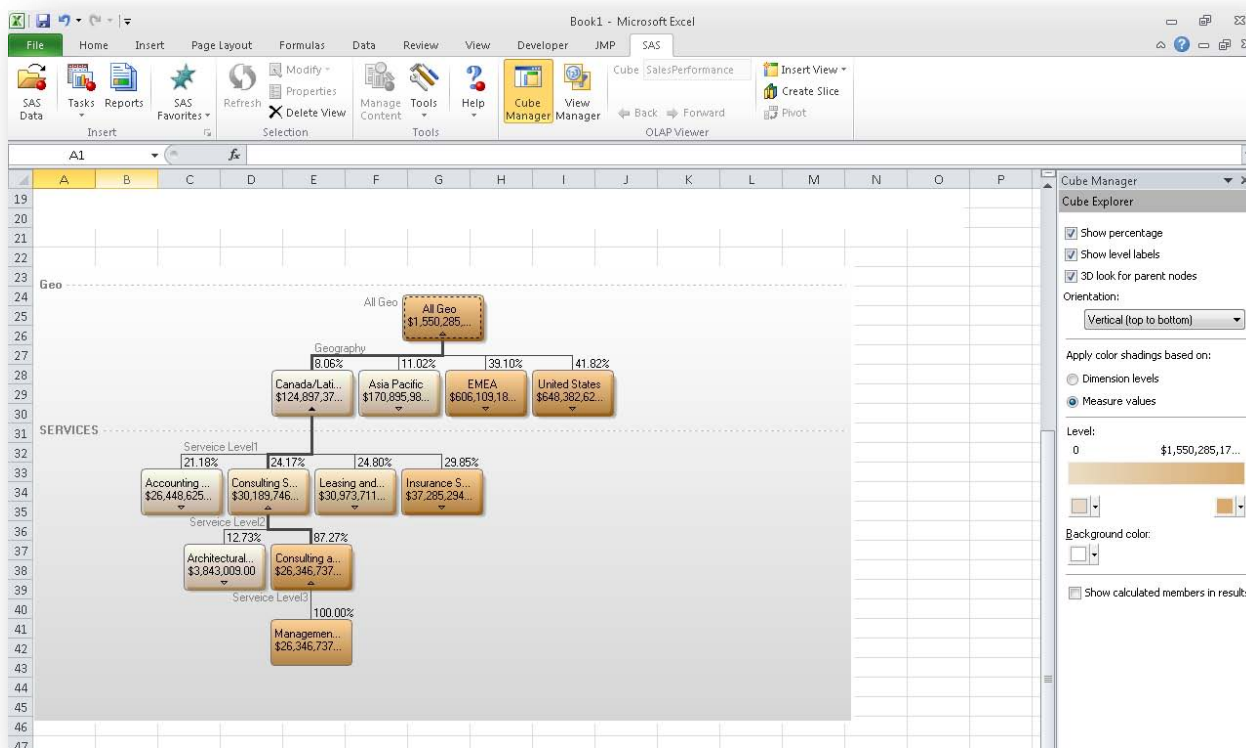
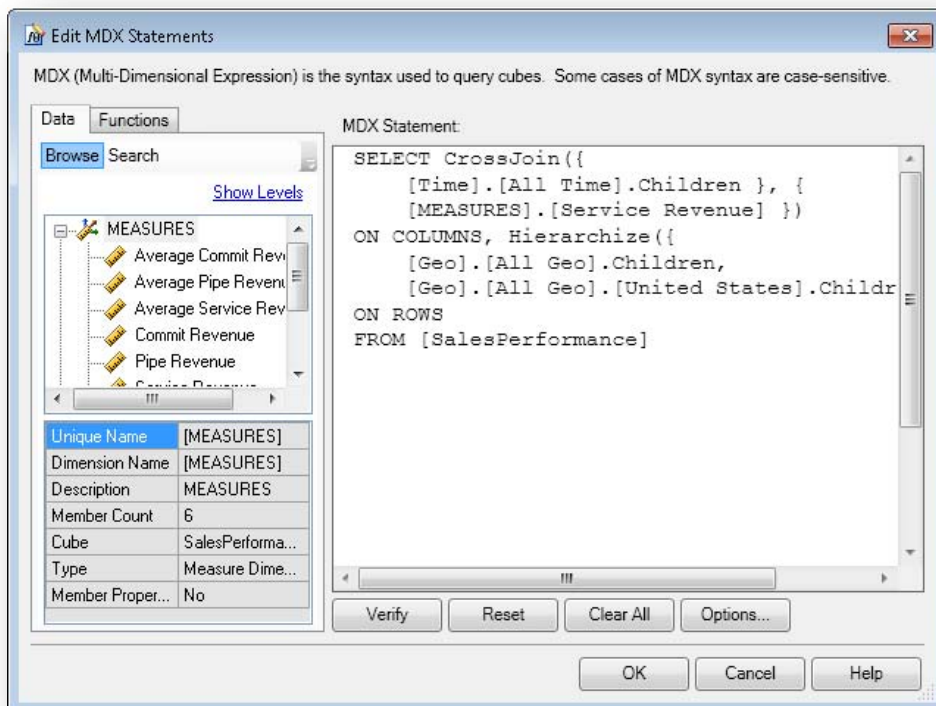


Figure 14: Example of the Explorer Tree View

Users can interact with the graphic to select the dimensions of analysis. Users can perform cross-dimensional analysis (move from one dimension to another), highlight the chart with dimension levels or measure levels, and view the values of any calculated members in the cube.

For more advanced users who are familiar with MDX scripting, the OLAP Viewer provides an enhanced MDX editor. This editor includes search capabilities and a drag-and-drop interface to generate MDX code. (See Figure 15.)

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**Figure 15: MDX Editor**

As users discover new insights during their OLAP analysis, they can create a slice of this information in the form of a data table that can be opened inside Excel. Users can use this data for their self-analysis in an offline mode or feed the data to another analysis across other systems and tools.

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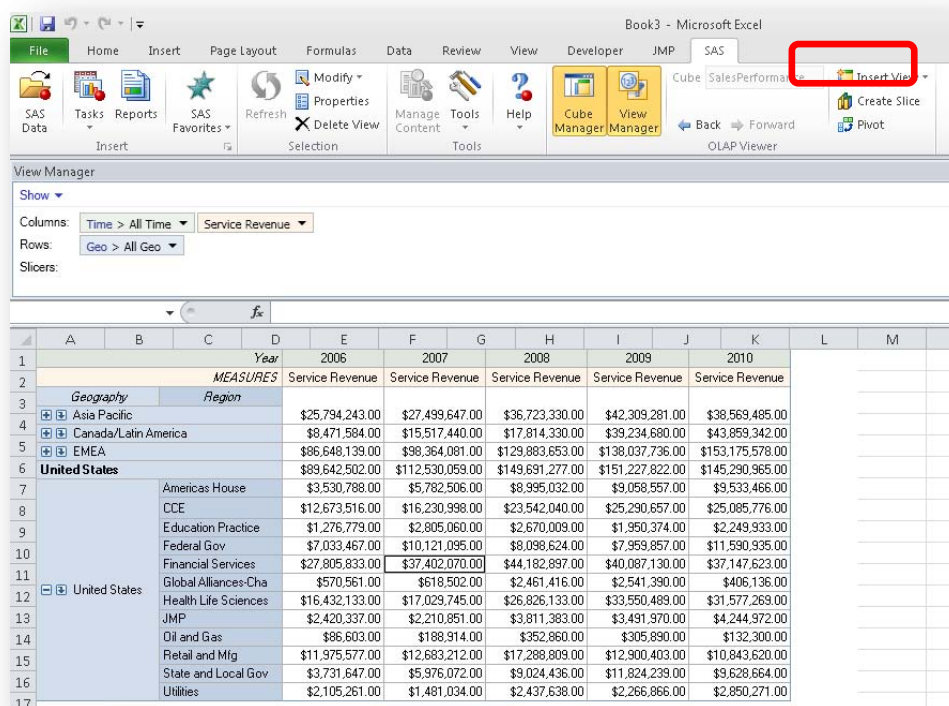


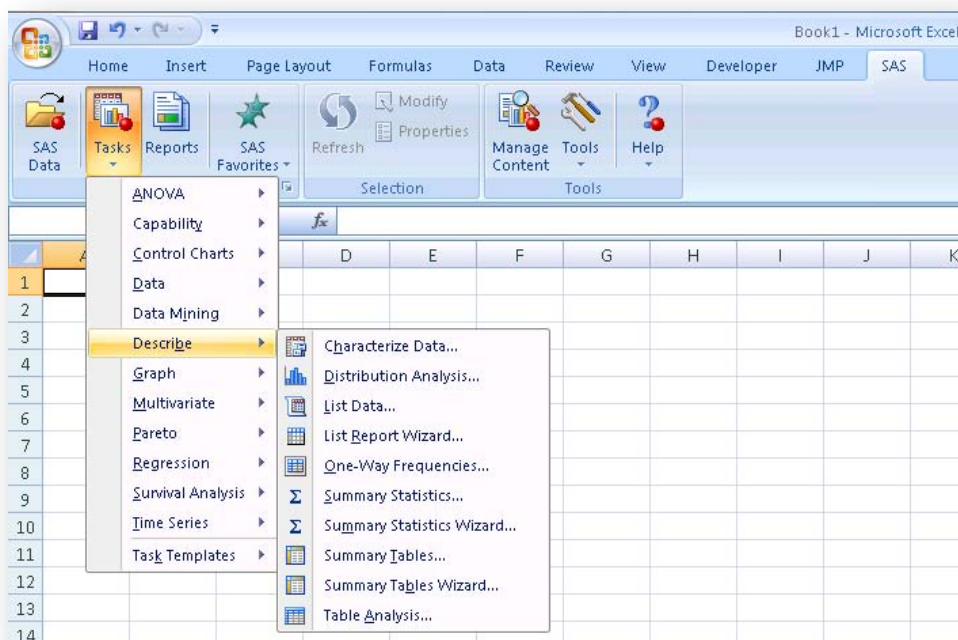
Figure 16: Create Slice Option in the OLAP Viewer

INTEGRATION WITH ANALYTICS

The SAS® Add-In for Microsoft Office provides more than 80 tasks that enable users to analyze their data. This seamless integration of analytical capabilities into Microsoft Office bridges the gap between normal business users and analytical-business users; with the added competitive advantage that information can be analyzed and shared in a familiar environment.

The interface provides easy access to a wide range of capabilities including descriptive statistics, forecasts, multivariate analysis, and many more. The full list of analytical tasks is listed in the Help for the SAS® Add-In for Microsoft Office; to open Help, click **Help** in the SAS Ribbon.

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**Figure 17: Tasks Menu in the SAS Ribbon**

All these tasks provide an easy-to-use, guided interface that helps users select the data items they want to analyze, make use of any pre-defined options for the selected tasks, and generate analytical results.

The 4.3 release of the SAS® Add-In for Microsoft Office further enhances the integration with SAS analytics and puts predictive modeling in the hands of business users.

Predicting possible outcomes based on analytical calculations is an increasing requirement to make more informed decisions quickly. Business analysts need to participate in developing models to support a variety of business decisions. These analysts need a self-service type of application to create these models, so they do not have to depend on data miners for their typical data modeling needs.

With increasing awareness of predictive modeling, the SAS® Add-In for Microsoft Office provides the Rapid Predictive Modeler task (needs SAS® Enterprise Miner along with SAS® Add-In for Microsoft Office), an integrated capability inside of Excel for predictive modeling. Now, a business analyst who uses Excel as an interface for their analytical needs can get the seamless integration on predictive modeling capabilities.

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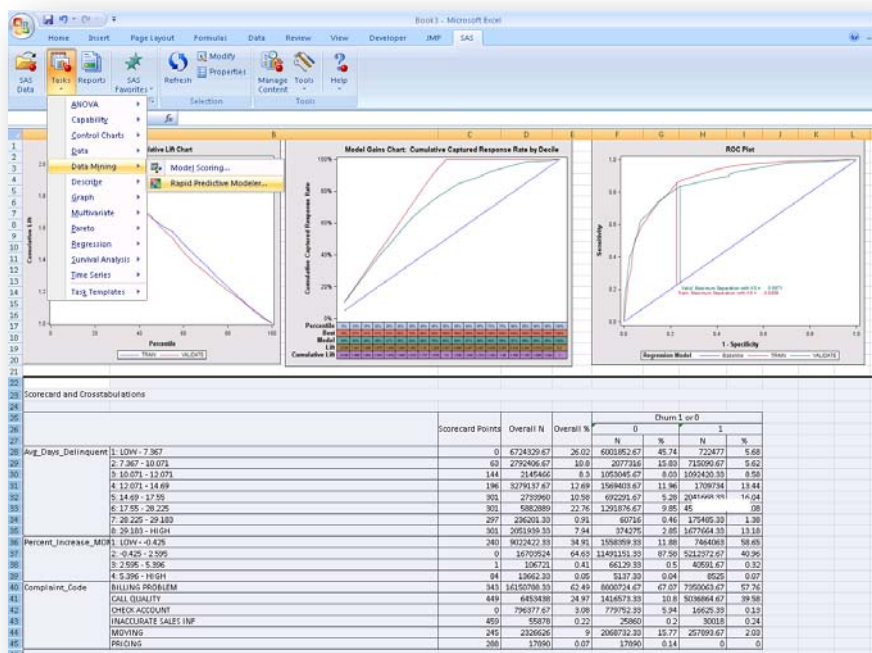


Figure 18: Rapid Predictive Modeling Task in Microsoft Excel

This task provides users a rapid, automated modeling engine (powered by SAS® Enterprise Miner) and report generation process. Working alongside the data miners of an organization, business analysts can leverage their expertise to further enhance and fine tune their models.

For more details on how to leverage the predictive modeling capabilities inside Excel, read the SAS Global Forum 2010 paper "Rapid Predictive Modeling for Customer Intelligence" by Wayne Thompson and David Duling. This paper is available at <http://support.sas.com/resources/papers/proceedings10/113-2010.pdf>.

AUTOMATING THE SAS® ADD-IN FOR MICROSOFT OFFICE WITH VISUAL BASIC CODE

The functionality of Visual Basic scripts has been greatly enhanced to automate the functionality in the SAS® Add-In for Microsoft Office. By using the automation interface, you can perform the following tasks:

- Insert a stored process, report, data view, or PivotTable into your Microsoft Office document.
- Refresh or modify any SAS content in your Microsoft Office document.
- Provide your own prompt values for stored processes.
- Provide your own filter and sort string for data views.
- Change your server connection.
- Publish a document to a central repository.

There are numerous out-of-the box capabilities available for the SAS® Add-In for Microsoft Office. By using your scripting skills, you can be as creative as you like and further automate the Microsoft Office environment with customized interactivity. You can also leverage the integration of SAS in these Microsoft Office documents.

This paper does not cover the full details on how to leverage Visual Basic Automation (VBA) to automate your Microsoft Office documents. It is recommended that you look at the details in the paper from Tim Beese as included in the references. For more information about automation, see the Help for the SAS® Add-In for Microsoft Office.

CONCLUSION

The SAS® Add-In for Microsoft Office provides deep integration with Microsoft Office tools and brings enhanced capabilities for providing the users of Microsoft Office tools with an enriched user experience for data analysis. These

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capabilities help users to analyze their data easily and in an interactive manner using the power of SAS. Leveraging this wide range of capabilities, organizations can turbocharge their Microsoft Office environment and help their users by making their process of analyzing data richer and faster. These capabilities will lead to improved productivity and expand the reach of business intelligence across the organization.

REFERENCES

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