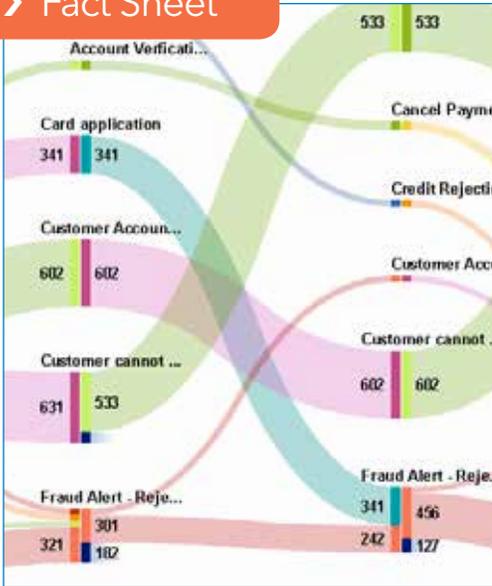### What does SAS® Visual Analytics do?

SAS Visual Analytics provides a complete platform for analytics visualization, enabling you to identify patterns and relationships in data that weren't initially evident. Interactive, self-service BI and reporting capabilities are combined with out-of-the-box advanced analytics so everyone can discover insights from any size and type of data, including text.

Why is SAS® Visual Analytics important?

Users of all skill levels can visually explore data on their own while tapping into powerful in-memory technologies for faster analytic computations and discoveries. It's an easy-to-use, self-service environment that can scale on an enterprisewide level.

For whom is SAS® Visual Analytics designed?

It's designed for anyone in your organization who wants to use and derive insights from data – from influencers, decision makers and analysts to statisticians and data scientists. It also offers IT an easy way to protect and manage data integrity and security.

SAS® Visual Analytics

Business visualization: Dashboards, reporting and approachable analytics – all from one interface

Regardless of size or industry sector, organizations collect all types and amounts of data. Unfortunately, traditional architectures and existing infrastructures aren't designed to deliver the fast analytical processing needed for rapid insights.

As a result, IT is swamped with constant requests for ad hoc analyses and one-off reports. Any delay can frustrate decision makers because it takes too long – or it may be impossible – to get the information needed to quickly answer their questions. And increasingly, decision makers, analysts and other business users want to share reports via email or mobile devices.

To help you make sense of the growing data within your organization, SAS® Visual Analytics provides an interactive user experience that combines advanced data visualization, an easy-to-use interface and powerful in-memory technology. This lets a wide variety of users visually explore data, execute analytics and understand what data means. Then they can create and deliver reports wherever needed via the web, mobile devices or Microsoft Office applications.

Benefits

- **Go where the data takes you – without boundaries**. Implement dashboards, reporting and analytics – all from a single interface.

- **Add analytics and modeling to your BI toolkit**. SAS ushers in truly intelligent business intelligence by providing one interface that lets you go directly from reporting to exploration and model creation. Now, you can transition from consuming and interacting with BI to diving deeper into your data and building analytical models.

- **Get information on the go**. Native mobile BI apps enable you to view and interact with dynamic reports and dashboards from your smartphone or tablet.

- **Share the story of your data**. Microsoft Office integration allows you to share live, dynamic visualizations through familiar Office applications like Excel and PowerPoint to collaborate on your BI efforts.

- **See what you've been missing**. Advanced data visualization and guided analysis using a variety of visualization techniques let you present your data in the most compelling way.

- **Choose a BI implementation that fits**. Start with a BI/reporting or data exploration environment that meets your needs, and expand your environment as your organization's needs grow. Deploy on-site on a single server or in a distributed environment. You can also deploy BI in a private cloud or a public cloud (such as Amazon Web Services), or subscribe to SAS Visual Analytics for SAS Cloud.

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Overview

Data visualization helps you explore and make sense of your data. Adding analytics to your visualizations helps uncover insights buried in your data. And analytics visualization helps you discover trends within your business and the market that affect your bottom line. You can quickly recognize outliers that may affect product quality or customer churn. You can also easily recognize parameters in your data that are highly correlated. Some of these correlations will be obvious, but others won't. In identifying these relationships, you are able to focus on areas most likely to influence your highest-priority goals.

By combining dashboards, reporting, BI and analytics, SAS Visual Analytics provides both data visualization and analytic visualization. However deep you want to dive into your data, SAS Visual Analytics provides the capabilities and visualization techniques to take you there.

Dashboards, reports, BI and analytics – all from a single interface

Go beyond the scope of typical business intelligence platforms and move to intelligent BI. SAS Visual Analytics lets you go directly from reporting to exploration in the same user experience. With support for data management, report creation, collaboration through SAS Mobile BI apps, and Microsoft Office integration, SAS Visual Analytics helps you unlock insights and improve efficiency throughout your organization. SAS Visual Analytics reduces the number of tools your teams must use – and the number of systems IT must maintain.

A complete analytic visualization platform for everyone

SAS Visual Analytics combines powerful in-memory technologies with an extremely easy-to-use exploration interface and drag-and-drop analytics capabilities. No coding required. Report creators, business analysts and even traditional consumers of BI

reports can create and share visualizations to gain new insights from their data. SAS Visual Analytics is designed to handle big data, with in-memory processing designed to meet the demands of today and tomorrow. And flexible deployment options let you easily scale your system as your data and analytic needs grow.

Figure 1: Analytic visualizations uncover insights buried in data.

A better way to tell your BI story

Diving into reports and dashboard data allows you explore options and identify opportunities. Arriving at an aha moment can bring that thrill of uncovering new relationships in your data. Once you arrive at this destination, it's important for you to be able to explain your journey so others
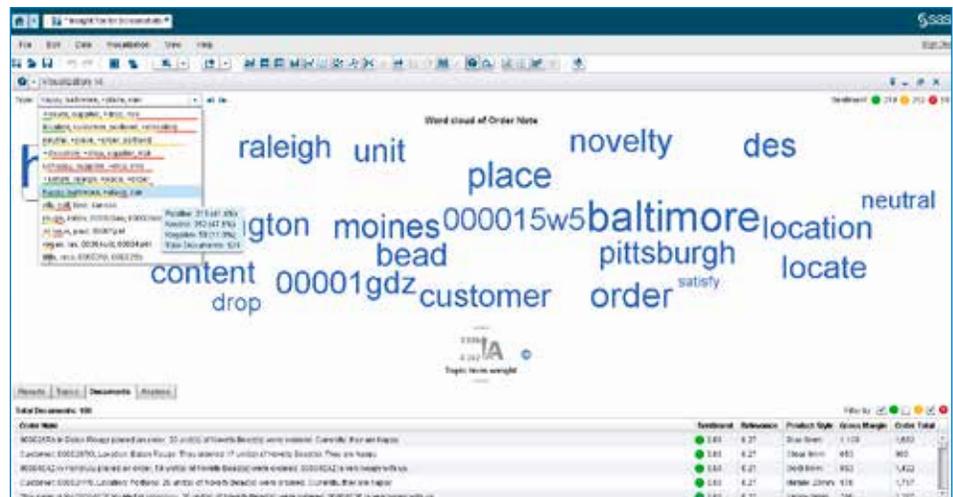

Figure 2: Text sentiment analysis shows you the most frequently used terms and phrases, as well as the sentiment of terms, phrases and documents, so you can quickly discern the good feedback from the bad. Data can be imported from a variety of social media sources, including Twitter streams, Facebook and Google Analytics, as well as other text-based documents.

can follow the paths you took to get there. By telling your story, sharing and collaborating, you get deeper insight into your data, enhancing the value and credibility of your results. SAS Visual Analytics integrates with Microsoft Office, helping you share interactive, self-service reports directly within familiar Microsoft Office applications. These are more than static reports. SAS Visual Analytics allows you to build reports that enable collaborative, engaging discussions that can drive deeper insights – and better decisions.

Speed and accuracy through high-performance, in-memory SAS® LASR™ Analytic Server

The SAS LASR Analytic Server is the in-memory analytics engine for SAS Visual Analytics. In-memory analytics allows SAS Visual Analytics to quickly determine relationships across hundreds of parameters in billions of rows of data. After all, speed and accuracy are critical to effective analytics. You want to be the first in your market to recognize a trend – and find a way to use it as a competitive differentiator.

Making sense of next-generation data sources

With social media data and freeform text documents becoming part of your data ecosystem, the question is often "What valuable information is in all this data?"

With SAS Visual Analytics, data from the social media world, including Twitter streams, Google Analytics and Facebook, as well as call center logs, online comments and other text-based documents can be analyzed to determine much more than the frequency of common terms and phrases. You can also determine the sentiment around topics, terms and entire text documents.

Through the combination of text sentiment analysis and data visualization techniques, documents can be filtered by topic and sentiment, so you can isolate areas that need attention.

Key Features

Visual data exploration
- Autocharting capability helps determine the chart best-suited to display data based on items selected for analysis.
- Integration with mapping technologies provides an understanding of geospatial data.
- "What does it mean" capabilities explain the relationships between variables.
- Analytic visualizations include box plots, heat maps, bubble charts, animated bubble charts, network diagrams, decision trees, Sankey diagrams and more.
- Queries can be changed by selecting items to be displayed from a sidebar or by dynamically filtering and grouping.
- A resizable overview bar lets you zoom in on selected portions of your big data.

Figure 3: Explore data from an interactive data visualization environment.
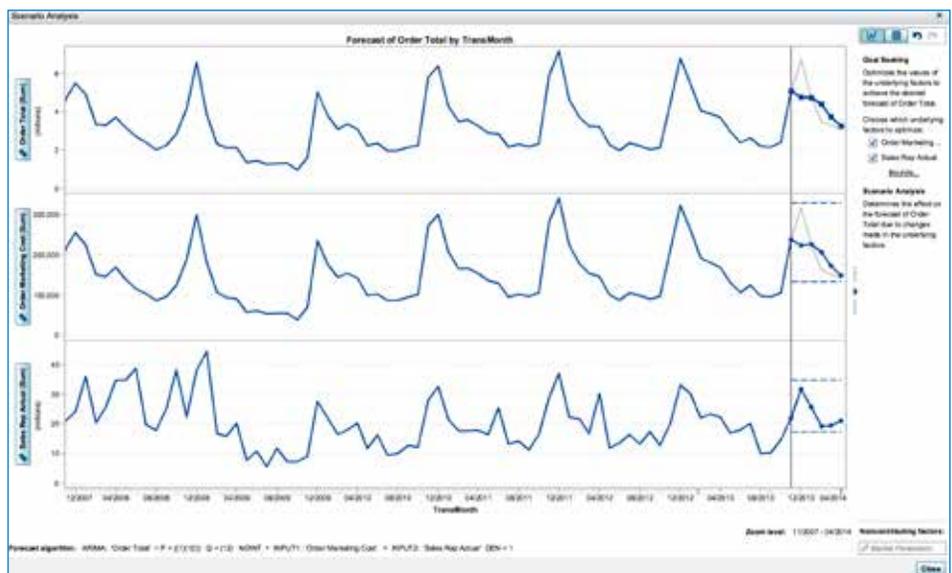

Figure 4: Use goal seeking to see how changes to a forecast affect underlying factors, and use scenario analysis to see how a forecast is influenced by changes to underlying factors.

Visualizations powered by SAS® Analytics

With web-based exploratory analysis and other easy-to-use features, even users without analytical expertise can use predictive analytics to gain precise insights. Nontechnical users can create and change queries simply by selecting items from a sidebar or dynamically filtering and grouping data items. Autocharting selects the visualization that best suits the type of data chosen. "What does it mean" pop-up boxes provide explanations of analytical techniques, helping everyone understand the data and what the analysis means.

Analytically savvy users can use visualization techniques to spot trends and derive deep intelligence quickly and easily. This eliminates much of the everyday trial-and-error process currently used to identify areas that need further analysis.

A view of the flow of data within your operational systems

How do customers navigate your website? What is the customer journey through your support structure? Data accumulated from operational systems provides information to paint a clear picture of how transactions move within those systems. Path analysis with SAS Visual Analytics allows you to see those flow patterns and recognize trends, such as where customers enter your website, where they navigate and where they exit. With SAS Visual Analytics, you can identify successful flow patterns and isolate flows that failed to deliver the desired action. This level of analytics visualization provides decision makers with the information required to pinpoint opportunities for improvement.

Key Features (continued)

Self-service, easy analytics
- Fast in-memory analysis on data of any size.
- Descriptive, predictive and prescriptive analytics out of the box.
- Data can be easily queried from a seamless set of viewing modes.
- Multidimensional data can be sliced and diced by applying filters on any level of a hierarchy.
- Drillable hierarchies include expandable and collapsible levels.
- Viewable descriptive statistics, such as min, max and mean, provide an overall sense of a particular measure.
- New measures can be calculated and added to any view.
- Forecasts can be generated on the fly with forecasting confidence intervals included.
- The most appropriate forecasting algorithm for specific data is automatically selected.
- Using scenario analysis, see how a forecast would be affected by changing variables.
- Interactively generate decision trees to graphically depict likely outcomes. An expert level allows you to modify certain influencing parameters for the tree generation.
- One-click ability to create time-period based calculations.
- Custom binning and grouping (based on custom categories).
- Text analysis, including word clouds and content categorization.
- Network diagrams with the ability to display networks across a map, including ESRI maps.
- View can be saved as report packages to share with other advanced data exploration users in web reports, images or SAS mobile apps.

Figure 5: Sankey diagrams use path analysis to show the dynamics of how transactions move through a system.

Key Features (continued)

Analytics for everyone

Analytic features are tailored for ease of use so everyone can create analytic visualizations on their own without learning new skills or engaging IT. Self-service autoloading lets your users load their own data from Excel spreadsheets and other sources for analysis. Powerful, yet easy-to-use analytics include:

- Automated forecasting that selects the most appropriate forecasting method for the data chosen. Even novice users can forecast reliably.

- Goal seeking and scenario analysis, so you can interactively analyze how changes to forecasts influence the relevant variables. You can also see how forecasts are affected by changing values of the contributing variables.

- Decision trees that graphically depict the most likely outcomes.

- Network diagrams that show how complex data is interconnected.

- Integrated mapping technologies so you can see geographic specifics.

- Text analytics that applies sentiment analysis to Twitter streams, Facebook posts, Google Analytics data or customer comments provides quick insight into the hot topics being discussed. SAS Visual Analytics provides more than simple word clouds that display how many times a word is used. Through sentiment analytics, content categorization determines which topics are most important and identifies sentiment of both topics and documents to provide clear paths for further exploration.

- Path analysis that gives insight into the dynamics of flow through a system. Analyze how customers navigate through your website, or how shipments flow through your distribution centers, using Sankey diagrams.

Robust report design, creation and viewing

- Web-based, interactive report-building interface for report authors.
- Design reports once, then print to PDF, publish anywhere, or schedule for distribution.
- Parameterized calculations enable dynamic filtering, ranking, calculations and display rules.
- Popup sections provide access to additional details or context without cluttering the report.
- Data acquisition wizard for previewing, filtering or sampling data prior to creating reports.
- Data can be loaded into SAS LASR Analytic Server from within the report design interface.
- Precision layout capabilities provide flexibility in report layout and design.
- Custom graph templates and mashups are available.
- On-the-fly hierarchies can be created to add drill-down capabilities to reports.
- Ability to select predefined filters, set groupings and sorting, and override defaults.
- Custom calculations and progressive filters are easily created.
- A variety of charts are included: bar/3-D bar with multiple lines, pie/3-D pie, line, scatter, heat map, bubble, animated bubble, and tile.
- Filtering and selection capabilities can be easily added to reports with common action elements such as drop-down/combination boxes, check boxes and sliders.
- Integration with ESRI mapping technology adds geospecific information to reports.
- Range-based or threshold-based alerts let people subscribe to reports and receive notices when a report changes.
- Guest mode for viewing explorations, reports and dashboards without logging in.
- Seamless integration with SAS Office Analytics and SAS Add-In for Microsoft Office lets users open dynamic reports from Microsoft Office applications.

Figure 6: Design and distribute dynamic, interactive reports and dashboards using the SAS Visual Analytics drag-and-drop designer environment.

Add sophisticated statistics and machine-learning capabilities to your interactive visualization environment

SAS Visual Statistics is an interactive predictive modeling tool that can be added on to SAS Visual Analytics for increased analytical power. Point-and-click access to sophisticated SAS statistical modeling and machine-learning techniques, as well as model comparisons, are included within the user interface of SAS Visual Analytics Explorer. SAS Visual Statistics also adds interactive decision tree capabilities (i.e., prune, split and train), model assessment and model score code generation to the decision tree visualizations in SAS Visual Analytics Explorer. This means users can explore data and create models from the same, easy-to-use, web-based environment.

Mobile BI

Sharing and collaboration relies on reaching decision makers no matter where they are. With SAS Visual Analytics, they can use native mobile apps for iOS and Android to quickly view and collaborate using dynamic reports and dashboards on their iPad, iPhone, Android tablet or Android smartphone. The mobile BI apps are available for free from the Apple App Store℠ and Google Play.

Collaboration and storytelling through integration with Microsoft Office and SharePoint

Microsoft Office and SharePoint integration encourages collaboration and sharing through live, dynamic visualizations delivered through familiar Microsoft applications. Combine exploring, reporting and presenting with Excel and PowerPoint to tell your story. Collaborate using dynamic reports shared with others through their Outlook email inbox or through SharePoint. And document your discovery in Microsoft Word using the same dynamically updated reports.

Mobile BI

- Native iOS and Android apps provide a feature-rich user experience for the iPhone®, iPad®, Android tablets and smartphones.
- Reports can be viewed securely on mobile devices either online or offline via mobile tethering.
- Ability to annotate, share, email and comment on reports and screenshots with others.
- Alerts can be sent to mobile devices when reports are updated.
- Integration with third-party vendors, such as Good Technology and Mocana, provides mobile device management.

Collaboration

- Reports, visualizations and data sources can be opened directly from the SAS Visual Analytics Hub for exploration.
- Integration with Microsoft Office applications: Outlook, SharePoint, Excel and PowerPoint.
- Mobile users, Microsoft Office users and web users can all share and view comments in a central location. Comments stay with the reports so everyone can see them.
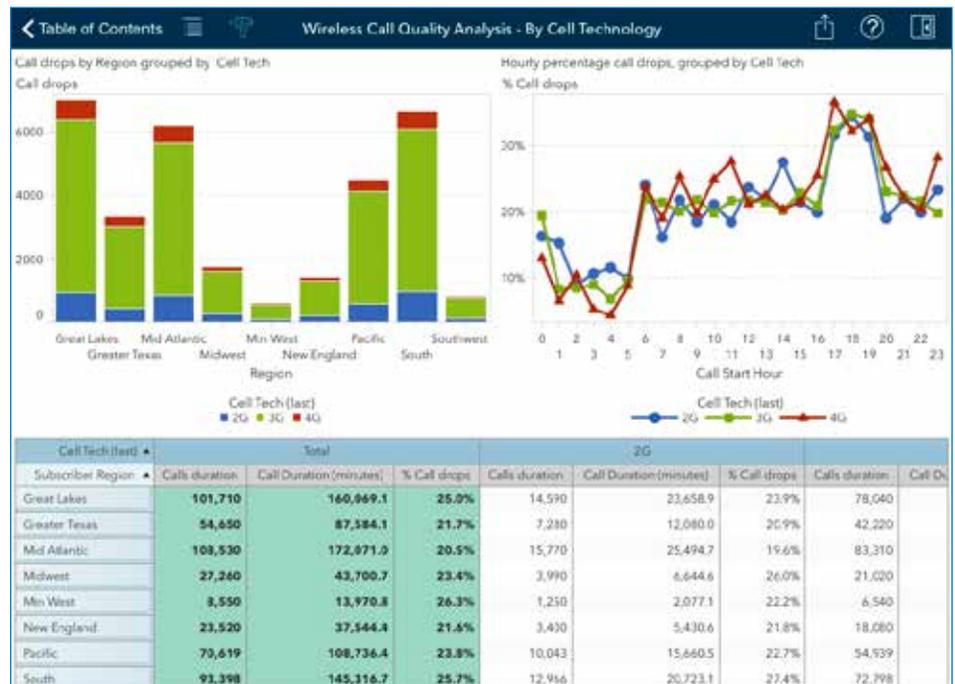

Figure 7: Interact with dynamic reports through the SAS Mobile BI app, available for the iPad, iPhone, Android tablets and smartphones.

Accessing and loading data

Support for loading data into the SAS LASR Analytic Server in-memory analytics engine is provided for most data sources, including Hadoop distributions. Fast, parallel data loading is provided for many data sources, including SAP HANA, Oracle, Pivotal HD, Cloudera Hadoop, IBM Netezza, Teradata and others. Data set compression is available so you can load data that is larger than the available memory of the SAS LASR Analytic Server for reporting, data exploration and analytics.

BI and analytics administration

Through the SAS Visual Analytics administration environment, which includes out-of-the-box audit and usage reports, administrators have direct access to monitoring and management capabilities. Data is automatically collected for all SAS Visual Analytics components, and administrative reports are created based on this data.

Single machine or distributed mode

The SAS Visual Analytics in-memory analytics engine, SAS LASR Analytic Server, is engineered to run either on a single server or in a distributed mode using a cluster of computers. Single-server support for SAS Visual Analytics starts at four-core servers, and support for distributed mode starts at four (four-core) servers.

When SAS Visual Analytics executes in distributed mode, all servers in the distributed computing environment are used for calculations. Data is distributed across the machines in the cluster, and the massive computing power of the cluster is used to solve analytic tasks.

Run in the cloud

Subscribe to SAS Visual Analytics running in SAS Cloud to quickly begin using SAS Visual Analytics to explore your data, and create and share reports. Self-service administration and user access through the SAS Cloud environment provides quick time to value.

Key Features (continued)

Easy setup and data administration for IT
- A web-based interface makes it easy to manage SAS information assets, including users, servers and data.
- Ability to set thresholds on memory usage by the SAS LASR Analytic Server.
- Audit and usage reports are available out of the box.
- Data compression lets you load tables larger than the size of available memory into the SAS LASR Analytic Server engine for analysis.
- User authentication and information authorization is persisted across the SAS Visual Analytics platform to support data governance and IT policy implementation.
- Offers both IT-managed and end-user self-service data loading options.
- Data can be interactively prepared for analysis, including joining tables, defining custom calculated columns and creating custom expressions.
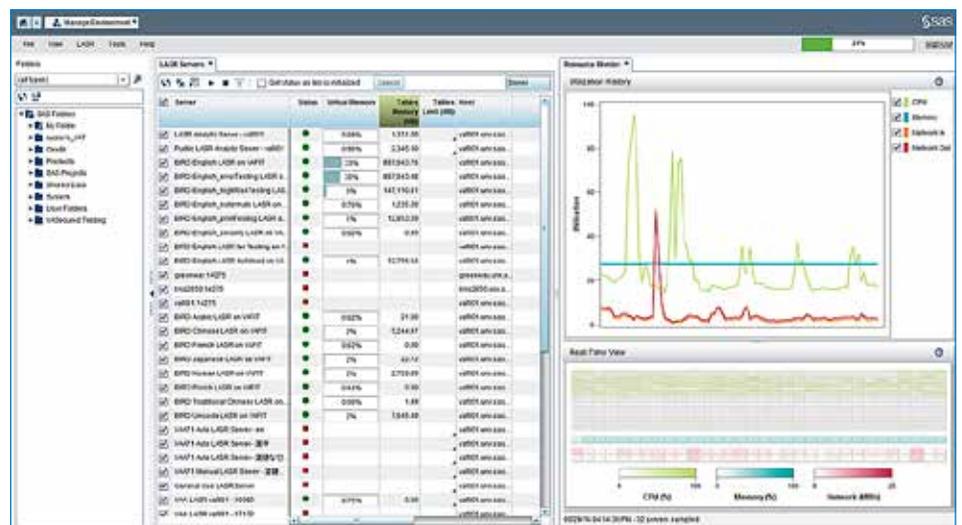

Figure 8: Monitor and manage your SAS Visual Analytics environment using the built-in administration interface.
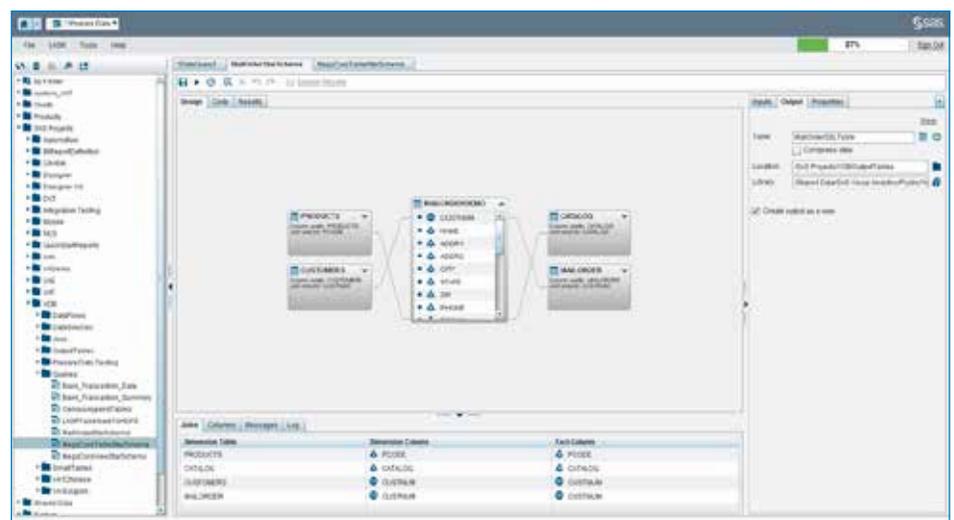

Figure 9: Prepare and load your data through a drag-and-drop interface where you can join tables, create calculated columns and more.

Key Features (continued)

Deployment flexibility

- Traditional on-premises deployments:
  - Single server with support for Windows servers is appropriate for small to midsize organizations.
  - The distributed mode is easily expandable to support growing data demands (on either database appliances or commodity hardware).
- Cloud deployments:
  - Public cloud providers, including Amazon EC2 Web Services.
  - Your own private cloud and/or virtualized data centers.
  - The SAS Cloud.
- SAS® Solutions OnDemand:
  - Provides a customized experience for private hosted cloud services.
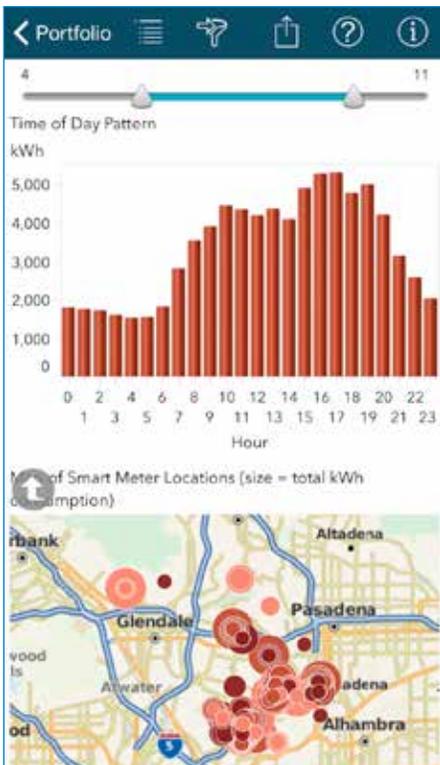
Figure 10: In addition to the iPad and Android tablets, SAS Visual Analytics mobile apps are now available for the iPhone and Android smartphones.
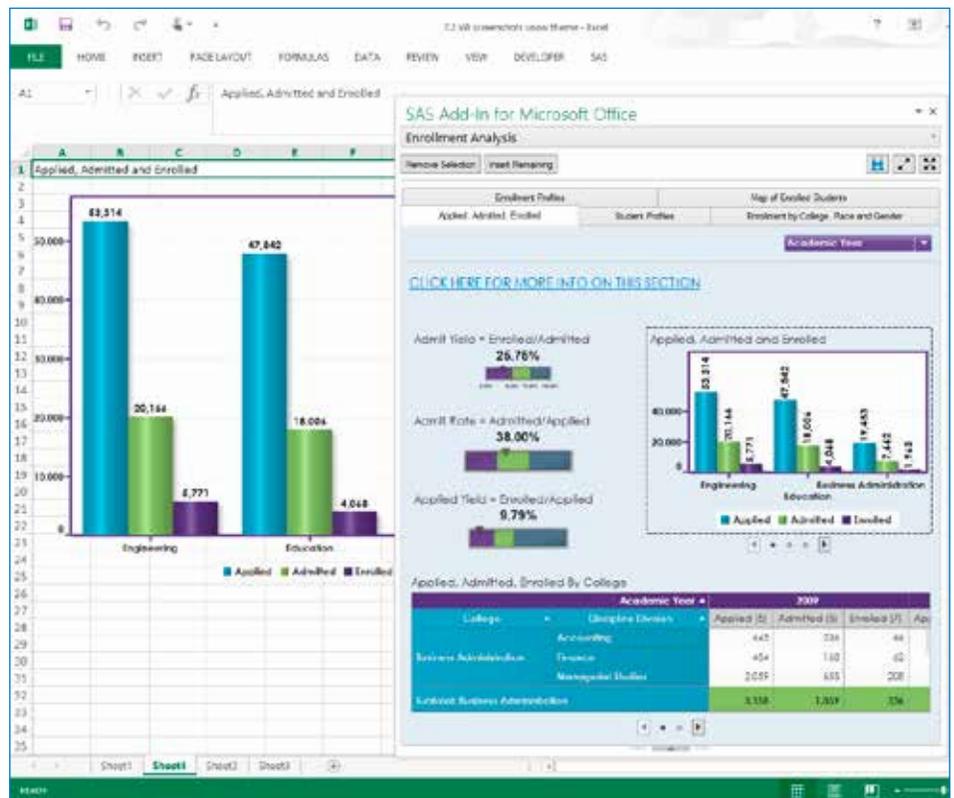

Figure 11: Enhance the data presentation capabilities of Microsoft Excel through integration with SAS Visual Analytics and SAS Office Analytics.

KYBEIDOS GmbH
Heinrich-Fuchs-Straße 94, 69126 Heidelberg, Germany

Karsten Wohlgefahrt
phone: 49 6221 61 60 50
email: info@kybeidos.de