



SAS® Demand-Driven Forecasting

Maximize profitability, market share and customer satisfaction

What does SAS® Demand-Driven Forecasting do?

SAS Demand-Driven Forecasting drives the development of the consensus forecast in conjunction with the S&OP process. Featuring not only scenario modeling, but a new demand planning workbench to support advanced consensus forecasting, it provides scalability, automation, depth and a breadth of advanced analytics to aid the demand forecasting and planning process.

Why is SAS® Demand-Driven Forecasting important?

SAS Demand-Driven Forecasting combines the power of automation, analytics and workflow to generate an unbiased accurate consensus forecast on a large-scale basis. Using what-if analysis capabilities, you can adjust forecasts based on a structured process that incorporates data and analysis – rather than pure judgment – to enhance the accuracy of your forecasts.

For whom is SAS® Demand-Driven Forecasting designed?

SAS Demand-Driven Forecasting is designed for forecast analysts, business planners in sales, marketing and finance, and senior level managers responsible for creating sales forecasts that provide input into the consensus forecasting process.

Today, most companies use legacy ERP/SCM solutions that are workflow-based with little emphasis on analytics, resulting in inaccurate forecasts. This process is resource-intensive, time consuming and is driven solely by domain knowledge and biased judgment.

Using inappropriate systems can put your organization at a competitive disadvantage and prohibit you from driving top-line growth and fulfilling customers' needs. With appropriate technology, organizations can become demand-driven by incorporating customer demand signals and market trends in the demand plan accurately, frequently and in real time – while anticipating demand variability to remove the threat to profit margins.

SAS combines the power of automation, analytics and workflow to generate the most unbiased and accurate forecast on a large-scale basis. SAS allows you to consolidate and reconcile large volumes of information in a structured way to create accurate consensus forecasts and easily share them throughout the organization to reduce excess inventory costs, eliminate out-of-stocks and improve downstream planning efficiencies.

The SAS solution automatically creates a weighted consensus forecast by tracking variation between forecasted and actuals to aid the consensus forecasting process. SAS' what-if analysis and scenario modeling capabilities help you plan for future events, including new product launches, location and channel introduction, and simulate the impact of possible marketing investment strategies and product mixes to find the optimal forecasting scenario for maximum profitability.

With SAS Demand-Driven forecasting, you can:

- Harness your existing data with powerful analytics through a user-friendly interface.
- Build a workflow designed around your processes.
- Use business intelligence to drive what-if analysis and disseminate the results across your organization to make better decisions.
- Shorten the time it takes to drive your supply chain and realize significant savings in time and money.
- Support a formal S&OP process with strong methodologies that incorporate an understanding of organizational dynamics.

Key Benefits

Improve statistical forecasting accuracy across the product hierarchy

SAS' patented statistical forecasting engine has a complete array of advanced forecasting methods, including Exponential Smoothing, Winter's, ARIMA, ARIMAX, UCM and dynamic regression to model and forecast all products across an organization's product portfolio. SAS can integrate consumer demand (pull), model it and forecast it automatically using award-winning data access tools.

Reduce finished goods inventory levels and stock-outs

SAS provides forecasts that reflect the realities of the business, improving your ability to forecast and plan future events with confidence. As a result, safety stock levels can be tightened along with on-hand finished goods inventory, adding more efficiencies to the overall supply chain. Also stock-outs, or back orders, are reduced as the right



products are produced at the right time and stocked at the right locations.

SAS also provides a Multi-Echelon Inventory Optimization component as an optional feature to SAS Demand-Driven Forecasting that includes distribution requirements planning (DRP) reporting, sensitivity analysis and scenario planning capabilities.

Generate a more accurate consensus forecast with gap analysis and strategies reporting across all business units

The overall forecasting process and workflow are enhanced with SAS' more structured approach provided with the advanced consensus forecasting planner workbench supported by advanced analytics. Statistically generated weighted consensus forecasts are created automatically using award-winning weighted combined forecasting methods. Gap reports are generated electronically, indicating the gap between the financial plan, all individual, departmental and statistical baseline forecasts, with notes indicating reasons. Those reports can be viewed through the SAS Supply Chain Intelligence Center using SAS' Web access engines. The reports can be reviewed, changed and written back to the SAS Demand-Driven Forecasting data model during the consensus forecasting process.

Solution Overview

SAS Demand-Driven Forecasting automatically creates statistical forecasts on a large scale – based on a business hierarchy that utilizes the most current statistical methods. It allows manual adjustments by domain experts and automatically creates a weighted consensus forecast based on variation between forecasted and actuals.

Monitoring, tracking and reporting with alerts allow you to compare the forecasts to KPIs, track performance

and share results through the SAS Supply Chain Intelligence Center using SAS' Web access engine across the organizational business hierarchy. The solution features a new demand planning workbench that provides workflow to generate a final consensus forecast. The weighted consensus forecast, along with individual forecasts, will populate a "gap" report, providing information that can be utilized during the S&OP process to finalize a consensus forecast that helps drive all downstream planning functions and/or systems.

Large-scale automated statistical model selection and optimization with hierarchical reconciliation

SAS' patented expert-selection forecast engine analyzes and combines various models to produce a forecast that best depicts your organization at every level of your corporate and product hierarchy for complex supply chain networks with complex business rules.

SAS provides hierarchical forecasting for hundreds of thousands of data series and synchronizes and allocates forecasts from any level within the hierarchy. Other features include:

- Interactive point-and-click interface (GUI).
- Project set-up wizards.
- High performance hierarchical statistical engine.
- Graphical engine.
- Statistical engine to provide various statistical calculations (e.g., MAPE, MAD, etc.).
- Filter generator.

A model repository

SAS provides the appropriate forecast methods to address your product portfolio requirements regarding harvest, growth, niche and new product demand, based on the unique marketplace dynamics associated with your

business. The open model repository has all statistical methods, including: time series, exponential smoothing, Winter's, ARIMA, ARIMAX, dynamic regression, UCM and custom methods.

Flexible data modeling allows you to model large and complex forecasting structures and easily make changes to your forecast model to reflect changes in your business and product structures. For example, use forecast models for high-volume manufactured products, highly seasonal products, promoted products and slow-moving items with intermittent demand.

Event modeling console

Model the effects of sales promotions, marketing events, and other external events (i.e., pricing policy actions, holidays, severe weather events, etc.) that affect the forecast. The console statistically models events to determine sales lifts associated with promotions, special marketing events and other irregular activities. Using patented technology in the event model console, you can choose among several event types including pulse, level shift, ramp up/down and temporary events. And, pre-programmed holiday events are available (e.g., Christmas, Easter, Thanksgiving and others).

What-if analysis and scenario planning

With scenario analysis, evaluate exceptions to your sales history and plan for future events – including new product, location and channel introduction. Conduct what-if analyses using statistical models to find the optimal forecasting scenario based on available marketing investment strategies. What-if analysis and scenario planning can be used for any situation, including realistic, optimistic and pessimistic projections.

Demand planning workbench

The demand planning workbench allows you to import and consolidate internal

and external customer forecasts (sales, marketing, finance and others). Using what-if analysis capabilities, easily adjust the statistical baseline forecasts based on a structured process that incorporates data and analysis – rather than pure judgment – to enhance the accuracy of your forecasts. You can automatically create a weighted consensus forecast using SAS' weighted statistical method embedded in the demand planning workbench.

The automatically generated statistical weighted consensus forecast is surfaced through the SAS Supply Chain Intelligence Center, or can be exported to Excel as part of a consensus forecasting process in support of the S&OP planning process. The reports can be shared across the enterprise using the SAS Supply Chain Intelligence dashboard Web access engine. Centralized, collaborative templates are used to simplify the enterprisewide consensus forecasting process using the Demand Planning Workbench workflow to finalize the consensus forecast and drive S&OP requirements planning.

An automated interactive application and set of screens and reports help you collect and consolidate internal and external forecasts to create a consensus forecast to drive the S&OP process. Forecasts can be averaged or weighted based on past performance for reconciliation. Assessment routines can be performed against financial KPIs to determine the financial impact from a revenue management perspective.

Monitoring, tracking and reporting

Monitor, track and report with drillable alerts surfaced through a balanced scorecard, or dashboard. Surface forecasting results with KPIs and performance metrics through a series of monitoring, tracking and reporting capabilities using the SAS Supply Chain Intelligence Center.

Key Features

Model repository with pre-defined models:

- Time series methods
 - Single Exponential Smoothing
 - Holt's/Brown's Two Parameter Exponential Smoothing
 - Winter's Three Parameter Exponential Smoothing
 - Additive/Multiplicative
 - ARIMA
- Causal methods
 - ARIMAX (ARIMA with intervention and causal variables)
 - Lagged variables/transfer functions
 - Dynamic Multiple Regression
 - UCM (Unobserved Components Model)
- Open model repository
 - Add your own custom models

Event modeling console:

- Interactive JAVA GUI
- Pre-defined holiday events (Christmas, Easter, etc.)
 - Automatic date realignment for Easter and other moving holidays
- Customer event creator
 - Four event types
 - Pulse
 - Ramp up/down
 - Level shift
 - Temporary

What-if analysis and scenario planning:

- Plug-in into the DDF applications dashboard
- What-if planning capabilities using model parameter estimates
- Ability to change model parameter estimates to determine effects on forecasts

Demand planning workbench:

- Interactive Consensus Planner workbench (workflow) with GUI
- Automatic weighted consensus forecast generator
- Override templates with drill down/up capabilities
- Web Access for sharing, viewing and authorized changes

Monitor, track and report:

- Supply Chain Intelligence Center Dashboard with KPIs/Metrics
- Series of interactive forecasting monitoring and tracking reports
- Series of alerts (graphical/tabulator) monitor exceptions
 - Drill down/up capabilities

The SAS application provides Web-enabled reports to monitor and track forecast performance and interaction with the demand planning workbench, allowing access on an enterprisewide basis. Included in the dashboard are alerts to identify key issues related to forecast performance – such as exception reports and iterative reviews of the consensus forecast.

Technical Requirements

Client environment

- Windows (x86-32): Windows 2000 Professional, Windows XP Professional
- Internet Explorer 6 and later
- Microsoft Office 2000 or later (for Microsoft Office add-in)
- Microsoft .NET framework 1.1 (for Microsoft Office add-in)

Additional software

- JRE: 1.4.2_09 (Sun)
- MySQL Pro 5.0.22
- MySQL Connector/J 5.0.3, commercial version

Server environment

SAS Servers, including Base SAS and SAS Metadata Server, can be installed on one or more hardware systems in a multitier configuration.

Operating Systems

- AIX: Release 5.2 / 5.3
- Windows (x86-32): Windows NT 4 Server, Windows 2000 Server, Windows Server 2003
- Solaris SPARC Version 10

Additional software

- BEA WebLogic 8.1 service pack 3
- MySQL 5.0.22

Mid-tier environment

Additional required/optional software:

- SAS client and mid-tier require JRE 1.4.2_09
- BEA WebLogic 8.1 service pack 3
- WebSphere Application Server Network Deployment Version 5.1.1.5



Figure 1. Supply Chain Intelligence Center featuring the Interactive Business Intelligence Dashboard.

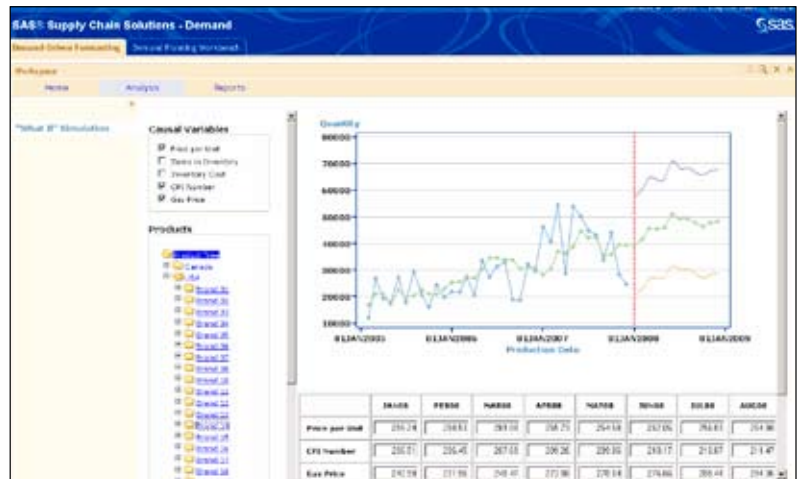


Figure 2. What-if analysis and simulation application helps planners make overrides in a more structured environment using data and analytics versus pure judgment.

About SAS

SAS is the leader in business intelligence and analytical software and services. Customers at 44,000 sites use SAS software to improve performance through insight from data, resulting in faster, more accurate business decisions; more profitable relationships with customers and suppliers; compliance with governmental regulations; research breakthroughs; and better products and processes. Only SAS offers leading data integration, storage, analytics and business intelligence applications within a comprehensive enterprise intelligence platform. Since 1976, SAS has been giving customers around the world THE POWER TO KNOW®.



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