



## SAS® Demand Forecasting for Retail

Outperform the competition and improve business results with SAS' next-generation demand forecasting platform

### What does SAS® Demand Forecasting for Retail do?

SAS Demand Forecasting for Retail uses SAS software's unique high-performance forecasting engine to automatically diagnose, model, execute and reconcile forecasts across multiple merchandise levels and locations. It allows creation of forecast projects and manages forecasts with a built-in repository and versioning system. SAS Demand Forecasting for Retail produces results at any level of the product and location hierarchies, down to the SKU/store level.

### Why is SAS® Demand Forecasting for Retail important?

Accurate, consistent forecasts are a key input to financial planning, assortment planning, allocation, replenishment and store labor planning processes. With a common demand forecasting platform, SAS delivers consistent, accurate and detailed aggregate forecasts. Improved forecast accuracy and consistency empower better decision making, allocation and replenishment, and reduce stock-outs and manual intervention in the supply chain – the results of which drive both top- and bottom-line growth.

### For whom is SAS® Demand Forecasting for Retail designed?

Demand forecasts are leveraged in preseason and in-season planning activities by merchandise buying, planning and allocation teams, as well as dedicated forecast analysts and promotion managers. Of course, understanding of consumer demand is critical to processes enterprise-wide, from financial planning through the supply chain. SAS forecasts supply the business accuracy that enables nearly every decision maker in your organization to drive competitive advantage.

To thrive in the 21<sup>st</sup> century, retail organizations must strive to satisfy the unique demands of every customer. Gone are the good old days of the mass market, when a single assortment, standard pricing and a single “average location” forecast would satisfy consumer demand in all stores. Today, with so many factors affecting consumer behavior, predicting demand for a single item in a single store can be a difficult proposition. Forecasting demand for all stock-keeping units (SKUs) across all stores and all geographies is a greater challenge by far.

This increased complexity must be addressed in an ever-more demanding business environment. Dynamics such as globalization, increasing customer expectations, high-efficiency supply chain models and diversification of sales channels have made the retail industry intensely competitive.

This competition, in conjunction with economic conditions, has increased pressure on profit margins, forcing retailers to focus on better understanding the demand for merchandise throughout its retail life cycle. The result is a need for better forecasting and more reliable methods for managing demand. Ultimately, the goal is better planning – for fewer stock-outs, improved margins and more solid overall business results.

Effective forecasting in this environment requires sophisticated capabilities delivered via a highly automated solution.

### Key benefits

- **Highly Accurate Forecasts** – SAS provides the most robust library of models in the retail software industry that generate forecasts based on underlying trend, seasonality promotions, inventory effects and other known causal factors. Proprietary “best pick” functionality automates model selection.
- **Drives Business Results** – By seamlessly integrating with existing planning processes, SAS Demand Forecasting for Retail helps identify opportunities and improve profitability.
- **Softlines Ready** – Includes models for fashion forecasting, short lifecycle products and intermittent demand; leverages SAS Merchandise Assortment Planning for end-to-end fashion forecasting workflow.
- **Highly Scalable** – Supports the entire organization down to the individual store SKU level, for all types of retailers. By exploiting a parallel execution design with a high degree of automation, SAS delivers reliable performance in the most demanding environments.
- **Grid Ready** – Operability with SAS Grid Computing and SAS Grid Manager ensures that you can easily leverage grid technology to add more computing horsepower *and* reduce hardware cost.
- **Reduced Workload** – Automated exception-based forecast management reduces the need for manual inputs and forecast updates.



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## The Bottom Line: Reducing Forecast Errors Saves Money

Forecast errors can result in significant costs to retailers. Potential sales losses can range from 20 to 25 percent, as a result of stores selling out of a product or not stocking enough of a popular brand, color or style. But with accurate forecasts, you can reap every sales opportunity without wasting inventory or other resources – which translates into great competitive advantage, especially in challenging times.

The costs of poor forecasting include:

### Over-forecasting:

- Excess inventory and obsolescence
- Higher inventory holding costs
- Reduced inventory turns
- Unexpected transshipment costs
- Lower margins

### Underforecasting:

- Costs for order expediting
- Higher product costs
- Lost sales from out-of-stocks
- Lost companion product sales
- Customer satisfaction issues

A truly comprehensive forecasting solution provides an accurate picture of key demand signals to all levels of the retail organization. An integrated workflow is required to provide a viable demand forecast without embroiling users in detailed statistical forecasting. In short, SAS Demand Forecasting for Retail delivers on all of these challenges.

What if you could develop accurate, preseason plans based on expected customer demand and other statistically generated demand insights, using large-scale, automated forecasting that reduces errors, increases efficiency and improves your bottom line? With SAS Demand Forecasting for Retail, these capabilities are possible in a common platform.

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## Product Details

### Agile Retail Technology

Statistically sound demand forecasts serve as the foundation for all levels of your business, from merchandise planning to replenishment. SAS Demand Forecasting for Retail provides the foresight your organization needs to survive in an increasingly consumer-driven economy. Forecasts can be generated for any dimension of your business (SKU, store, region, etc.), appropriate for the user and need; the SAS forecasting solution adapts to your business. When deployed with SAS Integrated Merchandise Planning and SAS Merchandise Assortment Planning, it enables planners to build merchandise, financial and assortment plans that better anticipate consumer demand. Additionally, when coupled with SAS Merchandise Assortment Planning, the powerful forecast management functionality lets retailers reconcile demand in a centralized platform.

### Built on High-Performance Forecasting Analytics

Built on the SAS Forecast Server, SAS Demand Forecasting for Retail automatically chooses the best model and optimizes its parameters to produce the forecasts. The solution can generate a starting-point forecast as a means of seeding financial plans, as well as help with in-season re-forecasting so that retailers can better react to sales. SAS Forecast Server reduces the overall workload by rapidly generating multiple statistically based forecasts without the need for human intervention, but also provides the capability to override generated forecasts in special instances.

SAS has the most robust library of forecasting models for a wide range of retail business situations. This library includes intermittent demand models, unobserved components models, ARIMAX models, dynamic regression, exponential smoothing models with optimized parameters, and user-defined custom models. For the forecast analyst, SAS provides a quick and easy way to manage forecasting through the new SAS Forecast Studio graphical user interface.

### Adaptable Forecasting Execution Workflow

Our demand forecasting solution offers a detailed and flexible forecasting workflow. It offers the capability of defining the analyst control points and parameterization for this best-practice workflow, supporting all forecast execution scenarios and configurations. This is critical for analysts who need to adapt forecasts to individual products within the model and across the forecast horizon. This solution also leverages the workflow from SAS Merchandise Assortment Planning for preseason forecasting of new fashion or short lifecycle items.

SAS Demand Forecasting for Retail follows an integrated approach to IT, working with SAS Merchandise Planning or an external replenishment system to automate the forecast execution process. This process, which includes data preparation, diagnosis, model selection, fit/forecast, automated evaluation and reconciliation, can be executed for each distinct level of merchandise and location as well as for each distinct KPI. Analysts can choose to skip one or more of the steps in this process either while working on a forecast or during the batch execution. Users can also define unique performance metrics to suit specific business needs.

## Designed to Meet Large-Scale Forecasting Needs

The focus is on speed, without sacrificing accuracy. The solution automatically adjusts forecasts to changing demand and quantity patterns – easily managing seasonality, including difficult-to-predict demand for slow-moving goods. To do this, SAS Demand Forecasting for Retail provides a pre-defined framework for demand forecasting data models that ideally suit the retail industry. This framework stores data for points of sale, events, promotions, price, weather and other effect parameters that can have an impact on demand. Combined with the solution's industry-leading analytics, the framework ensures super-efficient demand forecasting. As a result, SAS Demand Forecasting for Retail has proven extreme scalability in highly complex benchmark scenarios, running multiple concurrent forecast jobs at retail enterprise levels.

Parallel processing capabilities deliver even greater assurance of high performance in a large-scale forecasting environment. SAS Demand Forecasting for Retail automatically separates workloads with millions of time series forecasts into smaller jobs that are executed in parallel and then merged back together. By using SAS/CONNECT® to drive these jobs, the system can seamlessly process forecasts on remote and local servers. Thus you can easily add hardware to meet forecasting needs as they grow.

## Key Features

### SAS® Demand Forecasting for Retail

- A stand-alone solution for any retail forecasting need, such as replenishment, store labor scheduling and supply chain operations.
- Native integration with SAS Integrated Merchandise Planning solution provides financial, assortment and allocation planners:
  - Direct access and management of demand forecast versions.
  - Use of dynamic time set for automatic adjustment of the forecast time frame based on a number of periods after current time period.
  - Easy use of merchandise and location filters, clusters and time events.
  - Access to forecast accuracy reports and metrics.
- Segmentation of SKUs, based on sales patterns and other variables, to identify individual SKUs that can be addressed one at a time where similar forecasting strategies are applicable.
- Pre-forecasting analysis to determine the seasonality of SKUs and relevant historical data.
- Statistical forecast generation at any level in the merchandise (SKU, subcategory, category, etc.), time (day, week, month, quarter and season) and location (retail outlet, postal code, city, state region, country) hierarchies.
- Demand forecasts that incorporate the base forecast, seasonality, trends, promotions and events that predictably affect demand.
- Introduce new products, define “like item(s)” and manage demand signals with integrated merchandise planning workflow.
- Decomposition of sales to clearly see the historical demand patterns of merchandise through seasonal component, trend component and irregular component analysis. Helps investigate trends and seasonal variation in sales.
- Support for top-down, bottom-up and middle-out forecast reconciliation.
- Control of the models and workflow at a forecast job level for specific merchandise, location levels or external criteria, as well as for a particular KPI.
- SAS Forecast Studio provides exception-based forecasting to simulate and monitor any unusual parameters that are input in manual mode.
- Ability to specify flexible effect parameters that influence forecasts. For example: event, price, weather and promotions, including halo/cannibalization, pantry and delay promotional effects.
- Ability to allow defined KPIs to be executed within a forecast job. For example: sales units, sales dollars, inventory count, etc.
- Model revisit: saving the model in a repository for subsequent forecast runs. This helps analysts review the soundness of a particular forecast model based on changes in business conditions.
- In-season planning: forecast revisit and progressive weeks re-forecast based on new history, each week.
- Archive forecasts. Ability to archive a configurable number of prior forecasts so that forecast accuracy reports can be generated.
- Configurable standard forecast reports, including options for plots and statistical measures. Reports may be saved as HTML, PDF or Excel documents and are accessible from SAS Merchandise Planning.
- Supports multiple country formats and database configurations for dates, currency and language.
- Includes effective error-handling mechanism to report any issues occurring within the forecasting process.
- Operability with SAS grid technology allows you to add more computing horsepower while keeping hardware costs low.

## Comprehensive Retail Intelligence

SAS Demand Forecasting for Retail is just one part of SAS' vision for complete retail intelligence. Retailers can employ a wide range of powerful SAS solutions, all built atop a common retail business intelligence platform, to allow for rapid integration and lower total cost of ownership. These solutions include nearly three decades of SAS retail analytics experience and merchandising best practices. No other vendor offers such a comprehensive, integrated set of solutions for retailers.

- **SAS Customer Intelligence** — Identify, acquire, activate, serve and retain profitable customers.
- **SAS Merchandise Intelligence** — Drive revenue, protect margins and earn customer loyalty with optimized merchandise plans, assortments, demand forecasts, pricing, promotions, space plans and allocations.
- **SAS Operational Intelligence** — Leverage organizational assets to serve customers and trade with vendors efficiently and profitably.
- **SAS for Performance Management** — Analyze, forecast and maximize profits across the entire value chain and monitor performance toward common goals.

## SAS® Demand Forecasting for Retail Software Components

SAS® Forecast Server  
SAS® BI Server  
SAS/ACCESS®  
SAS/CONNECT®  
SAS/SHARE®

### Technical Requirements

Client environment

- Microsoft Windows (x86-32):  
Windows XP Professional
- Internet Explorer

### Server environment

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

- AIX (64-bit), Release 5.1+
- Solaris (64-bit), Version 8, 9 or 10 on SPARC
- Microsoft Windows (x86-32):  
Windows Server 2003

Web tier

- SAS includes a reference implementation of Apache Tomcat.

## About SAS

SAS is the leader in business analytics software and services, and the largest independent vendor in the business intelligence market. Through innovative solutions delivered within an integrated framework, SAS helps customers at more than 45,000 sites improve performance and deliver value by making better decisions faster. For nearly three decades, SAS has been giving retail organizations THE POWER TO KNOW®.

[www.sas.com](http://www.sas.com)

SAS is an associate member of the National Retail Federation.



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POWER  
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