



SAS® Forecast Server

Automatically produces statistically-based forecasts you can trust

What does SAS® Forecast Server do?

SAS Forecast Server generates large quantities of high-quality forecasts quickly and automatically, allowing organizations to plan more effectively for the future.

Why is SAS® Forecast Server important?

The unsurpassed scalability of SAS Forecast Server enables your business to operate more efficiently at all levels by quickly and automatically producing statistically-based forecasts you can trust.

For whom is SAS® Forecast Server designed?

It is designed for organizations in any industry that need large-scale forecasting and/or require automation because of the large number of forecasts or a lack of highly-analytic forecasters.

The target audience ranges from analysts responsible for the actual creation of the forecasts, to the managers and directors responsible for overseeing the success of forecasting and planning processes.



**THE
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For companies that need to produce numerous forecasts with huge volumes of data, the forecasting process can be problematic. There may be too few skilled analysts to do the forecasting, or there are too many forecasts for existing staff to analyze within a reasonable timeframe. Another issue may be that current software cannot produce statistically-based forecasts on a large scale, so shortcuts are taken and accuracy is sacrificed.

SAS Forecast Server alleviates these problems by combining a graphical user interface for ease of use (SAS Forecast Studio) with SAS software's sophisticated forecasting capabilities in an incredibly scalable and automated way.

SAS Forecast Server can automatically generate large quantities of statistically-based forecasts without the need for human intervention, unless so desired. SAS Forecast Server operates in both an interactive and batch environment. Business user requirements will determine whether the interactive interface or a batch job is most appropriate. SAS Forecast Server automatically chooses the most appropriate forecasting model, optimizes the model parameters and produces the forecasts (even accounting for seasonality and intermittent data).

SAS Forecast Server also includes time series data management capabilities. Transactional data can be converted to a time series format and forecast all in one step, or the converted data can be fed into a forecasting data mart as part of an overall data processing function. The ability to preprocess transactional data can save significant time and resources.

Key benefits

- **Provides forecasts in a quick and timely manner through a user-friendly graphical interface.** SAS Forecast Server automatically produces high-quality forecasts with the ability to modify models interactively without programming. This makes large forecasting processes manageable and allows analysts to focus their time on the most important forecasts. Forecasting requires less manual input, which frees up time for analysis and reporting and improves accuracy.
- **Provides forecasts that reflect the realities of the business, improving your ability to plan future events with confidence.** Only SAS Forecast Server automatically selects the business drivers, holidays or events that aid in the forecasting process from any number of variables supplied to the system in the modeling process. Forecasts better reflect the business and require less overriding and fewer manual interventions. SAS Forecast Server automatically builds the most appropriate model for your data and delivers trustworthy forecasts.
- **Improves forecasting performance across all products and locations, at any level of aggregation.** SAS has a complete array of advanced forecasting methods and can statistically estimate the impact of sales and marketing events. Graphical displays of the impacts provide a greater understanding of the effects of holidays, marketing events, sales promotions and unexpected events such as weather, improving the ability to forecast and plan future sales promotions and marketing events.

Product overview

SAS Forecast Server is a large-scale automatic forecasting solution that offers unsurpassed scalability. It enables automatic diagnostics and statistical forecasting in batch or through the interactive graphical user interface. For each item being forecast, SAS Forecast Server automatically constructs the most appropriate forecasting model, mathematically optimizes all model parameters and generates high-quality forecasts.

New Project wizard

Novice forecasters can set up the automatic forecasting process quickly and easily using the New Project wizard. The wizard guides users through data selection, assigning roles to variables in the data set, setting up a forecasting hierarchy and selecting important automatic forecasting criteria. Forecasters can specify criteria for automatic outlier detection, holdout samples, forecast horizons, whether forecasts are allowed to go below zero, and more. Exception rules can be set to flag potentially problematic forecasts.

Automatic forecasting

SAS Forecast Server produces forecasts by intelligently determining the forecasting models that are most suitable for the historical data. An appropriate model is generated for each item being forecast based on user-defined criteria, and model parameters are automatically optimized. Any number of business drivers and events (regressors) can be supplied and will be automatically considered for inclusion in the models. Holdout samples can be specified so that forecasting models are selected not only by how well they fit the past data but by how well they are likely to predict the future.

Hierarchical forecast reconciliation and disaggregation

A hierarchical forecasting model incorporates each individual time series and their aggregates. Every series in the hierarchy (each lowest level series and all higher levels of aggregation all the way up to the top) is modeled and forecast individually. Then the forecasts are reconciled using top-down, bottom-up, middle-out and other forms of hierarchical reconciliation. These reconciliation options are provided to support the hierarchical nature of many forecasting processes. Intelligent reconciliation preserves forecasts that have been “locked” by the user, and will identify any locking inconsistencies.

User-customizable hierarchies

SAS Forecast Server allows users to define whatever hierarchy is most appropriate for each forecasting task. A user in Sales Planning may create a hierarchy based on customers, territories and sales regions, while a user in Production Planning could define a hierarchy based on items, distribution centers and manufacturing sites.

Exception rule settings

Automatic forecasting processes are not always perfect. SAS Forecast Server lets users set up business rules for flagging potentially problematic forecasts. Upon completion of the automatic forecasting process, forecasters can quickly identify the forecasts that violate a defined rule so they can focus attention where it is most needed.

Events management console

Events such as sales promotions, unusual weather, etc., can greatly affect forecasts. An events management console allows users to create event definitions, assign events to selected series in the project and delete events. Event definitions also can be imported and shared across projects. Users can

specify event duration, shape and recurrence options. Predefined common events and holidays are built-in and available for inclusion in the forecasting models, making model development and deployment fast and easy.

Code generation for batch processing

SAS Forecast Server generates SAS code through the interactive graphical interface. All work performed within SAS Forecast Studio is captured as SAS code. Users can export the code to edit the project in a program editor, schedule and run projects in a batch mode or create SAS Stored Processes.

User override facility

With SAS Forecast Studio, forecasters can override the statistical forecast to incorporate judgment or outside information into the forecasting process. Forecasters who have new information that is not accounted for in the data or who do not wish to refine the forecasting models may find that manual overrides are the quickest way to deal with problematic forecasts. Intelligent reconciliation procedures preserve forecasts that were “locked” by the user and will identify any locking inconsistencies.

Client-server architecture

SAS Forecast Server can reside on a single machine or on a server for access by multiple users. The ability to operate in a client-server environment makes SAS Forecast Server suitable for large-scale enterprise forecasting problems. SAS Forecast Studio is a Java-based GUI that can be set up to connect to SAS Forecast Server either on a server or on the same standalone machine.

Optimized model parameters

Mathematically optimized model parameters are provided so users don't have to guess and manually enter model parameters or perform a

cumbersome grid search for reasonable estimates. Optimized parameters provide models and forecasts that more accurately reflect the data.

Automatic regressor/event selection and model specification

SAS Forecast Server automatically selects the regressors (causal variables) or events that aid in the forecasting process. Regressors and events are selected from any number of variables supplied to the system. In addition to selecting the most useful regressors and events, SAS Forecast Server automatically determines how they are specified in the model. The system not only examines the contemporaneous relationships of the regressors and events to the items being forecast, it also determines whether lagged and/or dynamic relationships are present. It automatically computes variable transformations, lags and transfer function definitions.

Automatic outlier detection

SAS Forecast Server examines the history of each item being forecast and automatically identifies outliers and shifts in the data. Subsequent forecasts adjust for these outliers and shifts appropriately. The automatic detection of outliers and shifts in data enables forecasters to spend time focusing on more important forecasts rather than fixing data problems.

Choice of automation level

Users can choose the automation level for the forecasting process. If the best forecasting model for each item is unknown or if the models are outdated, users may choose a maximum level of automation. If suitable models have previously been determined, users may choose to keep the current models and simply re-estimate the model parameters. For maximum processing speed, users may keep the previously selected models and model parameter estimates and simply generate forecasts.

Key Features

Easy-to-use GUI

- Automatic enterprise forecasting: set up the hierarchy, parameters and business rules through an interactive graphical interface.
- Project set-up wizard: generate automatic forecasts in batch or through the interactive graphical interface.
- Hierarchical reconciliation: reconcile up and down the hierarchy, leveraging the strength of SAS Analytics.
- Fix exceptions automatically: generate exception reports based on sound statistical logic and business rules.
- User override facility: overrule models by manual override to statistical forecast values; override locking facility.
- Extensible reporting: publish results automatically via hardcopy, company portal or Internet.

Scalability

- Choice of forecast automation level. Users can choose the level of automation for the forecasting process: re-diagnose and identify candidate models, re-estimate existing model parameters or generate forecasts using existing models and parameters.
- Facilitates ongoing and repeatable forecasting as part of a company's overall planning process, surfacing more effective statistically-based forecasting methods that can be operationalized throughout the forecasting process.
- Extensible model selection list: intermittent demand models, unobserved components models, ARIMAX models, dynamic regression, Exponential Smoothing models with optimized parameters, plus user-defined models.
- Client-server architecture.

Easy manageability

- Access to the superior forecasting capabilities of SAS through SAS Forecast Studio, the user-friendly interactive graphical interface. No programming is required, users just point and click their way to powerful forecasting capabilities.
- Functionality to support forecasting as an ongoing and repeated process that fits into the organization's planning workflow.
- An easy means to customize several aspects of the large-scale forecasting process, including exception rules, the model repository and events, giving users more flexibility and control over model selection, event identification and exception reporting.
- Events management console.
- Manual overrides console, including override locking.
- Automatic regressor and events selection.
- Automatic outlier detection.
- Code generation via GUI: code generation for batch processing.

Forecasts you can trust

Only SAS Forecast Studio features the ability to:

- Automatically perform large-scale enterprise forecasting tasks.
- Perform automatic hierarchical forecasting: define the hierarchy, parameters and business rules through an interactive graphical interface.
- Reconcile up and down the hierarchy, preserving locked forecast values and leveraging the strength of SAS Analytics.
- Generate exception reports based on sound statistical logic and business rules.
- Support forecasting as an ongoing and repeated process that fits into the organization's planning workflow.
- Publish results automatically via hard copy, company portal or Internet.

SAS® Forecast Server
Technical Requirements

Client environment

- Windows (x86-32): Windows 2000 Professional, Windows XP Professional
- Internet Explorer 5.5 and 6

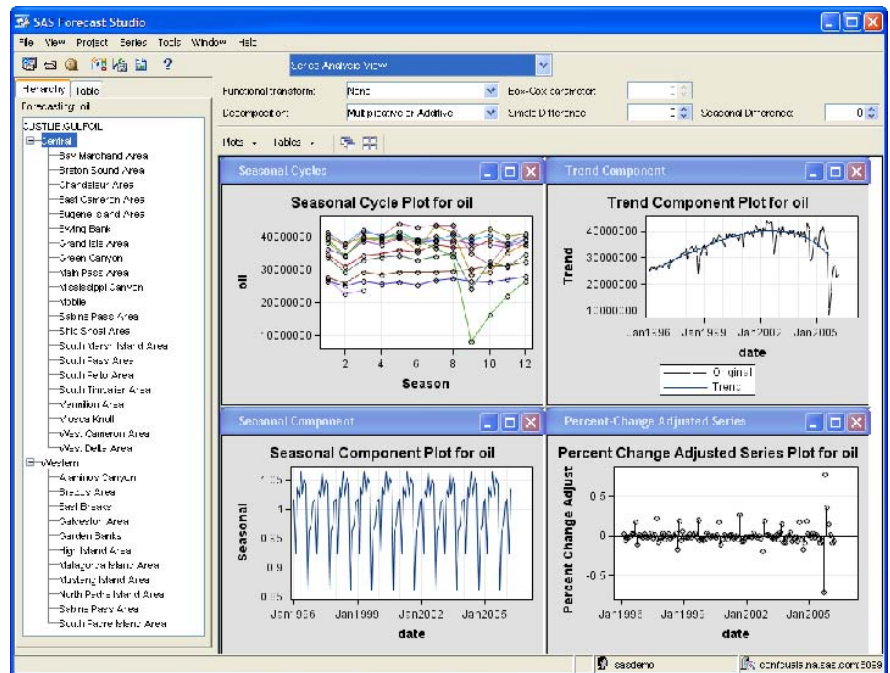
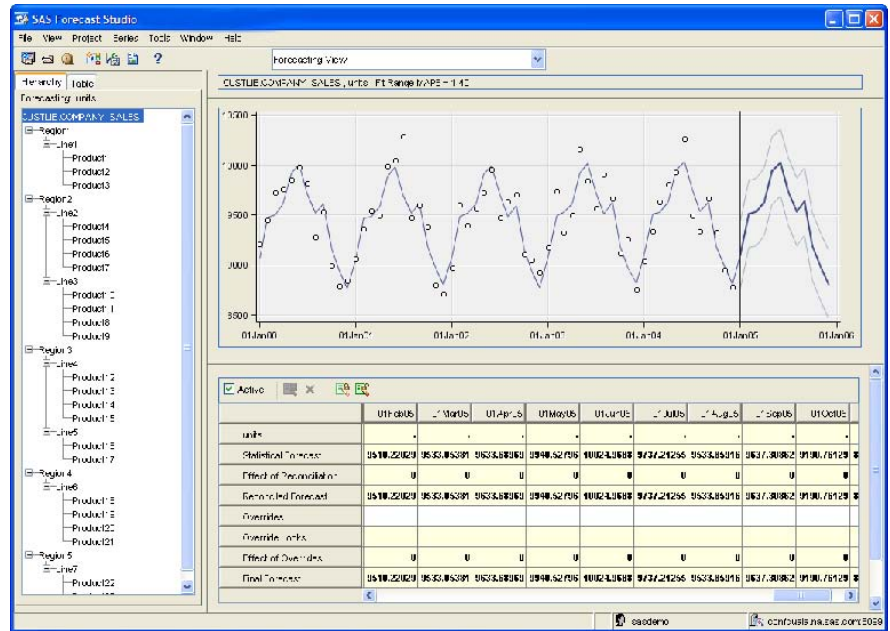
Server environment

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

- AIX: Release 5.3 on POWER
- HP-UX PA-RISC: Release 11i Version 1
- HP-UX Itanium: Release 11i Version 1
- Linux for x86 (x86-32): RHEL 4.0
- Solaris on SPARC: Version 8, 9, 10
- Windows (x86-32): Windows 2000 Server, Windows Server 2003, Windows XP Professional
- Windows (on Itanium): Windows Server 2003 for Itanium-based systems

Midtier required/optional software

- SAS includes a reference implementation of Apache Tomcat
- SAS client and midtier require JRE 1.4.2_09



SAS Forecast Server provides a quick and easy way to manage forecasting through the SAS Forecast Studio graphical user interface. It allows forecasters to focus their attention addressing exceptions and high-value forecasts.



THE POWER TO KNOW.

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