What does SAS® Warranty Analysis do?
SAS Warranty Analysis integrates warranty and other field data with key customer, product and geographic information in a manner that enables organizations to accelerate detection and reduce time to correction, lowering warranty costs and increasing customer satisfaction.

Why is SAS® Warranty Analysis important?
Many companies struggle to get a handle on true warranty costs and gain an understanding of what issues are affecting warranty claims. SAS Warranty Analysis is the most complete solution for reducing warranty costs and improving product quality and brand reputation.

For whom is SAS® Warranty Analysis designed?
Primarily it is intended for use by financial, engineering, marketing and operations analysts who want to get to the root cause of warranty problems and avoid serious customer service and brand reputation issues. It is also useful as an executive reporting tool and for those involved in forecasting and strategic planning.

Leading companies realize that warranty data is an integral component of the voice of the customer. Not only is it strategic to the bottom line, it also affects customer satisfaction and brand reputation. Brand reputation for safety and reliability takes years to create but much longer to recover even if consumer confidence is undermined by only one issue.

In the past, many companies developed their own warranty reporting systems using basic reporting tools such as spreadsheets and OLAP. Any real analysis was relegated to a small number of statisticians. These dynamics forced problem solvers to focus on ranking and reporting and rely on engineers to decide which differences were worth investigating. This often led to ineffective problem solving, which in turn yielded poor results and reduced customer satisfaction.

Today, world-class organizations are implementing systems that use automated analytics to aggregate and decode the massive amounts of data collected from numerous sources. It is no longer sufficient to reactively manage warranty issues when continuous pressure from high customer expectations and stringent government regulations are affecting profit margins. Proactive warranty management requires automated analytics.

While many vendors claim to have warranty analytics solutions, their primary focus is on reporting. Any reporting tool, from the most sophisticated solution down to a basic spreadsheet application, can tell you what happened. But to see into the future and detect emerging issues before they become huge, costly problems, organizations need a true warranty analytics solution. Combining more than three decades of warranty analysis experience, unmatched domain expertise and industry-leading analytics, SAS Warranty Analysis 4.1 is not simply an analytical tool that has been adapted to the task; it is a dedicated solution built with a focus on warranty analysis and reporting.

Key benefits
- **Early issue detection.** Because the SAS solution has been designed expressly for warranty analysis, it provides manufacturers with early detection of problems that otherwise may go unnoticed. By identifying warranty-related issues early, companies can save countless dollars in both repair costs and customer retention because issues are proactively addressed before they become significant, costly problems.

- **Problem prioritization.** SAS Warranty Analysis puts problems into perspective, calculating how much it will cost if nothing is done. This allows manufacturers to determine the best course of action and associated costs, as well as any potential effect on customer satisfaction.

- **Problem identification and definition.** Because many warranty-related issues are the result of underlying process or procedural problems, SAS Warranty Analysis identifies which combinations of variables drive failures. It then isolates failure modes to enable true root-cause analysis. By drilling down to the root cause of a problem or failure, SAS enables manufacturers to treat the underlying cause rather than simply acting on a symptom.
Solution overview

SAS offers a unique solution that has been designed specifically for warranty analysis and reporting. It provides an automated workflow for identifying and acting on emerging issues, and analyses that filter out normal variations so resources can be focused effectively. SAS Warranty Analysis 4.1 adds significant value in four key areas: data integration, analytics, text mining and reporting.

Data integration

SAS Warranty Analysis enables organizations to combine warranty claims data with sales data, call center contact information and more into one database for tracking and reporting.

- Standard, extensible data model. Consolidating data from various sources, including structured and unstructured data from call centers, dealers, service centers, production facilities, etc., provides a comprehensive view of field issues and helps SAS users gain a better understanding of their customers’ experiences.

A standard data model is common to all SAS Service Intelligence solutions and includes an interface with dashboards and scorecards designed specifically for the service chain.

Warranty-specific analytics

Simply reporting on warranty data is not sufficient. SAS Warranty Analysis uses analytics to detect, prioritize and define potential issues before they become major problems.

- Integrated warranty business rules. Address the variation and complexities of warranty data by applying business rules such as sales lag profiles, usage distributions, maturity calculations and seasonality adjustments.
- Emerging issues. Automatically detect shifts in claims activity through an emerging issues system that simultaneously monitors production period, usage and claim period, usually cutting months off of the traditional issue detection process. SAS Warranty Analysis includes two categories of emerging issues processes. Analytic-based methods identify statistically significant upward shifts in claims activity of a particular type on a particular set of units. Threshold-based methods identify when a calculated metric for a defined subset of data has surpassed a manually specified threshold value. Early warning alerts are prioritized and sent to appropriate parties for investigation.
- Ad hoc analysis. Prioritize and define issues using 12 standard analysis types chosen for their applicability to warranty data, including Pareto charts, trend charts, control charts, decision trees and more. Users then can interact with the output, selecting which data to display, drilling into charts and easily exporting graphics and tables to PDF, Excel, PowerPoint and other applications.
- Advanced warranty analysis. Unlock additional knowledge from the data by allowing advanced users to choose from hundreds of powerful analytic techniques all within an environment that does not require programming knowledge. Statistical drivers identify variables that significantly influence failure rates. Multivariate statistical drivers allow users to examine the main effects and interactions to identify combinations of variables that may be causal.

Integrated text analysis enables you to find patterns in customer and technician comments.
**Integrated text analysis**

SAS Warranty Analysis transforms text-based data into a meaningful format ready for use in data exploration, clustering and statistical modeling. You can extract and categorize essential information from large volumes of text-based information, combine it with structured data and analyze it to gain valuable knowledge about critical service and product issues.

- **Pattern recognition.** Find patterns in customer comments and technician notes, isolating multiple failure modes within a set of claims.
- **Find similar comments.** Identify claims with similar text content to the specific claim being reviewed, accelerating claim review and saving hours of problem-solving time.
- **Increased coding reliability.** Allow the system to automatically bin new claims to create a new coding structure or increase the accuracy and efficiency of current coding processes.

**Easy reporting capabilities**

SAS Warranty Analysis is designed so users can easily create reports – from simple to complex – using a selection of filters to subset data, making it immediately available for analysis and reporting.

- **Warranty dashboard.** Use this Web-based, point-and-click dashboard to access the latest information on key warranty performance indicators, drill down to performance trends and disseminate strategic objectives and information across the organization.
- **Report library.** Make interactive reports available across the enterprise or limit them to specific users or groups. Provide automated reports that focus on specific areas for executives, dealers, suppliers and others.

**Key Features**

**Data integration**

- Standard, extensible data model.

**Warranty-specific predictive analytics**

- Integrated warranty business rules.
- Emerging issues system:
  - Automatically determines the critical values and simultaneously monitors changes across production period, usage and claim period.
  - Uses three different analytical methods to detect shifts in claims activity: automated analytical process, analytical watch list and threshold watch list.
  - Issues with criteria that surpass specified threshold values are flagged and issues identified.
  - Comments can be attached so current progress is easily ascertained.
- Ad hoc warranty analysis, including product usage profiling, warranty rate calculation, Pareto charts, trend charts, exposure charts, trend by exposure charts, statistical drivers and comparisons, and reliability analysis.

**Advanced analysis:**

- Interactive reporting and analysis dialog boxes.
- Hundreds of analyses and charting options, including descriptive analysis, table analysis, ANOVA, regression, multivariate, survival analysis, capability analysis, control charts and graphs.
- Point-and-click interface enables users to organize warranty data and analysis into a self-contained environment for easy sharing.

**Integrated text analysis**

- Pattern recognition.
- Grouping.
- Increased coding reliability.

**Easy reporting capabilities**

- Web-based, project-oriented interface for creating both simple and complex reports:
  - Workflow mirrors the warranty processes.
  - Powerful filters let users easily subset and combine data. Filters can be applied using time attributes, product attributes, geography, production plants and more.
  - Group by project.
  - Field issues analysis.
  - Specific-person analysis.
  - Fix-validation analysis.
  - Organizational and individual analysis processes.
- Warranty dashboard:
  - Includes out-of-the-box performance metrics.
  - Corporate dashboard controlled by system administrator.
  - User-personalized dashboards let users select which metrics to track, which BY variables to use for analysis and which data to display.
  - Drill-to functionality lets users drill into dashboard to analyze data.
  - Users can interact with graphs for further analysis.
  - Analytic options can be modified for use by corporate dashboard or user dashboards.
- Warranty report library:
  - Web-based repository of information.
  - Contents can include special studies, documents posted by individual users and automatically generated standard reports.
  - Personalized views with My Library feature.
  - Users can subscribe to reports and receive e-mail notification when reports are updated.
**SAS® Warranty Analysis**

**Technical Requirements**

### Server tier supported platforms

**SAS® Warranty Analysis server component**

- AIX: Release 5.1, 5.2, 5.3 on POWER architectures
- HP-UX Itanium: Release 11i Version 1, 2 and 3
- Solaris on SPARC: Version 8, 9, 10

**NOTE:** The SAS Data Integration and SAS Enterprise BI Server components can be installed on the same machine as the SAS Warranty Analysis server or on different machines. The SAS Data Integration and SAS Enterprise BI Server components of the SAS Warranty Analysis server are supported on these additional platforms:

- HP-UX PA-RISC: Release 11i Version 1, 2 and 3
- Linux for x86 (x86-32): Red Hat Linux 8.0, RHAS 2.1, RHEL 3.0 and 4.0, SuSE SLES 8 and 9
- Linux for Itanium: Red Hat RHEL 3.0
- Solaris on x64: Version 10

### SAS® Metadata Server component

All platforms listed under the SAS Warranty Analysis server as well as the SAS Data Integration and SAS Enterprise BI Server components are supported. Additional platforms supported for SAS Metadata Server component:

- Windows (on Itanium):
  - Windows Server 2003 for Itanium-based systems
- z/OS: Version 1 and higher

### SAS® Scalable Performance Data Server® component

All platforms listed under the SAS Warranty Analysis server are supported. Additional platforms supported for the SAS Scalable Performance Data Server component:

- HP-UX PA-RISC: Release 11i Version 1, 2 and 3
- Solaris on x64: Version 10

**NOTE:** This component should be installed and run on the same machine as the SAS Warranty Analysis Server or the SAS Data Integration Server component.

### Mid tier supported platforms

All platforms listed under the SAS Warranty Analysis server are supported.

### Client tier supported platforms

- Internet Explorer 5.5 and 6