



## SAS® Warranty Analysis 4.2

The leading solution for emerging issue detection and root-cause analysis

### 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 allows 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 reduce costs by getting 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 group of statisticians. These dynamics forced problem solvers to focus on ranking and reporting, and to 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 analytics solution. Combining more than three decades of warranty analysis experience, unmatched domain expertise and industry-leading analytics, SAS Warranty Analysis 4.2 is not simply an analytical tool that has been adapted to the task. It is a dedicated solution built with a specific 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 may otherwise go unnoticed. By identifying warranty related issues early, companies can save countless dollars in both repair costs and customer loyalty and 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, as well as analyses that filter out normal variations so resources can be focused effectively. SAS Warranty Analysis 4.2 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, 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, as well as an interface with dashboards and scorecards designed specifically for the service chain.

- **Multiple database support.** In addition to SAS data marts, data models can be stored in third-party databases such as Teradata, Oracle and MySQL.

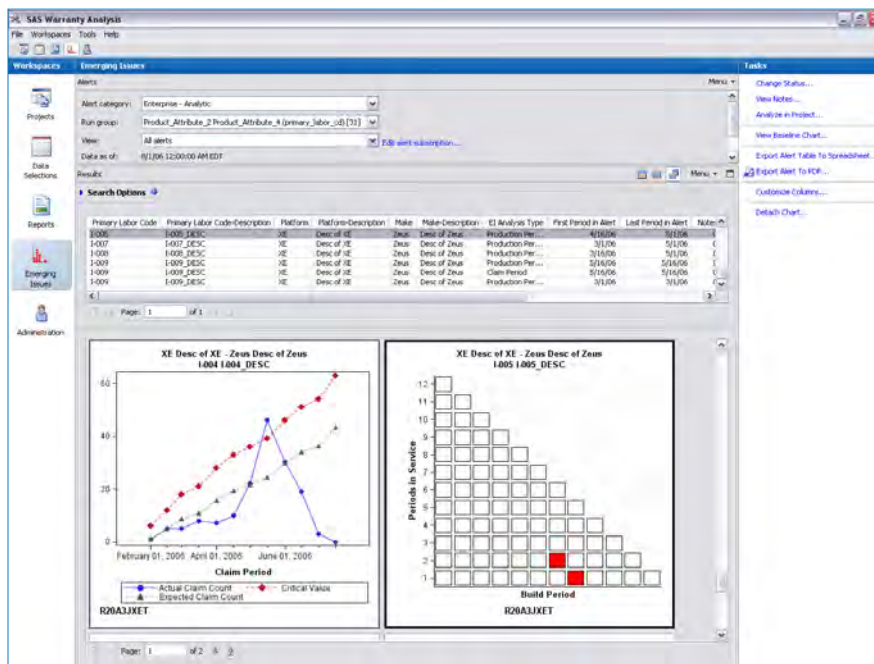
## Warranty-specific analytics

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.

- **Drill-to from emerging issues.** When viewing an emerging issue, users have the option to move its definition to the project workspace for further analysis so they don't have to recreate the filter definitions.
- **Drill on multiple points.** When viewing most analyses, users can select multiple data points (e.g., bars 1, 2 and 4) for drilling. They then have the choice of analyzing each data point individually or as a group.
- **Analyze by alert.** After drilling into an emerging issue, a new Alert variable is created. It can be used to compare claims from time periods with alerts to those without alerts.
- **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.



The Emerging Issues Workspace provides interactive alerts on new field issues. Reports can be drilled into for further analysis.

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.

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### Integrated text analysis

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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 claims review and saving hours of problem-solving time.
- **Related-word search.** When creating a data selection, users have the option to include related words (synonyms, misspellings, acronyms, etc.) in their text selection. These related words are managed via SAS Text Miner's synonym list. The list can be generated automatically and enhanced by advanced users.
- **Increased coding reliability.** The system can automatically bin new claims to create a new coding structure or increase the accuracy and efficiency of current coding processes.

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## Key Features

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### Data integration

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- Standard, extensible data model.
- Multiple databases supported.

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### Warranty-specific predictive analytics

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- 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 thresholds are flagged and issues identified.
  - Comments can be attached so current progress is easily ascertained.
  - Drill-to from emerging issues.
  - Drill on multiple points.
  - Analyze by alerts issued.
- 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 warranty 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 for organizing warranty data and analyses into a self-contained environment for easy sharing.

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### Integrated text analysis

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- Find similar comments.
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### Easy reporting capabilities

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- Web-based, project-oriented interface for creating both simple and complex reports:
  - Workflow mirrors the warranty processes.
  - Powerful filters for easily subsetting and combining data.
  - 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: select which metrics to track, which BY variables to use and which data to display.
  - Drill-to functionality lets users drill into dashboard for further analysis.
  - Users can interact with graphs for further analysis.
  - Analytic options can be modified for use by corporate or user dashboards.
- Warranty report library:
  - Web-based repository of information.
  - Contents can include special studies, documents posted by users and automatically generated standard reports.
  - Personalized views with My Library feature.
  - Users can subscribe to reports and receive e-mail alerts when reports are updated.

## 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.** This Web-based, point-and-click dashboard can be used 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.
- **E-mail subscriptions and alerts.** Users can subscribe to specific analytic watch lists, threshold watch lists or a specific subset of automated emerging-issues runs (for example, any electrical subsystem alert on a particular model). Personalized alerts with optional e-mail notification enable rapid filtering of emerging issues of interest to each user.

## SAS® Warranty Analysis 4.2 Technical Requirements

### Supported platforms for server tier

#### SAS® Warranty Analysis server component

- AIX: Version 5.3 and 6.1 on POWER architectures
  - HP-UX PA-RISC: HP-UX 11iv2 (11.23), 11iv3 (11.31)
  - HP-UX Itanium: HP-UX 11iv2 (11.23), 11iv3 (11.31)
  - Linux for x86 (x86-32): RHEL 4 and 5, SuSE SLES 9 and 10
  - Linux for x64 (EM64T/AMD64): RHEL 4 and 5, SuSE SLES 9 and 10
  - Microsoft Windows (x86-32): Windows XP Professional, Windows Server 2003, Windows Vista\*
  - Microsoft Windows on x64 (EM64T/AMD64): Windows XP Professional for x64, Windows Vista\* for x64, Windows Server 2003 for x64
  - Microsoft Windows (on Itanium): Windows Server 2003
  - Solaris on SPARC: Version 9, 10
  - Solaris on x64: Version 10
  - OpenVMS for HP Integrity Servers (Itanium): 8.3
  - z/OS: V1R7, V1R8, V1R9 and higher
- \* **NOTE:** Windows Vista Editions that are supported include Enterprise, Business and Ultimate

#### SAS® Metadata Server, SAS® OLAP Server and SAS® Workspace Server components

All platforms listed under the SAS Warranty Analysis server are supported except for:

- OpenVMS for HP Integrity Servers (Itanium): 8.3

### Supported platforms for middle tier

#### WebLogic Server

- AIX: Version 5.3 and 6.1 on POWER architectures
- HP-UX Itanium: HP-UX 11iv2 (11.23), 11iv3 (11.31)
- Microsoft Windows (x86-32): Windows XP Professional, Windows Server 2003, Windows Vista\*
- Solaris on SPARC: Version 9, 10
- Solaris on x64: Version 10

#### JBOSS

All platforms listed for WebLogic Server are supported plus:

- Linux for x64 (EM64T/AMD64): RHEL 4 and 5, SuSE SLES 9 and 10

#### WebSphere Application Server

- AIX: Version 5.3 and 6.1 on POWER architectures
- Linux for x64 (EM64T/AMD64): RHEL 4 and 5, SuSE SLES 9 and 10
- Microsoft Windows (x86-32): Windows XP Professional, Windows Server 2003, Windows Vista\*
- Microsoft Windows on x64 (EM64T/AMD64): Windows XP Professional for x64, Windows Vista\* for x64, Windows Server 2003 for x64
- Solaris on SPARC: Version 9, 10
- Solaris on x64: Version 10
- z/OS: V1R7, V1R8, V1R9 and higher

### Supported platforms for client tier

- Windows (x86-32): Windows XP Professional, Windows Vista\*
- Supported Web browsers: Internet Explorer 6 on Windows XP Pro; Internet Explorer 7 on Windows XP Pro and Windows Vista\*; Firefox 2.0 on Windows XP Pro, Windows Vista\* and Linux x86 (SuSE and RHEL)



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