



SAS® Quality Lifecycle Analysis

Powerful predictive analytic and reporting technologies provide a holistic view of quality across the enterprise and throughout the entire product life cycle

What does SAS® Quality Lifecycle Analysis do?

The primary purpose of SAS Quality Lifecycle Analysis is to deliver a reporting, monitoring and alerting solution that provides manufacturers with a holistic view of quality across the enterprise through advanced analytic and reporting technologies. These include quality-centric modeling, automatic monitoring and alerts as well as an advanced analysis workbench, best-practice workflows, a case-management feature and Web-based dashboards and reports.

Why is SAS® Quality Lifecycle Analysis important?

It combines the power of data integration, automation and analytics to create the most unbiased insight into large-scale manufacturing processes to help companies improve quality while better understanding and managing costs.

For whom is SAS® Quality Lifecycle Analysis designed?

The product is designed for the engineering community (quality, product engineering, process engineering, etc.) and senior-level managers who are all responsible for achieving and exceeding quality, productivity, utilization and cost targets throughout the supply chain.

Manufacturers today face a myriad of issues surrounding product quality, including the integration of data from disparate systems and isolated sources; obtaining visibility into and understanding of multiple operational processes; the cost of poor quality goods, rework and scrap; and the improvement of downstream product quality and overall manufacturing yields.

Disparate and isolated data sources limit a manufacturer's ability to see quality issues across the entire operation. With a limited understanding of these processes, companies are often unable to solve underlying quality problems or implement effective improvement actions. A lack of visibility into operational processes hampers a manufacturer's ability to react to changes in product quality. Without this information, it is difficult to make fact-based business decisions, leaving manufacturers to rely on employee intuition and guesswork. This can be very expensive if the decisions made are wrong or based on incomplete information.

In addition, poor-quality goods that result in high rework and scrap costs can devastate a company's bottom line. Without a clear understanding of quality effects on manufacturing and service costs, organizations can be left with a broken business model, unexpected expenses and reduced yields.

Downstream quality issues also can lead to significantly reduced customer satisfaction rates. This is especially true when problems appear after the product has been manufactured and sold. Without the ability to integrate both manufacturing and post-sale quality data, companies are left in the dark

as to where problems are occurring and how to fix them.

SAS Quality Lifecycle Analysis provides an analytics-based solution for integrating all data relevant to quality, productivity and utilization. It also assists in monitoring the health of processes and helps drive sustainable quality and yield improvements while containing costs. Featuring an advanced analysis workbench, SAS Quality Lifecycle Analysis provides users with a rich set of interactive root-cause analysis and quality improvement tools that can identify quality issues before they become serious problems. The solution's integrated data mining capabilities allow organizations to gain true process understanding across their entire manufacturing operations. Best-practice workflows and a case-management feature document findings and problem-resolution measures, while promoting collaboration and knowledge sharing.

Key Benefits

- **Gain a holistic view of the enterprise.** The SAS enterprise data model captures large volumes of data regardless of format or source – from legacy to modern MES, ERP and other systems – then transforms, standardizes and cleanses the data to prepare it for analysis. While the SAS data model can handle practically any type of data, it can also be customized to incorporate any additional data types that an organization may require. In addition, state-of-the-art analytics and reporting technologies let manufacturers align strategies in order to reduce the gap between target and actual performance.



- Understand changes quickly.** World-class quality control delivers up-to-the-minute insights into the performance and quality of manufacturing operations, enabling tighter process control at every level. SAS software's early-warning analytics enable users to proactively address and take action to fix potential quality and performance issues before they become a customer problem.
- Lower the cost of quality.** SAS software's state-of-the-art analytics and predictive data mining capabilities drive continuous quality increases, improved reliability and higher yields. With tighter controls and more efficient processes, rework rates and scrap rates will decrease. This helps improve the overall manufacturing cost structure.
- Increase profitability.** Predictive modeling allows optimal process setup, leading to improved asset utilization, optimized material con-

sumption, reduced rework rates and reduced scrap expenses. And SAS software's state-of-the-art analytics allow improvement of equipment performance and cycle times. The result is an improvement in the overall profitability of manufacturing operations.

Solution Overview

Enterprise quality-centric data model

The SAS enterprise quality-centric data model captures large volumes of data regardless of format or source – from legacy to modern MES, ERP and other systems. This provides a manufacturer with both logical and physical storage capabilities to capture all aspects of the manufacturing process, beginning with the suppliers and carrying through manufacturing. It also encompasses field performance and post-sale quality variables.

Because it is integrated throughout the manufacturing life cycle, the data model allows companies to overcome the

barriers created by silos within operational systems. This enables true visibility into operations on the shop floor and allows comparisons between suppliers, plants and production lines.

Automated monitoring and alerting

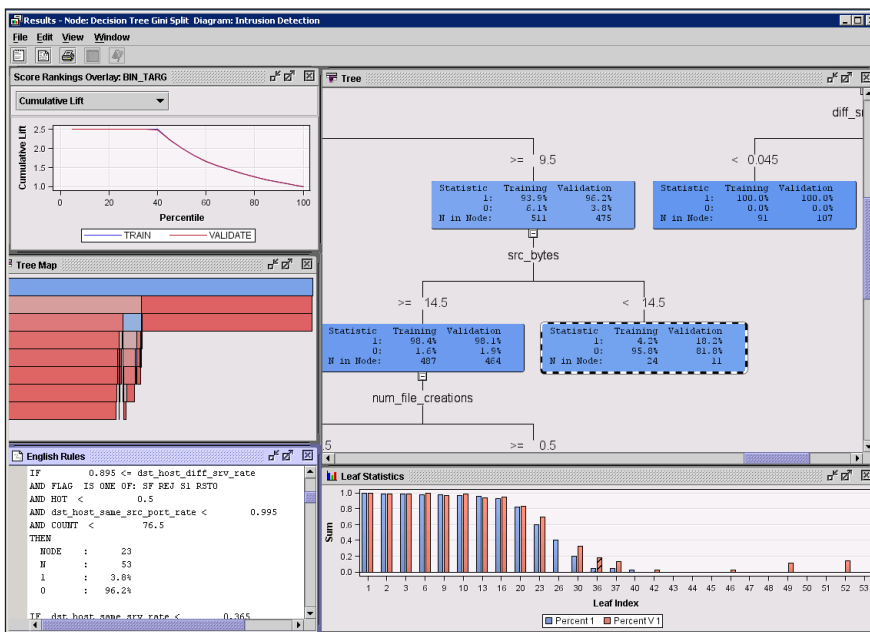
SAS software's large-scale, automatic monitoring engine continuously monitors the health of all processes to help ensure quality throughout manufacturing and operations. It can test new data against the Western Electric statistical process control rules or against unique rules that are custom defined. This level of customization lets users refine and integrate business rules, enabling continual process improvements.

Once tests have been flagged, indicating a variance, supporting control charts and other reports can be supplied that identify the source of the problem. This allows alerts to be published through a variety of different media (portal, e-mail, pager, etc.).

Predictive modeling

SAS is a world leader in delivering unparalleled predictive modeling capabilities and techniques to organizations around the world. For manufacturers, SAS provides tools to help optimize process and equipment setups that result in improved quality, yield, productivity and performance. This includes a complete spectrum of analytical tools – from explorative analysis to design of experiments with optimizers to cause-and-effect tools such as Ishikawa diagrams.

Predictive models can be used to achieve advanced process control (APC). This allows manufacturers to set up downstream processes to compensate for quality issues that may not have been identified earlier in the operation or that were identified as a result of upstream analysis. The



Predictive models help users gain a true understanding of processes.

techniques for achieving this include neural networking, regression analysis and clustering.

Advanced analysis workbench

The advanced analysis workbench lets users analyze quality issues and explore areas of improvement in a highly interactive and visual environment. It serves a broad variety of users ranging from the casual user to the high-end statistician. Designed with this range of users in mind, the advanced analysis workbench gives users an interactive graphical interface that provides a level of operational visibility never before experienced.

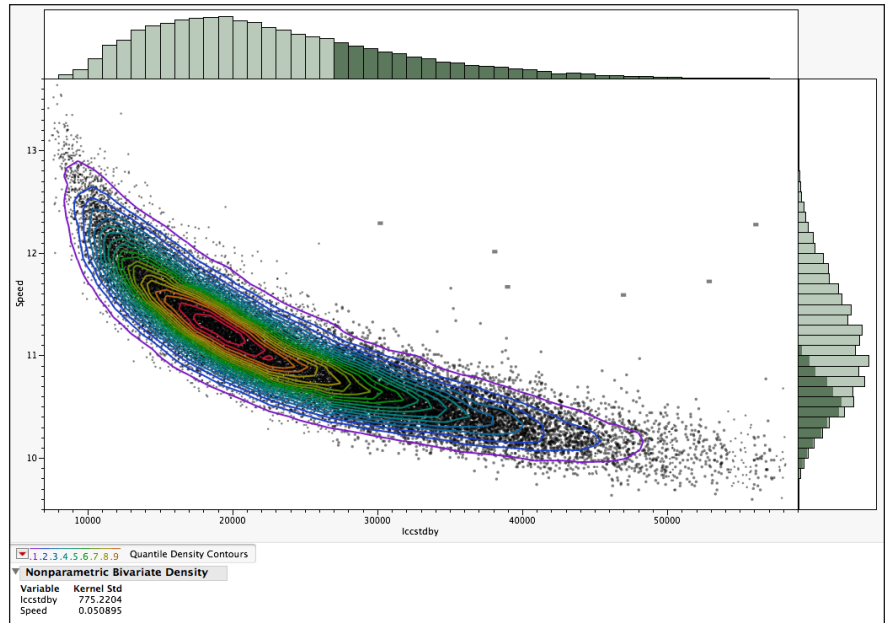
Workflow and case management

Corrective Action and Preventative Action (CAPA) workflows enforce operating procedures and make problem resolutions sustainable, repeatable and auditable. The case management feature documents investigative findings, makes them easily reusable for others and fosters collaboration and knowledge sharing.

Reporting and KPI dashboards with drillable alerts

SAS Quality Lifecycle Analysis delivers customizable reports and graphs enabling information sharing among those who need it at all levels of the organization. This includes standard and ad hoc reports, KPI scorecards, drillable views, snapshots and trend analysis from across the manufacturing operation.

Critical for many companies, the integrated executive dashboard enables reporting on current quality performance at all levels and across geographies. Reports, dashboards and other analysis can be delivered through Web-based clients that allow users and executives to access them anywhere and at any time.



The advanced analysis workbench enables interactive visual data exploration for in-depth root-cause analysis.



The executive dashboard provides a clear picture of where the organization stands in relation to its goals.

SAS® Quality Lifecycle Analysis Technical Requirements

Standard Edition

Includes the following software and components: SAS® Data Integration Server, SAS® Enterprise BI Server, SAS® OLAP Server, SAS® Metadata Server, SAS/QC®, SAS/STAT® and SAS® Visual BI

Advanced Edition

Includes all of above plus
SAS® Enterprise Model Management

Products and supported platforms

SAS® Data Integration Server

- AIX, HP-UX Itanium, HP-UX PA-RISC, Linux for x86, Linux for x64, Microsoft Windows (x86-32), Microsoft Windows (x64) and Solaris on SPARC

SAS® Enterprise BI Server, SAS® OLAP Server and SAS® Metadata Server

- AIX, HP-UX Itanium, HP-UX PA-RISC, Linux for x86, Linux for x64, Microsoft Windows (x86-32), Microsoft Windows (x64), Microsoft Windows on Itanium, Solaris on SPARC, Solaris on x64 and z/OS

SAS/QC® and SAS/STAT®

- AIX, HP-UX Itanium, HP-UX PA-RISC, Linux for x86, Linux for x64, Microsoft Windows (x86-32), Microsoft Windows (x64), Microsoft Windows on Itanium, OpenVMS for HP Integrity Servers (Itanium), Solaris on SPARC, Solaris on x64 and z/OS

SAS® Visual BI

- Linux, Mac OS, Microsoft Windows (x86-32), Microsoft Windows (x64)

SAS® Enterprise Model Management

- AIX, HP-UX Itanium, HP-UX PA-RISC, Linux for x86, Linux for x64, Microsoft

Key Features

Integration of all relevant data in an enterprise quality-centric data model

- Parts-movement data.
- Measurement data:
 - Continuous measures.
 - Categorical measures.
- Equipment data.
- Physical failure analysis data.
- Field-failure data.
- Supplier-quality data.
- Engineering-process data.
- Environmental data.
- Cost attributes.
- Organizational data.

Automated monitoring and alerting

- Parts-movement data.
- Measurement data.

Predictive modeling

- Decision trees.
- Neural networks.
- Regression analysis.
- Clustering.

Advanced analysis workbench

- Pareto charts.
- Control charts.
- Histograms.
- Distribution analysis.
- Design of experiments.
- Regression and curve fitting.

Workflow and case management

- Corrective Action and Preventative Action (CAPA) workflows.
- Case-management documentation.

Reporting and KPI dashboards with drillable alerts

- KPI dashboard.
- Web-based reports.
- Web-based graphs.

Windows (x86-32), Microsoft Windows (x64), Microsoft Windows on Itanium, Solaris on SPARC and Solaris on x64

Middle tier environment

- AIX, HP-UX Itanium, Linux for x64, Solaris SPARC, Solaris x64, Windows (x86-32), Windows (x64)

Required/optional software

- JBoss is supported for application server purposes, but a commercial-grade Web application server is recommended for production environments.

For more information, please visit www.sas.com/solutions/quality/lifecycle.html#section=5 or contact your sales representative.