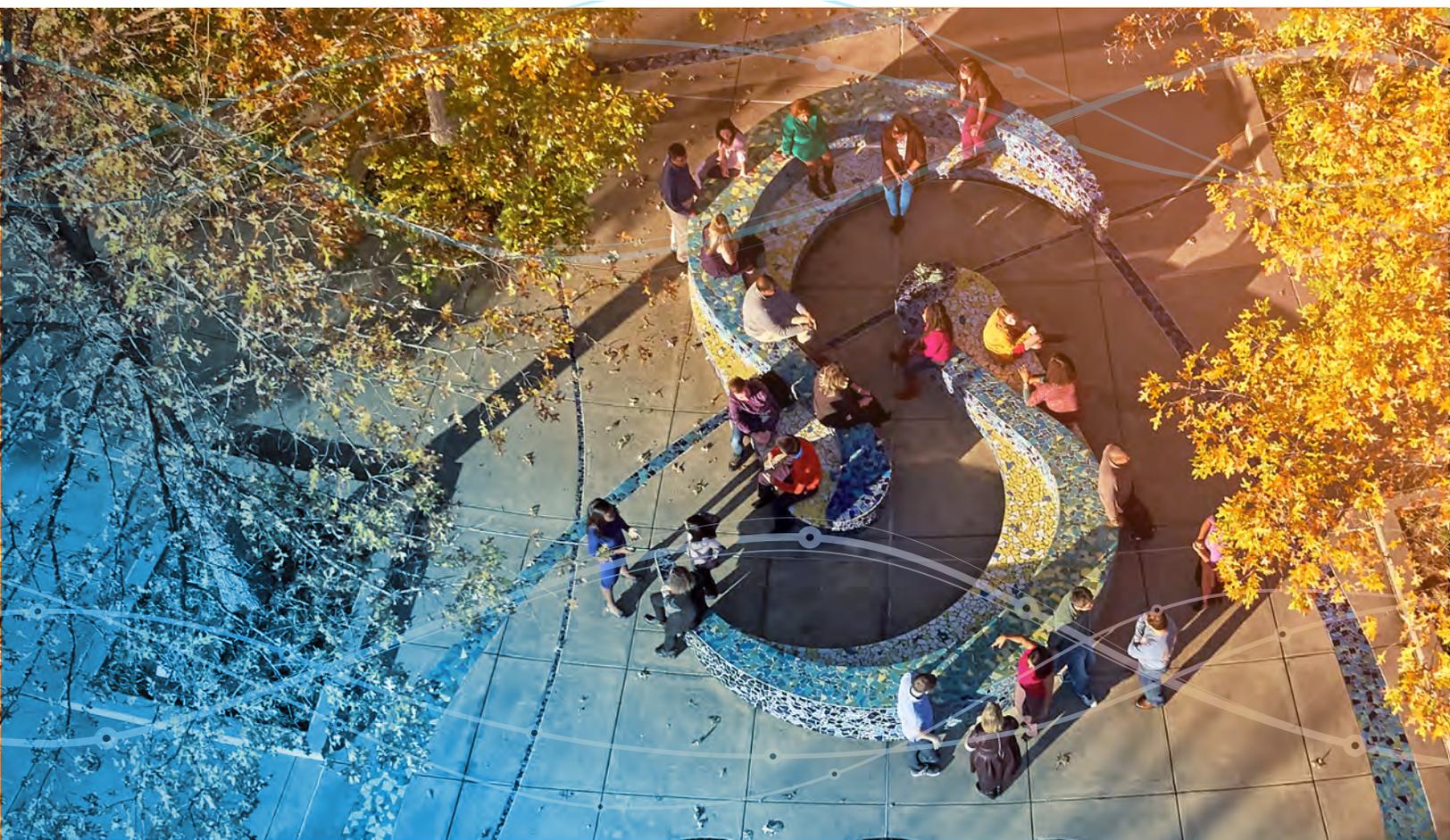


The Quality Imperative: SAS Institute's Commitment to Quality

A corporate statement of SAS' commitment to product quality,
service quality, and customer satisfaction



Appendix 7: Quality in Consulting

The SAS Professional Services and Delivery Division helps SAS users implement their SAS products, solutions, and offerings on premise and in the cloud. We are also well prepared to help our clients with expert SAS services. Engaging SAS consultants can help you tap the full power of SAS technology or services and reap maximum returns on your investment.

To help you gain that return, we deliver implementation services of exceptional quality—across the full range of SAS offerings—in parallel with our expert guidance. We are committed to your satisfaction with our software and services and have a vested interest in making sure that you get the most out of your SAS investment. To do that, we use project methodologies that include quality management (quality assurance and quality control), industry standard project governance practices, and highly qualified consultants. In addition, we have experts in business transformation advisory services and strategic consulting to help our customers navigate any organizational changes needed to best use the power of analytics.

Our goal is to become your trusted technology and business partner.

Our Experience, Our Consultants

SAS Professional Services and Delivery Division offers experienced domain and industry thought leaders in the world of business intelligence and predictive analytics. SAS consultants have bachelors, masters, and doctoral degrees, as well as certifications, in such areas as computer science, statistics, operations research, project management, and business administration. SAS consultants are also experienced in performance management, detailed consulting operations, applications development, and system analysis and design.

When we utilize personnel from our alliance partners, we know that our clients will see them as part of the SAS team. We work hard to make sure that partner personnel have the same qualifications and expertise that any other member of the SAS project team would have based on the needs of the implementation. Our alliance partners represent a select group of vendors who share the same commitment to implementation excellence that we do.

What makes SAS Professional Services and Delivery Division exceptional?

- SAS Professional Services and Delivery Division has the experience and know-how to manage the continual life cycle of SAS implementations.
- SAS Professional Services and Delivery Division knows “one size does not fit all.” We bring the experience of working with thousands of our clients, addressing each as a new environment with unique needs.
- SAS Professional Services and Delivery Division enables our customers to innovate and drive value from tactical installations to strategic business transformation with a proven methodology that adapts to each client’s capabilities, business conditions, and environment.

- SAS Professional Services and Delivery Division brings proven SAS implementation methodologies and approaches that have been developed through our collective experiences in thousands of successful projects. Available only from SAS, these methodologies and roadmaps are the basis for the customization and implementation for your company that brings proven success and increased business value.
- With our industry experience as users and business leaders, SAS Professional Services and Delivery Division employees bring the contextual experience needed to drive value and solve complex business challenges.

SAS consultants take the time to listen and learn about customers' business challenges and enterprise goals to establish a foundation for a strategic and successful implementation. This is a requirement built into our methodologies. This enables us to deliver the right SAS technology and customized services to solve customers' unique business requirements. By combining a staff of SAS experts, a proven implementation methodology, quality management, and project governance, we provide an excellent consulting choice for our customers.

SAS Professional Services and Delivery Division information is available at sas.com/consulting.

SAS® Project Methodologies

SAS project and delivery methodologies are the basis for all SAS Professional Services and Delivery engagements; these methodologies ensure that business requirements are aligned with SAS technology and support.

All SAS methodologies feature the following key components, with their respective benefits for project planning and execution:

- Detailed work breakdown structure enables the project team to create project schedules faster and ensures that they have a common approach.
- Roles and responsibilities matrix enables determination of resources for each task, and for the establishment and management of teams that work faster and better.
- Questionnaires and templates shorten time for project planning, assessment, and documentation.
- Estimation, communications, and risk assessment tools help to increase mutual understanding and satisfaction.
- Where appropriate, agile techniques, processes, and principles such as iterative development and prototyping help optimize the work effort and communicate status.

All the methodologies' key components enable SAS to quickly deliver superior projects. Here are the key SAS project methodologies:

- SAS Project Management Methodology, focusing on project management processes
- SAS Intelligence Platform Implementation Methodology, focusing on technical implementation
- SAS Agile Plug-in, focusing on the use of agile practices within implementation

SAS® Project Management Methodology

The SAS Project Management Methodology is based on best industry standards including the Project Management Institute's Body of Knowledge, PRINCE2, and iterative development practices.

The SAS Project Management Methodology supplies the basis on which all SAS projects are executed. Based on industry standard project management principles, it takes into consideration the specific requirements of a SAS project. In short, the SAS Project Management Methodology accomplishes the following:

- Supports the delivery of the project within the agreed time frame, budget, and required features (project scope)
- Helps set and maintain the right expectations with all project stakeholders
- Provides the necessary techniques and tools to monitor and control the project life cycle and project risks

SAS® Intelligence Platform Implementation Methodology

The SAS Intelligence Platform Implementation Methodology ("IPI") is the most versatile of SAS' implementation methodologies. It is applicable to projects that contain any combination or all the following:

- Data quality evaluation and resolution of issues
- Data integration, or creating a data mart, data lake, or warehouse
- Data mining, forecasting, model development, and other analytics
- Business intelligence (BI) delivery such as query and reporting solutions

Covering a complete implementation of the SAS Business Analytics Framework, the methodology contains the quintessential knowledge and best practices of SAS' more than 40 years of experience. The IPI is structured as a hybrid approach to implementation activity and includes iterative development in all three of its branches.

Comprehensive by design, the IPI is customizable to be adapted to projects with a narrow focus, such as data integration, data quality, data mining, or pure-play business intelligence projects. In such projects, only a subset of phases, activities, and tasks applies, thus avoiding unnecessary overhead.

SAS methodologies contain best practices and recommendations for areas such as these:

- Project planning, estimation, and execution
- Project phases, activities, tasks, and subtasks
- Work breakdown structures
- Assignment of roles and responsibilities
- Questionnaires and templates
- Project deliverables
- Key objectives

SAS® Agile Plug-in

In today's fast-paced business environment it is often necessary to use agile practices to better address business challenges. These proven practices can address unique business situations where requirements for technology may not be well defined or the approach that the client wants to take is entirely new. In such cases, the final deliverables or implementation results may need to be "discovered" rather than prescribed in advance.

SAS has developed an approach that is based heavily on the Scrum framework that enables SAS consultants to work with our clients using agile practices. SAS will work with interested clients to make sure that there is alignment between the business and technology needs of the implementation and the agile approach used on the project. Our approach leverages our deep experience with our existing methodologies by borrowing tools, templates, and practices where appropriate and using them in an agile context. SAS has made a large investment in training our consultants and managers in the successful use of Scrum and our agile practices.

This commitment, along with our many successful experiences using this approach, can benefit clients who have a need for innovation within our software or solution implementations.

SAS® Business Advisory

It is critical to the success of our clients that implementations deliver the value that our clients expect when they engage us to do an installation and development of SAS applications. SAS has a built-in incentive to make sure that these implementations succeed in delivering the business value that motivates our clients to invest in SAS software and services. As a demonstration of our commitment to our clients, SAS can provide business advisory services to help make sure a client achieves their business objectives inherent in the implementation. These services can be delivered as part of the implementation or after the implementation. These services can include:

- Business process transformation
- System optimization
- Analytical model development or optimization
- Data governance or management
- Strategic planning

We recommend that our clients consider these and similar services and ask their SAS representative about how such services can help them get the most out of their SAS investment.

Quality Management in SAS® Project Management Methodology

One important knowledge area within the SAS Project Management Methodology is quality management. The purpose of quality management activities is to ensure that the development process is carried out in accordance with written approved technical standards and guidelines conforming to corporate policies and SAS methodologies.

Quality management supports the delivery of high-quality products and services by providing the project staff, all levels of managers, as well as SAS with appropriate visibility into, and feedback on, the processes and associated work products throughout the development life cycle. One of the purposes of quality management is to motivate action.

Quality management is a process made of two main components:

- Quality assurance
- Quality control

The first ensures that planned processes are implemented while the latter ensures that the specified requirements are satisfied and that each of the components of the final product performs predictably.

Quality assurance and quality control might occasionally look at the same product but from different perspectives. Product quality is, thus, a key measure of the software process.

Quality Assurance and Procedures

Quality Assurance

Quality assurance (QA) focuses on the processes that are used to generate software solutions, and its objective is to prevent defects by continually improving those processes. It is a matter of establishing performance standards, measuring and evaluating performance to those standards, and reporting performance. QA also requires taking action when performance deviates from standards, such as the following:

- Ensuring that all projects follow current policies, standards, and guidelines
- Monitoring the results of those projects
- Reporting the results to the management team for evaluation

A quality assurance plan is developed at the beginning of the project depending on the needs of the project. It ensures that appropriate quality activities are built into the development and support process. The QA plan also gives the project team a guideline to use to better meet the quality objectives of the project. The QA plan document defines which activities should be included to meet the quality objectives of the project. This information might be incorporated into other project documents or created as a separate document.

The document should meet these requirements:

- Accessible to all stakeholders
- Refined on an ongoing basis
- Specific to each project
- An approved and controlled document

Quality audits are conducted at specific points in the project to ensure that the appropriate standards, policies, and methodologies are being followed. In addition, these audits also inspect the work products produced to determine whether required internal and external work products have been produced. Quality audits do not test the work products for accuracy; they determine only whether the work products have been produced and whether they contain the appropriate authorization signatures.

Quality Assurance Procedures

Create a Quality Assurance Plan for Each Project

A Quality Assurance Plan might include items such as the following:

- Purpose
- Definition and acronyms
- Policies, standards, practices, and guidelines, including identification of the specific SAS development methodology to be used
- Reviews and audits
- Testing
- Tools, techniques, and methods
- System and user manuals
- Configuration management
- Supplier control (if necessary)
- Education
- Security
- Existing systems
- Operating procedures
- Performance and revalidation
- Specific components covered

Conduct Quality Reviews

Quality Reviews can include steps such as these:

- Requirements specification review conducted with the customer.
- Design specification review conducted with the customer for the user interface portion of the design.
- Code inspections performed at peer-review sessions.
- Configuration audits performed periodically throughout the project.
- User documentation review conducted with the customer.
- Test plan review performed at peer-review sessions unless they involve acceptance testing. In that case, they are conducted with the customer.

SAS projects' overall performance is reviewed on a regular basis to provide confidence that the project satisfies the established quality objectives. SAS uses a project review process that combines the in-depth knowledge of the proposal and project delivery teams with the experience of senior project managers to provide an objective appraisal of the project's viability and performance throughout its life cycle.

The project reviews support the following objectives:

- Improve customer satisfaction
- Maintain SAS standards for quality
- Use resources effectively
- Manage and monitor delivery performance
- Reduce project loss
- Enhance project team satisfaction and capabilities
- Support reuse of intellectual capital
- Ensure compliance with SAS Project Management Methodology (PMM) and business best practices

Quality Control

Quality control (QC), on the other hand, is focused on the product that is being created by the implementation project, on testing that product and attempting to find and correct defects before the product is delivered to the customer. It includes aspects of QA related to monitoring, inspecting, and most especially testing. QC focuses on ensuring that stakeholder needs are satisfied and on providing a high degree of assurance that the components and system operate according to preapproved requirements and specifications.

The challenge of QC is to ensure that all business requirements have been addressed and that the product functions up to defined success criteria before it is delivered to the customer. A QC test plan is created well before coding is begun. As are all plans, test plans are strategic directions for the testing process. The test plan includes items such as these:

- Which types of testing will be performed?
- Which items will be tested and when?
- Which resources will be needed?
- What prerequisites are needed to prepare for testing?
- How will responsibilities be assigned?
- What the expected results are?
- What mitigation action will be taken when tests fail?

Quality Control Procedures

The testing process has three parts:

- Test planning
- Test case development
- Testing

Therefore, before testing can begin, we meet these prerequisites:

- An approved test plan
- Complete test cases for use in the testing
- A signed-off and managed set of requirements to test for
- A documented set of the customer's success criteria

Quality Control Tests

- Unit testing: Testing at the lowest level sufficient to ensure that every source statement has been executed at least once under test.
- Integration testing: Testing the interfaces between otherwise correct components to ensure that they are compatible.
- System testing: Testing an entire software system end to end to discover common system bugs, such as resource loss, synchronization, and timing problems, and shared file conflicts.
- Testing to requirements: Testing from the users' perspective, typically end to end, to verify the operability of every feature.
- Stress testing: Subjecting a software system to an unreasonable load while denying it the resources needed to process that load.
- Regression testing: More specifically, this is equivalency testing—that is, rerunning a suite of tests to ensure that the current version behaves identically to the previous version except in those areas known to have been changed.
- Beta testing or acceptance testing: Testing that is usually done by representative users typically in the final stage of testing before official release.

Quality Management

To sum up, SAS quality management is a quality assurance approach that involves the following:

- Objectively evaluating performed process, and work products, against the applicable project management methodology and the applicable development methodology process descriptions, standards, and procedures.
- Identifying and documenting noncompliance issues.
- Providing feedback to project staff and managers, as well as to SAS Professional Services Management on the results of the quality assurance activities.
- A description of the quality assurance reporting chain and how it ensures objectivity of the process and product quality assurance function needs to be defined to ensure objectivity.
- Ensuring that noncompliance issues are addressed.

When local resolution of noncompliance issues cannot be obtained, SAS uses established escalation mechanisms to ensure that the appropriate level of management can resolve the issue.

When noncompliance issues are identified, they are first addressed within the project and resolved there, if possible, with a clear set of action plans. Any noncompliance issues that cannot be resolved within the project are escalated to the appropriate level of management at SAS Professional Services for resolution.

Project Governance

In order to facilitate effective communication and a quality implementation, we use an agreed upon project governance process throughout the full project life cycle. The recommended approach to governance is outlined below and is integral to the SAS Project Management Methodology.

Outstanding services governance accomplishes these goals:

- Provides a framework to define, refine, and guarantee project success
- Actively engages the project sponsor on an executive steering committee
- Drives the accuracy of schedule estimation
- Increases the likelihood of services engagements on budget
- Improves project execution
- Proactively mitigates or reduces project risks
- Facilitates continuous communication with all project stakeholders

Effective project governance ensures predictability and avoids any unpleasant surprises. Key to this is to secure clarity of roles through a formal project organization and shared project expectations. Formal commitment to the project charter among all stakeholders facilitates effective project governance.

Clarity of Roles: Project Organization

A formal project organization that clarifies each role should be established for the project. The figure below shows an example:



Figure 4: Example of Formal Project Organization

Project Governance: Roles

Steering Committee

The steering committee represents the interests of the business (from both a user and a supplier perspective) and is responsible for setting the overall direction of the project. The steering committee signs off on a key project governance document or a project charter at the end of the project planning phase.

With its sign-off to the project charter, the steering committee sets the shared expectations for the scope and timelines that the project team will be working to meet. After setting the expectation, the steering committee can control the project by exception—requiring further action to be taken only when events occur, or changes are requested that deviate from the agreed project charter.

Project Management

The project managers are responsible for planning the project and presenting a draft project charter to the steering committee for its review and sign-off. SAS recommends that the project charter be developed by both SAS and client project managers in partnership, which is done in close liaison with the various experts on the project team. This ensures that the estimated timelines are realistic and consider the complexity of tasks.

After the project charter has been signed off by the steering committee, the project managers run the project on a day-to-day basis, according to agreed reporting routines. Typically, steering committee meetings are organized at the end of each project phase to facilitate status reporting and to verify the continued validity of the plan for the next phase.

Project Team

The project team plays a crucial role during the planning cycle. It provides expert advice regarding the complexity and duration of tasks. During the project execution phase, the project team is responsible for delivering the various expected work products according to the project's agreed specifications.

Communications are always customized to meet the jointly agreed upon information needs of the project and of the stakeholders.

Release Information

The version of this paper is January 2022.

Unless otherwise indicated, this document relates only to SAS 9.4, SAS Viya, and the products that are available with SAS 9.4 and SAS Viya. It also relates to services from the date of this paper forward. Quality processes are continually evolving. Therefore, SAS reserves the right to modify the processes described in this document at any time. If you are using SAS 9.4 and SAS Viya and have questions about processes in those releases, send email to qualitypaper@sas.com.

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