ISO 9001 and Agile Development

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Abstract

Conventional thinking would conclude that agile and ISO must not be compatible. After all, ISO is often characterized as being heavy on process / heavy on documentation – the opposite of agile. Just as the assumption that agile is about no documentation is faulty, so are the assumptions that ISO needs to be a burdensome process. ISO 9001:2000 is not only compatible with agile, but can provide just enough structure to help ensure your agile processes are followed.

This paper describes how Primavera Systems, a developer of enterprise project management software, established a Quality Management System (QMS) that was aligned with ISO 9001 while still maintaining all of the benefits of its Scrum / XP agile practices.

Introduction

A Quality Management System (QMS) can be defined in the simplest manner as the policies and procedures of an organization. The QMS components would include the Quality Manual, which states the organization’s quality policies, its quality procedures or required practices, and work instructions or documented steps on how to execute these practices. A QMS can be aligned with a standard, such as ISO. ISO is a worldwide organization for standardization, with ISO 9001:2000 being a well accepted standard centered around process improvement, customer satisfaction, and product quality. Typically, organizations that claim to be following agile software practices and to be aligned or certified with ISO 9001 started out as ISO accredited (typically so they could deal with government agencies) and then went through the experience of determining how they could fit agile practices within their ISO world. At Primavera, it was the opposite. We had been following Scrum/XP practices and went through the experience of how we could provide appropriate levels of documentation around our processes to satisfy customer requests and to provide useful references to our developers. To do so, we established a formal, documented Quality Management System (QMS) that was “aligned” with the ISO 9001:2000 standard. “Alignment” is not an official ISO term, but rather is used in this context to refer to use of the ISO 9001:2000 standard as a reference model that would be familiar to potential customers.

Why did Primavera pursue a documented QMS aligned with ISO?

Primavera had received specific customer inquiries about ISO certification / ISO registration. In response, Primavera engaged the firm RCG IT to conduct an assessment with the following objectives:

- Provide a third party opinion of the current status of Software Development and Information Technology policies, procedures and work instructions as they relate to alignment with ISO 9001:2000 standards.
- Create a Gap Analysis Report that identifies the gaps between the current state and ISO 9001:2000 standards.

RCG’s initial assessment concluded that Primavera’s product development processes, while not documented to the letter of the ISO 9001:2000 standard, strongly reflect its intent in both spirit and execution. Software development at Primavera was structured around highly evolved teams which focus on customer-driven requirements to implement complete, tested functionality within short development cycles. However, it was missing the necessary formal documentation to be in alignment with the ISO standard. In most instances, formal documentation was replaced by direct communication within the teams, enhanced by co-location, brief meetings and frequent reviews.

Besides customer inquiries, Primavera was also internally motivated to establish process documentation. It had recently implemented a Scrum /
XP development methodology and there was little documentation describing these practices. There was also a desire to establish a benchmark from which to drive process improvements. Additional documentation would also be useful to help “ramp up” new team members.

Since Primavera was committed to creating process documentation, as well as control, approve, and periodically review this documentation, why not create documentation that was aligned to a standard that would be familiar to customers?

The decision was made to establish a formal, documented Quality Management System (QMS) that was “aligned” with the ISO 9001:2000 standard. There was not a business justification to go through the costly process of certification. ISO certification is not required by any Primavera customer or regulatory body. The Primavera QMS was not created to the full letter of the standard required for certification. Rather ISO 9001:2000 alignment means that there are documented policies and procedures in a format consistent with ISO, that Primavera maintains evidence that these policies and procedures are followed, and that documentation is easily auditable by customers who are familiar with ISO.

Establishing a documented QMS in an agile manner

On the surface it would seem that the idea of creating a Quality Management System and using a standard such as ISO 9001:2000 as a basis would be counter to principles of agile development. In fact, this would be a reasonable conclusion if the method was to devise a set of procedures and then train the development teams to follow the procedures in some rigid and prescribed manner. Instead, the process to establish the QMS sought to simply document processes that were already institutionalized as a result of the ongoing work of self-directed teams. The process of determining the as-executed processes, as well as creating and reviewing the documented procedures, was facilitated and structured in a workshop format. It was determined that the key procedures that should be documented included: software testing, configuration management, defect tracking, internationalization, product maintenance, requirements management, and release management. In addition, there should also be procedure documentation around the core supporting processes of IT/Facilities and HR/Training. In other words, the procedure documentation would describe Primavera’s agile methods.

We held over thirty workshops to create the procedure documents. Each workshop involved a cross section of the development team and was facilitated by a consultant from RCG. The procedures that, along with the Quality Manual, comprise the QMS were all under twenty pages long. The entire process was executed over a period of ten months, resulting in minimal impact on development schedules and also allowing sufficient time for review and validation of the final documents. Information was gathered using the following simple questions posed to small groups of team members:

- What tasks are associated with this function?
- And for each task …
  - What has to happen before you can start?
  - What inputs do you need, and where do you get them?
  - Who is responsible to be sure the task is done?
  - How do you know how to do the task?
  - What outputs do you produce, and where do you put them?
  - How do you know you’re finished?

The procedures reflect the sequence and dependencies of the tasks, incorporating the answers to these questions in simple, narrative text.

The QMS development method sought to incorporate agile principles in the following manner. The schedule was timeboxed with clear deliverables and was agreed upon by the team. Since our goal was to capture the collective consensus of the group on existing practices, it was important that all data gathering and reviews were done collectively as a team, face-to-face whenever possible. Regular reflection and adaptation of the procedure documents was done through frequent revisions and reviews.

The RCG consultant did the actual writing of the documents, which allowed the team members to focus on describing the processes and reviewing the documents. Having someone outside of the organization facilitate and write the initial procedure documentation proved to be a critically successful factor. The workshops and review meetings had minimal impact on existing projects and the participants found the workshops to be extremely productive and efficient.

An important point to emphasize is that the method of gathering process information was itself beneficial in exposing opportunities for process
improvement that could be realized very quickly. Both best practices and process deficiencies were identified by session participants and acted upon during the QMS documentation process. There were productive process oriented follow-up hour meetings that were generated by the workshops on various development topics. An example of a deficiency uncovered was the realization that a key test server was not covered through our standard backup/recovery processes.

The resulting written procedures were placed on a wiki site. This allowed additional work instructions to be created, edited, and linked at anytime by team members. By encouraging everyone in the development organization to help build the process documentation, it has led to more usage, ideas to be shared across teams, and documentation to remain fresh.

Besides procedure documentation, Primavera also created a Quality Policy, which articulated its Quality Measures. The Quality Policy called for an annual review and an annual audit of projects to ensure accepted practices are being followed. It should be noted that the entire QMS process had full support of executive management, and periodic review sessions were held to report on the progress and benefits.

**Benefits realized**

Primavera has realized the following benefits of establishing a QMS aligned to ISO 9001:

- Primavera’s sales team can more easily respond to customer inquiries regarding Primavera’s development process and can provide documentation describing our agile development methodologies and their benefits.
- Primavera’s sales team can respond to questions regarding ISO 9001:2000.
- Documented procedures describing good practices on how to perform key development processes are in place. This has been very useful for training and for on boarding.
- There is evidence that processes are being followed.
- Simply getting a group of developers together to discuss important development practices has resulted in improvements in processes.

Primavera measures quality based on customer surveys and by tracking customer reported defects weighted by severity. Since these are both trailing measures, the correlation of a documented QMS to improved software quality is not yet conclusive. Undoubtedly, the QMS and the workshop process helped drive process changes and measurable improvements. The most noteworthy has been a decrease in the number of in-process defects.

**Conclusion**

ISO does not equate to quality. It simply helps ensure your agile practices are being followed. There were concerns about violating the principle of “working software over comprehensive documentation”. Our mantra was to provide just enough documentation to be a useful reference and to help with enforcement of existing processes. As far as future plans for Primavera’s QMS, there is still not a business justification to pursue ISO certification.
However, we plan to keep evolving the documents and the processes they reference.