

The integration of the agile SCRUM methodology and the ISO / IEC 12207 Standard

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Abstract - Software engineering is a discipline that is still far from being understood, and a number of schools of thought and methodologies are emerging to try to capture and describe it. The ISO / IEC 12207 standard, for example, has tried to standardize the approach to software engineering since 1995. It must be borne in mind that this discipline is constantly evolving. For this reason, the standard is being revised for the first time since 2008. On the other hand, agile methodologies obtained great recognition in the world after the publication of the agile manifesto in 2001 software engineering after discovering that the classic methods of project management They are not ideal for Software Project Management, which are characterized by frequent changes in requirements, and subsequently the plan. In this article, we describe the integration between the Agile Scrum methodology and the ISO / IEC 12207 standard. As a result, it is intended to be a starting point for anyone interested in implementing Scrum or other agile concepts in a highly structured workplace.

Index Terms - Scrum, ISO / IEC 12207, agile.

TROUBLE

Organizations that provide software and services want to establish quality assurance systems based on ISO / IEC 12207 to ensure the quality of their processes and, as a result, the products and / or services they provide. Customers, on the other hand, are swayed to favor ISO / IEC 12207 certified organizations in the belief that they will receive a higher quality product. Adopting a quality management system is a strategic decision for an organization that can help it improve its overall performance and provide a solid foundation for sustainable development initiatives. Scrum, as a work environment in which people can solve complex problems and tailor them to specific clients.

OBJECTIVE

The objective of this work is to integrate the agile Scrum methodology in the context of the ISO / IEC 12207 standard.

LITERATURE REVIEW

Some international quality standards will be briefly described below: COBIT, ISO / IEC 12207, ISO / IEC 27001.

I. COBIT

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II. ISO / IEC 27001

Software Life Cycle Processes (INDECOPI, 2006): (a) Main (Acquisition, Supply, Development, Operation and Maintenance); (b) Support (Documentation, Configuration, Quality Assurance, Verification, Validation, Joint Review, Audit and Troubleshooting).

III. ISO / IEC 12207

Information Security Management System. According to Alexander (2007), this standard has been developed as a model for the establishment, implementation, operation, monitoring, review, maintenance and improvement of an Information Security Management System for any type of organization, and uses the ISO / IEC 17799 control targets for reference.

ISO 12207: 2008 AND THE SCRUM METHODOLOGY

Author names and affiliations are to be centered beneath the title and printed in Times New Roman 16-point, non-boldface type. Authors affiliations are centered below each author name, italicized, not bold, 12-point Times New Roman Include e-mail addresses if possible. Follow the author information by two blank lines before main text.

IV. SCRUM

Scrum [2] is a process in which a set of processes is used on a regular basis to work as a team and obtain the best possible result from a project, in which the client establishes priorities and the Scrum team organizes itself to select the best method of delivery of results. Work is organized into sprint cycles, which are short-term iterations that typically last two to four weeks. During each sprint, the team selects a set of requirements from a prioritized list, ensuring that the functions

developed at the beginning of the project are the most valuable. At the end of each sprint, a functional software

product is delivered to the customer in the desired environment.

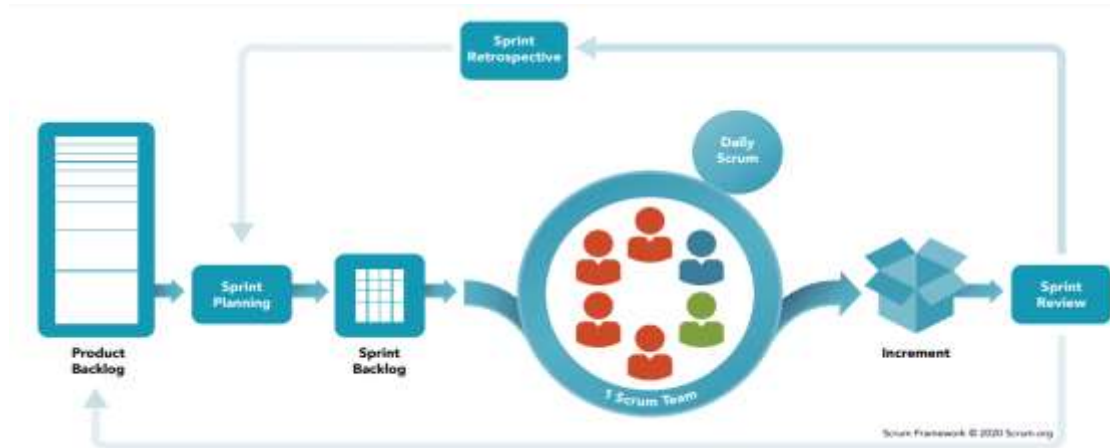


FIGURE 1
SCRUM IN ACTION FROM PLANNING TO SOFTWARE DELIVERY.

V. ROLES

They are the people who are committed to the project and the Scrum process

Product Owner: It is this individual who makes the decisions and who truly understands the customer's business and product vision. It is your responsibility to write down the customer's ideas, prioritize them, and add them to the Product Backlog.

Scrum Master: He is in charge of verifying that the model and methodology works. It will eliminate all the inconveniences that make the process not flow and will interact with the client and with the managers

Development Team: Usually a small team of 5-9 people with the authority to organize and make decisions in order to achieve their goal. It takes part in estimating the effort of Backlog tasks.

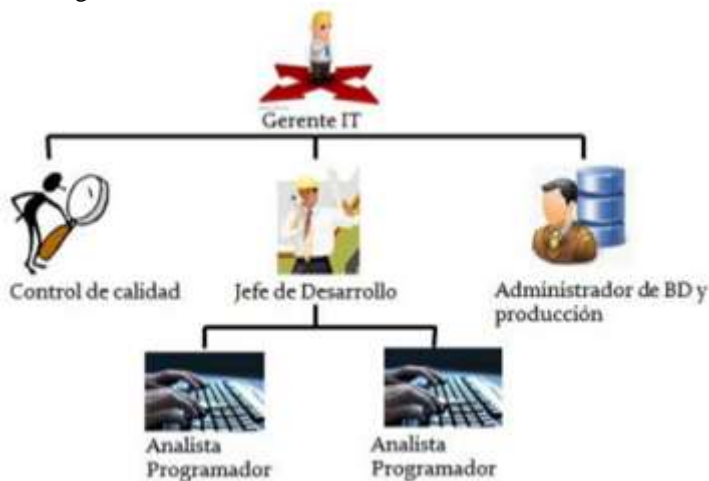


FIGURE 2
DEFINITION OF ROLES.

VI. SCRUM benefits

When using this method [2], it benefits customers by giving them what they really want, not just the features they might have specified the first day they knew the least about their true

needs. They also get a better return on investment by getting their orders delivered in a more timely manner.



FIGURE 3
SCRUM BENEFITS.

VII. ISO / IEC 12207: 2008 Software life cycle processes

The software life cycle process [3](ISO / IEC 12207) is a comprehensive framework for companies to implement software projects in a more professional and well-planned way. ISO / IEC 12207 offers a standard framework for software life cycle procedures, complete with well-defined nomenclature that the software industry can relate to. It describes the procedures, actions, and tasks to be followed during the purchase of a software product or service, as well as during the provision, development, operation, maintenance, and disposal of software products. However, there may be a lack of understanding about the benefits of software development techniques and software lifecycle frameworks.

International standards divide the activities during the system development process into 2 main subdivisions, 7 process groups, 43 processes, 121 activities, and 406 tasks. [4].

The processes are grouped into three broad classes: primary; medium; and organizational.

Acquisition, supply, development, operation and maintenance are the main processes that drive the life cycle.

Documentation, configuration management, quality assurance, collaborative review, auditing, verification, validation, and troubleshooting are all support procedures. A supporting process helps another process to complete a certain task. Management, infrastructure, improvement and training are examples of organizational processes. A supporting process helps another process to complete a certain task.

Management, infrastructure, improvement and training are examples of organizational processes. A life cycle process can be established, controlled, and improved through an organizational process.

The actions that can be taken during the life cycle of a software system are divided into seven process areas in this International Standard. Each of the life cycle processes of those groups is explained in terms of its purpose and expected results, as well as the activities and tasks that must be completed to achieve those results. [5].

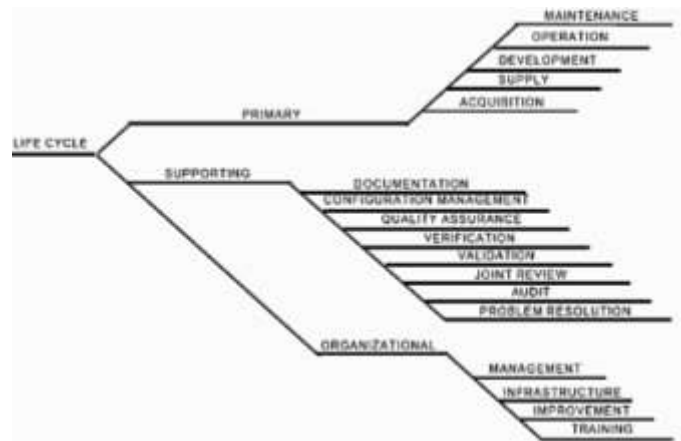


FIGURE 4
THE LIFE CYCLE PROCESSES OF ISO / IEC 12207.

VIII. Methodology development process

The process followed for the development of the methodology was as follows:

SCRUM	ISO 12207
A project is done in short, fixed blocks of time.	Modularity
Each iteration should produce a complete result, an increase in the final product that can be delivered to the customer with the least effort when requested.	Maximum cohesion and minimum acceptability
The process is part of the product's prioritized set of objectives / requirements, which serves as the project strategy.	Responsibility - Each process is believed to be responsible for a part of the software life cycle.
	Quality is considered from the beginning of the life cycle.
	Each process is associated with a PDCA (plan-do-check-act) cycle.
	The standard implements comprehensive quality management principles.

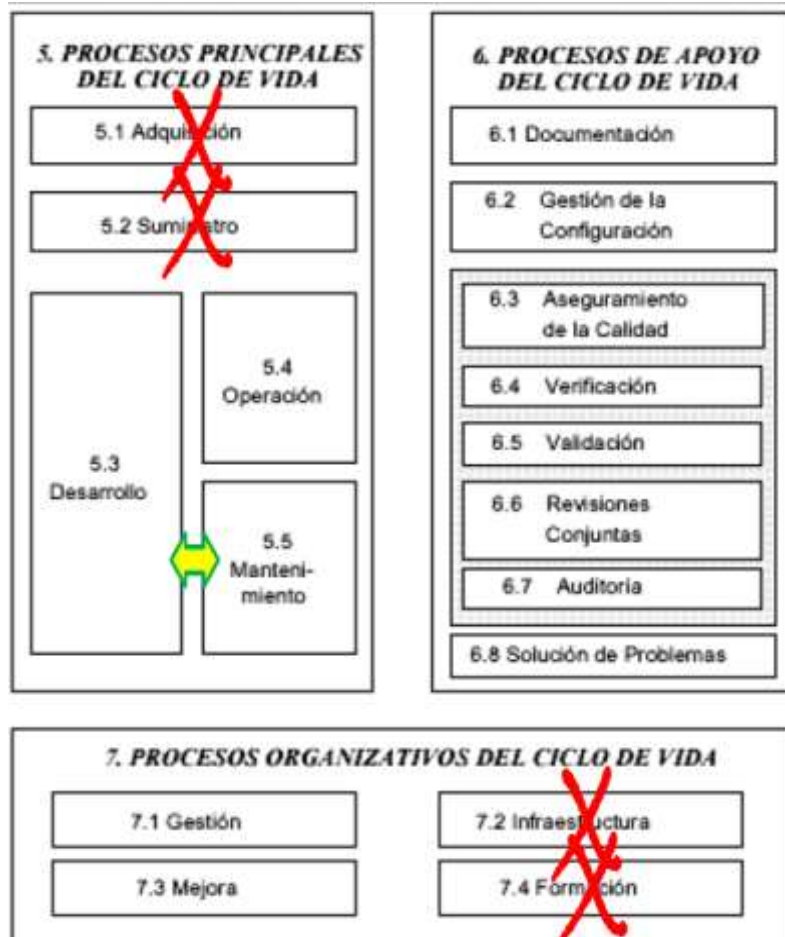


FIGURE 5 Structural scheme of the proposed ISO 12207

Although the ISO / IEC 12207 software life cycle standard is a collection of expert opinions on a number of software development procedures, there is no one-size-fits-all approach. Process selection and configuration However, the responsibilities of both the acquirer and the supplier are critical in the construction process. According to ISO / IEC 12207, the acquisition process is defined. [6] The success of a vendor depends largely on a clear definition of customer expectations, both in terms of system requirements and the software development process.

There is a common view on the quality of any software product and it is highly dependent on the software development process. Furthermore, all successful companies, regardless of their size, continue to carry out well-defined activities and tasks in a timely manner. Receiving adequate feedback from both users and previous projects is another aspect that increases the success of a larger development and reduces the problems of the current project.

To meet these criteria and improve the development process, companies invest in development activities. improvement. However, a large number of companies believe in the success of the implementation of ad-hoc processes, which is based on human skills. This approach is difficult to replicate and has a negative impact on quality.

Mapping ISO / IEC 12207 processes to SCRUM processes

In ISO / IEC 12207, processes are assigned a set of results that explain the purpose of the process. These outputs will be assigned to Scrum actions.

We will implement the Scrum standard as a result of mapping from the other direction, that is, from Scrum processes to conventional procedures, would reveal. Scrum is a technique

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for software development to what extent, if we believe that the standard stipulates software development, as well as the scope of Scrum operations outside of software development As an example:

If there is an activity in Scrum that is not covered by the standard, we can assume that it is not covered by the standard that this activity is not limited to software development, each mapping will be evaluated based on the degree of conformity with the results of the standard, similar to the previous work dealing with the mapping of this standard and Scrum.

Acquisition process

Scrum is not designed for software procurement in the sense that the acquirer requires a cash solution and selects the best among the available vendors. It is not designed, in particular, for processes by the assignee of the product [7].

Delivery process

The delivery process is linked to the procurement process, not only from the acquirer's perspective, but also from the supplier's perspective. Scrum does not clearly describe how to create acceptance protocols or how to deliver and install the product in this process [7].

Life cycle model management process

In reality, Scrum frequently suffers from not following specific roles, such as when the Scrum Master behaves like a project manager and intervenes in team decisions. According to the standard, the rules for the software development process must be defined for a specific requirement. It is suggested that Scrum roles be followed at least until the end of the draft. Scrum members will understand and respect their duties and will not confuse them with others.

Roles They Have Become Used To Scrum does not expressly state that business rule development is prohibited. method, but for this purpose this introduction will help ensure Scrum is effectively implemented [7].

Infrastructure management process

Scrum does not describe how to handle the infrastructure required for product creation and delivery in this situation. [7].

Project portfolio management process

Scrum, once again, does not specify any rules or processes in this process. [7].

Human resource management process

Scrum does not specify how HR should be managed in a Scrum-powered project [7].

However, according to agile concepts, jobs should be personalized to the personalities of individuals and not the other way around. [7].

Quality management process

The participants themselves ensure quality by reviewing the increments incorporated in the work on a regular basis [7].

ISO / IEC 12207 output

The organization's quality management policies and procedures are specified.

SCRUM

Scrum does not specify how the rules should be written. According to agile principles, a team will develop them according to the requirements of the project.

ISO / IEC 12207 output

Quality objectives are defined within the organization.

SCRUM

In planning discussions, quality is always specified. All team members know the scope and result of each task. Users are frequently used for this purpose.

ISO / IEC 12207 output

The responsibility and authority for quality is defined and assigned to a specific person.

SCRUM

Team members are directly responsible for product quality. Scrum does not specify a single person who is responsible for the outcome of the task.

ISO / IEC 12207 output

Customer satisfaction is monitored.

SCRUM

The customer who participates in the creation of the product using Scrum is invited to frequent post-print review meetings and has the opportunity to comment on the existing work as well as the progress of future work.

ISO / IEC 12207 output

Appropriate action is taken if objectives are not met [7].

SCRUM

Unlike the waterfall paradigm, you don't see any quality in an agile approach. During review sessions, a lack of quality is discovered and further development effort is focused on eliminating the identified low quality [7].

ISO / IEC 12207 output

Definition of the scope of work.

SCRUM

During the first sprint, the initial scoping occurs. Based on information from previous sprints, additional scope is defined only for future sprints.

ISO / IEC 12207 output

Assess the project's ability to manage tasks and objectives within the limitations of available resources and resources.

Tasks are classified according to their size and difficulty.

SCRUM

In frequent planning meetings, tasks are evaluated based on their complexity and the product owner and development team prioritize continued product development. Tasks are then prioritized and requests are included in the next sprint.

ISO / IEC 12207 output

Identify similar characteristics, resources and people between projects and other organizational units.

SCRUM

The resolution of project-to-project relationships is not expressly specified.

ISO / IEC 12207 output

Preparation of plans for the launch of a project (identifying activities and tasks for which budget, schedule, time, resources and risk are established).

SCRUM

The minimum to start a scrum is to establish the vision and scope of the project, as well as the list of evaluated elements of the backlog. Both a calendar plan and a scope plan can be created.

ISO / IEC 12207 output

The use of project plans and the beginning of a project.

SCRUM

A scrum master initiates the sprint by assisting in session planning when sprint tasks are presented, prioritized, and graded based on complexity. When starting The project denotes the beginning of the first sprint.

Planning process

ISO / IEC 12207 output

Definition of scope of work

SCRUM

During the first sprint, the initial scoping occurs. Based on information from previous sprints, additional scope is defined only for future sprints.

ISO / IEC 12207 output

Evaluation of the management capacity of the tasks and objectives of the project in relation to the existing resources and constraints.

Tasks are classified according to their size and their difficulty is approximate.

SCRUM

In frequent planning meetings, tasks are evaluated based on their complexity and the product owner and development team prioritize continued product development. Tasks are then prioritized and challenges added to the next sprint.

ISO / IEC 12207 output

Identify similar characteristics, resources and people between projects and other organizational units.

SCRUM

The resolution of project-to-project relationships is not expressly specified.

Decision-making process

Scrum empowers the development team with decision-making authority. If the development team cannot come to a conclusion, the Scrum Master can step in and help the team make a decision, but should not be allowed to decide for itself.

The development team should always handle conflict situations on their own, for example by using a recommended path for a sprint, with the option to modify it if necessary.

Risk management

Because agile approaches do not provide a clear solution for risk management, it is unclear whether risk management plays a role in iterative development. Some people prefer to overlook the dangers of approach until they materialize.

It can be used for management in the same way that the well-known Scrum Burndown chart is used for task management.

Configuration management

As a project management approach, Scrum does not expressly specify a configuration management procedure.

The process of measuring and obtaining data from the project.

The purpose of the measurement process is to collect, evaluate and report data related to the development process to aid in the successful management of the project and objectively show the quality of the resulting product. Scrum does not specify data measurement activities. These stem only inadvertently from Daily survey, planning and review

meetings are held on a regular basis. The team can take this into account data such as a count.

IX. Architecture of the methodology

Scrum is an agile software development management approach that is based on an iterative and incremental procedure. Because software architecture is so important, identifying your position in scrum is critical. That is why this article describes a suggestion for the role of software architecture in the Scrum development cycle, as well as the duties of the software architect in this approach.

Competition from the software development industry, as well as the need for customers to reduce time to market, forces software development companies to be aggressive in their delivery times. As a result, agile software development techniques such as Scrum have emerged: a methodology for software development and management based on an iterative and incremental process. Its structure is based on sprints, which are iterations of one to four weeks. Scrum is used in difficult environment projects where fast results are desired and productivity is the most essential factor.

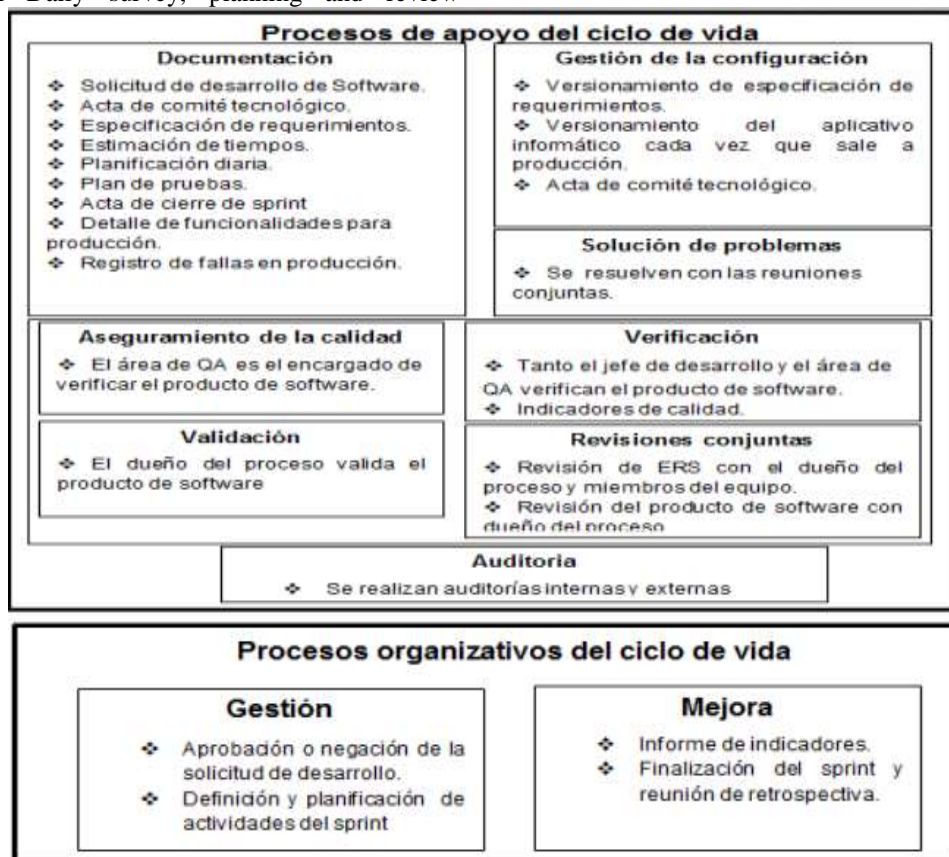


FIGURE 9 VALIDATION WITH ISO / IEC 12207

X. Details

Next, the components of the SCRUM methodology will be detailed: objective, scope:

Objective.

CONCLUSION

As with other work on comparable topics, this one does not claim to be complete in terms of mapping, but it does provide a starting point for anyone interested in using Scrum or other agile principles in a high-risk environment.

The goal is to maximize return on investment for the business, reduce delivery time, create higher value functionality for the customer, and adhere to ongoing management principles: Adaptation, self-management and innovation.

[8] Because ISO / IEC 12207 allows the implementation of the methodology in the real world, it is possible to use Scrum to a large extent in accordance with the standard; however, compliance with the agile principles outlined in the agile manifesto must be monitored on a regular basis, because compliance practices lead in the opposite direction of ideas.

Particularly in the category "functional software versus

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