**SOLUTIONS**

**Improved Tool Chain**

**Requirements Management and Traceability**

Key elements of a successful project are requirements management and traceability. Their goal is to ensure that the needs and expectations of the project stakeholders are correctly documented, verified and validated.

**Complete Solution View**

Standard development is a long process that can take many years for some standards. This process is constantly evolving with the emergence of new technologies and the needs of the different people working on it. Moreover, in the standard development process, requirements come from different sources and each stakeholder has needs to meet using this standard. During the development process, some requirements can change according to the evolution of the stakeholders’ needs and new requirements can also be created from feedbacks on the implemented features for example. Consequently, requirements traceability should be integrated into these processes to document the life of each requirement, from its origin to its implementation by way of its development. Thereby, each stakeholder could know the source of each requirement, track changes made to this requirement and link each implemented feature to the requirements they satisfy. Tracing requirements allows the stakeholders to know whether a requirement has been successfully implemented or if it needs to be reworked. Besides, having a requirements management tool makes it easier to get back to the person or group of people that wanted this requirement to get more information about it or even, to have an overview of all the requirements to prioritize them.

The development of STEP began several decades ago and since that time, the stakeholders’ requirements have evolved because of the change of the business needs and the evolution of technologies for instance. Moreover, in the STEP development process, requirements are listed in ISO documents, without any information about the requirement source or what was the objective behind each requirement. Thus, once the features are implemented, it is almost impossible to get back to the concerned stakeholder to validate his requirement because of the lack of information. Besides, in STEP, there are two different types of requirements: technical requirements, which are the requirements about the implementation of the standard, and domain requirements, which are the requirements about the environment in which the standard will be operated, for example, PMI, Mechanical and Electrical wire harness.

Additionally, the development of standards includes many actors that came from different countries and organizations. This geographic dispersion of the stakeholders necessitates efficient tools to make it possible for all of the different actors to work together on the standard development. Indeed, the stakeholders needs to be able to understand the role and the activities of everyone on the project for a good collaboration. In the same way, it can be useful for all members of the WG to know who is working on what and what tasks still need to be done. Indeed, requirements traceability is a roadmap that defines where in the standard development process each requirement was implemented.

🡪 Impact Analysis

**Current Tool availability**

Due to the popularity of Agile methodology, the number of requirements management and traceability tools is constantly increasing.

🡪 List of possible tools we can use

**Future Research Needed**

As previously mentioned, SAFe provides some methods to help teams to implement Agile in their projects, for example, Backlog management and Agile Release Trains. SAFe also offers artifacts for requirements management such as SAFe Requirements Model and, Continuously Verify and Validate processes. SAFe Requirements Model “provides a scalable model that demonstrates a way to express systems behaviors” (Scaled Agile Framework), like features, stories, and non-functional requirements. Continuously Verify and Validate processes ensure “that the system works as designed and it meets the needs of the user” (Scaled Agile Framework), and these processes are supported by the Requirements Model. However, these are only conceptual model and processes, which means that you need tools to implement them.

Moreover, even if SAFe provides guidelines to implement Agile principles and requirements management, there are still some practices that are missing and need to be integrated such as meetings’ minutes. In standard development, the different actors are generally geographical dispersed, and they are working in different teams in parallel. By definition, meeting minutes record what was discussed and agreed during the meetings. Taking meeting notes helps then to ensure that every member of the development process knows what was decided, when it was decided and what needed to be done. These notes can be really useful to keep people informed and integrated into the development process. The STEP development process is led by several international meetings such as SC4 meetings or PDES meetings. The SC4 and PDES meetings are both held twice a year. STEP experts don’t necessarily attend all the international meetings, and minutes are not always taken during these meetings. A lot of information is repeated, and a lot of decisions are discussed again, which is a loss of time and resources for all the attendees. Taking minutes during these meetings and make them available to all the STEP community will create a better integration of the different attendees’ communities.

🡪 Tools integration

🡪 Development process model with Agile