A QA vision within SAFe®

Discover the value of embedding quality
engineering in the software and systems lifecycle,
by Marc Roekens

Introduction

More and more organizations feel the need to implement their Agile method '@scale'. Various models/frameworks are available for this, of which the Scaled Agile Framework (known as SAFe®) is by far the most used. Although Quality Assurance (QA) is mentioned within SAFe®, for example organizing the production process, it is not elaborated in detail. That makes sense, since every SAFe® implementation is unique.

Nonetheless, there are compelling reasons to embed QA and testing at depth in the end-to-end lifecycle of all software and systems. Sogeti's TMAP® approach offers a comprehensive body of knowledge for quality engineering in IT delivery, including good practices for test management, execution and QA. The key is to bring together the tenets of SAFe®, through which software and services are developed, with the QA and Testing approaches of TMAP®, through which trust is engendered in the quality of the products (apps, systems, services) and their ability to support business processes.

This is increasingly important as the volume of SAFe® implementations continues to grow. At Sogeti, we aim to make it easier for teams to adapt and use TMAP® to embed quality engineering in their SAFe® implementations. For this reason, we have drafted the practical guidelines in this document to link our QA vision with a full SAFe® implementation. This represents another element in the continually evolving TMAP® body of knowledge, which also includes the recently launched book 'Quality for DevOps teams'.

This document maps our own vision on quality in Agile with the QA components in SAFe®, and extracts key descriptors, characteristics and questions from the wealth of SAFe® documentation to make it easier to find the links between the two.

The Sogeti vision on quality in Agile

The Sogeti vision on quality in Agile distinguishes between the following four Quality Values:

- **Optimized Customer Experience** delivers optimal customer value. In this way, a team or organization is enabled to deliver the right products and services. Intensive interaction with the (end) customers is a precondition for this.

- **Controlled Quality** is aimed at gaining insight into quality in a short-cycle, high-speed development process. Within Agile teams, this happens in the retrospective, in SAFe® this also happens during the Inspect & Adapt stages across the different teams.

- **Continuous Testing** is the early and continuous measurement of quality throughout the entire delivery process. This can take the form of tests, but there are also various other quality measures to be taken.

- **Quality as Culture** means that everyone, both inside and outside the team, is aware of quality and actively contributes to it. Quality is a shared responsibility both within a team and between teams.

These Quality Values are supported through a set of topics within TMAP®, where a differentiation is made between Organizing Topics and Performing Topics. More information on these topics (and the full TMAP® body of knowledge) can be found at www.tmap.net/page/introduction-qa-testing-topics.

Some relevant aspects of SAFe®

Every SAFe® implementation is unique. This means that the same cadence is not used in every implementation. Neither are the same roles always filled in, nor the same names always used for the existing entities. For example, terms from the Spotify model for scaled Agile delivery, such as Tribe and Guild, are also used in organizations that have implemented SAFe®. However, to avoid any confusion, this document follows only the SAFe® nomenclature. In the elaboration of the various topics, the document distinguishes at a generic level between the following levels of cooperation:

- Portfolio
- Large Solution
- Agile Release Train
- Team

Although not all levels of cooperation occur in every SAFe® implementation, they are included here for completeness.

Figure 1: SAFe for Lean Enterprises
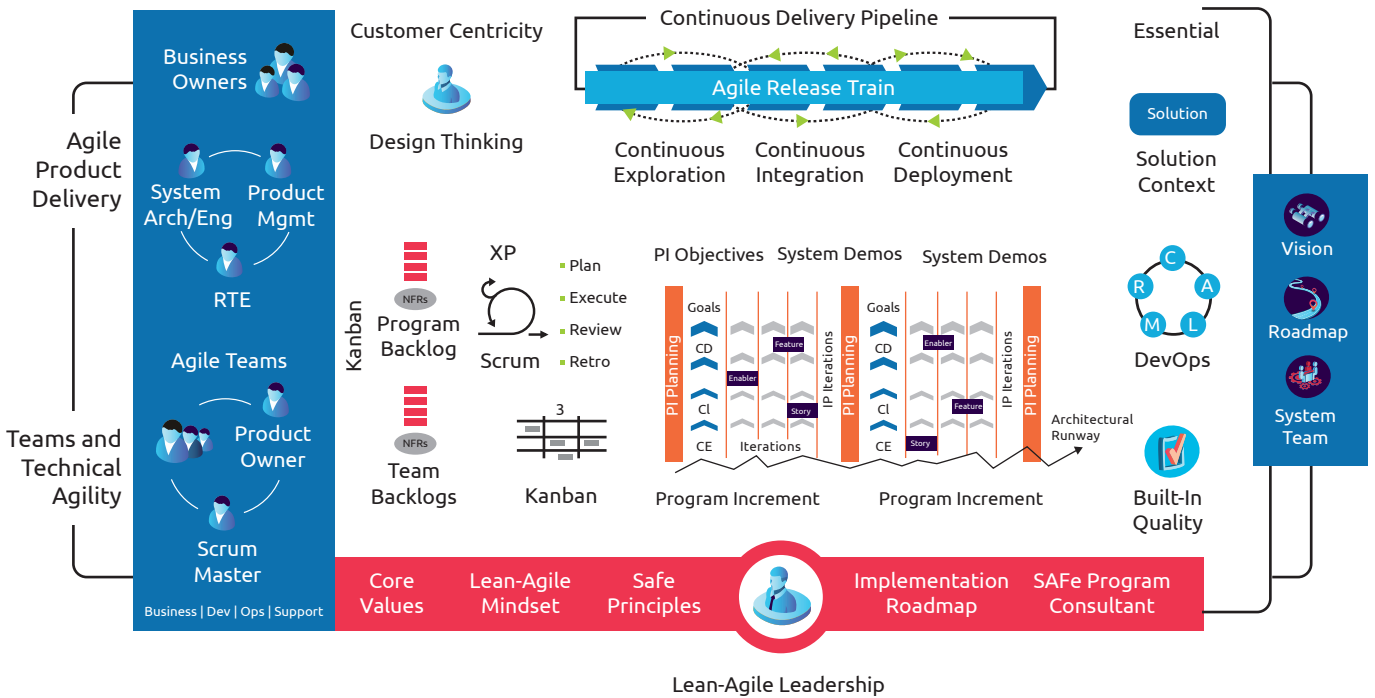
Within scrum the 'what?' question is answered by a business representative (the Product Owner) and the 'how?' question by the development team. These questions are addressed in the SAFe® framework in the following way:

- 'What?' is answered by Epic-Owners (at Portfolio level), Solution Management (at Large Solution level), Business Owners and Product Management (within Agile Release Trains) and Product Owner (at Team level).

- 'How?' is answered by the Enterprise Architect (at Portfolio level), Solution Architect (at Large Solution level), System Architect (within Agile Release Trains) and the development teams (at Team level).

- The process of matching the 'what?' question and the 'how?' question is led by the Solution Train Engineer (at Large Solution level), Release Train Engineer (within Agile Release Trains) and Scrum Master (at Team level).

- Where necessary, the teams can receive support from System Teams (for example for managing environments), Shared Services (for deploying highly specialized and scarce knowledge) or Communities of Practice (groups of colleagues with similar interests).

This document refers to the entities from the Scaled Agile Framework version 5.0. More information about the Scaled Agile Framework is available at www.scaledagileframework. com

Within SAFe® it is propagated that some decisions are centralized, and others are de-centralized.

Centralized decisions share the following characteristics:

- **Infrequent** – Made infrequently, these decisions typically are not urgent, and deeper consideration is appropriate (e.g. product strategy, international expansion).

- **Long-lasting** – Once made, these decisions are unlikely to change at least in the short term (e.g., commitment to a standard technology platform, commitment to organizational realignment around Value Streams).

- **Provide significant economies of scale** – These choices deliver large and broad economic benefits (e.g. a common way of working, standard development languages, standard tooling, offshoring). Leadership is charged with making these types of decisions, supported by the input of those stakeholders who are affected by the results.

All other decisions should be decentralized. Characteristics of these types of decisions include:

- **Frequent** – The problems addressed by decentralized decisions are recurrent and common (e.g. Team and Program Backlog prioritization, real-time Agile Release Train [ART] scoping, response to defects and emerging issues).

- **Time-critical** – Delaying these types of decisions comes with a high cost of delay (e.g. point releases, customer emergencies, dependencies with other teams).

- **Require local information** – These decisions need specific local context, whether it be technology, organization, or specific customer or market impact (e.g. shipping a release to a certain customer, resolving a significant design problem, self-organization of individuals and teams to an emerging challenge).

This differentiation is also applicable on defining QA measures on the various levels and in the various entities.

QA-related topics within SAFe®

As stated in the Introduction to this document, although QA is mentioned within SAFe®, it isn't covered in great detail. To facilitate finding what information there is on QA, the following quotes are taking from the SAFe® website and list QA-related topics in the context of Customer Centricity:

- **Built-in Quality:** "All Agile teams — software, hardware, business, or other — must create quality solutions and define their own built-in quality practices."

- **Lean QMS:** "Compliance refers to a strategy and a set of activities and artifacts that allow teams to apply Lean-Agile development methods to build systems that have the highest possible quality, while simultaneously assuring they meet any regulatory, industry, or other relevant standards."

- **Relentless Improvement:** "Since its inception in the Toyota Production System, kaizen, or the relentless pursuit of perfection, has been one of the core tenets of Lean. It is illustrated in various "House of Lean" models including the SAFe® House of Lean."

- **Design Thinking:** "Design thinking is integral to customer centricity. Design thinking has two main activities, understanding the problem and designing the solution."

- **Release on Demand:** "Release on Demand captures the mechanisms and processes by which new functionality is deployed into production and released immediately or incrementally to customers based on demand."

Figure 2: SAFe: Customer Centricity
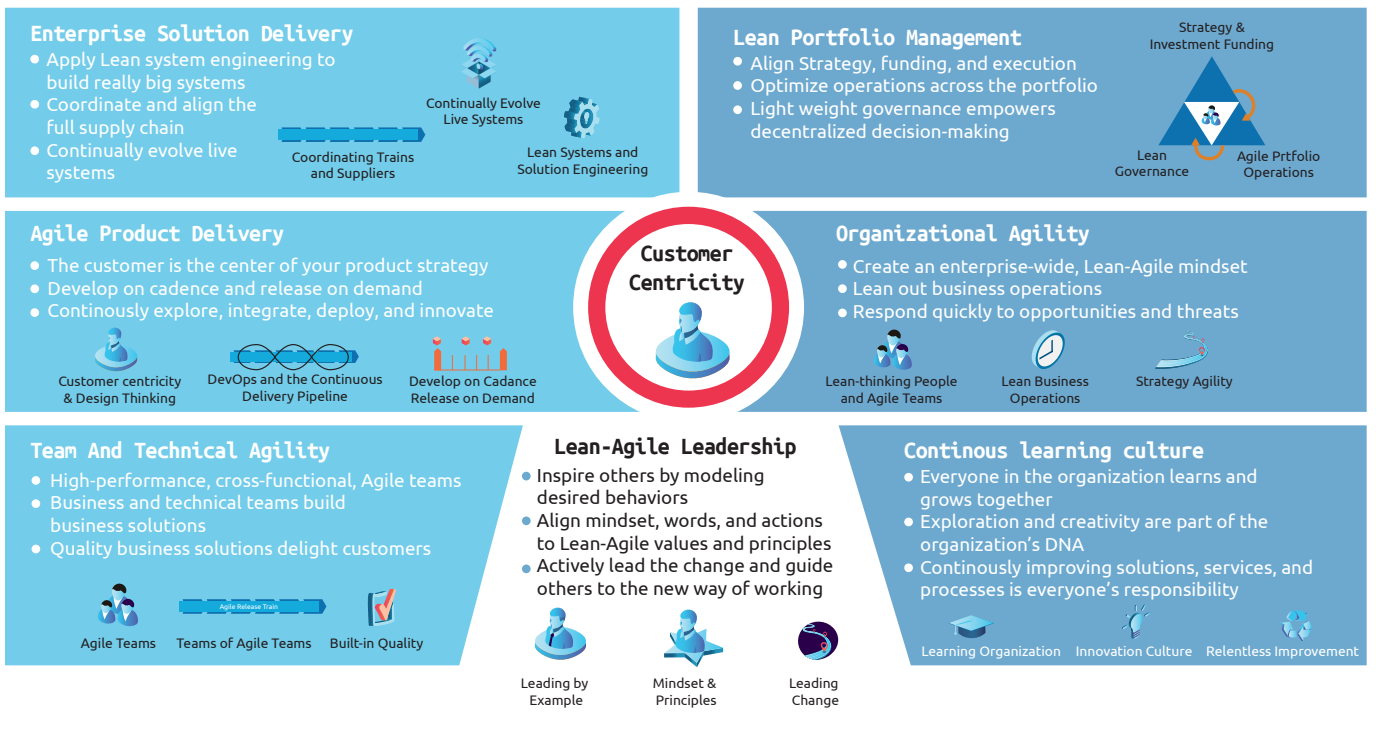
- **Culture of Shared Responsibility:** "Culture [as used in the DevOps acronym CALMR, see www. scaledagileframework.com/agile-product-delivery/ for more info] represents the philosophy of shared responsibility for fast value delivery across the entire Value Stream. It consists of everyone who helps create value, including Product Management, development, testing, security, compliance, operations etc."

- **Mindset and Principles:** "SAFe® is based on ten immutable, underlying principles for applying Lean and Agile at scale. These tenets and economic concepts inspire and inform the roles and practices of SAFe®, influencing leader behaviors and decision-making."

- **Agile Testing** (advanced topic on the SAFe® website): "Agile Testing applies the principles of agile development to the practice of testing. Although traditional development has used a big-bang, deferred testing approach, agile testing develops and tests systems in small increments, often developing tests before writing the code, story, or feature."

- **Test Driven Development** (advanced topic on the SAFe® website): "Test-Driven Development (TDD) is a philosophy and practice that recommends building and executing tests before implementing the code or a component of a system. By validating them against a series of agreed-to tests, TDD — an Agile Testing practice — improves system outcomes by assuring that the system implementation meets its requirements."

In SAFe® 5.0, the topics listed above are all discussed in the context of Customer Centricity, as depicted in Figure 2, taken from the SAFe® website.

QA at the different SAFe® levels

Different levels of cooperation are employed in SAFe® implementations to deliver diverse outcomes, as explained:

Portfolio level

Application-transcending and company-wide matters can be coordinated within the Portfolio layer. Here, cooperation can take place about company-wide quality frameworks, but also, for example, about the choice of specific tooling, or about a company-wide personnel development strategy.

In an interaction between Epic Owners and Enterprise Architect, the boundaries are set within which the desired customer value, or the desired quality, can be decided upon. Matters such as industry rules and regulations can have an impact on choices made, which then apply throughout the organization.

Where compliance affects the cooperation between components delivered by different teams, the assistance of a Shared Service could be sought.

From the perspective of the Sogeti QA vision, the Portfolio level is one of the places where the TMAP® Organizing Topics in particular might find a place: www.tmap.net/page/ introduction-qa-testing-topics.

Large Solution level

At the Large Solution level, matters are coordinated between teams working on related application components in a Solution Train. The application architecture forms the framework within which the teams working on the various application components must operate. This ensures that the total solution becomes workable for the business and maintainable for application management.

Where compliance affects the cooperation between components delivered by different ARTs, the help of the Shared Service could be sought by Solution Trains. Within the Large Solution level, compliance is given a place based on the quality perspective. Details are described in the white paper available at www.scaledagileframework. com/?ddownload=35712.

Within Solution Trains, proposals for improvement are laid down that help optimize the cooperation between teams of teams (i.e. between Agile Release Trains). Just as at the ART level, the investment in time and money involved is also accepted here. After all, investing in better cooperation between teams is beneficial in the long run.

SAFe® refers to quality between teams of teams in various places (as listed in "QA-related topics within SAFe®", previous page). In the Sogeti vision, special attention is paid to quality at a "team of teams level" within Controlled Quality (for the processes), Continuous Testing (for the deliverables), Quality as a Culture (for both) and Optimized Customer Experience (for the deliverables).

Both the TMAP® Organizing Topics and the TMAP® Performing Topics (www.tmap.net/page/introduction-qa-testing-topics) might find a place at the Solution level.

The Solution Architect, the Solution Management and the Solution Train Engineer jointly decide which functionalities they want the Solution Train (a team of teams of teams) to deliver and in what way. They do this within the boundaries set by the organization and taking into account the needs of the (end) customers.

Agile Release Train level

Within an Agile Release Train, a team of teams, under the guidance of System Architect, Product Management and Release Train Engineer, delivers its functionalities. At this level, there is mainly a need for coordination, for example about the timing of (partial) deliveries and interfacing, between teams that deliver functionalities within the same context. In the podcast https://podcasts. apple.com/tm/podcast/safe-agile-at-enterprise-level-release-trains-gitte/id1483649346?i=1000453629748 , Gitte Ottosen, in conversation with Rik Marselis, provides further explanation.

To facilitate cooperation between teams (in the process), proposals for improvement can be laid down at Agile Release Trains level. This will, in any case, occur during the Inspect & Adapt at the end of a Program Increment, or on an ad hoc basis if there is reason to do so. Just as with the Large Solution level, the investment in time and money involved is accepted here for the delivery of long-term benefit.

From the perspective of the Sogeti QA vision, the Agile Release Trains are another level at which both the TMAP® Organizing Topics and the TMAP® Performing Topics might find a place: www.tmap.net/page/introduction-qa-testing-topics.

Team level

In Agile environments it is customary to place the responsibility for quality (both of deliverables and of the production process) with the team. For example, the test effort is regularly recognized during refinement sessions and then considered during the planning session. In addition, the retrospective is used to propose process improvements. From these proposals, at least one will be resolved in the next sprint. The entire team decides which proposal is selected and the Product Owner agrees with the time to be invested in the improvement proposals.

SAFe® refers to quality within teams in various places (as previously listed in "QA-related topics within SAFe®" on page 4). In the Sogeti vision, at Team level special attention is paid to quality within Controlled Quality (for the processes), Continuous Testing (for the deliverables), Quality as Culture (for both) and Optimized Customer Experience (for the deliverables).

From the perspective of the Sogeti QA vision, the Team level is primarily the level at which both the TMAP® Performing Topics are resolved, although some of the Organizing Topics might also find a place here: www.tmap.net/page/introduction-qa-testing-topics.

Bringing it all together

Having outlined the QA-related aspects in SAFe® in the previous pages, the following table maps the 4 Sogeti Quality Values described earlier to the relevant SAFe® topics. As we have discussed, however, they are not necessarily elaborated in SAFe®.

These topics – aligned with our Quality Values – establish the parameters within which testing and validation activities should be run, setting standards and orchestrating QA across cross-functional teams. They provide a framework for scaled Agile QA and testing to be done the right way.

The SAFe® topics can be measured and monitored within a SAFe® implementation. The "SAFe® Business Agility Self-Assessment" tool is available for this, which can be found at https://www.scaledagileframework.com/?ddownload=45830. Discussing the content of this tool goes beyond the purpose of this document, but more information can be found on the ScaledAgileFramework site.

Sogeti Quality Values	SAFe® topics
Optimized Customer Experience	Customer Centricity and Design Thinking
	Release on Demand
Controlled Quality	Built-in Quality
Continuous Testing	Agile Testing (this is an advanced topic in SAFe®)
	Test Driven Development (this is an advanced topic in SAFe®)
Quality as Culture	Culture of Shared Responsibility
	Lean QMS
	Relentless Improvement
	Mindset and Principles

Conclusion

Given that SAFe® only addresses QA and testing at a high level, there is an imperative to look beyond it for proven approaches to embedding quality engineering across the lifecycle. Regardless of how SAFe® is implemented within an organization, there are numerous ways to incorporate QA. The TMAP® topics and the Sogeti vision on QA can help guide SAFe® Program Consultants to ensure the different levels of the implementation are designed to cater to all an organization's QA needs.

The business representatives at the different levels play an important role in determining which QA measures they consider necessary to deliver the quality demanded by the market. It is up to the technical representatives at the various levels to give substance to these QA measures by invoking the relevant TMAP® topics.

By thinking about QA in advance, before starting a SAFe® implementation, an organization can ensure it is ready to deliver the right quality to its customers.

To find out more about the TMAP® body of knowledge, visit www.tmap.net

About the author

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