SCRUMstudy
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A Guide to the

SCRUM BODY OF KNOWLEDGE

(SBOK® Guide)

13. SCALING SCRUM FOR LARGE PROJECTS

A Comprehensive Guide to Implementing and Scaling Scrum, with Practical Examples

(Includes insights into how Artificial Intelligence can enhance Scrum processes)

13. SCALING SCRUM FOR LARGE PROJECTS

This chapter emphasizes additional aspects of Scrum that are applicable to large projects. Scaling Scrum for large projects, as defined in *A Guide to the Scrum Body of Knowledge* (*SBOK® Guide*), is applicable to the following:

- Large projects in any industry
- Products, services, or any other results to be delivered to business stakeholders

The term "product" in the *SBOK® Guide* may refer to a product, service, or other deliverable. Scrum can not only be applied effectively to small projects in any industry but also to large, complex projects which may have hundreds of people assigned to many teams. In addition to the impacts that a large project can have on the fundamental Scrum processes discussed in chapters 8 through 12, this chapter introduces additional inputs, tools, and outputs that could apply to large projects.

To facilitate the best application of the Scrum framework, this chapter identifies additional inputs, tools, and outputs as either "mandatory" or "optional." Inputs, tools, and outputs denoted by asterisks (*) are mandatory, or considered critical for project success, whereas those with no asterisks are optional. It is recommended that the Scrum Team and those individuals being introduced to the Scrum framework and processes focus primarily on the mandatory inputs, tools, and outputs; while Chief Product Owners, Product Owners, Chief Scrum Masters, Scrum Masters, and other more experienced Scrum practitioners strive to attain more thorough knowledge of the information in this entire chapter. It is also important to realize that although all processes are defined uniquely in the *SBOK® Guide*, they are not necessarily performed sequentially or separately. At times, it may be more appropriate to perform some processes in parallel, depending on the specific requirements of each project.

This chapter is written from the perspective of a large project effort that coordinates activities of multiple Scrum Teams to jointly produce potentially shippable product increments/deliverables. Additional information pertaining to the application of Scrum to any project (large or small) can be found in chapters 2 through 7, which cover Scrum principles and Scrum aspects.

Large Scrum Project vs. Typical Small Scrum Project

The fundamental Scrum processes defined in chapters 8 through 12 are valid for Scrum projects with one Product Owner, one Scrum Master, and one to three Scrum Teams. These are usually considered small Scrum projects.

When dealing with large projects requiring the efforts of four or more Scrum Teams with multiple Product Owners and multiple Scrum Masters, the fundamental processes defined in chapters 8 through 12 remain valid, but some additional considerations and updates to inputs, tools, and outputs may be required. This may include additional coordination and synchronization efforts. The impact to the fundamental Scrum processes when scaling Scrum to large projects are described in this chapter.

The definition of what constitutes a large project usually depends on the organization and/or the complexity of the projects being undertaken. A key criterion for whether a project is considered small versus large is whether the project requires multiple Scrum Masters and/or multiple Product Owners. If the project still requires only one Scrum Master and one Product Owner, then these individuals can normally handle any additional communication and synchronization efforts required by the project.

Some reasons additional inputs, tools, and outputs would be needed for large projects are as follows:

Scrum Teams

- Increased interaction and dependencies among Scrum Teams, as complexity increases for a large project
- Need to manage conflicts, resolve issues, manage dependencies, and set priorities among all the Scrum Teams
- Requirement for specialization as some Scrum Teams may require specialized resources for specific tasks (and these particular skill sets are not needed on all Scrum Teams)
- Necessity to define certain guidelines and standards that should be adhered to by all Scrum Teams (e.g., security standards within a company or legal and governmental guidelines for specific industries); these may be defined by the Scrum Guidance Body
- Requirement to set up an environment or working area for the large project, which would then be used by all Scrum Teams
- Need for coordinating the outputs from several Scrum Teams to facilitate the release of a large project

Scrum Masters

- Need for collaboration between Scrum Masters when addressing impediments and for synchronizing the work of the multiple Scrum Teams

Product Owners

- Need for collaboration between Product Owners when working with business stakeholders, refining the Prioritized Product Backlog, and working with Scrum Teams.

It is also important to note that as Scrum is scaled for large projects, additional supporting services may be needed such as architects, product managers, compliance, information security, governance bodies, and so on.

Figure 13-1 shows the Vabro dashboard used for setting up a large project, displaying information on the project, personal tasks, and navigation options, allowing users to manage work, settings, and access the admin console efficiently.

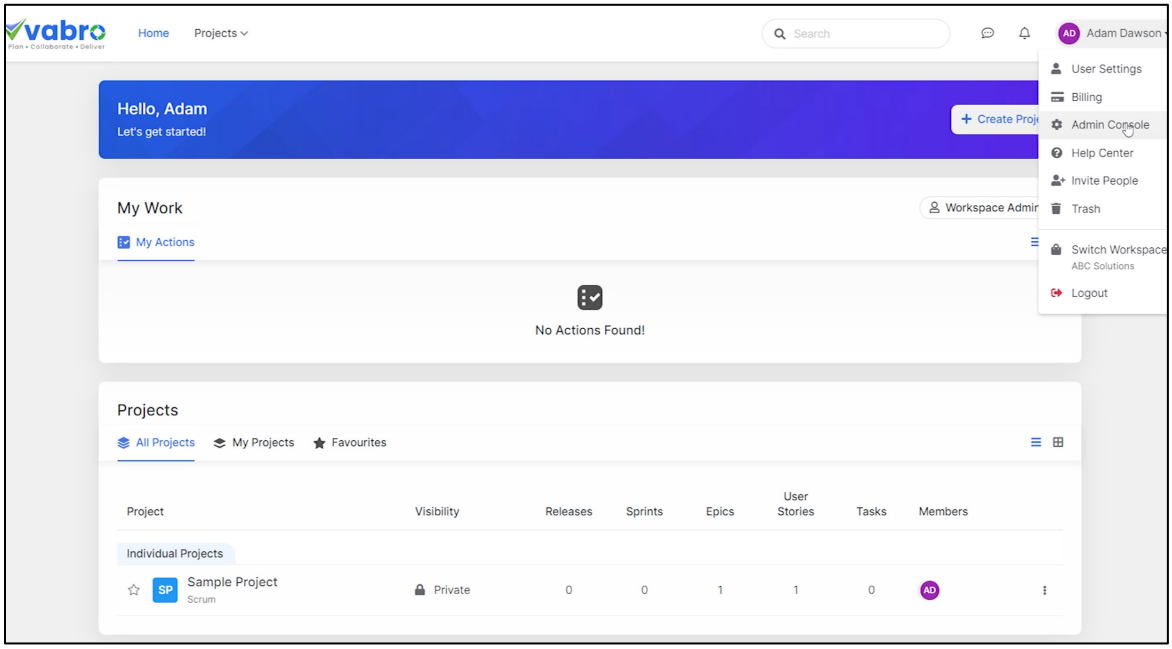

Figure 13-1: Setting up a Large Project (Source: Vabro)

13.1 Impact of Large Projects on Fundamental Scrum Processes

Although the fundamental Scrum processes described in chapters 8 through 12 remain valid for large projects, there are additional considerations that should be noted. Tables 13-1 through 13.5 outline a summary of the impacts of a large project to the fundamental Scrum processes for each project phase.

13.1.1 Initiate

The Initiate phase in a large project has the same objectives and follows the same flow as the Initiate phase in a typical/small Scrum project.

Compared to a typical Scrum project, additional roles need to be identified and additional activities need to be performed to achieve an agreement on how the multiple Product Owners, Scrum Masters, and Scrum Teams will collaborate among themselves and with the business stakeholders.

Figure 13-2 shows the project creation screen in Vabro, where users define the template, visibility, name, description, and estimation criteria for structured planning.

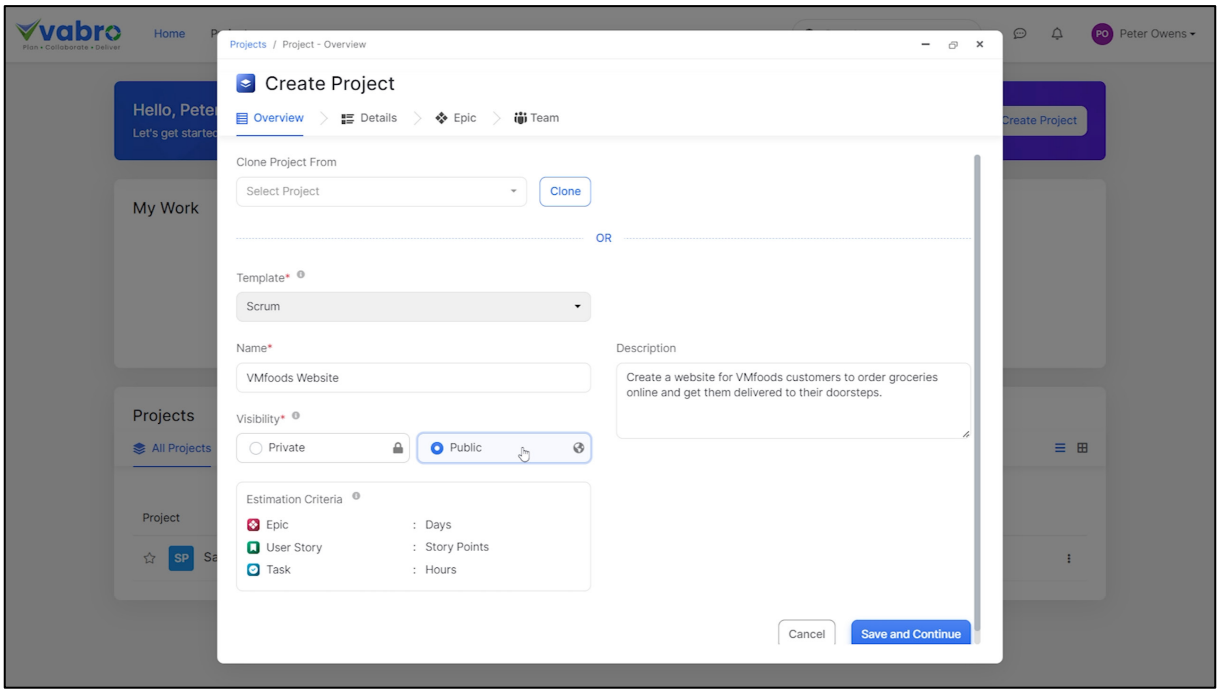

Figure 13-2: Initiating a Large Project (Source: Vabro)

Process	Summary of Impacts of a Large Project
8.1 Create Project Vision	A Chief Product Owner and additional Product Owners are identified in this process. In a large project, the Chief Product Owner has the overall business responsibility for the project and works with the sponsor and other business stakeholders to create the Project Vision. Additionally, the Product Owners Collaboration Plan is created. **Additional Output: Identified Chief Product Owner*** (see section 3.7.2.1) In a large project, the Chief Product Owner has the overall business responsibility for the project and works with the sponsor and other business stakeholders to create the project vision. As part of this process, the Chief Product Owner is identified. **Updated Output: Identified Product Owner*** (see section 8.1.3.1) Because in a large project, there are multiple Product Owners, they also need to be identified in this process. **Additional Output: Product Owners Collaboration Plan*** (see section 13.2.2) For large projects, it will be essential for the entire team of Product Owners to embrace Scrum and to collaborate to successfully deliver Scrum projects.

Process	Summary of Impacts of a Large Project
8.2 Identify Scrum Master and Business Stakeholder(s)	A Chief Scrum Master and additional Scrum Masters are identified in this process. The Chief Scrum Master focuses on multi-team interaction and synchronization. Several additional or updated outputs for this process are as follows. **Additional Output**: **Identified Chief Scrum Master*** (see section 3.7.2.2) Similar to the Chief Product Owner, the Chief Scrum Master should also be identified for a large project. He/she focuses on multi-team interaction and synchronization. **Updated Output: Identified Scrum Masters*** (see section 8.2.3.1) Because in a large project, there are multiple Scrum Masters that are identified in this process. **Additional Output: Large Project Scrum Organization*** (see section 13.2.1) It will be essential for the entire large project team to embrace a common understanding of Scrum and working agreements to successfully deliver the Scrum project. **Additional Output: Scrum Masters/Scrum Teams Collaboration Plan*** (see section 13.2.3) The Scrum Masters/Scrum Teams Collaboration Plan defines how the Scrum Masters and teams participate in the refining of the Prioritized Product Backlog. This plan would also define which team representatives would be involved in the refining process, and how they are selected. **Additional Output: Shared Resources*** (see section 13.2.4) Knowledge of any shared resources available to the Scrum Teams would be a necessary input in forming the individual Scrum Teams. **Updated Output: Identified Supporting Services** (see section 3.2.2) In addition to identifying supporting services, for a large project, some additional supporting services may be needed to coordinate activities between all Product Owners, Scrum Masters, and Scrum Teams.

Process	Summary of Impacts of a Large Project
8.3 Form Scrum Team	In a large project, multiple Scrum Teams are formed, involving multiple Product Owners and Scrum Masters, as well as a Chief Product Owner and a Chief Scrum Master. The Chief Product Owner and Chief Scrum Master are involved in determining the formation of the Scrum Teams and they also provide input during the selection of team members. The Chief Product Owner and Chief Scrum Master serve the interests of the larger project, while the Product Owners and Scrum Masters are more focused on their respective Scrum Teams. **Additional Input: Chief Product Owner*** (see section 3.7.2.1) For a large project, the Chief Product Owner would be involved in determining the formation of the Scrum Teams and have input regarding the members of the teams. The Chief Product Owner would serve the interests of the large project as a whole, while Product Owners would be focused on the individual team level. **Additional Input: Chief Scrum Master*** (see section 3.7.2.2) For a large project, the Chief Scrum Master would be involved in determining the formation of the Scrum Teams and have input to the members for the teams. The Chief Scrum Master would serve the interests of the large project as a whole, while Scrum Masters would be focused on the individual team level. **Additional Input: Scrum Masters/Scrum Teams Collaboration Plan*** (see section 13.2.3) **Additional Input: Team Specialization*** (see section 13.2.5) Some Scrum Teams and Scrum Team members may require specialized skills to work on specific issues related to large projects. **Additional Tool: Large Project Communications Plan*** (see section 13.3.1) This plan highlights how to manage effective communication between all people involved with a large project. **Additional Tool: Large Project Resource Planning*** (see section 13.3.2) This helps manage the complexity of allocating several types of resources to the numerous Scrum Teams working in parallel. **Additional Optional Tool: AI-powered Scrum Project Tool** (see section 13.3.8) Since large projects would have many people, there would be significant complexity and interaction between Scrum Teams, it is recommended to use an AI-powered Scrum Project Tool to automate processes, manage complexity, generate reports, manage communication between business stakeholders, etc.

Process	Summary of Impacts of a Large Project
8.3 Form Scrum Team (cont'd)	**Additional Tool: Environment Identification*** (see section 13.3.3) In large projects, it is important to identify the number and types of environments needed because numerous Scrum Teams will be working simultaneously to carry out the work of their respective Sprints. **Additional Output: Environment and Environment Schedule*** (see section 13.2.6) After environments are identified, an Environment Schedule is created which is used for the coordination of Sprint activities across teams. **Additional Output: Updated Scrum Masters/Scrum Teams Collaboration Plan*** (see section 13.2.3) As Scrum Teams are formed, inputs from the teams and additional considerations will result in updates to Scrum Masters/Scrum Teams Collaboration Plan.
8.4 Develop Epic(s)	Any Product Owner interaction with the customer and other business stakeholders is handled by the Chief Product Owner and the multiple Product Owners, rather than a single Product Owner. How that interaction is divided is defined in the Product Owner Collaboration Plan. Any interaction with and participation of Scrum Masters and / or Scrum Team members occurs as defined in the Scrum Masters/Scrum Teams Collaboration Plan. Otherwise, the creation of Epics is done the same way as in a typical small Scrum project. **Additional Input: Product Owners Collaboration Plan*** (see section 13.2.2) It defines how the multiple Product Owners work together and with the Chief Product Owner. It addresses how they work with the business stakeholders for collecting requirements, make updates to the Prioritized Product Backlog, and work with the multiple Scrum Teams. There will be only one Product Owner directly interfacing each Scrum Team. However, decisions must be made regarding how Scrum Teams will be allocated among the Product Owners, and how many Scrum Teams each Product Owner will work with. **Additional Input: Scrum Masters/Scrum Teams Collaboration Plan*** (see section 13.2.3) **Additional Optional Tool: AI-powered Scrum Project Tool** (see section 13.3.8)

Process	Summary of Impacts of a Large Project
8.5 Create Prioritized Product Backlog	Typically, the various Product Owners contribute to the creation of the Prioritized Product Backlog, as agreed to in the Product Owners Collaboration Plan. Final prioritization decisions and resolution of any conflicts between Product Owners are handled by the Chief Product Owner. Otherwise, the process is handled the same way as in a typical small Scrum project. **Additional Input: Product Owners Collaboration Plan*** (see section 13.2.2) Since the Product Owners Collaboration Plan defines how the Product Owners make updates to the Prioritized Product Backlog, it is an important input to this process. **Additional Tool: Prioritized Product Backlog Assignments*** (see section 13.3.4) Since the Chief Product Owner and several Product Owners are involved with a large project, Prioritized Product Backlog Assignments ensure effective allocation of Epics and User Stories to all the Product Owners. **Additional Optional Tool:** AI-powered Scrum Project Tool (see section 13.3.8)
8.6 Conduct Release Planning	For a large project, the Release Planning Schedule is created by the Chief Product Owner. Since releases can be more complicated with large projects, a Release Readiness Plan is created in the process (if needed) which is later used to confirm that the requirements for each release have been met. Otherwise, the process is handled the same way as in a typical Scrum project **Additional Input: Chief Scrum Master*** (see section 3.7.2.2) **Additional Output: Release Readiness Plan*** (see section 13.2.7) The Release Readiness Plan includes specific activities that need to be done shortly before release planning.

Table 13-1: Impact of Large Projects to Fundamental Scrum Processes—Initiate Phase

13.1.2 Plan and Estimate

As in a typical/small Scrum project, the Plan and Estimate phase in a large project has the objective to agree on and plan the work that will be completed in the upcoming Sprint. Each Scrum Team works with its respective Scrum Master and Product Owner to commit to the specific work for the Sprint and to plan how the team will perform the work (as in a typical Scrum project).

Compared to a small Scrum project, additional steps need to be taken to divide the work between the multiple Scrum Teams. Which teams and team members participate in the creation and estimation of which User Story, and how the commitment of User Stories and the creation of the respective deliverables are divided between the different teams is based on team specialization and the Collaboration Plan.

Figure 13-3 displays the User Story creation interface in Vabro, allowing users to define the name, description, work type, and team assignment for backlog items.

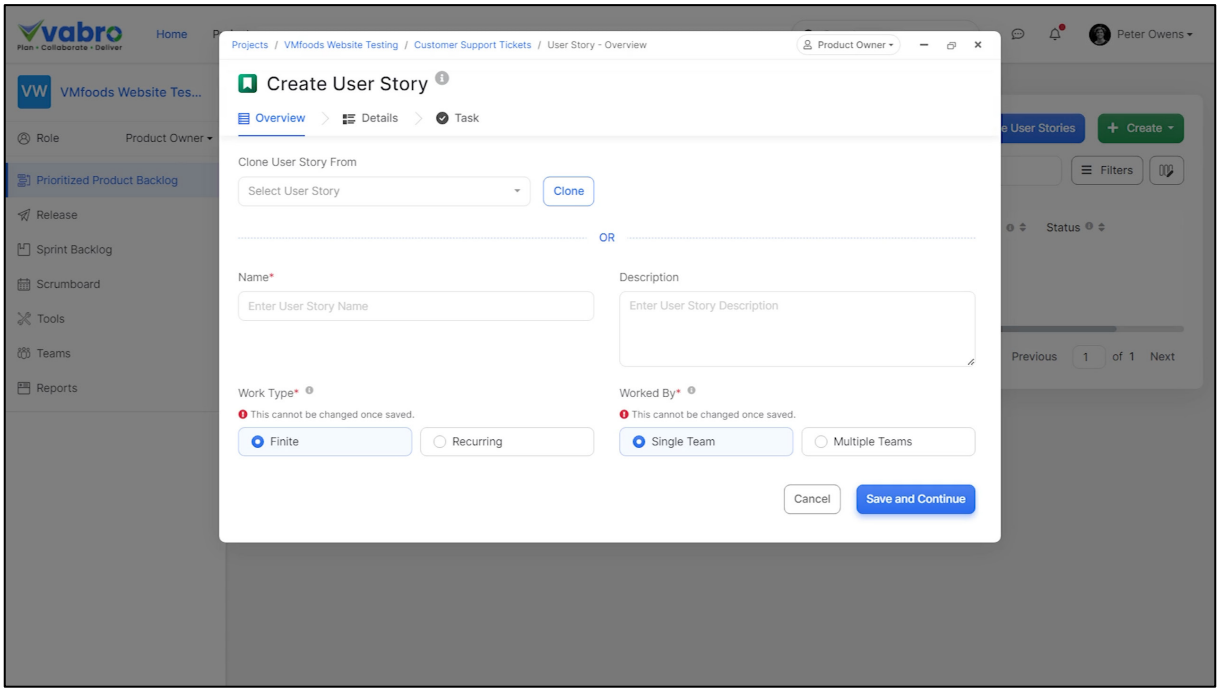

Figure 13-3: Creating a User Story in Plan and Estimate Phase (Source: Vabro)

Process	Summary of Impacts of a Large Project
9.1 Create User Stories	In a large project, multiple Product Owners and multiple Scrum Teams are involved in the Creation of User Stories. Not every Product Owner and not every Scrum Team/Scrum Team member can be involved in the creation of every User Story. Hence, the creation of User Stories is divided between the multiple Product Owners based on the Product Owners Collaboration Plan, as well as between the multiple Scrum Teams based on team specialization and the Collaboration Plan. Otherwise, the process is done the same way as in a typical small Scrum project. **Additional Input: Product Owners Collaboration Plan*** (see section 13.2.2) **Additional Input: Scrum Masters/Scrum Teams Collaboration Plan*** (see section 13.2.3) **Additional Tool: Environment Identification*** (see section 13.3.3) In a large project, it is important to identify the number and types of environments needed for Scrum Teams to work effectively. **Additional Optional Tool: AI-powered Scrum Project Tool** (see section 13.3.8)
9.2 Estimate User Stories	In a large project, not every Scrum Team/Scrum Team member can be involved in the estimation of every User Story. Hence, only specific teams/team members usually participate in the estimation of User Stories. Which team or team members estimate which User Stories is decided based on team specialization and the Collaboration Plan. Which Product Owner works with the respective Scrum Teams/Team members usually depends on who created the respective User Stories and is best suited to answer any questions related to the User Stories being estimated. This is also based on the Product Owners Collaboration Plan. Otherwise, the estimation of User Stories is done the same way as in a typical Scrum project. **Additional Input: Product Owners Collaboration Plan*** (see section 13.2.2) **Additional Input: Scrum Masters/Scrum Teams Collaboration Plan*** (see section 13.2.3) **Additional Optional Tool: AI-powered Scrum Project Tool** (see section 13.3.8)

Process	Summary of Impacts of a Large Project
9.3 Commit User Stories	For each Sprint in a large project, each team is asked to commit to a specific subset of User Stories for the Sprint and then to create the respective deliverables. The decision, which team is asked to commit and implement which User Stories, depends on the specific skills of each team, and is based on team specialization. Otherwise, the commitment of User Stories is handled the same way as in a typical small Scrum project, based on priorities, estimates, and team-specific velocity. **Additional Optional Tool: AI-powered Scrum Project Tool** (see section 13.3.8)
9.4 Identify Tasks	Each team does the identification of tasks to decompose the User Stories that the team has committed to. Each Scrum Team identifies tasks in a similar way as they would in a typical small Scrum project. **Updated Tool: Dependency Determination*** (see section 8.5.2.6) Also described in section 9.4.2.3. In large projects, properly identifying dependencies helps the Scrum Teams determine which of their decisions and activities may impact other teams. It may also influence the relative order in which a single Scrum Team executes its respective tasks to create the Sprint Deliverables. **Additional Optional Tool: AI-powered Scrum Project Tool** (see section 13.3.8)
9.5 Estimate Tasks	Tasks identified in the previous process would optionally be estimated, exactly as it is done in a typical small Scrum project. **Additional Optional Tool: AI-powered Scrum Project Tool** (see section 13.3.8)
9.6 Update Sprint Backlog	Each team updates its specific Sprint Backlog according to its committed User Stories and associated tasks. Each team updates the Sprint Backlog exactly as it is done in a typical small Scrum project. **Additional Input: Environment and Environment Schedule** (see section 13.2.6) **Additional Optional Tool: AI-powered Scrum Project Tool** (see section 13.3.8)

Table 13-2: Impact of Large Projects to Fundamental Scrum Processes—Plan and Estimate Phase

13.1.3 Implement

In the Implement phase of a large project, each Scrum Team, facilitated by its Scrum Master, creates the deliverables that are associated with the User Stories that were committed to by working on and completing the tasks that the team identified in the Plan and Estimate phase.

Compared to a small Scrum project, additional steps need to be taken to ensure there is effective communication between the multiple teams (as defined in the Communications Plan) and that the work is synchronized (as detailed) in the Collaboration Plan).

As in a typical/small Scrum project, while the Scrum Teams are creating the deliverables of the Sprint, the Chief Product Owner and the other Product Owners refine the Prioritized Product backlog to keep it up to date with any changes in requirements and/or changes to priorities. They also ensure that the set of User Stories they would like the Scrum Teams to commit to deliver in the next Sprint will be ready for estimation and commitment.

On a large project, the Product Owners divide their work, based on the Product Owners Collaboration Plan. Interactions with the Scrum Teams and/or Scrum Team members is based on the Scrum Team's specialization and the Collaboration Plan.

Figure 13-4 shows the "Prioritize User Stories" screen in Vabro, enabling users to rank backlog items by priority, DoR, status, and story point estimates.

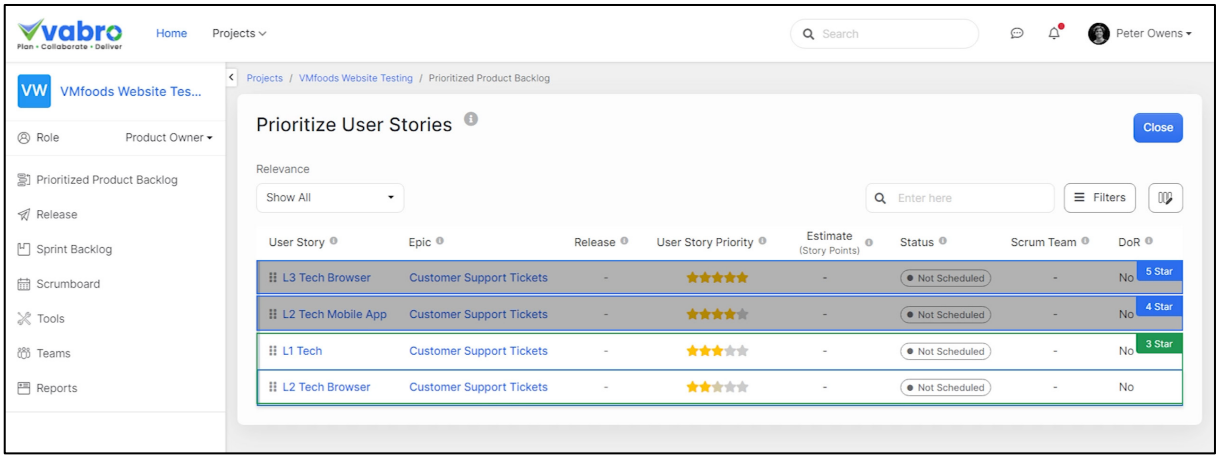

Figure 13-4: Prioritization of User Stories in Implement Phase (Source: Vabro)

Process	Summary of Impacts of a Large Project
10.1 Create Deliverables	Each team creates the deliverables associated with the User Stories it has committed to. Different from a typical small Scrum Project, a Scrum Team in a large project faces limitations in its freedom to organize its work. These limitations are due to the need to share resources with other teams (as specified and agreed to in the Shared Resources) as well as the Environment and Environment Schedule, and also due to potential impacts from decisions that other teams may make. Furthermore, additional activities are required to ensure effective communication and synchronization between the Scrum Teams. **Additional Input: Release Readiness Plan*** (see section 13.2.7) **Additional Tool: Scrum of Scrum Meetings*** (see section 13.3.5) These are focused meetings where Scrum Team representatives meet to share the status of their respective teams. **Additional Tool: Release Preparation Methods*** (see section 13.3.6) Release preparation methods are used to execute the tasks identified in the Release Readiness Plan in order to ready the deliverables to be shipped/released.
10.2 Conduct Daily Stand Up	Each team conducts its Daily Standup Meeting exactly as it is done in a typical Scrum project. However, because each Scrum Master may be working with multiple Scrum Teams, some coordination effort is required to avoid scheduling conflicts between the Daily Standup Meetings of their respective Scrum Teams. **Additional Optional Tool: AI-powered Scrum Project Tool** (see section 13.3.8)

Process	Summary of Impacts of a Large Project
10.3 Refine Prioritized Product Backlog	The differences compared to a typical small Scrum project are the same differences as in the processes *Develop Epics* and *Create Prioritized Product Backlog*. Specifically, any Product Owner interaction with the customer and other business stakeholders is handled by the Chief Product Owner and/or the multiple Product Owners, rather than a single Product Owner. How that interaction is divided is defined in the Product Owners Collaboration Plan. Additionally, the Chief Product Owner makes final prioritization decisions. Any interaction with and participation of Scrum Masters and/or Scrum Team members occurs as defined in the Scrum Masters/Scrum Teams Collaboration Plan. Otherwise, the Refining of the Prioritized Product Backlog is handled as in a typical Scrum project. **Additional Input: Product Owners Collaboration Plan*** (see section 13.2.2) The Product Owners Collaboration Plan defines how the Product Owners make updates to the Prioritized Product Backlog. **Additional Input: Scrum Masters/Scrum Teams Collaboration Plan*** (see section 13.2.3) **Additional Input: Team Specialization*** (see section 13.2.5) **Additional Tool: AI-powered Scrum Project Tool** (see section 13.3.8) **Additional Optional Tool: Release Readiness Sprint*** (see section 13.3.7) **Additional Outputs: Updated Release Readiness Plan*** (see section 13.2.7) Changes to the Prioritized Product Backlog made during the refining of the Prioritized Product Backlog may impact the Release Readiness Plan.

Table 13-3: Impact of Large Projects to Fundamental Scrum Processes—Implement Phase

13.1.4 Review and Retrospect

In the Review and Retrospect phase of a large project, each Scrum Team demonstrates the deliverables the team has created in a Sprint to its respective Product Owner for approval and feedback and then meets to determine ways to continually improve their work. This is done the same way as in a typical Scrum project.

In addition, the Product Owners meet to determine ways to improve their work, and as the final step of a Sprint, the Chief Product Owner and the Chief Scrum Master meet with the appropriate Product Owners, Scrum Masters, and Scrum Team members to share the results of their respective Retrospect Sprint Meetings. Because each Scrum Master and each Product Owner may be working with multiple Scrum Teams, some coordination effort is required to avoid scheduling conflicts between the Sprint Review Meetings and/or the Retrospect Sprint Meetings of different Scrum Teams.

Process	Summary of Impacts of a Large Project
11.1 Demonstrate and Validate Sprint	This process is carried out individually by each Scrum Team. For each team, the respective Product Owner approves the completed User Stories. However, this can be complex due to inter-dependencies. There may be times when the Chief Product Owner attends Sprint Review Meetings for some Scrum teams which have inter-dependent deliverables. **Additional Input: Chief Product Owner*** (see section 3.7.2.1)

Process	Summary of Impacts of a Large Project
11.2 Retrospect Sprint	Each Scrum Team in the project meets with its Scrum Master for a Retrospect Sprint Meeting, which is done in the same way as in a typical small Scrum project. Because a single Scrum Master and a single Product Owner may work with multiple Scrum Teams, some coordination effort is required to avoid scheduling conflicts between the Retrospect Sprint Meetings of different Scrum Teams. Also, the Chief Product Owner and the Product Owners meet for a Retrospect Sprint Meeting to discuss their collaboration and other aspects of the Sprint. Additionally, Scrum Masters and/or other representatives from each Scrum Team meet for a special Scrum of Scrums Meeting (SoS) to share best practices and other results of the Retrospect Sprint Meetings of the different teams, for example, issues with inter-team collaboration. Because in a large project, very often best practices, and problems stem from the collaboration between the multiple Scrum Teams and the team of Product Owners, it is common practice for the Chief Product Owner and other Product Owners to participate in this meeting. **Additional Input: Product Owners Collaboration Plan*** (see section 13.2.2) Refining the Prioritized Product Backlog may be particularly difficult where large projects are concerned. If not done effectively, refining can cause problems and waste effort across teams. Therefore, it is recommended that refining be discussed as part of the retrospective, specifically focusing on how the multiple Product Owners interface with each other and with the Scrum Teams to effectively conduct backlog refinement. Also, it is preferable to have Epics and User Stories with a lot of dependencies to be grouped together. **Additional Input: Scrum Masters/Scrum Teams Collaboration Plan*** (see section 13.2.3) For large projects the refining of the Prioritized Product Backlog may be particularly difficult. If not done effectively, refining can create problems and waste effort across the teams. Therefore, it is recommended that refining be discussed as part of the retrospective, with a specific focus on the interworking between the various Scrum Masters, Scrum Teams and how they interact with Product Owners for the refining activities.

Table 13-4: Impact of Large Projects to Fundamental Scrum Processes—Review and Retrospect Phase

13.1.5 Release

In the Release phase of a large project, the Product Owners of individual Scrum Team coordinate with the Chief Product Owner to ensure that the deliverables of all Scrum Teams are synchronized, integrated and released as required by the customer and other business stakeholders. Additionally, the Product Owners Collaboration Plan and Scrum Masters/Scrum Teams Collaboration Plan is refined to ensure better coordination across all teams in a large project.

Process	Summary of Impacts of a Large Project
12.1 Ship Deliverables	In a large project, all Accepted Deliverables from previously completed Sprints are generally delivered or transitioned to business stakeholders in the same way as in a typical small Scrum project. However, based on business considerations and due to the complexity of large projects, additional preparation steps may be necessary to prepare for the Release. **Additional Input: Chief Product Owner** (see section 3.7.2.1) **Additional Input: Chief Scrum Master** (see section 3.7.2.2) **Additional Input: Release Readiness Plan** (see section 13.2.7) **Additional Optional Tool: Release Readiness Sprint** (see section 13.3.7) Sometimes a Release Readiness Sprint may need to be planned for the whole project release. Requirements of such a Sprint are then added to the Prioritized Product Backlog.

Process	Summary of Impacts of a Large Project
13.2 Retrospect Release	**Additional Input: Chief Product Owner*** (see section 3.7.2.1) **Additional Input: Chief Scrum Master*** (see section 3.7.2.2) **Additional Input: Product Owners Collaboration Plan*** (see section 13.2.2) For large projects the refining of the Prioritized Product Backlog may be particularly difficult. If not done effectively, refining can cause problems and waste effort across teams. Therefore, it is recommended that refining be discussed as part of the retrospective, specifically focusing on how the multiple Product Owners interface with each other and with the Scrum Teams to effectively conduct backlog refinement. Also, it is preferable to have Epics and User Stories with a lot of dependencies to be grouped together. **Additional Input: Scrum Masters/Scrum Teams Collaboration Plan*** (see section 13.2.3) For large projects coordinating and managing activities and interdependencies across multiple Scrum Masters and Scrum Teams may be very difficult – so it is recommended that a Scrum Masters/Scrum Teams Collaboration Plan is available and continually refined to ensure better collaboration across all Scrum Masters and Scrum Teams.

Table 13-5: Impact of Large Projects to Fundamental Scrum Processes—Release Phase

13.2 Additional Inputs and Outputs for Large Projects

13.2.1 Large Project Scrum Organization*

The appropriate organizational structure needed to implement and support large projects is defined in consultation with the Chief Product Owner, Chief Scrum Master, Senior Management, Scrum Guidance Body, and other relevant experts. Organizations planning to use Scrum to implement large projects should fully embrace the Scrum framework. The organization should be able to support the effort by committing the required resources. If the organization cannot commit the required resources, plans must be made to procure necessary resources such as people, tools, and workspace. It is imperative that an organization planning to use Scrum be prepared to drastically change its work culture and habits in order to truly realize the benefits of using Scrum.

In a Scrum environment where large projects are being developed, there will be numerous Scrum Teams competing for resources. Thus, it is important to manage the organizational resources in an optimal way to achieve the overall project objectives. The Large Project Scrum Organization should consider the components that will be developed; the skills, costs, and other resources required to develop them; the Scrum Teams' current velocities (or estimated/assumed velocities) to provide a high-level estimate for the project's duration; the communication requirements; and other interfaces that the Scrum Teams need to maintain.

13.2.2 Product Owners Collaboration Plan*

The Chief Product Owner works with key Product Owners to create the Product Owners Collaboration Plan. The Product Owners Collaboration Plan should specifically define how the Product Owners should collaborate with the Chief Product Owner. Minimally, this plan should define how many Scrum Teams a Product Owner can be assigned to (usually based on factors such as experience, time, and domain knowledge), how the work of gathering requirements from the business stakeholders will be allocated among the Product Owners, how the Prioritized Product Backlog will be updated with new requirements or changes in requirements, and how the Product Owners will collaborate with multiple Scrum Teams. It should be noted that each Scrum Team will still collaborate with only one Product Owner; however, a single Product Owner can collaborate with more than one Scrum Team, if required.

13.2.3 Scrum Masters/Scrum Teams Collaboration Plan*

The Chief Scrum Master works with key Scrum Masters, the Scrum Guidance Body, and at times some already-identified members of the Scrum Teams to create the Scrum Masters/Scrum Teams Collaboration Plan. The Scrum Masters/Scrum Teams Collaboration Plan defines how the numerous Scrum Teams will collaborate with each other to provide the highest value in the shortest possible time. A large project will have multiple Scrum Masters assigned—each facilitating and ensuring a productive work environment for their respective Scrum Team. It is possible than one Scrum Master may be facilitating more than one Scrum Team at the same time. Scrum Masters need to collaborate with other Scrum Masters as well as the Chief Scrum Master, the Chief Product Owner, and the Product Owners to develop the list of components and resources needed in common for all teams throughout the project. They also help provide inputs for the creation of the Release Readiness Plan.

The plan should include information on specialized domains assigned to qualified teams, how the teams will support Prioritized Product Backlog refining and estimation (i.e., which of the team members will participate in the refining sessions and high-level estimation exercises), and how the teams will organize the Scrum of Scrums (SoS) meetings. It may also be necessary to use an AI-powered Scrum Project Tool to facilitate the use of Scrum on large projects.

The Scrum Masters/Scrum Teams Collaboration Plan may also include information on how each Scrum Team will be coached. For example, it may include information on whether there will be a separate coach in addition to the Scrum Master; whether there will be a Scrum Master at each location in the case of distributed teams; how the team members will collaborate with colocated Scrum Masters and with Scrum Masters who are not colocated, and so on.

Although Scrum Teams working on a large project need to interact with each other when creating the Prioritized Product Backlog, Product Owners can ensure that User Stories with a lot of dependencies are grouped together, and owned by a single Product Owner so that deliverables will be worked on by only one or a few Scrum Teams. This minimizes the dependencies of tasks between different Scrum Teams, the more effectively each Scrum Team can work efficiently to create its deliverables.

13.2.4 Shared Resources*

Shared resources can include people, environment, and equipment that are needed by some or all of the Scrum Teams working on the project. In a large project, the shared resources are limited and may be needed by multiple Scrum Teams at the same time. In this context, the Chief Product Owner, the Chief Scrum Master, other Product Owners, and other Scrum Masters need to agree on a method for how shared resources will be allocated. An example of a method for allocating shared resources could be to ensure that resources are assigned first to those teams working on the most important/highest value features. When competing requests have similar priorities, the Chief Product Owner should decide the allocation of resources based on current business requirements, priorities, and other defined criteria.

13.2.5 Team Specialization*

There are three considerations of team specialization that should be considered when applying Scrum to large projects. The first dimension is the need for accomplishing a set of specific tasks. For example, one specialized team might be an integration team that has expert knowledge of continuous integration. This knowledge could be especially important when conducting a Release Readiness Sprint (if there is a need for specific tasks to be performed prior to a release).

The second dimension is the need for special skills of individual team members. Theoretically, all Scrum Team members are generalists and specialists in that they have general knowledge of various fields and are experts in at least one. However, this might not be the case in a large project. Members of the team may need to possess specific skills—such as special domain knowledge like security—which may not be available across all the teams working on the large project for which the skill is needed. In this case, it would be extremely costly to train everyone in all the required specialized domains.

Experts with specialized skills and knowledge can be assigned to the Scrum project and used as needed in different teams. However, at times it may be necessary to hire experts from external sources when they are needed, keeping in mind that adding a new team member will impact team velocity.

The third dimension for acquiring experts is due to any limitations in team flexibility. Typically, on a Scrum project, each team will have one or more domains in which they have significant expertise, a few domains they can work on with some input and training, and other domains in which they do not have the skills or experience. During Sprint planning, for every team, there will be a subset of User Stories that are logically assigned to the team based on their expertise, some that they can work on, and some that they may not be able to work on because they don't have the required knowledge or skills. In this case, experts may need to be acquired when there is not enough flexibility in the skills of team members.

Limited access to resources with specialized skills on a large Scrum project results in some level of risk to the project. Some top-priority User Stories may not be able to be completed in a single Sprint. Teams may need to work on some lower-priority User Stories while waiting for the availability of team members with specialized skills.

13.2.6 Environment and Environment Schedule*

The required development environments may not always be available throughout the duration of a large project. For example, a crane needed for a construction activity, or a specialized testing environment may only be available on specific days. Once all the required environments are identified, an Environment Schedule is created and used for the coordination of Sprint activities in the *Update Sprint Backlog* process. The Environment Schedule is a calendar detailing how the Scrum Teams will access and/share any specific environments. The schedule allocates days and time periods for when each team can use each environment.

13.2.7 Release Readiness Plan*

The Chief Product Owner works with other Product Owners to create the Release Readiness Plan. The Release Readiness Plan details the steps to be taken by relevant Scrum Teams and any other individuals to confirm that the minimum requirements for release have been met, and the product or product increment is ready for release. The business decisions with their associated business justifications for performing release readiness tasks are also described in the Release Readiness Plan.

Because every Sprint creates a potentially shippable product or other deliverable, in a typical small Scrum project, a release can occur after any Sprint when it makes business sense to do so. However, in a large Scrum project, there may be certain activities related to release preparedness that should be performed for some Sprints in the project. For example, a project team may need to run a full set of expensive and time-consuming performance tests or conduct a special set of end-to-end integration tests just prior to a release. These activities are considered outside the defined Done Criteria for regular Sprints, and in such cases, a separate Release Readiness Sprint will be necessary (see section 13.3.7) to complete the tasks needed to prepare for a release.

13.3 Additional Tools for Large Projects

13.3.1 Large Project Communications Plan

The Communications Plan for a large project is created by the Chief Product Owner, Chief Scrum Master, and Scrum Guidance Body, with input from other Product Owners, Scrum Masters, Scrum Teams, and other relevant persons. A Large Project Communications Plan is essential in a large project as miscommunication or lack of communication on the project can be detrimental to the collaborative efforts and can result in project failure. A Communications Plan should include information pertaining to how communications will take place across all Scrum Teams and to business stakeholders, including the communication methods to be used, the communication channels or mechanisms to communicate key information, the responsibilities for communications, the classification of and means to deal with sensitive information, the timing of communication activities, and the processes to assess communication effectiveness. The Communications Plan should also include the timing and frequency of the Scrum of Scrums Meetings (SoS) and how these meetings will be conducted.

Each Scrum Team may also have its own Communications Plan (see section 12.1.3.4) that specifies the records that must be created and distributed, and how these records will be maintained throughout the project. The plan should also include the methods to be used to convey important project information to business stakeholders and who is responsible for all the various communication activities. Since it may be exceedingly difficult for everyone in a large project to be colocated, using an AI-powered Scrum Project Tool may help facilitate effective communication.

13.3.2 Large Project Resource Planning*

Resource planning for large projects is essential due to the complexity of allocating several types of resources to the numerous Scrum Teams working in parallel. There will be competing needs for scarce resources, and the Chief Product Owner and other Product Owners must plan for delivering the greatest value in the shortest amount of time. Resource planning in a large project should take into consideration the various costs associated with resources such as people, training, hardware and software, external services, and physical space. The Chief Product Owner and other Product Owners may have to coordinate with external sources to acquire resources and augment staff (e.g., external resources may need to be hired to work with the existing full-time team and may also need to interact with the existing vendor management team within the organization). When hiring external resources, the Chief Product Owner and team must comply with organizational policies for dealing with external resources and vendors.

In large projects, the Chief Product Owner may also need to consider additional resource planning to address the needs of specialized teams and the need for setting up environments for numerous Scrum Teams working in parallel. The Chief Product Owner and the Product Owners can collaborate with Scrum Masters and Scrum Teams to define the specialized skills required for the large project, the number of resources required, the Scrum Teams that need specialized skills, and allocation estimation.

13.3.3 Environment Identification*

The Chief Scrum Master works with other Scrum Masters, relevant Product Owners, Scrum Team members, Supporting Services, the Scrum Guidance Body, and other experts as required to identify the required and appropriate environments that will be needed to effectively complete the large project. This should preferably happen once during the Initiate phase or when required by the teams and/or the SGB.

In a large project, it is important to identify the number and types of environments needed because numerous Scrum Teams will be working simultaneously to carry out the work of their respective Sprints and environment needs could be complicated and may conflict. Some examples of environments include software development or test areas, physical work areas, or environments with specialized equipment. Process boundaries for each Scrum Team may also affect environments. Also, with distributed teams working in different time zones, it may be possible to conduct 24-hour testing and maximize the use of different environments. Therefore, it is imperative to create an Environment Schedule which shows the testing times for each team. For software projects, the Environment Schedule can also include information on how and by whom code will be promoted to each environment.

13.3.4 Prioritized Product Backlog Assignment*

In a large project, the Prioritized Product Backlog (with its corresponding Epics and User Stories) is created by the Chief Product Owner and other Product Owners in much the same way as for typical small Scrum projects.

The creation of Epics and User Stories by the Product Owners may depend on multiple factors such as:

- How the requirements were collected from the business stakeholders
- Knowledge and experience/skill set of the Product Owners

The Chief Product Owner and other Product Owners work together to review the Prioritized Product Backlog and determine which Epics and User Stories will be owned by each Product Owner. Although some Epics and User Stories may be created by a particular Product Owner, they may be assigned to another Product Owner to manage and implement as part of the large Scrum project. Epics and User Stories must be prioritized, and some pre-existing estimates may be used to facilitate their assignment to different Product Owners.

The assignment of Epics and User Stories to Product Owners is influenced by other factors such as:

- The Product Owner who created the Epic/User Story (as he/she will often own its implementation)
- The Product Owner who has the team with the appropriate skill sets to complete the Epic/User Story
- The specific customer, sponsor, or organization linked to the Epic/User Story (as there could be a past relationship with a particular Product Owner)
- The number of dependencies pertaining to each Epic/User Story (as grouping User Stories with a lot of dependencies under one Product Owner could allow the teams to work relatively independent of each other, without the need to spend too much time in coordination with other teams)

The assignment and prioritization of Epics or User Stories to Product Owners can be done over a period of time through meetings and if possible, through the use of an AI-powered Scrum Project Tool.

13.3.5 Scrum of Scrums (SoS) Meeting*

A Scrum of Scrums (SoS) Meeting is an essential element when scaling Scrum to large projects. The objective of most Scrum of Scrum meetings is the synchronization of teams during the creation of deliverables but could also be used for sharing best practices after Retrospect Sprint Meetings, and for planning future Sprints. The frequency of SoS meetings is project-specific and depends on project size and complexity, dependencies between different teams, etc. If Epics or User Stories in Sprints can be completed without too much interaction with other Epics or User Stories, these meetings may not be required too often; on the other hand, if the dependencies are high, then a higher frequency of SoS meetings may be required.

Typically, there is one representative in the SoS meeting from each Scrum Team—usually the Scrum Master—but it is also common for other members of a Scrum Team to attend the meeting if this makes sense. This meeting is usually facilitated by the Chief Scrum Master and is intended to focus on areas of coordination and integration between the different Scrum Teams.

These are preferably short meetings where at least one representative from each Scrum Team (e.g., Scrum Master and/or others) meet to share the status of the work being done by their respective teams, somewhat similar to the Daily Standup Meeting. They are usually not Time-boxed to allow all representatives to share their information, even for exceptionally large projects. The Scrum of Scrums (SoS) Meeting is held at predetermined intervals or when required by Scrum Teams to facilitate the necessary sharing of information among the various Scrum Teams. Issues, dependencies, and risks impacting multiple Scrum Teams can be closely monitored, which helps the multiple teams working on a large project to better coordinate and integrate their work. It is the responsibility of the Chief Scrum Master (or another Scrum Master who facilitates the SoS Meetings) to ensure that all representatives have an environment conducive to open and honest sharing of information, including feedback to other team representatives. For larger projects, involving a considerable number of teams, multiple levels of SoS meetings may be convened to share the status of each respective team.

Each Scrum Team representative provides updates from his or her team in turn. These updates are usually provided in the form of answers to the following four specific questions.

1. What has my team been working on since the last meeting?
2. What will my team do until the next meeting?
3. What were other teams counting on our team to finish that remains undone?
4. What is our team planning to do that might affect other teams?

The answers to these four questions provide information that allows each team to clearly understand the work status of all other teams and if there are or could be any issues with upcoming deliveries.

13.3.6 Release Preparation Methods*

Release preparation methods are the methods that will be used to execute the tasks identified in the Release Readiness Plan to prepare the deliverables to be shipped or released. These methods can be project specific, but more likely are valid on a program or portfolio level. The Scrum Guidance Body may define them.

13.3.7 Release Readiness Sprint

If there is a need for specific tasks to be performed to prepare for a release and to confirm that the minimum requirements for release have been met, these tasks are performed in a Release Readiness Sprint. In a Release Readiness Sprint, no User Stories from the Prioritized Product Backlog are developed. Instead, the tasks as identified in the Release Readiness Plan (see 13.2.7) are performed. A Release Readiness Sprint is only conducted once per release as the first step in the *Ship Deliverables* process. The length of a Release Readiness Sprint may be different from the length of other Sprints.

If there is a Release Readiness Sprint, its corresponding Done Criteria are typically unique and differ from the Done Criteria of the User Stories for other Sprints (which must still be met). Done Criteria are defined with the purpose of ensuring that the Sprint deliverables are "potentially shippable." The Release Readiness Sprint addresses all the activities that are only done once per release based on deliberate business decisions as justified in the Release Readiness Plan.

A Release Readiness Sprint is not mandatory unless there is a justified business decision to incorporate it into the project. Also, typically only the relevant team members are involved in the Release Readiness Sprint. Other Scrum Team members not involved in the Release Readiness Sprint can begin to work on other regular Sprints.

13.3.8 AI-powered Scrum Project Tool

Since large projects involve many Scrum Teams with several hundred or more people working on the project, and since teams may also be distributed, there can be significant complexity and interactions between the teams. It would therefore be beneficial for the teams to have access to a structured AI-powered Scrum Project Tool, or set of tools that can be used to automate processes, manage complexity, share information (between teams and to business stakeholders), generate reports, and so on.

Some specific tasks that could be managed by the AI-powered Scrum Project Tool on a large project include:

- Ability to form teams with appropriate roles and the ability to scale roles to large projects
- Ability to create and maintain a Prioritized Product Backlog for each team, including the creation, estimation, and management of Epics, User Stories, and Tasks
- Ability to support other important Scrum project artifacts, such as Scrumboards, Sprint Backlogs, meeting schedules/minutes, and so on
- Ability to allow for seamless and effective communication between all project team members
- Ability to support distributed teams (see section 2.5.3)
- Ability to support the creation of reports and metrics as required by different Scrum roles
- Ability to capture and share recommendations or expertise from the Scrum Guidance Body (e.g., lessons learned from Retrospective Sprints, best practices, Scrum-related organizational policies, and so on)

The Essential Guide to Successfully Deliver Projects using Scrum

A Guide to the Scrum Body of Knowledge (SBOK® Guide) provides comprehensive guidelines for the successful implementation of Scrum—the most popular Agile product development and project delivery approach. Defined in the SBOK® Guide as a flexible framework, Scrum can be applied to portfolios, programs, or projects of any size or complexity across industries to deliver products, services, or other results.

This Fifth Edition is based on the collective knowledge gained from thousands of projects across diverse organizations and industries. It reflects contributions from a large number of experts in Scrum and project delivery. Feedback from the global Scrum community played a vital role in shaping improvements and additions, making the SBOK® Guide a truly collaborative effort.

Unlike other Scrum references, the SBOK® Guide is available for free on Scrumstudy.com, along with free certifications, webinars, videos, and study guides. It is ideal for professionals seeking a foundational understanding of Business Analysis or exploring careers in related fields. The Guide addresses real-life challenges faced by Scrum practitioners and explains how to solve them using modern tools and Artificial Intelligence (AI).

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