

Build Your Project Using Scrum Methodology

#3 of a Series, by Pavan Kumar Gorakavi, M.S., M.B.A, G.M.C.P, C.A.P.M.

1. What is Scrum Methodology?

Scrum is an innovative software agile methodology that has gained significant importance in information technology. The term Scrum originally derives from a strategy in rugby, “getting an out of play ball back into the game” [1]. Takeuchi and Nonaka [2, 4] were the first ones to discuss Scrum methodology and its variants in product development with small teams. Scrum approach treats this system development as a controlled black box [3].

In 90’s when project developers were looking for alternative software development methodologies, agile practice looks promising. Agile practices provide higher flexibility when compared to conventional methodology. Scrum, an agile practice, addresses the problems caused by the long development cycles of traditional development models. Scrum is an enhancement of iterative and incremental approach. ‘Scrum is a management, enhancement and maintenance methodology for an existing system or production prototype’ [3].

Scrum is a disciplined methodology which implements controlled system development. This methodology facilitates higher flexibility to marketing, better adaptability, higher resource productivity, and efficient team environment. Scrum underlines the concept of ‘on-demand delivery’. Scrum methodology reduces re-factoring cost, prototype-cost and efficiency-leak cost. Agile process primarily focuses on high interaction, working model, customer collaboration, regular feedbacks, and flexibility for changing requirements. Scrum programming encourages high degree of interactions between team players including developers, testers, managers, business owners and others. Scrum programming emphasizes just not only on testing, but also testing well. Test cases and tests are created at all stages of coding. Scrum methodology develops products under several environmental and technical variables that changes dynamics of the system and makes the system complex.

There are six identifiable roles in Scrum. It includes Scrum master, Developers, Testers, Business owners, Customers, and management. Scrum master is key management person who ensures project is proceeding as per required practices. Scrum practice advises the team to be of size small – medium, and a small development life cycle of 3-8 weeks, called Sprint. Scrum process can be implemented in three phases: Pre-Game phase, Development (Game) phase, and Post-Game phase. Pre-Game phase includes planning and architectural implementations; the Development phase includes iterative development using typical SDLC approaches. The Post-Game phase includes system testing, integration testing, and iterative releases.

Life cycle of Scrum methodology

Thus the Scrum methodology is implemented in three phases: Planning, development and closure phases[5]. A Life cycle of Scrum is illustrated in figure 1 at right. The first phase relies on planning. In this phase, Scrum players decide on the list of deliverables targeted for the Sprint. Scrum players includes Scrum master, Business Owners, marketing, team leads. Scrum methodology provides a flexibility of changing the requirements at later part of the game. This characteristic helps in building a product using trial and error prototype.

Scrum uses a product Backlog sheet as a reference while planning for the Sprint. A Product Backlog is a list of features or service request or change request to be accomplished to achieve business needs. In a Sprint planning meeting, all Scrum players identify the requirements, prioritize and estimate the level of effort.

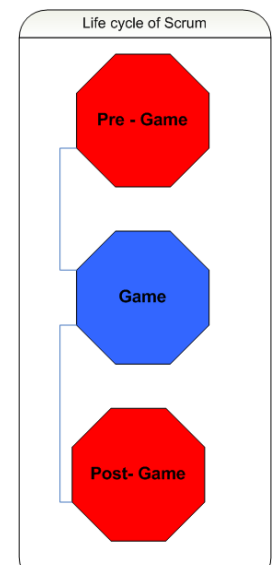


Figure1: Scrum Life cyclef

The product backlog list is updated periodically with new requirement, service request, and change requests. A sample product backlog list is in Figure 2, below.

S.no	SR/CR/FE no.	Description	Priority	Type of Project
1.	SR100	Login functionality	1-high	Infra structure
2.	CR 1234	Billing System	2-high	Revenue
3.	SR 2345	Credit card system	1- high	Revenue

Figure 2: Product Backlog list

Effort estimation is performed at a higher level in Scrum planning meetings. Effort estimates are iterative in nature. Sprint size, resource availability, dependency with other Scrum teams, risk factors are considered in planning phase, which is also called a *pre-game phase*. Various environmental variables like resource availability, technological challenges, system stability, expertise, and any other dependent factors must be considered during Sprint commitment.

After the initial planning phase is complete, Scrum players have a detailed outline about Scrum cycle duration, tasks to accomplish, resources performing various tasks, and other deadlines. The Scrum cycle is also called a Sprint, which is usually varies between 3-8 weeks. The Development phase is iterative in nature.

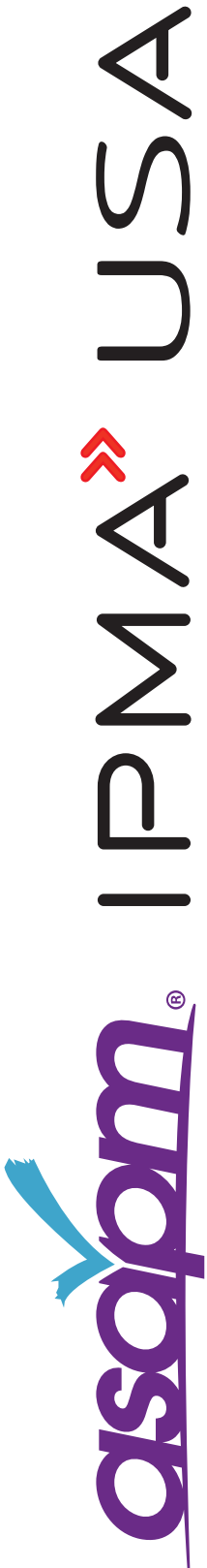
In the Development phase, the Scrum team gets the prioritized tasks after sprint planning meeting, players break down the higher-level tasks into detail tasks and formulate them in a detailed task list called Burn down charts. Burn down charts has all necessary details about tasks, estimated hours, daily updates, load factor, and project velocity. A sample Burn down chart or BDC is in Figure 3, below.

S. no	SR/CR/FE no.	Resource name	Est'd hours	Remaining hours	Day-to-day updates
1.	SR100	Mr. Anish Gorakavi	32 hrs	16	
2.	CR 1234	Mr. Praveen Gorakavi	40 hrs	32	
3.	SR 2345	Mr. Pavan Gorakavi	24 hrs	0	

Figure 3: Sample Burn down chart

Daily status meetings, also called stand-up meetings, are organized every day to track day-to-day status. Tasks update are been tracked in burn down chart. The Development phase is generally considered to be a black box because of the unpredictability of results.

Factors like application dependencies, project dependencies, under estimation of tasks, requirement modifications, technological challenges and resource challenges can influence the results of software development life cycle. Each sprint follows conventional software development life cycle: analysis, design, implement, and testing.



Unlike conventional software development lifecycle methodologies, Architecture and Design are part of this development phase. A product can be developed in multi sprints or by multiple teams based on the complexity of the project. The Development phase is iterative in nature; any show-stoppers faced during the sprint cycle must be discussed among the Scrum players: Scrum Master, Team Leads, Business Owners, Marketing folks, and Customer Support staff.

Once the product achieves necessary maturity, there may be a scenario where there are no new user stories from the business or product owners and the existing product reaches 100 percent stability. Then we can conclude that the Scrum cycle is in closure or post-game phase.

3. Different Actors of Scrum

A Scrum process includes a Scrum master, and a Scrum team that includes development team and testers, Product Owners, Customers, and Marketing. The Scrum key stakeholders are illustrated in figure 4.

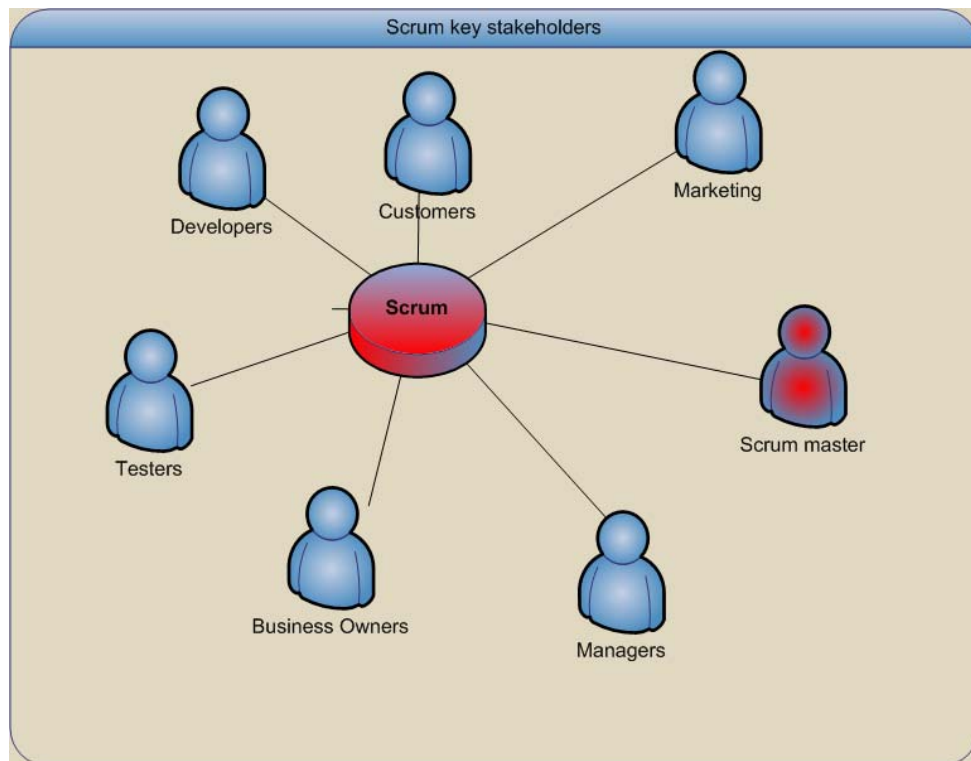


Figure 4: Scrum players

Scrum Master

Scrum master is a chief coordinator of the project. His job is to facilitate lucid communication flow across the system. Scrum master acts as a point of contact for business team [Business owners / Product owners/ Marketing/ Customers] and scrum team [developer/testers/Team leads].

Scrum master validates the project practices and its compliance with mandatory practices of Scrum. Scrum master organizes sprint planning meetings, requirement analysis meetings, and sprint commitment meetings. He/She also updates backlog items, identifies project risks, and coordinates requirements changes. The Scrum master conducts daily standup meetings, used to track the project on a day-to-day basis.

Product/ Business Owners

Product owners also called as business owners are responsible for designing product. Product owners design products assuming business interest and technical feasibilities. Product owners prepare high-level requirements documents and add them to backlog list.

Product owner along with Scrum master is responsible to maintain and update backlog lists. In Industry, product owners generally hold accountable for a result of product commercial success.

Scrum team

Scrum team includes both developers and testers. In sprint planning meeting, based on the requirements in the backlog list, Scrum team estimates the effort. After receiving high-level requirements, Scrum team break down the high-level tasks into smaller tasks and allocate suitable resources. Scrum team frames dynamic solutions during their product development. The Scrum team needs to play a strategic role during sprint planning meetings, sprint requirement analysis meetings, and sprint commitment meetings. The Scrum team plays a pivotal role in identifying risk factors and their impacts. The Scrum team updates their task status to Scrum master in the daily standup meeting.

Customers / Marketing

Customers and marketing folks will also participate actively in Scrum meetings and day-to-day business meetings. This kind of participations reduces the problem of 'This is not what I expect'.... thereby reduces re-factoring cost. Customer/Marketing participations enables the flexibility of changing the requirements on the fly, unlike conventional software development methodology. Management is in charge of the final decisions for charters, standards and conventions to be followed in all projects.

4. Different Strategic Meetings

Sprint planning meeting

Sprint planning meeting associates with agenda of identifying tasks and resource estimations for subsequent sprint. The Sprint planning meeting is attended by the Scrum Master, Product Owners, Scrum Team, and other interested parties. During the Sprint Planning meeting, the product owner(s) describes tasks from the product backlog list, and identifies the highest priorities to the team. This meeting provides a scope for Scrum team to question and get clarification about different features raised from product backlog and sprint backlog list. Scrum team along with product owners defines sprint goal, which is a short description of what the sprint will attempt to achieve.

Sprint requirement analysis meeting

The Sprint requirement analysis meeting is driven by the agenda of the product owner, who goes through the list of requirements in the product backlog list, and provides high-level explanations. The Sprint requirement analysis meeting is attended by the Scrum Master, Product Owners, Scrum Team, and other interested parties. This meeting provides a scope for the Scrum team to question and get clarifications about different features raised from the Product Backlog and Sprint Backlog list. In Industry practice, the Sprint Analysis meeting is often a part of the Sprint planning meeting.

Sprint commitment meeting

Scope of Sprint commitment meeting is to review sprint goals by considering resource availability, risk factors involved, application dependencies and any other factors. After considering dependent variables for sprint release, Scrum master prepares a list of scrum tasks which Scrum team will be committed for that particular sprint. After negotiation between Scrum team and management, a list of final goals is framed for the subsequent sprint.

Daily standup meeting

Standup meetings are conducted every day by the Scrum Master to drive a project with pinpoint focus on sprint goals. This meeting helps to track daily updates of sprint tasks, calculate project velocity, and drive the team in a correct direction. Standup meetings are generally short and sweet, 15-20 minutes in duration. Meetings are typically conducted at the same location and at the same time every day. Ideally, meetings are conducted during early business hours, which facilitate to utilize rest of the business hours effectively.

5. Conclusion

According to Schwaber and Beedle, Scrum methodology, independent of any engineering practice, can be adopted in any organization. Scrum can be adopted both in a new project and an existing project. Scrum's salient features, including Iterative development, high level accountability, small teams, Regular builds, Configuration management, and frequent monitoring, all help in developing a robust system.

References:

- [1] Schwaber, K. and Beedle, M. Agile software development with Scrum, Prentice – Hall.
- [2] Takeuchi, H. and Nonaka, I. The New Product Development Game. Harvard Business Review.
- [3] Schwaber, K. Scrum development process, <http://jeffsutherland.com/oops/schwapub.pdf>
- [4] Takeuchi, Hirotaka and Nonaka, Ikujiro. January-February 1986. "The New Product Development Game." Harvard Business Review.

About the Author

Pavan Kumar Gorakavi is working as a Senior Software Developer in Dallas, TX. He is settled in Dallas, TX with his family (wife Swapna Gorakavi and son Anish Gorakavi). He is VP - programs for *asapm* Young Crew. He is also acting as Associate Director [Marketing] for PMI-ISSIG. Pavan earned his Bachelor's degree in computer science from Jawaharlal Nehru Technological University and Masters in computer science from Lamar University. He did his MBA from University of Texas at Dallas and GMCP from Southern Methodist University. Pavan holds SUN, IBM and PM Institute certifications.

Pavan Gorakavi authored a book on 'Artificial Intelligence' published by Rahul publications - India, and 'Digital Electronics' published by Subhash publications, India. His research interests are Artificial Intelligence, Agile methodologies, and Software development in ADA, Prolog and Java. You can reach Pavan at gorakavi@gmail.com.

About this Series

This article is the third in a series by Mr. Gorakavi on Agile, posted on the *asapm* website; watch for the others in the series. And, although the concepts of Agile are most-common in Software Development projects, increasingly Agile and Lean PM methods are also turning up in many other project areas, including Engineering and Manufacturing, where some assert they actually originated.

