Designing an Agile Collaboration: How to Succeed in Cross-Team Interactions

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Abstract

Agile models within the field of software engineering are widely used to facilitate flexibility and ease of communication in order to solve dynamic engineering challenges. For agile teams to succeed on a complex project, they must be able to work not only with their own members but also with other teams. This is vital for projects where changing requirements may impact multiple teams. To support collaboration in an agile setting, strong architectural planning is required so multiple teams to contribute simultaneously. By designing a valid architecture that allows for collaborative programming, all participants in the development are given immediate feedback. This ultimately leads to better software products developed in a more efficient manner.

Keywords agile, teamwork, design, architecture, project management, software engineering

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1 Introduction

Agility is currently the byword of the software engineering field. Software engineers must respond to customer requirements with speed and flexibility, and for many projects, development teams have turned to agile methodology as the answer to these demands. A good agile team is one that communicates, but is also responsive to, changing requirements to and from other teams. Understanding the communication techniques used on best practice agile teams reveals optimal development architectures for future projects. This work primarily focuses on cross-team interaction methodology and architectural design in an agile environment.

The section "Communication Across Agile Teams" will discuss which qualities allow teams to work together successfully. This section lists actionable qualities of a healthy team dynamic that can be incorporated into any team making use of agile processes. The following section, "Design and Architecture", discusses the importance of integrating design and development in multi-team projects. This section highlights the importance of architectural design as a tool to assist cross-team development as well as how design planning and agile can coexist.

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2 Agile Collaboration

2.1 Communication Across Agile Teams

Agile methodology prioritizes interaction between individuals. While this principle is certainly essential to interactions with the customer, it is no less important for agile teams to actively seek out interactions with other teams as well. Yang et al[8] have shown that teamwork and cohesiveness exert a significant influence upon project success. A lack of cross-team communication can result in conflicts of interest, knowledge silos, and misunderstandings that negatively impact the status of the project. With a large project, workers must be split into multiple agile teams to address the scope of the work, but the more teams exist, the more issues related to team cooperation are magnified. Therefore, agile teams must consider what elements of cross-team collaboration are important to ensure the overall success of the project.

The agile principles enumerated in the Agile Manifesto include statements that emphasize the importance of interpersonal relations. Such principles include:

- "Business people and developers must work together daily throughout the project."
- "Build projects around motivated individuals. Give them the environment and support they need, and trust them to get the job done."
- "The most efficient and effective method of conveying information to and within a development team is face-to-face conversation." [2]

These principles prescribe a regular, encouraging, and personal environment in which to nurture collaboration. The successful agile team should communicate with other

teams on a consistent basis, ideally in person. Team managers should give team members the resources they need to succeed, including resources from other teams.

Another important component for cross-team collaboration is to ensure that team members are invested in communication. For instance, Crocker et al[1] performed an extensive survey through interviews and other methods that showed that amongst multiple teams forming a cohesive agile network, the following are important: "1) managing the center of the network, 2) engaging the fringe, 3) bridging select silos, and 4) leveraging boundary spanners." Summed up, these four points all focus on one key idea: the importance of managing interactions between key players and experts to allow for successful communication of ideas and issues. Agile teams must not take communication for granted, but rather must take active ownership of their cross-team participation. Without an institution-wide, systematic effort to reach out to others, teams run the risk of individual cooperation falling to the wayside and important knowledge being lost.

It is important to keep in mind, however, that different teams are separate entities. Lee et al[5] found in a study that team autonomy encourages creativity and efficiency within the team, but team diversity allows for better problem-solving and distribution of knowledge. This concept may also be extended to diversity across teams. Too much collaboration can lead to issues between teams, especially if one team sacrifices their own autonomy in order to continuously assist other teams. Through ample communication, balance can be achieved with sufficient discussion of task priorities, both within and between teams.

2.2 Design and Architecture

Architectural planning is a vital part of successful cross-team agile development despite the perceived conflict between the two practices. A key aspect of agile is high adaptability to change over following strict plans [2]. This seems to directly contrast the traditional viewpoint for architecture which provides the "floor plans" as framework directly tied to the requirements of the project [7]. At first glance, the two are at odds on the fundamental level with agilists concerned with Big Up Front Design (BUFD) and You Ain't Gonna Need It (YAGNI) features and architecturalists seeing the agile methodology as amature [4]. When requirements change, "the architecture team do not always fully understand the repercussions their design changes will have on existing and new product features," [3]. By integrating the architecture and implementation teams into agile scrum teams, all developers have a stake in the final product and understand the impacts of changes requirements [3].

The key success in this integration is the sprintable nature of scrum. With up-front design that decomposes the architecture into sections with architecturally significant boundaries, teams are able to distribute the systems and implement in sprints [6]. Newly designed parts of the architecture can developed by multiple teams and rolled out in parallel to existing architecture to build up the planned design [3]. By producing the parts in increments, developers are able to "learn and adjust along the way," [3]. To account for change, the architecture can be designed such that a range of options are considered so that modifications can be made as the system is being built [6]. These architectural choices place collaboration at the forefront of the design and ensure that communication between teams must be maintained in order for efficient development.

3 Conclusion

In conclusion, cross-team agile developement requires ample communication to ensure the success of the project. By utilizing the encouraging and personal environment of agile, teams are able to consistently communicate with each other such that key aspects of the project are addressed by experts across teams. Giving teams the freedom to reach out to other teams when they need to communicate their issues ensures knowledge is shared across the institution. This collaboration can be encouraged by re-integrating architecture and implementation teams into diverse teams. While agile and architecture may seem dichotomic, careful architectural planning ensures that the agile philosophy is maintained. With an emphasis on adaptability, agile architecture focuses on smaller, iteratable design that provides room to adjust in the future. Development is done in parallel iterations that are integrated together to form the larger architecture.

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