

Exam 2014

Exercise 1 (20%)

What is the motivation for software process improvement; that is, why should one work smarter when developing software?

Svar:

The motivation for software process improvement is the several benefits that it brings. A good process provides guidelines for efficient development, as well reducing risk and increasing predictability. Having everyone follow the same, well defined process also creates a common vision and culture, which also enables easier coordination and co-operation. Process improvements implemented correctly are likely to lower cost in the long run, since developers, testers, etc, are empowered to work more efficiently.

Exercise 2 (50%)

A Norwegian public service company runs a large software development project in the public sector. In total, 175 people work on the project, which is estimated to cost around one billion NOK. Beside the public service company, there are two other main contractors, both consultancy companies. In addition, there are several contractors that fill various roles in the project. Three important roles filled by the public service company are: one overall project manager (dealing with contracts with all the contractors, etc.), one product owner (PO) and one technical project leader. All project members are co-located.

The public service company contributes with six Scrum teams and the two other main contractors contribute with three Scrum teams each. All teams have three weeks sprints and start the sprints on the same day. One person is the PO for all the teams.

The overall requirements specification of the system has already been written and forms the basis for the Product Backlog, which consists of approximately 300 master elements (specified as use cases). These elements are divided into six requirement areas. Each master element in the Product Backlog is roughly estimated by the use of planning poker with a relative size to each other. The technical project leader, three of the Scrum masters (one from each of main contractors) and the PO participate in this estimation. Through the Product Backlog process for each release (a release is delivered approximately twice a year), the master elements are broken down into user stories that form the Product Backlog items. These items are prioritized by the PO according to the functional importance, technical importance

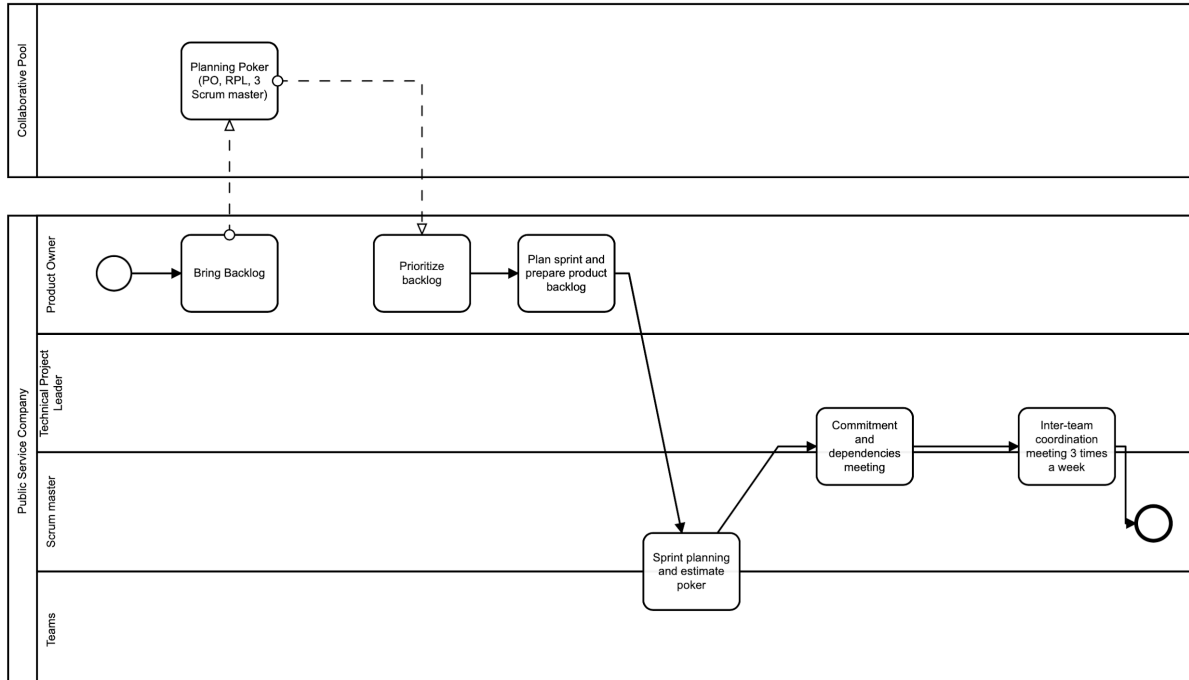
and technical dependencies. The PO may change the priority of the Product Backlog items during the release phase. The PO pre-plans every sprint and prepares the next Product Backlog items before the items are given to the teams in the next sprint planning. In the sprint planning, all the teams further define the tasks required to implement the Product Backlog items that they have been provided. The teams estimate the work on the tasks (using planning poker with absolute estimation in hours). These estimated tasks will become the teams' Sprint Backlog.

The day after the sprint planning, all the Scrum masters and the technical project leader meet to tell each other what the team commitments are in the sprint. They focus on dependencies and make notes about where to go if they run into problems regarding tasks that the other teams are solving. The results of these meetings may affect the Product Backlog process.

There are inter-team coordination meetings (Scrum of Scrum) three times a week where the Scrum masters lift the problems regarding dependencies. The results of these meetings may also affect the Product Backlog process.

a) Use BPMN to document the Product Backlog process described above as a process model.

Svar:



Assumptions:

- The tools I was using did not have functionality for making choreographies notation shown in the BPMN notation poster. I have therefore placed them, but without saying explicit which roles are involved. The roles included are the lane directly above and below the task. The task that involves three lanes is therefore drawn as a collaborative lane.
- Most tasks potentially affect the backlog. I was considering having a gateway that if changes would have to be made, the backlog would be changed, and if not, move on to the next task. However it was unclear which role would do this for each step. It also proved to be quite unreadable in the end. Therefore, please note that if changes to the backlog is needed in each task, this can be done.
- I also assume that the Scrum Master is present in the teams sprint planning meeting
- Some tasks consist of two tasks. E.g. Sprint planning and estimation poker. This is because these tasks seem to be included in the same meeting. Therefore shown as one task.

After a while, it became clear that the Product Backlog process was not good enough. The Product Backlog was not refined and prioritized sufficiently to meet all the changed requirements and dependencies among Product Backlog items in the different requirement areas. This resulted in delays and many bugs, especially in features that had dependencies between functional areas. Consequently, many sprints had the Sprint Backlog filled with too many bug-fixing tasks instead of tasks that implemented new features. Therefore, the management decided to make some changes in the organization of the project and in the Product Backlog process.

b) Propose changes in the organization of the project and in the Product Backlog process that might have improved the situation described above.

Svar:

As far as I understand from the description, there are in total 3 activities where the backlog can be changed, and 2 activities where dependencies are discussed. If the main problem is that the backlog is not refined enough to meet changed requirements and that there are too many unseen dependencies, these activities do not serve its purpose. The first proposed change would therefore be to ensure that these activities and meetings are efficient and actually help reach their initial goal. If not, they should be dropped.

- Catch bugs earlier - automated tests and Merge systems (PR)
- Make it easier to change the main backlog consistently through the development
- Work more Agile ← The process seem to be quite “stiff”
- Should the actual user be involved in the process? ← Not mentioned in the case

Thoughts :

- Issue of too many bugs in the sprints:
 - What are causing these bugs? Is it because the developers aren't getting enough time to test their code, or do sloppy mistakes due to them having little time? In this case the estimation of the tasks should be looked into, and the number of tasks per team per sprint can be lowered.
 - Also the bugs should be categorized, so that the critical bugs have higher priority, and then perhaps only accept a maximal number of non-critical bugs to be done during each sprint
- Should really investigate what how the product backlog is being used.

After a couple of months, there were indications of challenges also with the new Product Backlog process. Therefore, the management wanted to start measuring the effect of the proposed changes.

c) Suggest and describe a minimum of three measures that the project could use to evaluate the effects of the changes in the organization of the project and the Product Backlog process that you suggested in

- Delays before/after changes introduced
- Number of bugs in backlog as a whole
- Number of bug backlog items in each sprint

(b). For each measure, show the relationship between the measure and the purpose of the changes.

- Less delays
- Less bugs

d) Describe how data of the proposed measures could be collected and analysed.

Exercise 3 (30%)

a) Describe five core principles of Lean. The description should include a motivation for each of the principles, that is, its purpose.

Svar:

The five core principles are: Satisfy the customer, flow, visualization, avoiding waste and supporting change.

Satisfy the customer: Create something which has value to the customer. This means producing something the customer actually wants. If we produce something that has no or little value to the customer, changes will have to be made (which can be costly), or our customer will be unhappy with the results, which is bad for business.

Flow: The process is stable, optimized and goes as planned without interruptions. The motivation is having little waste and an efficient process. A unstable process will likely have a negative effect on employees as well

Visualization: Refers to planning and overview of processes. This can be done by using diagrams like BPMN, UML, Kanban boards etc. Visualization gives a shared understanding of the process, enabling more efficient co-operation.

Avoiding waste: Waste refers to everything that requires resources, but does not give value to the customer. Define what the customer is willing to pay for in order to reduce waste. An important principle here is Just-in-Time which recommends not spending resources producing something before it is demanded. The motivation for avoiding waste is to ensure flow. Wasted resources can also be costly.

Supporting change: Supporting change refers to that changes should be welcomed, even late in the development. This helps meet the goal of satisfying the customer, as well as being competitive among many other organizations.

b) For each of these five principles, describe how using Scrum may support the principle.

Svar:

Assumptions: I am only gonna discuss the positives of Scrum, since that is what the task asks for.

Satisfy the customer: Scrum focuses on delivering frequently so that the customer is constantly updated with the most recent changes. That way the customer can tell if we are making what the customer actually wanted.

Flow: Scrum defines sprints, which are constant timeboxes. Employees have the backlog which contains all the tasks that must be done, every single sprint. This acts as a stable process. The Scrum Master also “protects” the scrum team against interruptions during the sprint.

Visualization: It is normal to have a Scrum board when following Scrum. Here, team members can see an overview of tasks under different categories “to do”, “in progress” and “done”. This gives a visualization of the process.

Avoiding waste: Scrum includes retrospective meetings which help optimize the process. As mentioned Scrum also includes frequent deliveries to make sure that only what the customer actually wants is produced.

Supporting change: One of the reasons many organizations switched to Scrum instead of for instance the waterfall model was Scrum's ability to handle change. If change is needed, it is simply added to the backlog and prioritization in the upcoming sprint. Since Scrum goes in iterations, it should not be a problem.