Whitepaper: Story-points vs hours

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1.1Inroduction

What is the advantage of introducing an abstract concept (story points), where we can just use a concrete measurement, like estimated man-days? We can also calculate velocity, estimate coverage of an iteration, etc. using estimated man-days. In contrast, story points are harder to use (because the concept is abstract), and also harder to explain to stakeholders. What advantage does it offer?

1.2The Agile idea behind story points

Story Points are vital to the Agile process and thinking. Agile takes a considerably different approach to determining a team member's capacity. First of all, Agile assigns work to an entire team, not an individual. Second, Agile teams prefer not to quantify work in terms of time because this would undermine the self-organization central to the success of Agile. This is a major break from waterfall: Instead of a manager estimating time on behalf of other individuals and assigning tasks based on conjecture, team members in Agile use effort and degree of difficulty to estimate their own work.

Unlike estimates in hours, story points are not meant only for projecting work time or budgeting, but rather help guide the team in thinking about what they can deliver to the business. It helps the team being transparent and predictable. After all it's not about the hours we produce, it's about the work we produce which adds value to the Business.

1.3Estimating project size

A key tenet of Agile estimating and planning is that we estimate **size** but derive **duration**. In estimating the size we consider 'how big' (is the tower, is the pile of sand, is ...). In estimating the duration we consider 'how long' (will it take to build the tower, to move the pile of sand, to ...). Estimates in hours intermingle 'how big' with 'how long', without being able to discern the two afterwards. Story points are only about 'how big' a piece of functionality or work is.

All we need to know is whether a particular story or feature is larger or smaller than another one (size). Than we can derive duration based on what we know about the effort it took for the story or feature we have done. We call that the team's rate of progress or velocity.

What are Story points?

Story points are a unit of measure and are used to calculate how many work a team can take in an iteration.

Story points often take into account three different aspects when estimating: Complexity, Effort, and Doubt.

Story points are relative. When we estimate with story points, we assign a point value to each item. A story that is assigned a two should be twice as much as a story that is assigned a one. It should also be two-thirds of a story that is estimated as three story points. A team can begin with the smallest feature and assign it 1 point. The team can then estimate all other features relative to the smallest feature.

1.4Estimating velocity

Velocity is calculated by summing the number of story points assigned to each user story (or other piece of work) that the team completed during the iteration.

Suppose all of the user stories are estimated and the sum of those estimates is 100 story points. This is the estimated size of the system. Suppose further that we know from past experience that the team's velocity has been twenty points per two-week iteration, and that they will continue at the same velocity for this project. From our estimate of size and our known velocity value, we can derive a duration of five iterations or ten weeks. After the first few iterations their observed velocity is only ten. Without re-estimating any work they will have correctly identified that the project will take ten iterations rather than five.

This keeps the estimates in size stable. Duration is more variable than size, because it has more sources of variation like individual capacities, context switching, distractions, allocation, indirect work, engineering practices, technology and team dynamics.

1.510 reasons to start with story-points

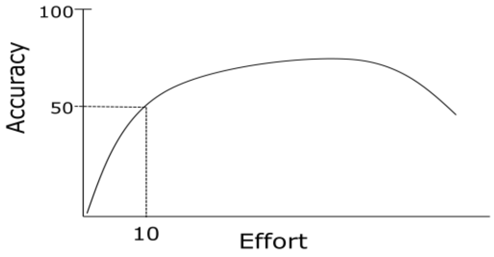
1.5.1We are better at estimating relative sizes than we are at estimating absolute size

Studies have shown that we are best at estimating things that fall within one order of magnitude (Miranda 2001; Saaty 1996). Within your town, you should be able to estimate reasonably well the relative distances to things like the nearest grocery store, the nearest restaurant, and the nearest library. The library may be twice as far as the restaurant, for example. Your estimates will be far less accurate if you are asked also to estimate the relative distance to the moon or a neighbouring country's capital. Because we are best within a single order of magnitude, we would like to have most of our estimates in such a range. We use the Fibonacci sequence (1,2,3,5,8,13,21,99) this is a very useful estimation sequence because the gaps in the sequence become appropriately larger as the numbers increase. A one point gap from 1 to 2 and from 2 to 3 seems appropriate, just as the gaps from 3 to 5 and from 5 to 8 do.

1.5.2Estimating in story points is faster than estimating in hours

To estimate each requirement precisely in hours, we would have to know the exact composition and interaction of the requirement, the technology used to build the requirement, and the skills and mood of the people doing the work. We could potentially spend more time trying to make a precise estimate than we would spend actually transforming the requirement into functionality.

We can often spend a little time thinking about an estimate and come up with a number that is nearly as good as if we had spent a lot of time thinking about it. No matter how much effort you put into an estimate, an estimate is still an estimate. No amount of additional effort will make an estimate perfect. Next, notice how little effort is required to move the accuracy up dramatically from the baseline. As drawn in this figure (Mike Cohn, Agile planning & estimation), about 10% of the effort gets 50% of the potential accuracy. Finally, notice that eventually, the accuracy of the estimate declines. Agile teams, however, choose to be closer to the left in the figure. They acknowledge that we cannot eliminate uncertainty from estimates, but they embrace the idea that small efforts are rewarded with big gains. Working with points helps them not to be to precise and estimate faster, because it is more abstract than hours.



1.5.3Thinking in hours gives a false feeling of precision

People attach less emotions to points than to hours. This is because most project managers and project boards tend to stuck on their initial estimates. Often there is a management culture that viewed a preliminary estimate as a contract. When you start your project and estimate it will take 5 months that is all anyone will remember. A culture change is needed because we cannot predict the future of complex projects. Every iteration review meeting makes visible the difference between the estimates and reality and between what the team thought it could do and what it really did. At every such point, management has a chance to develop and moderate its expectations.

1.5.4Story points are not a basis for budgeting, capacity does.

Story Points are NOT a basis for budgeting, at least not directly. The budget is based upon the team capacity. For example: we have 5 fte in a 2 week iteration, so the budget per iteration is 400 hours x rate per hour. Because Agile teams are dedicated teams, the team capacity should not change much, so the budget should remain the same (or increase based on increasing prices, or decrease caused by holidays or other absence). The team velocity tells us how much iterations we need to realize the system size estimated in story points. While the budget and the hours remain the same, the focus is on increasing productivity, thus being able to deliver more with the same resources through a better and more flexible system design.

1.5.5Story points are a team result

Estimates are not created by a single individual on the team. Agile teams do not rely on a single expert to estimate. Despite well-known evidence that estimates prepared by those who will do the work are better than estimates prepared by anyone else (Lederer and Prasad 1992), estimates are best derived collaboratively by the team, which includes those who will do the work.

Story Points are not an addition of estimates from different disciplines; they are the result of communication and discussion between the team and the Product Owner outlining time, complexity, effort, and risk, among other factors. This gives a good understanding of the work to all participants and produces a better estimate of needed effort than simply adding the various parts together.

1.5.6Estimating story-points with Planning poker is fun

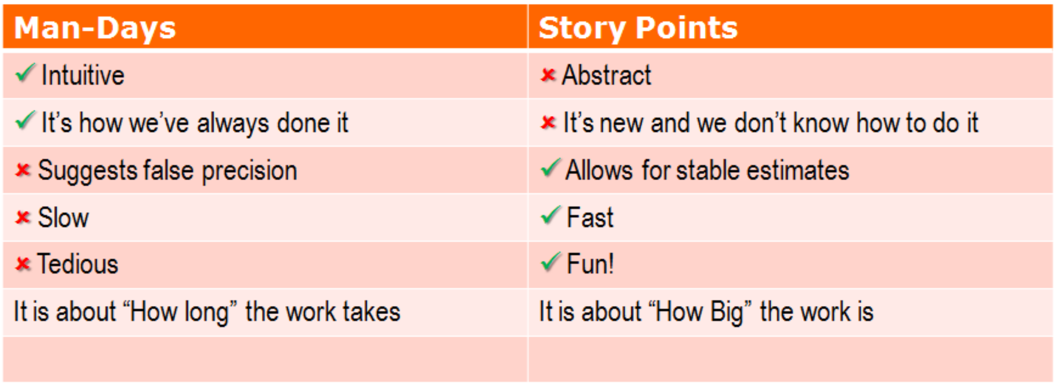
Planning poker is a consensus-based estimating technique based on a common understanding of the requirement. Agile teams use Planning Poker to estimate their product backlogs in relative size using story points and a deck of planning poker cards based on the Fibonacci sequence (1,2,3,5,8,13,21,99). The fun factor is the “Poker” aspect in the poker planning session not showing your individual opinion and all throwing your card on the same time, see the differences and have a lively discussion.
Why do planning poker works?

- It lets the people who are actually going to be completing the work do the estimating.
- Estimates derived from planning poker are more accurate because estimators are called upon by their peers to justify their estimates.
- The lively group discussion common in planning poker also helps lead to better estimates.
- Planning poker provides a true average of individual estimates, which has been shown to yield better results.

1.5.7Story points focus on results

Story Points are used not just within the team to measure progress and delivery, but also can be used to inform the business and management about what they are getting for their investment. One of the goals of Agile is to make us more transparent; this means adjusting our current way of reporting production and effort.

Hours cannot be analyzed beyond being spent or not; the business does not have the time or inclination to learn or be taught how we devote every minute of our day. So long as the focus is on hours spent, attention will drift from doing things well and delivering valuable products and end up on how to save time. This typically means cutting resources and/or quality.
Bottom line is that Story Points paint a better picture of what the team can do, what can be produced in an iteration, and what the business can expect in terms of value for investment.



Man-Days	Story Points
✓ Intuitive	✗ Abstract
✓ It’s how we’ve always done it	✗ It’s new and we don’t know how to do it
✗ Suggests false precision	✓ Allows for stable estimates
✗ Slow	✓ Fast
✗ Tedious	✓ Fun!
It is about “How long” the work takes	It is about “How Big” the work is