

How2guide: Estimating

Introduction	When do you use this guide
Projects tend to suffer from an optimism bias, which is the demonstrated tendency for people to be over-optimistic about the outcome of planned actions. This includes over-estimating the likelihood of positive events and under-estimating the likelihood of negative events. It is also reflected in overestimation of benefits. There are a number of reasons for this, including: • Lack of experience in the type of change. • Leadership that enforces the ethos of “just do it”. • Lack of willingness to face up to the reality of how long it will take or how much it will cost. • Poor recognition of the organisation’s capability to deliver the change (often organisations just keep adding to the change burden). • No basis for estimation, consequently there is no basis on which to improve and no mechanism to learn lessons.	When making estimates it is a common failing to think in terms of how long it will take to get the job done rather than the amount of effort it will take to do the job. These are completely different concepts yet they are often used within projects without that recognition. To have effective estimates it is necessary to understand what tasks are required and what activities need to be undertaken to deliver a product. Each task will take an amount of resource effort as well as capital costs and there will be a timeframe within which the resource effort will be undertaken for the activity. There are a number of ways of estimating both the effort to do the task and the period (or duration) over which it is likely that the task will take. This guide should be used when developing the plans, which is during the Define stage of the lifecycle; however the 3 point estimation technique is a good discipline at any time.
Principles of Estimation There is no substitute for experience when developing estimates - this can be gained from investigating: • Previous projects • Other organisations and reference sites that have done this type of project before • Subject matter expertise on the topic area All three of these sources provide valuable input into the techniques of developing estimates. The Project Board should be heavily involved in making the decision about which approach to estimating should be used. Top Down carries significantly more risk than Bottom Up estimating, so the approach will reflect its appetite for risk and potentially the consequences of failure. There are areas where the project may assume that the stakeholder resources will be available which may be off the estimates radar, but will have a big impact on the operational performance including: • Meetings to assist with specifications or estimates	

How2guide: Estimating

- Training
- Workshops for risk or stakeholder analysis
- Testing
- Commenting on documents
- Calls and emails

These are why the stakeholders must be involved in the estimation process and sign up to their commitment to the resource levels. Going forward they must re-affirm that commitment.

Three point estimating should be used for either Top Down or Bottom Up approaches as a way of establishing a reasonable likelihood of events.

Often 'estimates' are influenced by sponsor's desires or their 'lines in the sand'. Realism would say that some of the Time; Cost; Quality and Scope parameters are unachievable from the outset.

Estimation techniques

There are a number of different approaches to estimation. Here is a summary of the main types:

Top Down Estimation recognises that there are limitations to what can be achieved and takes the position "what can we do in x timescale and with y budget". Within that position there may be things that simply must be done. These estimates are often highly subjective 'have similarities' based on past experience.

Backcast Planning is useful for softer projects, where the destination is clear but the journey is proving difficult to construct, or there is an immovable deadline imposed externally.

It asks the question "What will we need to have in place to achieve xxx outcome". From that some people find it easier to work backwards to work out what has to be done. This method focuses on the "must do's" and avoids distractions, unachievable requirements and establishes the minimum that has to be done, in effect, the critical path. Any additional products that the project delivers will be negotiable or could be delivered after the non negotiable deadlines have been passed.

Beware; there is a danger that unrealistic planning dates are imposed by an unachievable deadline.

Timeboxing is a technique common in planning projects (typically for 'agile' software development), where the schedule is divided into a number of separate time periods (timeboxes are normally two to six weeks long), with each part having its own deliverables, deadline and budget.

Timeboxes are used as a form of risk management, especially for tasks that may easily extend past their deadlines. The end date (deadline) is one of the

How2guide: Estimating

primary drivers in the planning and should not be changed as it is usually linked to a delivery date of the product. If the team exceeds the deadline, then the team failed in proper planning and/or effective execution of the plan. This can be the result of the wrong people on the wrong job (lack of communication between teams, lack of experience, lack of commitment / drive / motivation, lack of speed) or underestimation of the (complexity of) requirements.

The **Bottom Up approach** undertakes a detailed analysis of the products that need to be delivered and works out the time and cost it will take to deliver the stated outputs.

Where the estimates exceed the time or cost estimates of the project board, a structured and systematic approach to deciding what must stay in scope and what can be removed will be undertaken until the plan meets the aspirations of the board and can be included into the business case.

At this point, Bottom Up estimating meets Top Down estimating.

The Technique – 3 point estimation

Technique overview	Concept
A popular technique is three-point estimation. This is used in the construction of an approximate probability distribution representing the outcome of future events, based on very limited information. Using this technique to assemble estimates for each of the tasks will help to balance the optimistic bias that occurs in many estimates and also helps to develop a better understanding of what the risks are.	In three-point estimation, three figures are produced initially for every activity that is required to complete the task, based on prior experience or best-guesses: bc = the best-case estimate; everything goes according to plan, none of the risks materialised and there were no issues. lc = the most likely estimate; allows for some risks and issues materialising but that contingency plans work and no major unexpected events happen. wc = the worst-case estimate; reflects everything that could go wrong does, risks materialise, issues are worse than expected and other unexpected events occur. This estimate will reflect the maximum amount of contingency that will be required to deliver the product. We can then apply a simple formula to achieve the estimate. $\text{Estimate} = (\text{wc} + \text{lc} + \text{wc}) / 3$.

How2guide: Estimating

Scenario	Condition	Estimate	When used across a group of activities to achieve a task, it should give a more balanced view of the total time because it will balance the risk of things going well and badly. It is still based on guesstimates if there is no previous experience to draw on, but it reduces the optimistic bias described earlier that can affect planning estimates during periods of early optimism. In this scenario, the estimate would be: $1 + 4 + 10 = 15/3 = 5$
Best case	Road is totally clear, all the traffic lights are in your direction and everything works perfectly	1 hours	
Likely case	No breakdowns, but most of the lights are red and there was heavy traffic in some areas that could reasonably have been expected.	4 hours	
Worst case	Major accident on one of the roads and there is a minor breakdown with the car that means a delay and a need to stop off at a garage.	10 hours	

Where there is previous experience of doing tasks, the likely case can be loaded to reflect increased confidence. So if you have done the task 3 times before and you are confident that your estimate is good, you can multiple it by a number that reflects your confidence – e.g. if you have done it 3 times and it has been 4 hours each time, then you could multiply the likely case by 3 to reflect this. This is then divided by 4 rather than 3.

$BC + (LC * 3) + WC/4$

$1 + (4*3=12) + 10 = 23/4 = 5.75$ so the estimated time is closer to the likely case as you have factored in experience.