BEST PRACTICE
Budgeting

There is no one correct way for budgeting. Some IT organizations use judgment and experience to build the budget; others use automated estimating tools to develop the budget.

The following discussion of budgeting represents some of the better budgeting processes, but not necessarily the only budgeting processes. The tester needs to be familiar with the general concept of budgeting and then use those processes available in their IT organization. Every project is unique. Different factors play a role in making one project differ from another. Among the factors that must be estimated are: size, requirements, expertise, and tools.

Test management depends for a major part on *estimation* and *judgment*. By judgment we mean, the expertise of the test manager or person responsible for the estimation. Internal factors within the organization and external factors (such as economy and client requests) always affect the project. This is where risk analysis and estimate meet. Estimation involves risk at all levels. We can say, "The importance of estimation cannot be underestimated."

Factors that influence estimation include, but are not limited to:

- Requirements
- Past data
- Organization culture
- Selection of suitable estimation technique
- Own experience
- Resources available
- Tools at our disposal

Remember, by definition an estimate means something that can change and it will. It is a ballpark on which we can make decisions. For this reason the project manager must continually monitor the project estimate and revise the estimate for remaining work as necessary. The importance of monitoring will vary depending on the project phase. Figure 26 shows the estimated testing costs by phase, which probably will change during test execution.
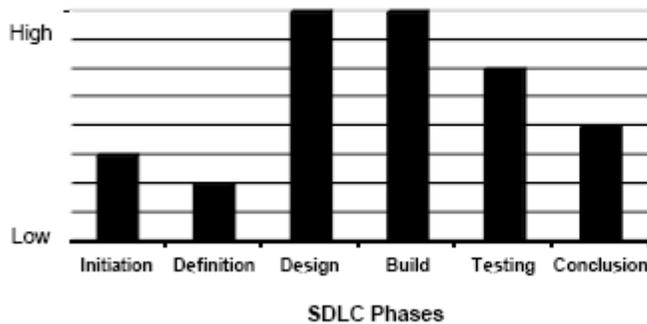
Estimating the budget and schedule for testing involves determining what effort and time will be needed to accomplish the testing goals as stated in the test plan. Accomplishing a testing goal is the objective of testing. In software testing, we are trying to achieve a goal. The Project Smart Web site has stated this very aptly. According to them, all goals should be smart goals wherein SMART stands for:

Specific – Well defined; clear to anyone that has basic knowledge of the project

Measurable – Know if the goal is obtainable and how far away completion is; know when it has been achieved

Agreed Upon – Agreement with all the stakeholders what the goals should be

Realistic – Within the availability of resources, knowledge and time

Time Frame – Enough time to achieve the goal; not too much time, which can affect project performance

When you estimate or run a project, take a moment to consider whether your testing goals are SMART goals. If they aren't, use the techniques mentioned to achieve the same. There are several estimation tools; they translate the data that you input. So, monitor projects and measure the performance to estimate better the next time.

Budgeting Techniques

Budgeting techniques are techniques to estimate the cost of a budget. The following budgeting techniques are discussed below:

- Top-Down Estimation

- Expert Judgment
- Bottom-Up Estimation

Top-Down Estimation

The assumptions in the Top-Down Estimation approach are that software has its own complexity and difficulty in design and implementation. Project management uses this technique since they generate an <u>overall estimate based on the initial knowledge</u>. It is used at the initial stages of the project and is based on similar projects. Past data plays an important role here.

<u>Preliminary estimates are required to determine the feasibility of a project and detailed estimates are needed to help with project planning</u>. The choice of the model will depend on the purpose. There are several metrication methods and models in use. Size is a primary factor in costing models. We will briefly discuss the major ones. It is important to note that all models give the output based on the data input. Inaccurate or wrong estimation inputs will give bad estimates.

The following types of models are used to estimate cost:

- **Cost Models**

  These models provide direct estimates of effort. They typically have a primary cost factor such as lines of code (LOC) and a number of secondary adjustment factors. A few examples of cost models are Function Points and COCOMO.

- **Constraint Models**

  These models demonstrate the relationship over time between two or more parameters of effort, duration, or resource. An example of a constraint model is the Putnam's SLIM model.

- **Function Points Model**

  Function points (FP) measure the size in terms of the amount of functionality in a system. Function points are computed first by calculating an unadjusted function point count (UFC) for different categories. They are then adjusted based on complexity to arrive at the Function Point. Function Points are useful when doing a feasibility analysis. It is always a good practice to have more than one person do the estimation. This way the organization can measure the subjectivity and also arrive at common ground in the future.

- **COCOMOII Model**

  COCOMOII is an enhancement over the original COCOMO (Constructive Cost Model). The COCOMO model is based on inputs relating to the size of the system and a number of cost drivers that affect productivity. COCOMOII is useful for a wider collection of techniques and technologies. It provides support for object-oriented software, business software, software created via spiral or evolutionary development models and software using COTS application utilities.

Expert Judgment

If someone has experience in certain types of projects or certain tools, their expertise can be used to estimate the cost that will be incurred in implementing the project.

Bottom-Up Estimation

This cost estimate can be developed only when the project is defined as in a baseline. The WBS (Work Breakdown Structure) must be defined and scope must be fixed. The tasks can then be broken down to the lowest level and a cost attached to each. This can then be added up to the top baselines thereby giving the cost estimate. It gets its name 'bottom-up' since it works its way up from the bottom, which is the lowest level task.

At this level, each activity has a resource and skill level attached to it and dependencies have been identified. Contingencies also have been taken care of.

Tracking Budgeting Changes

A cost estimate is an estimate of the costs that will be incurred. A budget is the accepted cost. A *cost baseline* is the comparison of the estimate versus actual cost. It is necessary to have a cost estimate for the following reasons:

- It helps in monitoring the cost with the goal of preventing the project from going beyond budget as a surprise.
- It helps to track variances to take appropriate action.
- It helps in proving to the stakeholders, the justification of costs incurred.

A cost baseline, once established should not be changed unless approved. It is used to track variances against the planned cost during the execution of the project.

References

Guide – CSTE Common Body Of Knowledge, V6.1