

# Implementing Software Subcontract Management – A new approach

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## Abstract

In the fast growing IT scenario, it is imperative for any software organization to rapidly grow in business while retaining its core competencies intact. While doing so, software organizations need to build competency centers outside their control and still continue to serve their customers with the same service levels. One of the ways to do this is by subcontracting a part or whole of the project work to outside agencies. As the software organization is finally responsible for the quality of its deliverables (both products and services), it is imperative for these organizations to monitor and oversee the process of carrying out the subcontracted work. One of the ways to do this is to implement the subcontractor processes as per the Software Engineering Institute's Capability Maturity Model (CMM) v1.1. The approach that is presented here is to treat the management of a subcontract as yet another *project* in the organisation and to identify the quality goals of *this project* beyond the product quality goals of the subcontracted work.

## Introduction

The need for IT solutions and services around the globe is fast increasing. The number of new streams in the Information Technology domain is growing at a rate faster than what we are able to manage. IT organizations are increasingly realizing the need to specialize in few of the core competency areas instead of trying to do everything themselves. At the same time, the expectations from the customers are becoming more and more demanding and comprehensive. The customers are expecting solutions from a 'single window' organization.

All this has forced the software organizations to look beyond their technical capabilities to develop customer acceptable solutions. An increasing number of software organizations are experimenting with the concept of getting a piece or whole of the software developed/serviced by a third party. This subcontracting hopefully should help the software organization meet the customer expectations while still maintaining its focus on core competencies. The software organizations which are used to deliver quality solutions and services to their customers, generally used to do everything themselves under their own management oversight. Now they are suddenly getting exposed to some unknown entity on which they do not have complete control.

Implementing the concepts of software subcontract management (SSM) as stated in CMM can reduce this risk to a large extent provided it is interpreted and implemented well.

## The Problem

Traditionally, software project managers have been successfully completing software projects and delivering the goods to meet customer expectations with a complete control over project's people, processes and tools. Project managers are involved all through the project life cycle and know the pulse of the project on a day to day basis. Using this inclusive knowledge of the project, project managers are in a comfortable position to make realistic commitments to customers as well as to their management about the project deliverables.

Unlike many streams in the manufacturing industry, Software being a logical entity, a lot depends on the consistency and adherence to correct processes though out the project's development life cycle. Also, we cannot be assured of the quality of the software only through system testing. As we are aware – "Testing does not prove absence of bugs but can only prove presence of bugs! ", project managers depend heavily on the quality and consistency of processes that are followed in the project to make commitments with respect to quality and reliability of the deliverables.

This being the case, when a software project is to be subcontracted to an external agency, project managers feel a huge vacuum in their knowledge about the project. And thus they are not sure of the quality of the receivables from the subcontractor and are not in a position to make reliable commitments about the project. The pressure from the management and customers is invariably so high that the project managers try to still somehow get involved in the project that is subcontracted in order to gain a better insight into the happenings in the project. This tendency defeats the very purpose of subcontracting which is 'to offload the work to external agency so that we can concentrate on our core competencies'. This involvement of project managers into the subcontracted project can lead to subcontractors perceiving it as meddling into their affairs and can lead to friction and misunderstanding between the company and the subcontractor. In some cases, project managers feel frustrated because they do not get to see all the process activities as they are carried out at a different location.

All these factors can lead to reduced insight into the project and thus often the project commitments are made without much foundation.

## **Our approach**

CMM provides an excellent framework for managing the projects that are subcontracted while tracking and controlling the project performance by quantitative and/or qualitative means. Similar to any scenario of software project, an interpretation of CMM to suit the organization's culture, policies and dynamics is necessary for software subcontract management. We present here an interpretation of CMM, which can help organizations implement SSM for their projects.

Our approach involves the following tasks/activities –

Identify the quality goals (project objectives/organization objectives) for subcontracting a project

Align the activities with those in SSM – KPA (interpretation)

Make a comprehensive agreement with the subcontractor covering SSM requirements

Identify a team (team of managers and technical consultants) that will act as the Subcontractor interface team (SIT) to manage the subcontracted project

Treat the SIT's activities as any other software project in your organization. Let it have its own software development plan (SDP)

Review and approve SDP of the subcontractor

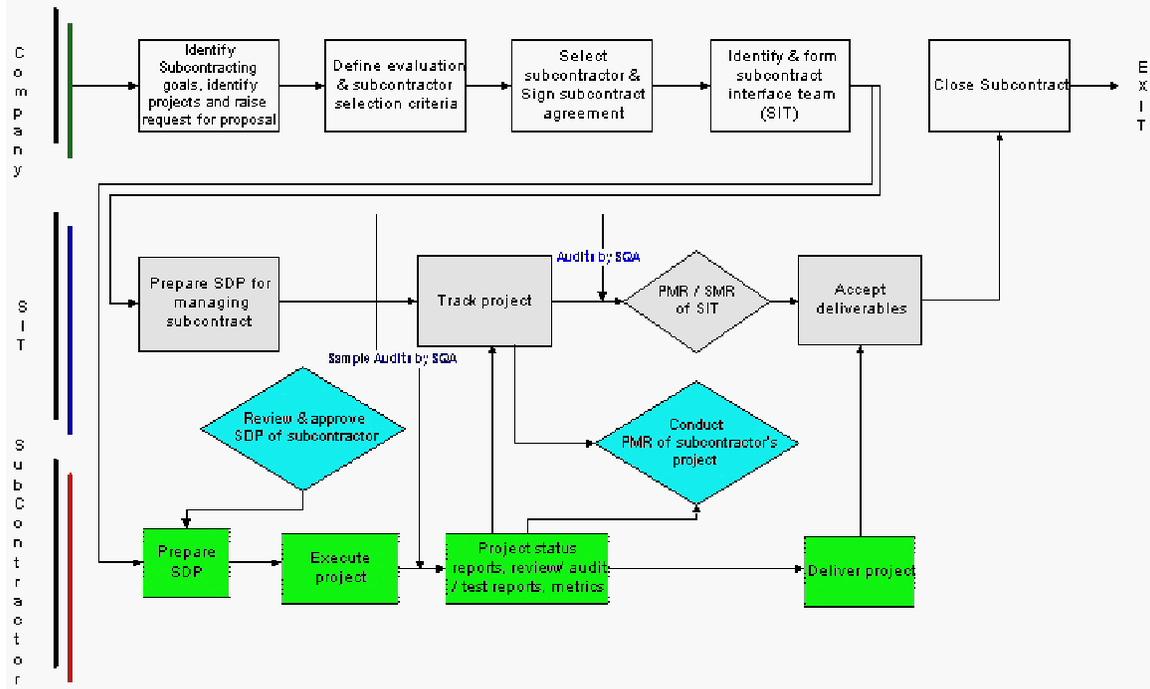
Incorporate project/senior management reviews at appropriate milestones/periodicity

Use quality goals as a means to track project's progress and quality of deliverables

Build defined bridges between the organisation and the subcontractors at various levels (technical, management, SQA, SCM, infrastructure)

Seek customer feedback and evaluation

## Software Subcontract Model



## Identify the quality goals

Similar to any other project/program, subcontracting activity will also be driven by certain objectives and expectations. At the end of the subcontract, one would like to see a definite result coming out of it. This set of expectations or goals has to be captured, analysed and a means of measuring their achievement has to be defined. It is to be noted that the goals that we are talking about are different from the product goals of the project that is being subcontracted. What we are suggesting is to have a set of goals for subcontracting itself.

For example, if our intent of subcontracting is to reduce our project management effort into this particular project to less than 25%, it is one of the goals of subcontracting the project.

Once the quality goals are established, it will be simple to define the subcontractor evaluation and selection criteria. As per the criteria, identify the subcontractor and sign a comprehensive agreement for executing the subcontract.

## Subcontract interface team (SIT)

Identify a team that will act as interface for the subcontracted work. This team will consist of project manager(s), SQA and technical consultants. It will be this team's responsibility to manage the subcontracted project in such a manner that the stated quality goals for subcontracting the project are achieved.

The interface team will have its own software development plan (SDP) similar to any other project. In fact, our approach is to consider this team as yet another project; a project to manage another (one or more) project that is subcontracted. Typically, this project will have more of management, review and SQA activities and less of engineering activities.

Once it is considered as a project, it should be executed, managed and tracked like any other project in the organisation. It will have its own project management and top management reviews, it will go through process reviews and audits, it will collect metrics, it will have milestone reviews etc.

We believe that, by doing this, a fairly visible and accountable interface for subcontracts is provided. In cases where only a part of the product is being subcontracted, the SIT may be a sub-team in the overall project team and its activities could be considered as part of the overall project plan and tracked accordingly.

### **Align the activities with those in SSM – KPA**

The Software subcontractor management Key Process Area of SW-CMM provides a good set of tools to manage subcontracted projects. It allows us to define a mechanism by which we can have an insight into the quality of the processes that are being followed in the subcontracted project as well as the quality of the products.

We believe that, while framing the project contract, the list of activities of SSM come in handy for inclusion. While drawing up the schedule for the project, consider the following –

Prime contractor (you) reviews and approves Software Development Plan of the subcontractor

Periodicity and scope of Project management reviews is identified

Schedules and scope of milestone/checkpoint reviews is identified

Scope of SQA and SCM reviews and audit schedule is defined

List of metrics to be submitted to prime contractor is identified

Scope of technical consultancy and mode of communication is defined

Acceptance criteria is clearly outlined

### **Review and approve SDP of the subcontractor**

Subcontractor needs to prepare a software development plan (SDP) for the subcontracted project. This SDP may not be as per the standards of the prime contractor. It can follow subcontractor's standards and procedures. The SDP should be reviewed by the SIT to ensure adequacy and sufficiency of processes

and phases in order to meet the project goals/objectives. Any concerns or confusion can be resolved at this stage. SIT should also ensure that subcontractor's SDP fits well into its own SDP.

Anytime during the project execution, subcontractor may find the need to modify the SDP. In all such cases, it will have to be reviewed and approved by the prime contractor.

This step helps the SIT and the subcontractor's project teams synchronise their plans and expectations.

## **Management Reviews**

The subcontracted project needs to go through the management reviews by the organisation's project manager and the subcontractor's management. It can be defined as a periodic activity or can be aligned with the project's milestones. During these reviews, project's progress against project's plans and quality goals are tracked. A standard format for the project management reviews can be defined.

In addition, as we are considering the SIT's activities as yet another project in the organisation, it will also need to go through the Management reviews by the senior management. In these reviews, subcontractor is not present.

### ***Use quality goals as a means to track project's progress and quality of deliverables***

Focussing on project's quality goals while tracking the project progress is seen to be providing the required focus to the management. All the activities in the project can be reviewed in relation to the quality goals.

### **Build defined bridges at various levels (technical, management, SQA, SCM, infrastructure)**

It is important to define the hand shaking interfaces between the prime contractor and the subcontractor for smooth and seamless progress of the project. The handshaking can be defined and maintained at various levels of activities. Technical, management, SQA, SCM, infrastructure, and any other group can be included. A defined process of interacting with each other helps reduce confusion and makes project progress smoother and clearer.

### **Accept the deliverables**

Perform the acceptance of work products (both interim and final) as per the agreed acceptance criteria. Give feedback to the subcontractor on the findings. This will help the subcontractors to evaluate their processes.

### **Customer feedback and evaluation**

Level of acceptance of the product by the customer is a major yardstick of success. Seeking customer feedback and evaluating the performance of subcontracting vis-a-vis the performance of doing it in-house will be appropriate to get an insight and will help in deciding future subcontracts.

## **Conclusions & future work**

Software Subcontract Management key process area of Software CMM can be used for defining, tracking and controlling subcontracts. It can help bring visibility of managing the subcontracted work to the senior management. This approach can be employed for any type of subcontract irrespective of whether it is a one-time development project or a maintenance project.

Focus is on identifying quality goals for subcontracting, which are beyond the product's quality goals as well as on defining an interface team and treating it as a project within the organisation. Hence, tracking this interface project.

This approach can also be applied within the organisation to manage interactions between software engineering teams and the various support teams like SQA, infrastructure, HR and Systems by treating them as subcontracts.

For help-desk and support-only subcontracts, we believe that this approach can still be applicable. However, this needs to be evaluated.

## **Glossary**

SSM	Software Subcontract Management
KPA	Key Process Area
CMM	Capability Maturity Model
SEI	Software Engineering Institute
SIT	Subcontractor Interface Team
SDP	Software Development Plan
SQA	Software Quality Assurance
SCM	Software Configuration Management

PMR        Project Management Review

SMR        Senior Management Reviews

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