DECISION ANALYSIS AND RESOLUTION PROCESS

By a client of The Process Group

One of the Process Areas (PA's) in the CMMI* is *Decision Analysis and Resolution (DAR)*. This PA is intended to ensure that critical decisions are made in a systematic way and to provide a record of the decision made.

In this article we share (with permission) a process definition from one of our clients used to implement DAR as part of their CMMI Level 3 rating. The process has been trimmed and revised for this newsletter article. A full version can be found at www.processgroup.com/DAR-process-v1.doc.

Introduction

1.1.   Purpose

The DAR process is a formal method of evaluating key program decisions and proposed solutions to program issues. This ensures a controlled, rather than reactionary, decision process.

1.2.   Roles and Responsibilities

The roles and responsibilities defined here are as follows:

1.2.1. Decision Owner

The decision owner is the person ultimately responsible for making the final decision. The decision owner's activities consist of:

- ➤ Completing the DAR worksheet in Appendix A (see web version for this appendix)
- ➤ Ensuring that the appropriate evaluation criteria and evaluation method(s) are identified for the solutions under consideration
- ➤ Ensuring that a final decision is reached

1.2.2. Decision Participant

A decision participant is someone who is involved in the decision-making process. The decision participant shall have the knowledge and background required to assist in making an informed decision. DAR participants shall have the appropriate organizational authority to make the decision.

1.2.3. Decision Stakeholder

A decision stakeholder is someone who is affected by the decision but does not necessarily participate in the decision-making process.

1.3.   DAR Process

DAR can apply to all levels of decisions made within a program. However, care should be taken to limit it to key program decisions (identified within the program through the event triggers defined in Section 1.4) so as to not impede the program's progress. Completed DAR worksheets will be stored in the approved program document repository according to the Configuration Management Plan.

1.4.   Event Triggers

Due to the unique constraints associated with each program, no single set of DAR event triggers can be created. Rather, each program shall document the event triggers it will use to identify when the formal decision process is necessary to make program decisions. These triggers shall be specified in the Project Plan.

Typical criteria for triggering DAR include, but are not limited to:

- ➤ A specified program cost increase threshold
- ➤ Capital expenditures over a specified cost
- ➤ Make/buy/reuse decisions
- ➤ Significant architectural changes
- ➤ Significant schedule slip
- ➤ Addition of a new release family
- ➤ Selection of third party solution providers
- ➤ Selection of organizational tools
- ➤ Modification of organizational processes

1.5.   Solution Identification

As a guideline, there shall be no less than two, and no more than five, prospective solutions identified for consideration. If there are too many solutions under consideration, it is likely that time constraints will dictate that some of them will not be given proper consideration. This, in turn, detracts from a more thorough analysis of the other potential solutions.

CMMI: SAM AND ISM APPLICABILITY

By Neil Potter and Mary Sakry

Over the past 3-4 years of using CMMI*, there have been several questions put forward regarding the applicability of the two Process Areas (PA's): Supplier Agreement Management (SAM) and Integrated Supplier Management (ISM). Since there is not always agreement among CMMI users or teachers regarding CMMI interpretation, this article briefly describes some rules-of-thumb (our current interpretation) for using these PA's.

In the CMMI, the intent of SAM is stated as:

This process area primarily applies to the acquisition of products and product components that are delivered to the project's customer. To minimize risks to the project, this process area may also be applied to the acquisition of significant products and product components not delivered to the project's customer (for example, development tools and test environments).

[CMU/SEI-2002-TR-012, page 137]

The intent of ISM is stated as:

Integrated Supplier Management emphasizes relationships with suppliers that are collaborative and coordinated. ...Integrated Supplier Management is not required for projects using off-the-shelf items that are generally available and that are not modified in any way. There, the use of Supplier Agreement Management is sufficient.

[CMU/SEI-2002-TR-012, page 434]

But how about the situations described below; Does SAM or ISM apply?

a) The component being supplied is Open Source. The original owner has moved on; the source code is freely available on a website. The component is integrated in your product.

b) The component being supplied is Open Source. Since the supplier has moved on, you hire a company to maintain a copy of the component for you. The component is integrated in your product.

c) Your customer requires you to use component X. The customer will buy the licenses. You ship the component along with your solution.

d) Your customer requires that you make your solution compatible with operating system (OS) Z, but you don't ship that OS with your solution.

e) The component (e.g., inkjet printer) is supplied by *very-big-company-inc*. It is off-the-shelf and you ship it with your solution. However, you are less than a drop in the ocean to *very-big-company-inc* and have no leverage with them at all.

f) Your product user's guide is translated into Spanish and you ship the final translation as part of your solution.

Here are our current interpretations:

a) Neither SAM or ISM need apply. There is no supplier to manage and with whom to have an agreement.

b) SAM applies since there is a supplier to manage and someone with whom to have an agreement. However, ISM is assessed only if the Supplier Sourcing (SS) model has been selected. ISM would apply if modifications are requested, or if you wanted to make this and similar engagements more robust using ISM practices.

c) SAM should apply, but in this case, someone outside of your group is performing all the legwork of selecting the supplier and defining the agreement. If there is nothing else to do, SAM cannot really apply. For your part, the supplier should at least be managed as a risk in the Project Planning Process Area. You could also verify that the supplier is performing SAM activities sufficiently.

d) SAM need not apply if you do not ship the component, but it can be used to manage risk.

e) SAM should apply since you select and ship the component with your solution. However, the supplier is so big that you have no leverage at all (and therefore no one to manage), and really no agreement more than a store receipt. So SAM doesn't apply, unless you have a vendor you can manage. Outside of an appraisal, you might use part of SAM for supplier selection. (Within an appraisal, Process Areas cannot be half-assessed.)

f) SAM applies because you are selecting and managing a vendor, and the component is shipped along with your solution. If the SS model is selected, then ISM can be used to provide visibility over the way they manage their work.

Disagree?

We asked these questions of numerous people, including the SEI (CMMI authors and appraisers), some of our competitors, and also passed the questions by the CMMI Yahoo forum. And there was a range of answers—a large enough range to cause potential differences in CMMI appraisal results.

* Capability Maturity Model Integration v1.1

Typical methods of solution identification include, but are not limited to:

> ➤ Brainstorming
> ➤ Question and answer
> ➤ Solution solicitation
> ➤ Market research
> ➤ Competitor analysis
> ➤ Customer feedback
> ➤ Analysis of similar problems solved on other programs and their solutions

1.6. Evaluation Criteria

As a guideline, there shall be no less than two, and no more than five, evaluation criteria.

Due to the unique constraints associated with each program, no single set of evaluation criteria can be created. Rather, each program shall document the evaluation criteria it will use for DAR along with the weighting factor, or coefficient, associated with each criteria. The coefficient is used to more accurately reflect the driving factors of the program. Each evaluation criteria should have a unique coefficient. The larger the coefficient, the more important that criteria is for the program. The evaluation criteria and coefficients will be documented in the DAR Worksheet.

Typical evaluation criteria used to evaluate potential solutions include, but are not limited to: cost, schedule, risk, performance, reliability, reusability, efficiency, maintainability, scalability and portability.

Criteria	Coefficient
Cost of proposed supplier solution	5
Performance (previous work and current CMMI rating)	4
Schedule availability of supplier	1

Table 1 Sample Evaluation Criteria

Table 1 illustrates an example of evaluation criteria for selecting a supplier. In this example, cost is ranked as the highest priority, performance is the second-highest priority and schedule is the lowest priority.

1.7. Evaluation Method

The evaluation methods used shall be documented using the DAR Worksheet. Typical methods used to evaluate potential solutions include, but are not limited to:

> ➤ Open discussion
> ➤ Use of simulations
> ➤ Use of trade studies
> ➤ Statistical analysis
> ➤ Use of prototypes
> ➤ Analysis of solutions to similar problems

1.8. Solution Evaluation

The DAR worksheet documents the triggering event, the people performing the evaluation, the people making the final decision, the method(s) of evaluation to be used, the evaluation criteria, the total score for each solution, and the final solution selected.

Each solution shall be assigned a unique, sequential ranking for each evaluation criteria. As an example, if there are four potential solutions, the rankings are 1, 2, 3 and 4; with 1 as the worst-ranked solution and 4 as the best-ranked solution.

1.8.1. Computation Method

Once the solutions are ranked for each evaluation criteria, the total score for each solution is computed. The total score shall be the weighted summation of the evaluation criteria. A higher score represents a better solution choice.

The method used to compute the total score shall be:

Total Score = sum (rank x coefficient) for each evaluation criteria.

Table 2 provides an example of evaluating four potential suppliers using the coefficients from Table 1.

In this example, Solution 1 was rated as the best "Cost" solution, Solution 4 was rated as the best "Performance" solution and Solution 3 was rated as the best "Schedule" solution.

Using the rankings from Table 2, the "Total Score" for Solution 1 is (4 x 5) + (2 x 4) + (1 x 1) = 29. The Total Score for Solutions 2, 3 and 4 are computed in the same manner.

1.9. Solution Selection

The solution with the highest total score shall be selected. In the event of a tie between multiple solutions, the solution with the best (highest) ranking for the most important evaluation criteria shall be selected.

In the example shown in Table 2, Solution 1 would be selected since it has the best (highest) Total Score.

Solution	Evaluation Method	Cost	Performance	Schedule	Total Score
Supplier 1	Previous customers + CMMI assessment data	4	2	1	29
Supplier 2	Ditto	2	3	3	25
Supplier 3	Ditto	3	1	4	23
Supplier 4	Ditto	1	4	2	23

Table 2 Sample Evaluation Table

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