

## ***Making the Case for a Requirements Management Strategy***

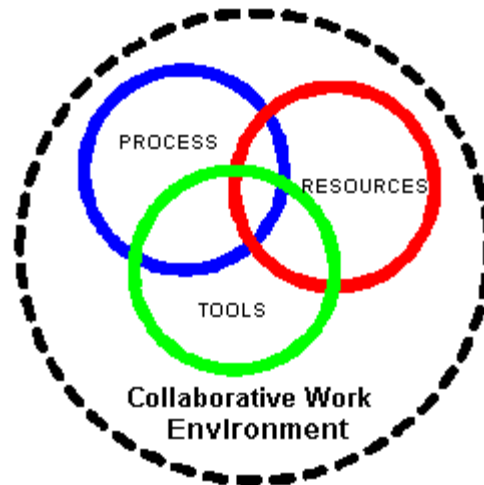
David Marco in his November, 2001 article published in the Cutter IT Journal, reminds us that when selling a concept to management, there are only two things they understand: increasing revenues or decreasing costs. If you are not talking about these, “you are the teacher in the old Peanuts cartoon: ‘Blah, blah, blah, blah, blah.’”<sup>1</sup>

This paper is an attempt to show you and your management the return on investment you can expect to achieve if you employ a requirements management strategy that’s supported by appropriate requirements specification and requirements management tools.

Let’s first define what we mean by a requirements management strategy. A requirements management strategy is the approach you take to gathering requirements, reviewing requirements, managing changes to requirements, tracing requirements from the business need through to implementation, and tracking the status of the requirements.

To accurately gather, review, trace, and track requirements requires three things:

- A process that describes how to gather, organize, analyze, publish and track the requirements
- Tools that support these activities
- Knowledgeable resources who know what to gather when and how to best accomplish their work



*Figure 1: Requirements Management Strategy Components*

Some vendors who calculate ROI for requirements management figure in the cost of the tool only – as if the tool by itself is what will help you achieve better requirements. We believe that the only way to achieve a true difference is by combining good tools with a good process and good people.

<sup>1</sup> David Marco, Meta Data Return on Investment. Cutter IT Journal, Vol. 14, No. 11, November 2001



## Requirements Process

A good requirements process will cover the full lifecycle, starting with the key phase of gathering requirements information and carrying through to tracing how a requirement has been implemented. But it's in the gathering, organizing, and reviewing of requirements where you'll see a major difference in the quality of the resulting requirements. A haphazard, unfocused approach will surely result in missing and misstated requirements. No one plans to have this kind of approach, but how can you avoid it?

We believe that an architecturally based process is what makes one approach stand out above the others, especially as contrasted with a process that's based on working with documents. An architectural process is predicated on using a repository-based modeling tool, and building a meta-model that ensures that the right information will be gathered, stored in the right place in the tool, and automatically inter-related to other requirements information.

## Requirements Tools

Two tools are necessary for a good requirements management strategy:

- A repository-based modeling tool for capturing requirements
- A web-based requirements tracking and collaboration tool for tracing and tracking requirements, and for supporting a collaborative review process

## Why a Repository-Based Modeling Tool?

We believe that process (functional/use case) requirements and information (data/class) requirements can best be understood using models. It might take several pages of text to describe the process of, say, taking an order. Even then, you risk missing some key business rule or forgetting to document the necessity for using a particular piece of data. Here a visual approach is clearly preferable to a written one. If you've ever been part of a building project and reviewed architectural drawings, you'll know exactly what we mean when we say that visual models are superior to text descriptions.

As you build your models there must be a repository behind them; otherwise you are just drawing pictures, not gathering information. It is the structure that you build into the repository that allows you to capture the right information and to automatically build relationships. As an added bonus, you can customize the repository to generate requirement specification documentation and user acceptance test scripts.

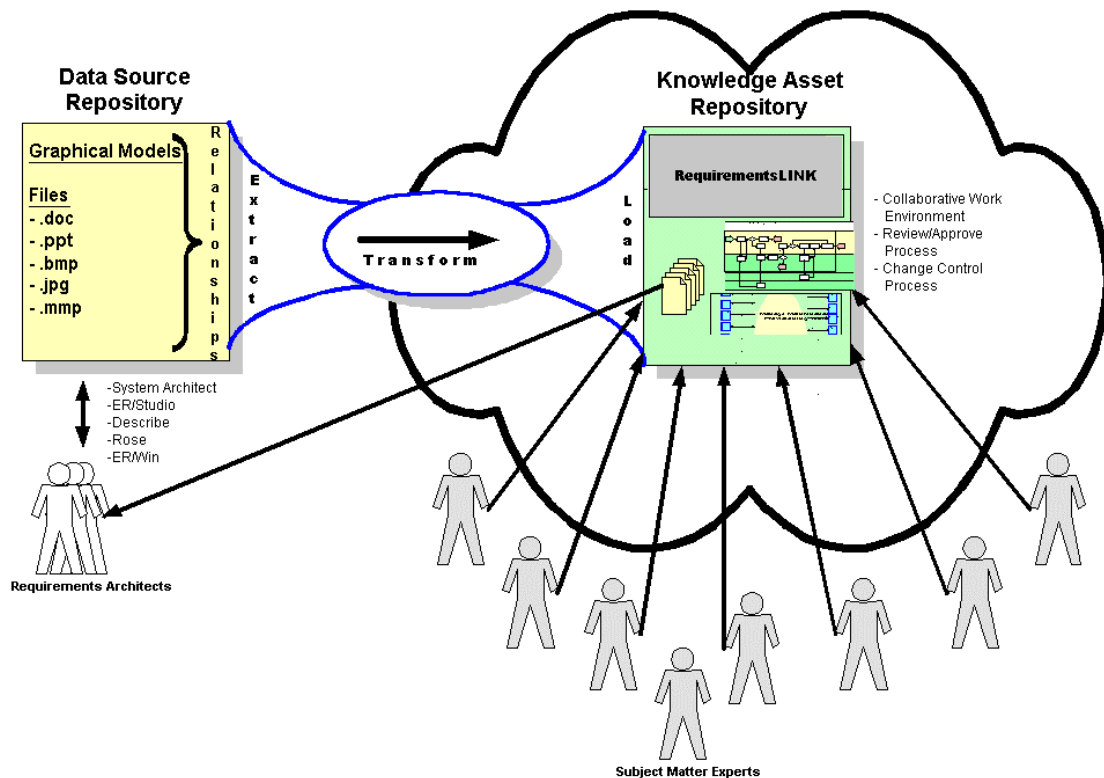
We believe that there are a number of excellent requirements modeling tools that can be used very effectively in the requirements-gathering process. These include, for example, System Architect, Embarcadero's ER/Studio (for Data Modeling), Rational Rose (for UML), and others. Which you select depends on your project needs.



## Why a Tracking and Collaboration Tool?

You need a tool that is built to work with modeling tools and that can extract all the requirements that are implied in the models, organize them into textual statements, and track all the relationships pictured in the models. In addition, you want to allow reviewers to see the information, to share the information, and to collaborate on the information by entering their comments and approvals. No modeling tool can do this within its native interface.

We have introduced a new tool, **RequirementsLINK™**, that is unique in its ability to provide everything you need to manage, track, collaborate on, and manage the review cycle of requirements. RequirementsLINK is built to work with modeling tools, to extract all the requirements that are implied in the models, to organize them into text statements, and to track all the relationships pictured in the models. In addition, RequirementsLINK provides a collaborative environment on the web where subject matter experts can review requirements and provide their feedback. A formerly manual, tedious, and time-consuming project task can now be streamlined.



Within RequirementsLINK, there are two key features that support requirements management. First, the tool provides automatic change history. Each time a requirement is changed, RequirementsLINK creates a history record of the date and time of the change, as well as a snapshot of the previous version so that you can see whether the change was major (a revamped function) or minor (a spelling correction).

In addition RequirementsLINK tracks all the relationships that requirements architects establish in the originating graphical models and definitions, and allow you to report on the traceability.

### **Knowledgeable Resources**

The people who do the requirements elicitation, organization, and documentation must be trained in the process and in the use of the tools. We call these people requirements architects because they play a similar role to an architect in a building project.

### **Measuring the Return on Investment – Employing a Comprehensive Requirements Management Strategy**

Measuring the return on investment of a comprehensive solution, such as the requirements management strategy outlined above that includes processes, tools, and resources, in a simple and straightforward way is difficult at best. In an initial attempt to establish an understanding of the return on investment, there are a number of ways that the strategy can help organizations can save time and money:

Process gains:

- Following a process (roadmap) better ensures that the project team members stay focused and on track; they know what they need to do, when they need to do it, and how best to accomplish it.
- Conducting facilitated model-building session reduces time to gather and confirm information. It also minimizes the amount of time required of the subject matter experts and maximizes the value of the information gathered.

Tool gains:

- Using a repository-based modeling tool provides a vehicle for improved communication and enables reuse of the requirement project artifacts.
- Using a requirements architecture (pre-defined meta model) directs what information needs to be collected and how the information is inter-related.
- Providing a mechanism so that the Requirements Specification can be automatically published (hard copy or web-enabled) directly from the information already stored in the requirements repository means that you only have to manage the repository information, not the documents as well.
- Automatically generating text requirements from models, including all the parent-child and peer-peer relationships captured in the modeling tool, means that no requirements or links are inadvertently lost.
- Working in a collaborative environment supported by a tool greatly facilitates the review and approval process and reduces the effort required to reconcile different versions of



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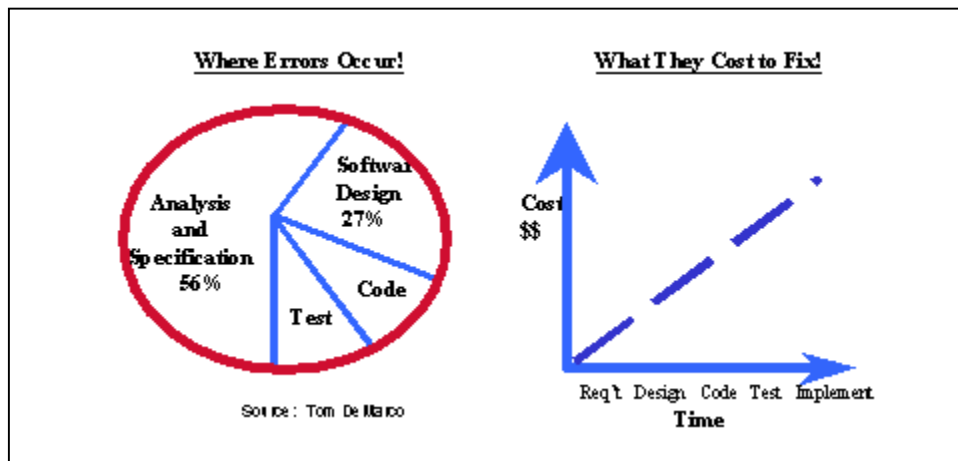
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changes. Managers can track status, schedule review dates, and assess the completeness of a review cycle. Reviewers can see what they have been scheduled to review and can make their comments online.

- Automatically generating user acceptance testing scripts eliminates the need to create scripts from scratch and enables the testers to ensure that the system design satisfies the user requirements.

While we intuitively know that these factors positively impact the return on investment, they are not easily measured.

Another approach is to look at return on investment from the perspective of how requirement errors can impact the cost of a system development project. According to Tom DeMarco, 56% of system errors occur during the Analysis and Requirements Specification phase, while the Standish Group has determined that finding and fixing requirements errors consumes 70-85% of total project rework costs. If we accept these figures, then it would make sense to do a better job earlier on in the system lifecycle to get the requirements right.



## Calculation: Return on Investment Based On Requirements Errors

### Assumptions:

- Project team consists of 10 resources (analysts, developers and support personnel).
- Fully loaded labor cost for each resource averages \$10,000/month.
- Duration of project is 12 months.
- Estimated cost of rework for the project is 30% of the entire project budget.
- Requirements errors are responsible for 70% of the project rework



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### Software Project Cost Estimates:

Number of team members	10*
Project length	12 months
Overhead per month per team member	\$ 10,000
Total projected labor costs	\$1,200,000
Total rework costs (30% of project costs)	\$ 360,000
<b>Total cost of project</b>	<b>\$1,560,000</b>

**Cost of requirements errors (70% of rework costs): \$252,000**

### Investment Cost of Comprehensive Requirements Management Strategy for First Project:

Training/mentoring for requirements analysts on project	\$ 40,000
License fee for process documentation (one-time fee)	\$ 15,000
Value-added repository-based modeling tool (one-time fee)	\$ 4,000
RequirementsLINK requirements management tool (one-time fee)	\$ 25,000
<b>Total investment cost</b>	<b>\$ 84,000</b>

### Cost Savings from Employing a Comprehensive Requirements Management Strategy:

	<b>Case 1</b>	<b>Case 2</b>	<b>Case 3</b>
<b>First Project</b>			
Investment	\$84,000	\$84,000	\$84,000
Requirement error reduction	50% \$126,000	25% \$63,000	15% \$37,800
Cost Savings	\$42,000	-\$19,000	-\$46,200
<b>Subsequent Projects</b>			
Investment	\$40,000	\$40,000	\$40,000
Requirement error reduction	50% \$126,000	25% \$63,000	15% \$37,800
Cost Savings	\$86,000	\$13,000	-\$2,200

### **Conclusion**

To more effectively reduce requirement errors, consider adopting a requirements management strategy that includes:



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- A requirements repository easily accessible by all interested parties.
- Easier integration and reconciliation of review comments in the approval process via a collaborative work environment that provides comment history for each requirement.
- A pre-defined requirements architecture meta-model that clearly and completely supports requirements gathering and organization.
- Requirements tracking throughout the evolution of a requirement during the system lifecycle.
- Automatic generation of testing scripts from approved requirements.
- Automatic generation of requirements specification documents.

## **About Doreen Evans Associates**

Doreen Evans Associates (DEA) is a professional services firm that focuses on business process improvement. We can help you change a process, build an enterprise architecture, or define requirements for your systems and technologies. Founded in 1992 as a woman-owned, privately-held small business, our mission is to ensure that business need drives solutions.