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# Selecting The Right Requirements Management Tool — Or Maybe None Whatsoever

by Carey Schwaber and Peter Sterpe

for Application Development & Program Management Professionals

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## EXECUTIVE SUMMARY

Many of today's requirements management tool purchases are misguided: Application development and program management professionals often buy requirements management tools for the wrong reasons and select tools that are out of line with their needs. To avoid purchasing tools that are more complex and more expensive than necessary, app dev organizations need to be realistic about the problems that a requirements management tool can address, the level of tooling that they require, and their ability to build and maintain tool integrations.

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## NOTES & RESOURCES

Forrester interviewed 10 companies, including Borland Software, Compuware, Hewlett-Packard, IBM, Kovair Software, Microsoft, MKS, Rally Software Development, and Telelogic. Forrester also works with clients investigating requirements management tools on a regular basis through inquiries and consulting.

### **Related Research Documents**

"The Root Of The Problem: Poor Requirements"  
September 1, 2006

"The Changing Face Of Application Life-Cycle Management"  
August 18, 2006

## IT SHOPS LOOK TO REQUIREMENTS MANAGEMENT TOOLS FOR MORE THAN THEY SHOULD

The purpose of requirements management is to maximize the likelihood that an application will function as intended and deliver its projected value to the business. Forrester defines requirements management as:

*The storage of requirements, the tracking of relationships among requirements, and the control of changes to individual requirements and groups of requirements.*

Requirements management is both a discipline and a category of tools. Business analysts, business customers, product managers, project managers, and developers use requirements management tools to increase the efficiency of their requirements management practices. The larger the development effort and the more granular the requirements are, the more important tool support is in making proper requirements management cost-effective. For this reason, firms in industries like aerospace and defense, telecommunications, and automotive have long used requirements management tools to support their embedded systems development efforts. But in recent years, requirements management tools have spread to enterprise IT organizations, as well. Here's why:

- **Turbulent business conditions have created painful levels of requirements churn.** As most enterprises can tell you, the pace of business is increasing, and the rate at which business conditions change is doing so, as well. As business conditions change, so do the business requirements that drive application acquisition, customization, development, and integration efforts. But the waterfall development process, generally considered to be obsolete but nonetheless in wide use, treats “change” as a four-letter word. Because waterfall is designed around the assumption that requirements will not change, the impact of the changes that do occur is tremendous. Requirements management tools are essential to understanding the impact of requirements change and enforcing the processes that surround it.
- **Compliance requirements have elevated the importance of traceability.** Many enterprises need to prove that their operations — more often than not automated by software applications — meet regulatory requirements like Sarbanes-Oxley, FDA CFR 21 Part 11, and HIPAA. In addition to proof that compliance requirements themselves have been appropriately implemented, auditors also require the same proof for business requirements that touch related domains like financial reporting or clinical trials. In both cases, the IT organization must demonstrate that applications behave as the business desires; this requires an unbroken chain from requirement to test case to deployed software. Requirements repositories are the first step in the chain of traceability.
- **Recognition that defective requirements result in defective applications has increased.** No matter how well architected, well constructed, or well tested an application might be, it is essentially useless if it fails to meet business needs. While the importance of accurately defining requirements might seem obvious, both the business and IT frequently give this function short

shrift. Fortunately, this is starting to change, and IT shops are focusing more attention on their requirements practices. Those who commit to improving requirements quality often look to requirements tools to help. Unfortunately, this rarely pans out, since requirements management tools have little impact on the contents of the requirements that they manage.

### IT Shops Expect More From Requirements Management Tools Than They Can Deliver

Requirements management is an important part of a mature application delivery process. But the wrong motives inspire many requirements management tool purchases. In fact, requirements management tools are not in and of themselves able to help app dev shops accommodate requirements change, achieve end-to-end traceability, or improve requirements quality. When it comes to meeting compliance requirements and establishing end-to-end traceability, requirements management tools are just one piece of a puzzle that must also include, at a bare minimum, test management tools.<sup>1</sup> While requirements management tools may be able to prevent requirements quality from degrading, it's requirements definition tools that define the initial quality level of requirements.<sup>2</sup> And using requirements management tools to address pains around requirements change is like using accounting software to curb runaway expenditures.

In analyzing our recent client inquiries on requirements management tools, we determined that much of the interest in requirements management tools is misplaced. What do clients need beyond or instead of a requirements management tool? Most often, the best solution to their problems is process change, better articulation of roles and responsibilities, or more and better tools and techniques for requirements definition (see Figure 1).

**Figure 1** Requirements Management Tools Aren't The Answer To Every Requirements Problem

**Sample inquiry No. 1:** Need for requirements definition tools

"We are looking to reduce rework and improve customer satisfaction. Which of our strategic vendors offers a requirements management tool that can help us do so?" (Insurance company)

**Sample inquiry No. 2:** Need for requirements management tools

"We are doing research to find a requirements tool that will make the following easier: tracking requirements, tracing requirements to test cases, a central repository for requirements, and version control of the requirement." (High-tech product company)

**Sample inquiry No. 3:** Need for application life-cycle management

"We need to select a tool that will store and provide traceability for requirements, test cases, change control, and defects for a large software upgrade project. What are the strengths and weaknesses of DOORS, RequisitePro, and CaliberRM in this regard?" (Health insurance company)

**Sample inquiry No. 4:** Need for development process change

"We spend four months documenting our requirements, and it's frustrating to do so when we know that they're only going to change. Can a requirements management tool do this for us?" (Telecommunications company)

## FEATURES TO LOOK FOR IN A REQUIREMENTS MANAGEMENT SOLUTION

In addition to expecting too much from requirements management tools, application development organizations also fumble in their selection of requirements management tools. All too often, they build their requests for proposals (RFPs) by compiling a list of all features known to exist in any requirements management tool, rather than all of the features that they actually need. This leads them to acquire tools that are more complex and more expensive than necessary. And when tool complexity exceeds requirements, the tool in question often becomes shelfware and the enterprise's needs go unmet.

### In-Scope Features

What features should IT organizations rightly expect to find in a requirements management solution? The features that make sense together in such a tool include:

- **Baselining to track the state of requirements at a given point in time.** Because individual requirements and the collection of requirements that correspond to a development effort will change over time, requirements management tools need to include baselining capabilities similar to those used in software configuration management tools. Baselining requirements is like taking a snapshot of their state at a point in time — both individually and in aggregate — and then applying a label to it. Requirements management tools should store baselines in a secure repository accompanied by information about the act of creating the baseline — potentially in the form of electronic signatures — and should make it easy to determine the differences between various baselines.
- **Linking and tracing to track relationships among requirements.** Identifying and managing dependencies among requirements is one of the main *raison d'être* for requirements management tools. Without this capability, keeping track of elaborate requirements hierarchies that include both parent/child relationships and arbitrary relationships can be downright grueling. Closely related to linking and tracing is the ability to perform impact analysis and determine the effects that changes to one requirement have on associated requirements. Enabling the creation of relationships between requirements artifacts is necessary, but it's not sufficient by itself. Requirements management tools also have to make it easy to visualize and explore these relationships. At present, most tools fall down in this area: Traceability matrices are the most well-known way of accomplishing this, but they're typically too large to easily consume.
- **Requirements input mechanisms that make end users comfortable in the tool.** The heaviest users of requirements management tools — business analysts, business customers, and project managers — are not accustomed to complicated tools. Bringing these tools into their native environment, rather than the other way around, increases the chances of acceptance and decreases their ramp time. Like it or not, the most common requirements medium is far and

away Microsoft Word.<sup>3</sup> This means that requirements management must support Word as an input mechanism, whether that's through utilities that parse Word documents to import requirements and associated metadata, plug-ins that expose requirements management toolbars within Word, or a Word-like interface in the requirements management tool. Second best is a Web-based interface, especially when designed with careful attention to usability and built with rich Internet application technologies.

- **Reuse to support sharing of common requirements across projects.** One of the most common motivating factors behind requirements management tool purchases is the desire to build up a repository of all of the requirements that have ever been fulfilled — to make it easy to search across all of these requirements — and thus to raise awareness of redundancy in software assets. For this to happen, though, reuse of requirements across projects has to be fully supported so that enterprise-level requirements can be linked to project-level requirements. Copying and pasting requirements from project to project is a primitive way to support this activity; true support for reuse of requirements involves parent/child relationships with inheritance among enterprise- and project-level requirements.
- **Workflow to automate requirements change management processes.** To automate the processes that surround requirements change, requirements management tools should include workflow capabilities, including graphical utilities for workflow design and form design and extensibility to support initiation of arbitrary internal and external events. Few tools meet this standard, however. Borland Software, IBM, and Telelogic sell separate change management tools that can be used in conjunction with their requirements management tools, but acquiring both is far more complex and far more expensive. IT shops expect requirements management tools to include their own workflow capabilities, and vendors should meet this expectation.
- **Integration with other life-cycle tools.** For requirements management to be more than just an academic exercise, other members of the development team will have to consume requirements in some form or another. And for the sake of traceability across the life cycle — not just among requirements — requirements will have to be linked to other life-cycle artifacts like test cases and deployed software. To accomplish these two goals, requirements management tools must be integrated with tools for test management, project portfolio management, software change and configuration management, and modeling, in descending order of priority. Look for Web-services-based bidirectional integrations that make it easy to map fields between tools and let you determine how frequently the repositories synchronize, as well as how conflicts are resolved. Better yet, to skip over integration challenges, look for requirements management capabilities inside of larger platforms for application life-cycle management (ALM).

In addition to these features, requirements management tools should include security, reporting and analysis, and collaboration capabilities. But such capabilities, as well as some of those listed above, are equally applicable in disciplines like configuration management, change management, and test

management. Rather than building a separate instance of these capabilities in each of their tools, vendors that offer ALM solutions will expose these features as services in their ALM 2.0 platforms.<sup>4</sup> This will be more efficient for vendors, and it will also remove the need for IT shops to acquire and employ these capabilities in redundant and inconsistent forms.

### Out-Of-Scope Features

When selecting a requirements management tool, IT organizations frequently include features in their RFPs that are related to the problem at hand but outside the scope of requirements management per se. These features are more commonly found in requirements definition tools, ALM solutions, or even project portfolio management tools. The most common examples of such features are:

- **Requirements definition features to help elicit and specify requirements.** While many requirements management tools offer support for inputting requirements through bulk import or even customized forms, they don't do anything to help elicit or specify requirements. There are tools that do just this, however. Borland Caliber DefineIT and Compuware Optimal Trace both include general support for requirements definition, and application simulation tools like iRise, Axure RP, Serena Composer, and Simunication do the same but rely more heavily on prototyping and simulation as a requirements medium.<sup>5</sup>
- **Requirements validation capabilities to assess the quality of requirements.** Many IT organizations expect their requirements management tools to measure or even to improve the quality of their requirements. But requirements management tools are agnostic about requirements contents: They store, associate, and version requirements without any respect to their quality. Ravenflow, in contrast, is an example of a tool outside of the requirements management category that tackles requirements quality by analyzing use cases for anti-patterns.
- **Decision support to facilitate prioritization and selection of requirements.** Once requirements have been defined, the task of determining which will be fulfilled and in what order remains. This is an especially pressing problem for software vendors, whose choices have dramatic consequences. Decision-support capabilities can be found in project portfolio management tools like Borland Tempo and in product life-cycle management tools like Siemens UGS PLM's Teamcenter and MatrixOne's Matrix10.


### THREE MAIN TYPES OF REQUIREMENTS MANAGEMENT SOLUTIONS, NONE OF THEM IDEAL

As we survey the requirements management tools landscape, at this point, the only types of purpose-built tools suitable for enterprise adoption fall into three categories (see Figure 2).

1. **Standalone requirements management tools.** Tools in this category were built expressly for the purpose of requirements management. Integrations between these tools and other life-cycle tools do exist, but they are perpetual works in progress. Smart application development and program management professionals take care to consider the availability of supported integrations to related tools. But even smart shops often fail to establish these integrations, no matter whether they're supported. Why? Because integrating tools is never higher priority than building software, and there is always more software to be built.
2. **Single-repository ALM platforms with requirements management on top.** Many of the vendors that have built out platforms for ALM have developed requirements management capabilities within these platforms. Even when these requirements management capabilities aren't as mature as those in standalone tools — as is often but not always the case — these solutions have the advantage of having integration built right in.
3. **Multirepository ALM platforms that include requirements management.** Multirepository ALM platforms provide common services to discrete practitioner tools, obviating the need for each practitioner tool to include redundant and inconsistent ALM functionality. The only vendor with a requirements management solution of this sort is Kovair. Kovair Global Lifecycle/Enterprise Edition functions as an orchestration engine for processes spanning multiple development life-cycle tools, including Kovair's own requirements management solution.

Although neither type of requirements management solution is ideal at present, requirements management capabilities within ALM solutions have the most potential. Requirements management tools have so much in common with other life-cycle tools that it doesn't make sense for them to be standalone offerings. As vendors enhance the requirements management capabilities in their ALM platforms, this option will become closer and closer to the ideal.

**Figure 2** Requirements Management Solutions By Type

 A spreadsheet with additional data is available online.

	Baselining	Linking and tracing	Microsoft Word support	Workflow	Base price
<b>Standalone requirements management tools</b>					
Borland CaliberRM	●	●	◐	○	\$6,000
Compuware Optimal Trace	●	●	◐	○	\$6,400*
IBM Rational RequisitePro	●	●	●	○	\$4,240*
Kovair Global Lifecycle/Requirements Management	●	●	◐	●	\$10,680†
Telelogic DOORS	●	●	◐	○	\$7,340*
Telelogic DOORS Fastrak	●	●	○	◐	\$3,150
<b>Requirements management within a single-repository ALM platform</b>					
HP Quality Center	●	●	◐	●	\$15,000†
Microsoft Visual Studio Team System	○	◐	○	●	\$3,298†
MKS Integrity	●	●	●	●	\$20,700†
Rally Software Development	●	●	○	◐	\$65‡
Serena Dimensions RM	●	●	◐	●	\$6,000*
<b>Requirements management as part of a multirepository ALM platform</b>					
Kovair Global Lifecycle/Enterprise Edition	●	●	◐	●	Unavailable

○ = None      ◐ = Partial      ● = Full

\*Per perpetual concurrent user license

†Includes cost of required server component and perpetual concurrent user license

‡Per month per named user license

## RECOMMENDATIONS

### BE REALISTIC IN YOUR SELECTION OF REQUIREMENTS MANAGEMENT SOLUTIONS

Application development and program management professionals searching for the right requirements management solution often get tripped up by ambition. They commonly assume that even if they don't buy the most full-featured tool on the market, they will surely need such a tool within a few years. They also fool themselves into believing that they can and will build seamless integrations between whatever tool they buy and the tools that they already have. In the end, this leads them to purchase a tool that's more complex, more difficult to use, and more expensive than is necessary. We recommend that app dev shops strive to keep their selection process grounded in reality. To this end:

- **Assume that requirements management within an ALM solution is your best bet.** Many of the most important benefits of requirements management come from integration with downstream tools for activities like change management and test management. Although you can build integrations to these tools, it's rarely easy to do and even less often a priority. Getting your requirements management capabilities as part of a platform has the advantage of immediate integration.
- **Be prepared to choose the tool with the right features, not the most features.** Standalone requirements management tools like Telelogic DOORS may have the most features, but they are more full-featured than most shops need. Unless your applications have long and deep requirements hierarchies — typical of high-ceremony development processes and especially typical of embedded systems development efforts — you may find “best-of-breed” requirements management tools like DOORS feature-rich to the point of distraction.
- **If you can, focus your attention elsewhere.** If you stop and think about it, you may find that requirements definition, not requirements management, is the root cause of your problems. If this is the case, consider allocating your budget elsewhere — on tools for requirements definition, on training for business analysts and even business customers, or on process change to enable easier accommodation of requirements change.

## SUPPLEMENTAL MATERIAL

### Companies Interviewed For This Document

Borland Software	Microsoft
Compuware	MKS
Hewlett-Packard	Rally Software Development
IBM	Telelogic
Kovair Software	

## ENDNOTES

- <sup>1</sup> Requirements management tools manage relationships among requirements, for example between business requirements, functional requirements, and technical specifications. Integrations between requirements management tools and tools for activities like software configuration management, build management, and test management are required for this chain of traceability to extend through the life cycle without significant manual effort.
- <sup>2</sup> For years, the only purpose-built requirements tools were requirements management tools; tools for requirements definition have only become available in the past few years. For this reason, buyers have assumed that requirements management tools could improve their requirements definition practices, as well. However, this is not the case. See the September 1, 2006, "[The Root Of The Problem: Poor Requirements](#)" report.
- <sup>3</sup> This in and of itself is a problem, as text is not the best medium for documenting requirements. Every project must include some text-based requirements, but business and IT stand a better chance of getting on the same page if text-based requirements are supplemented by more visual requirements like models, prototypes, and simulations. See the September 1, 2006, "[The Root Of The Problem: Poor Requirements](#)" report, and see the August 11, 2005, "[Show, Don't Tell](#)" report.
- <sup>4</sup> ALM 2.0 is Forrester's vision for the next generation of ALM solutions. ALM 2.0 solutions are platforms that provide common services to practitioner tools in areas like workflow, collaboration, security, and reporting. These features improve the efficiency of ALM, the goal of which is to coordinate the various activities that make up the software development life cycle. See the August 18, 2006, "[The Changing Face Of Application Life-Cycle Management](#)" report.
- <sup>5</sup> Compuware Optimal Trace is the only leading tool that combines both requirements definition and requirements management capabilities.

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