

KAON 580

Requirements Management SW for NGAO

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Executive Summary: I have done a brief evaluation of a number of Requirements Management tools for use in the NGAO project, the details of which are included below. A new company called Jama Software, Inc., has a very nice product called Contour. It is a web-based multi-user tool with no client SW required. It is easy to use and configurable to meet our needs, and is reasonably affordable. The Contour user community includes large companies like Intel, Amgen, and Lockheed-Martin, as well as smaller companies and startups. I have received a free single-user version of Contour from Jama, with no expiration date or other restrictions. I recommend that we use this free copy to begin our requirements management work for NGAO and purchase one or more floating licenses after we have had a chance to evaluate the tool more thoroughly and have better determined our user and licensing needs. I also recommend that someone in the NGAO project be appointed to act as a “Systems Engineer” for the project to ensure the consistency and traceability of all of our requirements from the science and system requirements all the way down to the functional requirements and back.

1. Background.

The purpose of this note is to document the short evaluation I have done of a number of SW tools available for requirements management. Because there will be a large number of requirements for the NGAO project (estimates in the 5k range), managing these requirements and ensuring traceability from the top-level science requirements down to the lowest level functional requirements and back will be of critical importance in ensuring the success of the project. In the past we have been less formal about requirements management; our projects have been fairly small and a few Word documents, spreadsheets, or a small database may have sufficed. Given the large scope of the NGAO project and the fact that we may very well be contracting out some of the work, it is imperative that we have a more formal tool to use for our requirements management. Moreover, in every project management class I have taken, it is emphasized over and over how many projects either fail outright or are late and/or over budget because of poor requirements management.

2. The RM tools to be evaluated.

This evaluation effort evolved out of an initial inquiry to Telelogic about their product DOORS, with which some NGAO team members were familiar. While the DOORS product is more than capable of meeting our needs, it is almost unaffordable given their licensing structure. As a result, I began to look for something less costly. I began by using the requirements management tools survey web-page at the International Council On Systems Engineering (INCOSE)

web site (<http://www.paper-review.com/tools/rms/read.php>). I identified eight products, for potential use, some well known and some lesser known (listed here in no particular order):

- a. DOORS (Telelogic)
- b. Cross-Tie (Teledyne Brown Engineering)
- c. CaliberRM (Borland)
- d. OSRMT (open source)
- e. Rational Requisite Pro (IBM)
- f. RMTrak (RBC Product Development)
- g. ARTS (Goda SW)
- h. Contour (JAMA)

Next, I attempted to evaluate the products based on our requirements management needs:

- a. Maintain a central database or requirements and all documents related to requirements
- b. Link related requirements (parent-child or peer-peer)
- c. Perform traceability analyses
- d. Generate various reports derived from the database (traceability matrix, compliance matrix, orphaned requirements, etc.)
- e. Understand the impact of a change on other requirements
- f. Change management and traceability (version control)

The evaluation was not meant to be exhaustive and methodical, but to get a quick overview of these products and determine which, if any, are suitable for our use. In the sections below, I give a brief review of each tool, noting the cost, user, and platform issues.

3. DOORS

DOORS is a product from Telelogic (www.telelogic.com), a company offering a number of enterprise level life-cycle management products. It is a multi-platform client server system, requiring both client and server SW. It is not clear if a separate underlying DB (MySQL, Oracle, etc) is required. It is quite powerful and will meet all our needs, but it is quite expensive as well:

- a. Node-locked: \$2345 / license
- b. Floating (single site): \$5870 / license
- c. Floating (multi-site): \$7340 / license

There is also a DOORS/Net product which allows basic requirement creation and editing for remote users: \$5870 for a 5-user license, and \$2935 for a 5-user review-only license. These prices do not include training, which would probably be required.

My opinion is that we can only afford this product as a single-user node-locked tool, which I am not sure will best meet our needs. The multi-site, multi-user licenses are clearly unaffordable. Telelogic do not offer an academic or non-profit discount. I did not have a chance to use a demo version of this tool.

4. Cross Tie

Cross Tie is a product from Teledyne Brown Engineering (www.tbe.com), a large government aerospace contractor. The Cross-Tie product is an older well-proven product that runs on Windows (only) and uses a proprietary database. It can easily be used in a distributed environment. It is a client-server system requiring both client and server SW. Both client and server SW are node-locked, which is a drawback. It does not use a web-based interface, but uses TCP/IP between client and server. It is reasonably priced:

- a. Server: \$1499
- b. Client: \$650 / license.
- c. Single-user system: \$1299

I had a chance to use a demo version of this tool. It uses an old windows style interface, but it works well. It is easy to import requirements from external documents, including textual requirements documents. I think the node-locked licenses that are required is a major draw back to this tool. The tool has been used for a long time at Teledyne Brown and by many other users as well, so it is well proven.

5. CaliberRM

CaliberRM is a product from Borland (www.borland.com). It is designed to be part of a larger enterprise level life-cycle management portfolio, similar to DOORS. The server will only run on Windows, but it appears that there is a web-based interface for the client that is platform independent. It will meet all our requirements, but is quite expensive:

- a. Single-user node-locked: \$1999
- b. Single named-user floating: \$3042
- c. Single-user floating: \$4906

I did not have a chance to evaluate a demo version of this product. I do not know if it requires an underlying DB or provides its own. My opinion is that it will meet our needs, but it is too expensive.

6. OSRMT

This is an open-source (free) requirements management tool (www.osrmt.com). It is the only open-source tool I could find. While it may meet our needs, it currently appears to be supported only by a single person. I downloaded and tested the SW. It is somewhat cumbersome and appears to be buggy. It requires

MS Access as the underlying DB. It does have a web-based front end. I do not recommend using this product.

7. Rational Requisite Pro

Rational Requisite Pro is a product from IBM (www.ibm.com). It is in the same league as DOORS and CaliberRM. It requires the user to provide an underlying DB (not compatible with MySQL or postgreSQL from what I could tell), but can use MS Access. It will meet all our needs, but is also quite expensive. I have heard that the support has gone “downhill” since Rational was acquired by IBM.
Cost:

- a. Single-user node-locked: \$2180
- b. Single-user floating: \$4240.

I downloaded a demo copy of the SW, but it was too complicated to get it up and running for a quick evaluation. I do not recommend that we use this product.

8. RMTrak

RMTRak is a product from RBC Product Development (www.rmtrak.com). It uses a “document-centric” focus. The user adds tags before and after each requirement in a document. RMTrak recognizes these tags and then imports the requirements into its database. Only one user at a time may have access to the database. It runs on Windows machines only. It appears that it will meet all our requirements management needs. It is reasonably priced, starting at \$250 per license down to \$196 for higher quantity. The single-user restriction on the database access is a major drawback, in my opinion. I am not recommending use of this product.

9. ARTS

ARTS (Analyst Real Time System) is a tool from Goda SW. It comes in personal or web-based server editions. It appears to be a fairly powerful tool that may be able to meet our needs. It runs on Windows machines only. I was able to download and test a demo version of this tool. It is cumbersome to use and not very intuitive. The pricing is reasonable: \$2500 for a 5-user system. The installed user base is “several hundred” customers. The web-site is not particularly professional, so I am not sure what to make of the company. I do not recommend using this product.

10. Contour

Contour is a product from Jama Software, Inc (www.jamasoftware.com) Their aim is to compete with the heavy hitters above (DOORS, Rational Requisite, and CaliberRM) by providing a simple web-based interface and making a product that is much easier to use. The server runs on a Windows machine and the client only needs a web-browser. Although a young company (formally founded this year), they already have an installed user base of over 200 users, including major companies like Intel, Amgen, and Lockheed-Martin that are using it for enterprise

management applications. It requires that we provide our own database engine, but supports open-source databases like MySQL and PostgreSQL, which we have. Contour will meet all our requirements management requirements, and it is reasonably affordable:

- a. Single named-user: \$995 (\$796 after discount)
- b. Single floating user: \$2985 (\$2388 after discount)
- c. Collaborator/reviewer licenses: free (can view but not edit requirements)

They offer a 20% discount for academic and non-profit companies. They are also willing to negotiate a better pricing structure for us once we know what our licensing requirements will be. Even better, I have received a free copy of the current single-user SW that can be used without restriction (i.e., it is not an evaluation demo). I have not had a chance to test it yet; however, all the documentation and short video clips I have seen regarding the product show that it is easy to use and will meet all of our needs. I recommend that we consider this product for use on the NGAO project, using my copy to start with, adding further licenses as needed. The rep I spoke to at Jama is willing to set us up with a 30 day free trial for multiple users so we can evaluate the tool together.

11. Conclusion

I recommend that we consider Jama Contour as our requirements management tool for NGAO. As a second choice, I recommend the Cross-Tie tool from Teledyne Brown, but dislike its node-locked client SW. I also recommend that we consider appointing someone to be a “Systems Engineer” for NGAO to ensure the consistency and traceability of the requirements for this project. I believe this is an important part of our project management process that may have been overlooked.