

Industry:
Government

Organization:
Department of Defense, DMLSS

Description:
The Defense Medical Logistics Standard Support (DMLSS) Program Management Office was established to improve medical logistics responsiveness while lowering costs, and to develop a high-quality, integrated system for use by everyone involved in medical logistics throughout the DOD.

Business Problem:
The previous release of the DMLSS medical logistics software consisted of 5,000 testable requirements, which were assessed manually using 2,000 test scripts. These scripts took 16 weeks to complete. And when the DMLSS team fixed one area, they couldn't conduct regression testing to detect new problems introduced in previously tested areas. They needed to significantly reduce their test burden for the latest release.

Rational Solution:
Automated Software Testing using Rational TeamTest and Rational Suite™ TestStudio™

- Key Benefits:**
- Time required to test Materials Management subsystem reduced from 3 1/2 weeks to mere hours
 - 90% reduction in time required to recover in the event of a test system crash
 - Testing runs seamlessly across multiple platforms, including the Web
 - Regression testing possible at every build, thus ensuring quality throughout iterative development cycle

Programming Environment:
Number of Developers: 117
Number of Testers: 30
Number of Analysts: 12
Other Active Personnel: 13
Platforms: Data General UNIX, HP-UX, Windows NT, Web
Development Tools: Sybase PowerBuilder, HTML, Java, DBMS: Informix

Rational's Testing Products Support a Massive Makeover of the Department of Defense's Medical Logistics Operations

"We are in the process of reinventing medical logistics," said Col. George Bonham, the Director of the Joint Medical Logistics Functional Development Center (JMLFDC), Fort Detrick, Maryland.

Col. Bonham (USAF) was referring to an ambitious and highly complex effort known as the Defense Medical Logistics Standard Support (DMLSS) Program, which has been underway since 1993. The mission of DMLSS is to dramatically improve medical logistics responsiveness while lowering costs, and to develop a high-quality, integrated system for use by everyone involved in medical logistics throughout all three services of the Department of Defense (DOD), in peace time and in war. Specifically, DMLSS is charged with meeting the requirements of Medical Treatment Facilities (MTFs) and field medical units at an affordable price through innovative ideas and reengineered business processes for the U.S. Army, Air Force, and Navy.

Reinventing Medical Logistics

"The DMLSS program has already exceeded initial expectations," Col. Bonham said. "We have successfully deployed the DMLSS Version 1.0 software to more than 100 MTFs worldwide and an updated Version 2.0 is currently in field testing. Overall, we've seen the requisition cycle of medical supplies reduced from days — or even weeks — to no more than 24 hours with a 95 percent overall availability of materials. We are experiencing increased customer satisfaction, plus we are realizing a great return on investment. Through FY1997 we experienced a \$429 million reduction in wholesale inventory, and a \$92 million reduction in MTF inventory. For every \$1 we spend on the DMLSS program, we have realized savings of \$5.70.

Col. Bonham noted that the highest payback for DMLSS has been in the area of pharmaceuticals where the order to receipt time has been reduced to one day from 20 days and the cost of pharmaceutical supplies has been cut by 15 per-

cent. As a result of competitive contracting that leverages standardization and committed volume pricing, savings on medical and surgical provisioning supplies have already reached \$50 million a year. And this is only the beginning, since even greater benefits are forecast with the complete fielding of Version 3.0 in 2002.

"But even though DMLSS is resulting in significant dollar savings, the program benefits go far beyond that," Col. Bonham said. "By replacing a multitude of aging legacy logistics systems with one standard DOD Medical Logistics System, DMLSS allows our health care providers to spend less time on logistics and more time on delivering primary health care. It increases our ability to share and transfer data within the DOD medical community. And it makes our medical logistics operations customer-centric — more user-friendly, less labor-intensive, and able to provide supplies when and where they're needed. DMLSS enhances health care delivery in peace time and promotes joint war-time readiness and sustainability."

Reducing the Test Burden

At the heart of the DMLSS Program is an automated information system, which interfaces with other military medical information systems and nonmedical systems such as financial, procurement, civil engineering, and wholesale logistics systems. Software, being developed by EDS, based in Plano, Texas, and other independent contractors, is the DMLSS program's lifeblood. And, at every critical step in the software development process, comprehensive automated testing using Rational TeamTest from Rational Software® ensures that the project is meeting its design goals. But this was not always the case. "When I became involved with the DMLSS program two years ago, Release 2.0 software was under development and all the testing was being done manually," recalled Gerry Christeson, DMLSS Development Test and Evaluation Manager. "As a matter of fact, when I

was interviewed for the position, the first question the project manager asked me was, 'How can you reduce my test burden?'"

The burden was significant. DMLSS 2.0 consisted of 5,000 testable requirements and 2,000 test scripts — all of which were being run manually. "We were overwhelmed," said Rupert Bullard, a Birch & Davis senior consultant and a lead member of the Quality Assurance test team. "In addition to coping with the sheer volume, if we wanted to repeat a test that was deep inside the application, we had to totally rebuild the test scripts for each run. Of course, we couldn't effectively do any regression testing — it took 16 weeks to run all the manual scripts. So, if a fix on one build caused a problem on a part of the program that had already been tested, we just didn't know about it."

Christeson added that each release of DMLSS is extremely complex. DMLSS integrates facilities and material management components, prime vendor and customer support interfaces, complete computer systems services and administration, and more than 15 commercially obtained software products.

Release 2.0 consists of six major components. Each component contains five to 20 subcomponents which, in turn, consist of varying but large numbers of additional subcomponents. DMLSS will replace nine major legacy systems and scores of smaller supply chain management systems in use by the three major services. "DMLSS is taking us from just-in-case inventory control, where you build a large stockpile of reserves, to just-in-time (JIT) inventory management which provides rapid inventory turns and major cost savings" Christeson said.

"I knew that to meet our test requirements, we had to automate the testing process," he added. "DMLSS 2.0 is just too complex to be tested manually — and Release 3.0 is going to be even more multi-layered."

"It took three testers three and a half weeks to execute the initial thread in our test of the Materials Management subsystem using manual methods. With Rational TeamTest, the identical test was run in hours. In addition, we are able to do regression testing at every build, something that was impossible with manual testing."

Re-introducing Rational TeamTest

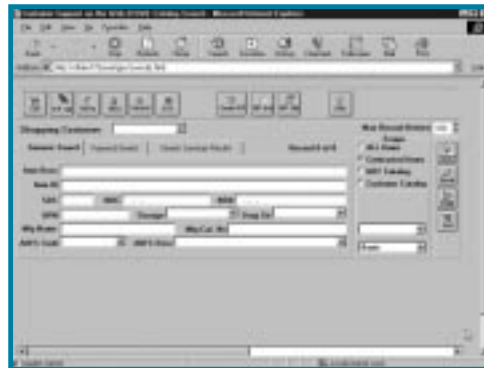
The job of changing DMLSS Release 2.0 testing procedures from manual to automated was assigned to Russ Stanley, a Consulting Manager and Certified Rational TeamTest Instructor for Noblestar Systems Corp., Reston, Virginia. "I discovered that DMLSS had already purchased a copy of Rational TeamTest, which is a very powerful automated testing tool," he said. "But because there had been no formal training, the Rational product was essentially shelfware. Very quickly, Rational TeamTest became the core of our testing efforts."

Rational TeamTest is a functional testing tool for seamlessly integrated testing of e-business, ERP, and client/server applications such as DMLSS. The software is built on a scalable, integrated server-based test repository. Rational TeamTest is composed of various components including Rational Robot for thorough functional testing, Rational ClearQuest™/TT Edition for defect and change request management, Rational SiteCheck™ for Web site management, and Rational TestManager, used for test planning, management, and analysis. The software integrates with the DMLSS client/server architecture, which includes an Informix RDBMS server running on a Data General UNIX-based platform. PowerBuilder from Sybase is the primary applications development tool. "Currently, the DMLSS applications are being migrated to HP UNIX and Microsoft NT," said Stanley. "We'll be able to use our Rational Robot automated scripts on both platforms with no re-work or re-recording necessary — this cross-platform functionality gives us a double payback."

The Noblestar Systems consultant set up an automated testing laboratory at Fort Detrick for use by the testing team which includes more than 15 government and contractor test specialists.

"We decided to automate the core of DMLSS 2.0 — the Customer Area Inventory Management (CAIM) system," Stanley continued. "CAIM is designed to help the military hospitals speed up the provisioning of supplies while lowering procurement costs. For example, prior to the introduction of Prime Vendor ordering under DMLSS, it might take 20 days for a medical treatment facility to be supplied with something as simple as cotton balls. In any situation, but particularly during a war, you just can't wait weeks for medical supplies, so the only other answer was to stockpile inventory, which is cumbersome and expensive. DMLSS is designed to facilitate JIT inventory management, which reduces both costs and the amount of inventory on hand at any one time."

► Web version of DMLSS Customer Support application, developed in Java and Dynamic HTML



About Rational Software:

Rational Software Corporation (NASDAQ: RATL), the leader in unifying software teams, helps organizations develop and deploy e-business, Web, enterprise-wide, technical, and embedded software through a combination of tools, services, and software engineering best practices. Rational's solution unifies the key members of a software team — including analysts, developers, and testers — and provides unique offerings optimized for each of these roles, thereby improving team and individual productivity. Rational simplifies the process of acquiring, deploying, and supporting a comprehensive development platform, reducing total cost of ownership.

Rational
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The Next Big Step — DMLSS 3.0

Release 3.0 is a major step in the evolution of the DMLSS system, incorporating even more subsystems and adding capabilities that can sustain optimum medical logistic inventories at the best cost during peace and war.

"As far as the testing is concerned, DMLSS 3.0 is a major change for us," said Christeson. "Unlike Release 2.0, where we introduced automated testing procedures after the development was well underway, with 3.0 we are integrating the Rational tools from day one of the development process."

Christeson said that the DMLSS Integrated Product Team is currently evaluating the use of Rational Suite TestStudio to support Release 3.0 development. Rational Suite TestStudio is a complete set of interoperable software that includes Rational TeamTest and a number of other powerful Rational products. "It will allow the DMLSS analysts, developers, QA, and testers to share test assets — such as requirements, plans, procedures, tests, and results — throughout the software's development life cycle. Because of Rational Robot's Object-Oriented Recording™ and Object Scripting™ capabilities, the DMLSS program expects to reuse many of the existing scripts and automated test cases that were developed for Release 2.0. This will save us time and money — time by allowing us to work faster and smarter; and money by reducing the manpower needed to create and run the test scripts."

Part of Russ Stanley's preparation for the DMLSS 3.0 push was to attend Rational University in Dallas, Texas. There, among other things, he learned more about "use case" best practices and the Rational Unified Process™, which he has tailored to meet the needs of the military. Use cases are a

proven format for complete capture, organization and communication of the flow of events of a system from the users' perspective. Rational Software gives analysts the tools to document, model and manage system use cases, and provides a standard process of use case best practices to enable more effective communication to the whole, extended team. Rational Unified Process is also a platform that allows developers to build cross-functional development teams using a knowledge base of proven software development best practices.

"With the use cases, we are able to determine which parts of DMLSS 3.0 are high-risk, high-frequency and focus our testing there," Stanley said. "Just two examples of DMLSS 3.0 increased complexity — the system is now being deployed over an interservice intranet which means we'll make full use of Rational's Web-testing capabilities; and we are adding medical equipment to the mix — X-ray machines, CT scan equipment, and so forth. Each piece of equipment is supported by a variety of services, such as installation, maintenance and training, not to mention spare parts inventory that has to be immediately available in field situations. We will use Rational Suite TestStudio to simulate millions of transactions from dozens of users accessing the system at all hours of the day and night."

DMLSS is reinventing medical logistics for the twenty-first century, and Rational's automated testing software is helping the program live up to its reputation as one of the most successful process reengineering projects in the Department of Defense.

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