

Florida Department of Health Relies on RUP and IBM Rational Tools for Long-Term Projects and Rapid Crisis Response

Overview

■ **The Challenge**

The Department's Division of Information Technology is responsible for a wide range of development efforts – everything from long-term, enterprise-class management systems to emergency response systems needed in a matter of days. The division needed a consistent, yet flexible development process and supporting tools that would enable it to respond effectively to the department's diverse needs.

■ **The Solution**

The division adopted the IBM® Rational® Software Development Platform, including RUP® and IBM Rational tools for requirements management, model-driven development, software configuration management, and automated testing, to establish a platform for rapid, high-quality software development. The implementation was accelerated with training and consulting services from IBM Rational.

■ **The Benefit**

On two occasions, the division was able to respond in emergency situations by designing, building, and deploying crisis management systems in just 48 hours. On both long and short-term projects, the division has realized significant improvements in collaboration, quality and alignment of development efforts with business needs.

The mission of the Florida Department of Health is to promote and protect the health and safety of all people in Florida through the delivery of quality public health services and the promotion of health care standards. The department is guided in its efforts by a set of core values that include excellence, empowerment and teamwork. The department strives to achieve and maintain quality results and outcomes through continuous performance improvement and learning. It fosters a culture that encourages people to exercise their judgment and initiative in pursuit of the organizational goals. And it encourages active collaboration to solve problems, make decisions, and achieve common goals.

The Division of Information Technology (IT) provides software systems and solutions to support the

department's mission and diverse business functions. In the past, providing this support was often difficult because the division's developers were using a number of homegrown, waterfall-based development methodologies and lacked the tools needed to implement a more consistent and predictable process. Looking for a flexible approach that would help it meet the department's needs on large and small projects alike, the division saw the adoption of the IBM Software Development Platform — including IBM Rational Unified Process®, or RUP, and IBM Rational tools — as a key to improving its capacity to rapidly deliver high-quality solutions. The IBM Software Development Platform is a complete and modular platform for teams who build business applications, embedded systems, and software products.

Bill Lucas, Data Processing Manager for the division's Enterprise Software Engineering Team, explains, "We had several versions of a homegrown software development life cycle methodology. RUP offered a bridge — a way to get out of the mode of waterfall lifecycle development and move to an iterative methodology. Iterative development, for us, is a much more common sense approach to development. Wherever

possible, we are trying to implement a rapid, agile approach to development. The iterative approach of RUP provides us the flexibility to do this.”

At the same time, the division was looking for software development tools — initially for modeling, but ultimately for the entire development lifecycle — that would support its process. Scott Sutterfield, the Systems Project Consultant for the division, recalls, “The group that was leading the push for an effective modeling tool recognized the need for a set of integrated tools that would help pull everything together. They were interested in version control and being able to track the process and report on the real project status in a way that was easy for everybody — including people such as special project monitors — to understand and be confident with.”

The First Steps

Among the first tools implemented at the division were IBM Rational ClearQuest®, for defect and change tracking and workflow management, and IBM Rational RequisitePro® for requirements management. Sutterfield notes that these tools addressed one of the division’s immediate needs and long-term challenges. “We felt that Rational ClearQuest was probably the easiest tool for us to get immediate results and that Rational RequisitePro was the most important for getting long-term results. In the short-term, we needed to be able to track what we were doing and to show what was happening — the short learning curve of Rational ClearQuest helped us do that. We also

felt that getting the requirements right for each project and making sure things were done right the first time would have the biggest pay off long-term.”

To help accelerate the adoption of IBM Rational tools, the development team attended onsite Rational University training courses on tool usage and administration. The division also engaged an IBM Rational partner to conduct an IT assessment. In addition, onsite consulting and mentoring from IBM Rational, provided the team with expert assistance to help them get up and running quickly. Lucas explains, “One of things that we got out of the IT assessment is that we didn’t need to implement every best practice all at once. Instead, we focused on implementing requirements management first.”

He continues, “We had two big projects going on at that time — one was strictly defining requirements so we could solicit bids and the other was a Health Management System. We had an excellent mentor from IBM Rational help us on these projects. It really gave us a great start.”

Sutterfield agrees, “The mentoring helped us enormously. IBM Rational really stepped up to help us with our implementation by providing some excellent resources.”

Meeting Business Needs through Improved Requirements Management

Analysts in the Division of IT began using IBM Rational RequisitePro as it applied the requirements management principles of RUP. They also started creating use case

diagrams and activity diagrams in IBM Rational Rose® to provide both business users and the development team with a clearer picture of system requirements. The combination of tools and best practices has led to substantial improvements in the development team’s ability to deliver systems that truly meet the needs of the Department of Health.

Carlos Dominick, Requirements and Use Cases Consultant for the division, explains, “We found that many of our customers — other groups within the Department of Health — would ask us to build a system without having a discussion of the business process and needs. So now, whether it’s a small project or a large project, we get them to explain to us what the business process is before we begin systems analysis. When we build the system, we want to make sure that the business dictates the system, and not the system dictating how the business is run. I think that has been very successful. In some cases, our customers take the business use cases we develop and use them as their new standard operating procedures. I think many of our business users now see the value of collecting and defining requirements in Rational RequisitePro. They see how it mitigates problems on the back end so that we don’t have to do as much rework, and it really makes them think about what they want.”

Sutterfield adds, “Managing requirements and modeling use cases has helped a lot. We do a lot of use case diagrams to ensure we have captured the flow of the business process and the high level business

needs. We have even had some customers spearhead the move toward use cases because they used them on one of their previous projects and saw the benefits. They found that they understood their systems better once they were built, which was not always the case before.”

Rising to the Challenge: RUP on a 48 Hour Project

As evidence that the division has implemented RUP in an agile and responsive way, Lucas points to the success the team had in delivering two separate projects that were needed by the department following a series of hurricanes in Florida. “A couple of real success stories for us involved systems that we built during the hurricanes. On one occasion, we were called in over the weekend to build an application to track volunteers. We had to have it up and running by Monday morning. By following RUP and applying sound project management principles we were able to narrow the scope down to just the critical features — things that they absolutely had to have. We followed RUP from start to finish, and by Monday morning we had a system running and tracking volunteers,” recalls Lucas.

He continues, “About two weeks later another hurricane hit and the incident management team needed another application — a more comprehensive one this time — to track incident-related information. We were successful again. The systems are still running, and we have been able to go through additional iterations to make enhancements. We have

been able to apply RUP in an agile way and we can apply it differently based on the needs of the project.”

Managing Change

IBM Rational ClearQuest and IBM Rational ClearCase® provide the Division of IT with a comprehensive, integrated software configuration management solution. Together, Rational ClearQuest and Rational ClearCase enable activity-based change management that helps the development team at the Department of Health manage change at the activity level and simplifies their development process.

The division’s largest project, the Health Management System (HMS) is cited as a key example of the effectiveness of Rational ClearCase within the department. Namit Pande, a Rational ClearQuest Consultant for the division, notes, “Rational ClearCase has been really successful on our larger projects. The HMS team is using it across the board. The activity-based change management capability definitely makes it easier for developers because it shortens the learning curve by streamlining development activities. The HMS team has now gained a lot of confidence in Rational ClearQuest and Rational ClearCase. After implementing Rational ClearCase and Rational ClearQuest in our environment, we have seen the benefits — we can track and manage changes in the code, and that has helped a lot.”

For other development teams, the division is currently in process of implementing different environments

for fully integrating Rational ClearCase with Microsoft® Visual Studio. This would help improve developer productivity by making it easy to check-out and check-in files without leaving the development environment.

Application Modeling and Data Modeling

In addition to creating use case diagrams with IBM Rational Rose, the division’s development teams are also using it for application modeling and data modeling with the industry-standard Unified Modeling Language (UML). “On the HMS project, they are doing almost every kind of modeling you can do. Also, because many of the applications we build are tracking systems, the state charts in UML have been a big help,” says Lucas.

Lucas adds that the teams also use IBM Rational Rose for data modeling. Leveraging forward and reverse-engineering capabilities, the team creates database schema from visual models and creates visual models from existing databases. “We can generate the schema right out of Rational Rose, or we can use Data Description Language (DDL) if we want” he notes.

Automated Functional and Performance Testing

Testing has played a central role in the division’s ability to improve the quality of the software it develops from a functional perspective, as well as, a performance perspective. Using IBM Rational TestManager and IBM Rational Robot, the HMS project team has developed a full suite of automated regression tests, which

greatly reduces the amount of manual testing and re-testing required for each release. Developers also use IBM Rational Purify® to find and eliminate memory leaks and other runtime errors before more rigorous functional and performance tests are conducted.

According to Cal Newville, Testing Consultant at the division, performance testing with IBM Rational tools has helped improve performance on systems built in-house and has also enabled the division to quantify the performance of systems built by outside contractors. He explains, “We perform quite a few performance tests and we have simulated up to 350 concurrent users. On one project that we had contracted out, we were able to use the tools to show that the system was not meeting performance requirements. During performance testing we found quite a few bottlenecks within the database, as well as, the application code itself. Whether we build the applications ourselves or not, we know before we deploy that the application can handle the expected user load.” Lucas adds, “We have saved the state money with the IBM Rational performance testing tools because we are able to determine and demonstrate that the system that we were buying was going to perform as advertised.”

Newville reports that the tools have provided significant benefits on many other projects as well. “For many of the smaller applications we developed quick performance tests to find out how many concurrent users the application could handle. Performance tests, utilizing virtual user

(VU) scripts, were used to simulate user loads during failover testing of our primary and secondary networks. In addition, we can get essential performance information down to the component level of our applications, using a combination of VU scripts and monitoring performance of the server with Windows® Performance Monitoring tools. We can then test the performance of the application interface, database access, as well as, any external interfaces, and make informed decisions about what components and methods to use for a specific application,” he adds.

Traceability from Requirements to Testing

Integration between Rational TestManager and Rational RequisitePro enable the development team to link individual requirements directly to the test cases that validate them. This traceability helps the division ensure effective test coverage for all system requirements. “Once the requirements are well defined with use cases, we can map them to our test cases. The traceability provides us with flexibility and a solid foundation to start functional testing,” says Newville.

Dominick agrees that traceability is a significant advantage. “We can trace requirements from a stakeholder’s request to features, the use cases, the test case and test script. We will then know if we implemented the feature and tested it, and if not, we know what iteration it should be in. It is a great tool for management. People can see the value of managing requirements in Rational RequisitePro and how it can be used to better manage a project.”

Improved Quality, Flexibility, and Collaboration

The Division of IT found that by adopting RUP and making IBM Rational tools available to its development team, individuals began using the tools more and more as they recognized the potential benefits. “We gave them the process and said, ‘This is what we need from you and these tools might be able to help you.’ That has proved to be very effective for us,” says Sutterfield.

Considering the gains in software quality, collaboration, and flexibility cited by the team, that approach certainly has been validated. Lucas notes that quality improvements are a by-product of the process, as well as, more effective testing. “We’ve really tailored RUP, so that we can be agile as we do requirements, implement testing practices and follow our methodology. By doing this, we have fewer defects and fewer changes to make after we release the software,” he says.

Sutterfield adds, “Not only is the quality much better, but there is a better understanding of the systems we build. By following the process, there is more documentation that can be passed along. That is something that we didn’t have before we started using RUP and the Rational tools.”

Sutterfield also points to the flexibility of IBM Rational tools and RUP as a significant advantage in dealing with the diverse needs of the Department of Health. “We have been able to take each of the IBM Rational tools and use them in a number of different business

processes. Their flexibility allows us to support different ways of doing things, while still using a common development environment. A customer may want a multilayered approval process or have some other special requirements, but the development team can still use the same IBM Rational Unified Process so that there is a common viewpoint and a common foundation," says Sutterfield.

Ultimately, software developers deliver the most valuable solutions when they collaborate effectively with end users. Through RUP and skillful application of IBM Rational tools, the division's development team has excelled at doing just that. "Our users understand the process and understand their own systems better than they ever did before. The systems we are building are better meeting the needs of the users because users and developers understand what is really required before we get there," says Sutterfield. Lucas agrees, "One of the biggest benefits of IBM Rational tools is the improved collaboration that we have between our different groups and with our business customers. Business customers are starting to take ownership of their projects and are getting involved in the process early on. As they understand that they own the requirements, they see that they own the system. In the end, we are coming out with a better product that has fewer defects and is much more manageable."



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