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Capgemini Finland Increases Productivity Using IBM Rational Software Development Platform

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Overview

■ *The Challenge*

Facing increased competitive pressures – including fierce price competition for software development services – Capgemini Finland needed to respond to client requirements of more reliable and higher quality software, and faster software development.

■ *The Solution*

Capgemini Finland established an Accelerated Delivery Center (ADC) to speed the development of value-added applications. The ADC approach is founded upon the IBM Rational Unified Process methodology and integrated tools of the IBM Software Development Platform.

■ *The Benefit*

Company-wide, Capgemini has experienced a 30 percent productivity improvement using Rational tools. The initial Helsinki ADC project was delivered on schedule – a schedule

based on productivity 15 percent higher than the industry average. Based on the success of this project, the client initiated four more projects with Capgemini.

As one of the world's foremost providers of consulting, technology, and outsourcing services, Capgemini has a unique way of working with its clients, which it calls the Collaborative Business Experience. Through commitment to mutual success and the achievement of tangible value, the company helps businesses implement growth strategies, leverage technology, and thrive through the power of collaboration. As part of that ongoing commitment to helping its clients succeed, Capgemini has established a global network of Accelerated Delivery Centers (ADCs), designed to speed the development of value-added applications through the use of reusable components, leading technologies, and a robust infrastructure.

The ADC in Helsinki, Finland is Capgemini's 28th center, and is

primarily focused on software development on J2EE and Microsoft .NET platforms in the retail, financial services, and telecommunications sectors.

"The Rational methods and tools have been very important to our success. They have helped us keep the focus on the most important aspects of software – development planning, project management, modeling, code development, testing and so on."

-- Tapio Tuomi,
Helsinki ADC Leader for Capgemini

The Helsinki ADC was established to respond to increased competitive pressures in Finland. Tapio Tuomi, Helsinki ADC Leader for Capgemini, recalls, "We noticed that the Finland

market was changing. For example, price competition was becoming fierce, and prices for development services started to fall. In addition, Capgemini saw that its clients required much faster software development and more reliable and higher quality software. We had to make changes to be more competitive and improve our financial results. Our response was to start ADC here in Finland. The Accelerated Development Centers allow us to industrialize software development so we can respond to these customer needs and market pressures.

A Proven Recipe for Success

Helsinki ADC promises its clients at least a 15 percent increase in software development productivity compared to the industry average. The Helsinki ADC can confidently deliver on this promise because they are following a time-tested approach to software development that has been used with great success at Capgemini ADCs throughout the world. The ADC approach is founded upon the IBM Rational Unified Process® methodology and integrated tools of the IBM Software Development Platform. Capgemini adopted IBM Rational Unified Process, or RUP®, to provide a consistent, proven methodology across its ADCs, and for use in client engagements requiring custom software development. In addition to RUP, Helsinki ADC adopted a wide range of IBM Rational tools that were already being used at other ADCs to accelerate development and improve

software quality, including:

- *IBM Rational ClearCase®*
  for software asset management

- *IBM Rational ClearQuest®*
  for defect and change management

- *IBM Rational RequisitePro®*
  for requirements management

- *IBM Rational Rose® XDE™*
  Developer for model-driven
  development

- *IBM Rational TestManager®*
  for test management

- *IBM Rational PurifyPlus™*
  for runtime analysis

- *IBM Rational Robot®*
  for software testing

In addition, Helsinki ADC's J2EE development efforts are further supported by IBM DB2® and IBM WebSphere®, including WebSphere Studio Application Developer, WebSphere Application Server, and IBM WebSphere.

Tuomi reports that although the use of IBM Rational tools at Helsinki ADC was not mandated by Capgemini policies, the decision to use them was an easy one because the benefits were readily apparent. "We had the support of other ADCs and an ADC handbook to assist us through the startup process. The selection of software development methods and tools was in a sense quite easy,

because we could see the positive results that the ADCs achieved using the Rational methodology and tools. In addition, J2EE development on the IBM WebSphere platform was our strongest competence, so we wanted tools and a process that supported object-oriented development and complemented the WebSphere platform. For example, the fact that Rational ClearCase integrates with WebSphere Studio Application Developer was a factor. Lastly, we knew we would be expanding our use of Microsoft .NET technology, and we wanted Rational solutions so we could continue to use the same tools and methods in the future with as little change as possible. Continuing the example, Rational ClearCase is also integrated with Microsoft Visual Studio .NET."

Establishing a Plan

To help get the ADC up and running, Capgemini Finland worked with IBM Rational Professional Services to create a plan for training the Capgemini team and implementing RUP and the IBM Rational tools. Tuomi reports, "One of the biggest benefits we received was the assistance from the Rational Finland team. Working together, we made a very efficient plan for how to implement the tools, and the correct order in which they would be implemented. This included training, certification, and plans for how the tools would be implemented on different projects. We didn't start out using every tool we had. We started with Rational ClearCase and

Rational Rose and then we expanded to Rational ClearQuest, Rational TestManager, Rational RequisitePro and so on. We trained about 40 consultants. Everyone received training in requirements analysis, and our developers also trained in analysis and design. In addition, we had custom tailored training on site for use of Rational ClearCase and the testing tools."

He adds, "The training was very efficient because we were able to combine the training and the actual work on our projects. The training and the project work were tightly coupled, and the overall plan was close to perfect. I think the fact that we already have 20 certifications on our team is proof of how effective it was."

IBM Rational ClearCase Simplifies Parallel Development

The first Helsinki ADC project was building a Customer Relationship Management (CRM) application for one of the largest retailers in Finland. This was a large project that required approximately 50 developers and a year and a half of development effort. According to Sami Putkonen, IT Consultant and Software Tool Engineer for Capgemini, success on the project depended on effective version control and parallel development. The ADC team adopted Unified Change Management (UCM), an activity-based process for managing change supported

by Rational ClearCase. Putkonen explains, "One of the biggest benefits of the tools was how the version control capabilities of Rational ClearCase were integrated with – and accessible from – IBM WebSphere Application Studio and IBM Rational Rose XDE Developer. Another big benefit for the developers was the efficiency of parallel development using Rational ClearCase and the UCM process. I know from past experience that parallel development can be difficult, but the UCM process made it easy for developers to use Rational ClearCase very quickly on a large project with parallel development streams. There are only four operations for the developers to learn -- check out, check in, deliver and re-base -- so we were able to gain an advantage with Rational ClearCase quite rapidly. And, the developers are able to deliver the tasks they have finished and keep tasks that are still ongoing in their own private workspace."

As a comprehensive software configuration management process, Unified Change Management is supported by tight integration between IBM Rational ClearCase and IBM Rational ClearQuest. Helsinki ADC plans to leverage that integration on upcoming projects. Putkonen notes that Rational ClearQuest has already contributed to the overall quality of the project by helping the team reliably track defects and

enhancement requests. He adds that Rational ClearQuest helped the team be more responsive to customer needs throughout the project. Representatives from the client used the Rational ClearQuest Web interface to enter problem reports and track the progress of existing issues. "Our customer was very pleased. Rational ClearQuest Web is very good from a customer point of view because at any time they can submit changes and check the status of what they had submitted previously."

Rational Unified Process and UML provide a "Common Language"

Prior to establishing the ADC, the Capgemini Finland team used a disparate set of tools and methods from project to project based upon their customer's request. Tuomi remembers, "It was our policy at the time – and common practice in Finland – to let our clients help us decide which tools and methods to use on a case-by-case basis. When the ADC was founded, we made the decision to invest in the RUP methodology and Rational tools." Now, the ADC team continues to build experience and competence with every project, helping them succeed not only on their first projects, but also enabling them to establish a foundation for continued success.

Putkonen agrees that using a consistent process and shared set of integrated tools has been a great advantage. "When we started the ADC and this project, I immediately saw that it started to move forward very quickly because we were all using the same tools, we had a common language and a common approach. We started using the Unified Modeling Language to model the software and that helped us develop some common components as well. We were able to use them on another project because they were modeled well and clearly documented in Rational Rose. It's a great advantage for the ADC to have a commitment to great tools and the entire platform."

Olli Salmi, Team Manager for Capgemini, notes similar advantages in his role as support leader for Rational Unified Process. "I am really pleased with the Rational Unified Process. From a project management perspective it gave us a great deal of control over the project. RUP is a core way of thinking for the ADC," says Salmi. By using Rational Rose to create UML models, Salmi explains, the development team was able to take a more standardized approach throughout development. He continues, "It was a big project with many people working on it. Having the same architecture and following the same methods helped us develop uniformly during every part of the project. We made a big effort before that first project to set our process of modeling and learn how to use Rational

Rose effectively. I think that was very important for the project and it was one reason why the project went so well. Rational consultants helped us develop a good base model. And we used Rational Rose to create use case models, application models, and database models." Salmi adds that the database team also used Rational Rose with DB2 to keep the database model and schema synchronized.

Repeatability and Traceability in Testing
Helsinki ADC testers applied automated testing tools from Rational to measure the performance of the CRM system, find and repair performance bottlenecks, and then re-test the system using the same tests to ensure the bottleneck had been removed and the system would perform well in real world scenarios. Putkonen explains, "We used Rational TestManager and Rational Robot for performance testing and that helped us a great deal. We used them for GUI testing too, but at the time, our primary focus was on performance testing. We were able to automate certain testing tasks, and to re-test when new versions of the software were released. With Rational TestManager and Rational Robot, we were always able to re-test the task in the same way. And of course the tools provided us with logs to show whether tests passed or failed, and to collect a range of metrics. We applied user loads from 50 to 150 virtual users using Rational tools to see how the

Web server and the database would actually act when real users accessed the system. When the customer started integration testing, we had already done testing and re-testing so we were able to provide the customer with a very polished release."

According to Salmi, the ability to trace test cases in Rational TestManager with requirements in Rational RequisitePro and defects in Rational ClearQuest is a significant advantage for project leaders at Helsinki ADC. Although the team did not use Rational RequisitePro on the CRM project because requirements analysis had already been completed, they have used it with great success on subsequent projects. "Of course, Rational TestManager links to Rational ClearQuest for any defects we found. And, we link our requirements in Rational RequisitePro to the test cases so we can follow up on any changes that are made. A major benefit of this is that it helps project managers analyze the impact of changes to requirements. I think Rational RequisitePro is a very good tool for us, because it provides excellent control of the requirements. Otherwise – if we used Excel or some other tools – our requirements would be all over the place. But now, with Rational RequisitePro, we can link requirements together and trace them. This is a big benefit for our team leaders."

Runtime Analysis with Rational PurifyPlus
In addition to system testing, Helsinki ADC helps ensure quality with IBM Rational runtime analysis tools

throughout development. Rational PurifyPlus helps Helsinki ADC developers deliver faster, more reliable code with runtime analysis that detects memory corruption and leaks, locates performance bottlenecks, and gathers code coverage metrics during tests. "When we found performance issues during our performance tests, we used Rational PurifyPlus to trace the bottlenecks in a certain component. And for our most critical components, we used it to verify the coverage of our tests, to ensure that there were no black holes – code that was not being tested," says Putkonen.

According to Putkonen, having the runtime analysis capabilities of Rational PurifyPlus on their desktop was a pleasant – and welcome – surprise for developers. "When we started the project, we didn't immediately announce that we had the whole range of these tools available. For example, when the developers asked me how to do performance profiling, I told them they already had that capability on their workstation with Rational PurifyPlus. And the same thing happened when they wanted to do memory testing and code coverage analysis. The developers were very pleased – they had the tools they needed, and if they wanted additional information they went to Rational's Web page. Whenever they asked, 'Do we have something that can do this?' I was able to immediately say it was available to them in their IBM Rational toolbox."

A Function of Effort and Quality

According to Tuomi, the Helsinki ADC has clearly helped Capgemini gain a competitive advantage. "I think the proof of that has something to do with the Finnish state of mind – we don't truly believe in a concept if we don't have some proof that it really works. Six months after we started Helsinki ADC, our clients saw that the approach and the tools really worked; and we started to get more clients and more projects. In fact our client on the first ADC project has already started four more projects with us," says Tuomi.

With a schedule based on the ADC promise of a 15 percent improvement in productivity over the industry average, the first ADC project was delivered on time. Tuomi adds, "ADC is about productivity. We define productivity as function of effort and quality. When more can be achieved in less time and with fewer defects, then software project teams are more productive. When I look back now and think about the concept of ADC, the Rational methods and tools have been very important to our success. They have helped us keep the focus on the most important aspects of software development – planning, project management, modeling, code development, testing and so on. The Rational tools and RUP have helped us keep on our path of improving our competence and improving the productivity of our software development efforts."

Garry Gomersall, Global IBM Alliance Leader, Capgemini, points out that Rational solutions have provided productivity gains for Capgemini worldwide. "The Rational tools automate our global delivery method and facilitate the use of a common process and toolkit to deliver predictable, consistent, high quality, and repeatable solutions by our Centers," Gomersall explains.

He adds, "By using the Rational tools, we have experienced a 30 percent productivity improvement on even the most complex projects. We anticipate further improvement as the technology continues to evolve."

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