

Industry:

Software

Organization:IFS
(Industrial & Financial Systems)**Description:**

IFS is one of the fastest-growing companies in the business applications market. Based in Sweden, IFS develops and supplies business applications that offer step-by-step evolution to the extended enterprise. With over 3,600 employees, IFS maintains a strong presence in 42 countries through 64 offices around the world.

Business Problem:

IFS wanted to load test their component-based applications with realistic workloads to establish accurate sizing guidelines. They needed a scalable, reliable and easy to use performance testing tool.

Rational Solution:

Rational Suite TestStudio

Key Benefits:

Increased development speed by quickly evaluating different architectural approaches with realistic tests

Improved software quality and performance by pinpointing bottlenecks and other potential problems during load tests

Rapidly evaluated product performance on a number of platforms at one of IBM's Solution Partnership Centers

Quickly created comprehensive, realistic load testing scenarios by recording test scripts, graphically creating workload schedules, and scaling tests to thousands of users

Established accurate sizing guidelines, which are used by sales personnel to recommend appropriate hardware for any IFS application and expected user load



IFS Creates Realistic, Large-Scale Load Tests with Rational Suite TestStudio

Vendor B, or not Vendor B

Imagine for a moment that your organization needs new enterprise-wide business software, and you are leading the evaluation effort to recommend a solution. You have narrowed the choices to two vendors. Both Vendor A and Vendor B offer similar features at a similar price. When you ask Vendor A how many users their software can support on your preferred platform, they wave their hands and change the subject. When you ask Vendor B the same question, they give you actual numbers of verified transactions and users that the software can handle on your preferred platform and several others — all backed with realistic, reliable, and repeatable test data. Which vendor would you choose? The answer is obvious.

If your customers need to know how your systems will perform before they deploy them, then you share an urgent business need with IFS (Industrial & Financial Systems), one of the fastest-growing companies in the business applications market. Based in Sweden, IFS develops and supplies business applications that offer step-by-step evolution to the extended enterprise. With over 3,600 employees, IFS maintains a strong presence in 42 countries through 64 offices around the world. IFS uses Rational Suite® TestStudio™ (formerly Rational Suite PerformanceStudio) to load test its software, enabling them to accurately predict how their key applications will perform across a wide array of available systems. Per Bauer, Benchmarking Manager for Research and Development division at IFS, reports that Rational Suite TestStudio has been a big part of IFS' success. "We've been able to beat our development schedule on a number of occasions, because Rational Suite TestStudio helped us evaluate different architectural approaches with realistic tests. This gives us a real competitive advantage."

Rational Suite TestStudio makes it easy to create load tests involving tens of thousands of users and millions of individual transactions. In a recent test, Rational Suite TestStudio applied a load of 7,000 concurrent virtual users to IFS

software. The 7,000 virtual users — a number well within Rational Suite TestStudio's capabilities — performed a variety of business activities while Bauer and his team used Rational Suite TestStudio to monitor system performance and gather performance measurements. Bauer was very happy with the overall results, "From a Rational Suite TestStudio point of view, the tests were most successful. During the whole period, we didn't have any problems at all. Our growth and success depends, in part, on our ability to provide our customers with accurate performance guidelines, and we rely on Rational Suite TestStudio to get them."

The Business Problem

Before IFS began using Rational Suite TestStudio they faced a common problem — they needed to load test their application with realistic workloads. Bauer, who had been with IFS for two years at that point, remembers, "We needed a way to test our application with extremely high realism and we needed to be able to establish guidelines for the application. We evaluated a couple of other testing products at the time, but we were already using other Rational tools, like Rational Rose®, and we were very pleased with their quality."

Since then, Bauer has used Rational Suite TestStudio extensively to test IFS Applications — IFS' flagship product. Based on proven component technology, IFS Applications include Web-based enterprise applications, supply chain management components, Internet storefronts, and e-markets and e-procurement solutions. The company offers over 60 functional business components — spanning the entire demand and supply chain — to improve business processes in medium to large companies. IFS eBusiness™ solutions provide seamless integration of all data sources from the fastest Web sites and exchanges to point solutions and legacy ERP (Enterprise Resource Planning).



“It is a very straightforward process. Rational Suite TestStudio is highly effective in this regard and it is also very stable during testing. When we update a script, we just record new segments for the added features. By reusing scripts this way, we save time and shorten the entire testing and development cycle.”

					Demand Planning			
					Constraint Based Scheduling			
					Costing			
Enterprise Storefront					Shop Floor Reporting	Payroll Administration		Vehicle Information Management
Web Store	Financial Ledger				CRP / MRP	Expense Reporting	Scheduling	Process Design
eProcurement	Report Generator		Supplier Scheduling		Shop Order	Time & Attendance	Preventive Maintenance	Instrumentation Design
eMarkets	Consolidated Accounts	Field Service & Operations	Customer Scheduling		Make to Order	Project Reporting	Work Order	Electrical Design
Contact Center	Fixed Assets	Proposal Generation	Customer Orders		Assemble to Order	Recruitment	Equipment	Plant Layout & Piping Design
Collaboration Portals	Accounts Receivable	Sales Configuration	Invoicing		Repetitive Production	Employee Development	Equipment Performance	Project Delivery
Employee Portals	Accounts Payable	Sales & Marketing	Purchasing		Master Scheduling	Skills & Qualifications	Equipment Monitoring	PDM Configuration
Wireless Services	General Ledger	Marketing Encyclopedia	Inventory		IFS Manufacturing	IFS Human Resources	IFS Maintenance	IFS Engineering
IFS eBusiness	IFS Financials	IFS Front Office	IFS Distribution					
Personal Portal Management	Project	Quality Management	Accounting Rules	Document Management	Business Performance			
IFS Foundation1 V5								

IFS applications include components that span the entire demand and supply chain, including Web and portal-based solutions as well as Internet-based business models for sales, marketing, procurement, and dynamic collaboration.

Bauer and his team of six test engineers are responsible for establishing sizing guidelines for IFS applications — including the more than 60 business modules that can be assembled in any combination to meet customer requirements. These sizing guidelines help IFS customers determine an appropriate system configuration for their particular needs. IFS has been using Rational Suite TestStudio for almost three years to help determine the maximum transaction rate and maximum concurrent user load that their software can handle.

Bauer explains, “With our interactive sizing guide, a customer can tell us how many users they have and what software they intend to run, and we can suggest a suitable platform. There are also many unique customer cases that fall outside our standard guidelines, so we do a lot of presales and individual sizing projects for special customer cases. Our customers require this information to make informed decisions, and of course, it has to be accurate. Accurate sizing

guidelines help keep our customers’ costs to a minimum.”

Preparing for The Big Test

The recent 7,000-plus virtual user test was one of the more extensive test scenarios that Bauer has conducted at IFS. The tests took place at an IBM Solution Partnership Center (SPC) in Waltham, Massachusetts.

Bauer reports, “Our SPC tests were basically aimed at establishing guidelines for IBM RS/6000® servers and IBM environments, like AIX® for example. We had two systems that we used interchangeably as the system under test and the load server. We were able to perform tests on AIX using TestStudio’s UNIX load test agents, which worked very well.” Rational Suite TestStudio supports performance testing in a wide range of environments with playback agents on a variety of platforms – including IBM AIX, Sun Solaris, HP UX, Red Hat Linux, and Windows NT. Bauer continues, “We used an IBM Netfinity® server as a load master for report processing and other tasks.”

Bauer’s team prepared for the tests at IFS by recording scripts and setting up the test environment. They then brought the scripts and their test

environment with them to the IBM Solution Partnership Center. Bauer continues, "Our team was at the SPC for about ten days, and we ran more than 7,000 virtual users on the system. That is very good because those are realistic users performing a lot of activities on the IFS application. We focused on those components that are normally high-volume in a customer installation because those components tend to determine the sizing of the required hardware. So in the test we processed a lot of sales orders, did a lot of inventory procurement, and a lot of financing and invoicing."

With Rational Suite TestStudio, Bauer's team is able to prepare for even the most extensive tests with relative ease. Using the Rational Robot component of Rational Suite TestStudio, Bauer quickly records new test scripts whenever a new feature is added to an IFS module. During the three years that IFS has been using Rational Suite TestStudio, they have assembled an extensive collection of test scenarios. "We upgrade our scripts when we release new IFS application versions. We extend the scenarios a little, modify them, or add new ones if needed," Bauer continues. "It is a very straightforward process. Rational Suite TestStudio is highly effective in this regard and it is also very stable during testing. When we update a script, we just record new segments for the added features. By reusing scripts this way, we save time and shorten the entire testing and development cycle."

From One Virtual User to Many

Typically, a recorded test script will perform one or more user activities, like placing an order for example. For that script to be used effectively in a performance test, the script must use a range of data (or variable data) when it is played back. Consider a script that added a new part number to a database. During a load test that script is executed many times, and a virtual user would try to add the same part number each time. The results of such a test would likely be of little value, since attempts to add the part number after the first would likely be rejected by the database. Rational Suite TestStudio uses datapools to create multi-user scripts that use a range of values – or a set of enumerated values – during playback. When a multi-user script is used in a performance test, Rational Suite TestStudio automatically varies the data used in the script based on the test engineer's specifica-

tions. Bauer confirms that creating a multi-user script from a single-user script with Rational Suite TestStudio is simple, "The quality of the scripts you get from recording sessions is very high, so you can rapidly add more functionality. For example, we can easily script different behavior and add datapools. We use datapools to generate different data and, to some degree, cause random behavior during our tests. Setting up a datapool with Rational Suite TestStudio is intuitive. We use them to vary everything from customer data, to order data, and part numbers."

Ramping Up

In the real world, there are many different kinds of users using a software system in different ways. For example, while customers place orders, managers check inventory, and accounting personnel create invoices. Effective performance tests must simulate the activities of each of these different groups of users, giving each group a proportionate amount of work to do. Rational Suite TestStudio enables testers to quickly build complex usage scenarios without programming. Testers create very realistic workload schedules by weighting each user group. For instance, a simple schedule might specify 50% of users as customers, 20% as report-generating management, and so on. Once a schedule is created graphically, the whole test can be easily scaled from ten users to thousands of users.

IBM created Solution Partnership Centers to help software developers port, enable, test, and market their applications on all IBM platforms. Located around the globe, Solution Partnership Centers provide access to the latest IBM hardware and software, secure porting labs, tailored configuration support, technical assistance, and education — essentially everything developers need to achieve compatibility with IBM environments. IBM has adopted Rational Suite TestStudio for performance testing at its Solution Partnership Centers.

"The ability to scale tests to very large numbers while maintaining realism is a very powerful feature — and it is something we need to continue to meet our customer's needs."

With this capability, the IFS team had a high-level of confidence that the benchmark workload they created was representative of the real world. Then they simply ramped up the number of users in the test. Bauer recalls, "We had a set of approximately ten different roles on the system – end uses pertaining to sales, procurement and the financial department and so on. We assigned a percentage to each group, and when we scaled up we got the same distribution among users. For each role there were four or five different activities and intensities inside each role. Some activities were done once every five minutes, some were done once every fifteen minutes. The ability to scale tests to very large numbers while maintaining realism is a very powerful feature — and it is something we need to continue to meet our customer's needs."

Rational Suite TestStudio simplifies the process of creating accurate, scalable performance tests that employ thousands of virtual users to carry out millions of individual transactions. It also gives testers, including Bauer's team, the ability to precisely control the rate of transactions. In Rational Suite TestStudio transactors are used to set the number of tasks that each virtual tester will run in a given time period. Bauer continues, "We use transactors a lot. We can set a pace for a user and we don't have to worry about how long it actually takes to carry out the scenario. Rational Suite TestStudio takes care of the pacing of user activities. If we want something done twelve times an hour, we can set that and we know TestStudio will do it."

Getting Results

The ten days Bauer and his team were at the IBM Solution Partnership Center proved to be time well spent. IFS came away with not only sizing guidelines, but also valuable insights into key performance issues. Bauer remembers, "One of the benefits of going to the SPC is you have a wide selection of different servers you can test. Normally, during the first part of the test, we focus on tuning the hardware and the system software to avoid bottlenecks there. We were able to tune our Oracle database for these high-volumes once we found out where contention issues were. Also we were able to identify some network bandwidth issues."

Rational Suite TestStudio also helped highlight specific areas of code in IFS components where changes might significantly improve perform-

ance. Bauer continues, "But when you get past hardware-tuning levels you start to find out things inside the application — implementation details — that are not 100% effective. We found some of those and were able to fix them during our tests. When we did find an issue, Rational Suite TestStudio helped us pinpoint exactly where in the source code the problem was. As a result, we were able to improve the reliability of our applications."

With Rational Suite TestStudio, Bauer analyzed everything from system resources to business transactions to low-level function calls. "With a very large-scale test like this one, when everything goes right, you look at it from a high level and only measure large blocks of transactions to see how long they take. But Rational Suite TestStudio also has a set of very fine-grained timers on each action you perform. So when you see things starting to take more time and become slower, TestStudio can actually drill down inside them so we can see how different transactions are performing at a detailed level. That is very useful for us. When we find potential areas of improvement we give feedback to our developers. We can't always suggest how to improve something, but at least we can show what areas we would like to see improved," Bauer notes.

Improved Speed, Improved Quality, Improved Business

IFS, like all successful software development companies, must develop software faster than ever before, while constantly improving on their already high-quality standards. Bauer believes that Rational Suite TestStudio has helped IFS do just that, "To start with, Rational Suite TestStudio has enabled us to find out how our application behaves under massive loads and high pressure. That is basically the most important part of it. Simulating a system with hundreds or thousands of users in the lab with 100% realism — you can't do without that. It's a must in all cases. In that sense, it helped us a lot in increasing quality. Our speed has improved because we save time in creating and maintaining our tests with TestStudio. And we can better serve our customers because we are able to provide reliable, accurate information on what our applications can handle on a variety of platforms."

For Bauer, the key benefits of Rational Suite TestStudio are the realism of its tests, the ability

to develop tests rapidly, scalability, and accuracy. Although confirming the accuracy of load test results with real world data is not easy, Bauer has managed to do it. "We have been able to verify the accuracy of our tests. Because we have an application that covers a wide range of functions, it is pretty rare that a customer will run the same configuration as we did during our tests. However, it has happened, and we have found for a given platform if a system doesn't scale past a certain point during testing it doesn't in reality either. Also, we get feedback on all our sizing guidelines. With Rational Suite TestStudio, we find that the feedback is in line with our tests, so we are confident in our ability to predict how our software performs in the real world. When we can provide this kind of assurance to potential customers, it really helps our business."

More Than Just Testing

Before Bauer and his team began using Rational Suite TestStudio, IFS was already taking full advantage of other Rational products, including Rational Rose. Developers at IFS have been using Rational Rose, the world's leading visual modeling tool, since 1996 to model business objects, attributes and methods. IFS developers also use Rose to generate code for their PL/SQLserver and Windows clients directly from their visual models. IFS is currently considering using its Rational Rose models to create component tests. With Rational® QualityArchitect, testers can quickly and easily generate functional tests for components modeled in Rational Rose. For more details on how IFS improved productivity and accelerated development with Rational Rose, see the story, "IFS Automates with Rational Rose".

In addition to Rational tools, IFS also leveraged Rational e-development Services to streamline the deployment and adoption of Rational Suite TestStudio. Bauer continues, "We had a proof-of-concept period where we implemented test scripts for a part of our application suite. Two consultants from Rational helped us for about a week and after that we decided on Rational. When we started using Rational Suite TestStudio, we attended Rational University courses at our site, which definitely accelerated our deployment. We got a kick-start, and started using

TestStudio immediately after that. Now, after three years with TestStudio, the biggest challenge for us is figuring what to test — not how to test. It's easy to do the tests now, the hardest part is coming up with tests that represent all the different ways our customers use our product."

Imagine That

Clearly, IFS has been very successful with Rational Suite TestStudio over the years. With its ease-of-use, scalability and accuracy, it is little wonder that Bauer has put Rational Suite TestStudio's load testing capabilities to use wherever possible. He explains, "Rational Suite TestStudio has grown to become our primary tool for all kinds of benchmarking and performance improvements. We are using it for both our Web-based and our traditional GUI applications. We are also using Rational Suite TestStudio to test part of our application built on a CORBA platform. We are using it for almost everything we are doing."

Even after using Rational Suite TestStudio on many projects, Bauer continues to be amazed at its usefulness and its value. "If I look back to before we started using Rational Suite TestStudio, I never would have imagined that a test tool could be this powerful — that you could get high level of realism, and really run one, two, five-thousand users and have them behave like five thousand real users. With TestStudio, you can really do this and that is very important for us. I am still really impressed that it can be done. And on top of that, it is easy. It is easy to orchestrate the whole test, and everything will happen exactly as you want it to."

Now, imagine for a moment that your organization needs a new load testing solution, and you are leading the evaluation effort to recommend a solution. If, like IFS, you demand effective, scalable, and easy-to-use tools, then your clear choice is Rational Suite TestStudio.

About Rational

Rational provides a software development platform that improves the speed, quality, and predictability of software projects. This integrated, full life-cycle solution combines software engineering best practices, market-leading tools, and professional services. Ninety-six of the Fortune 100 rely on Rational tools and services to build better software, faster. This open platform is extended by partners who provide more than 500 complementary products and services.

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