



Achieving ROI with Rational Suite Integrated Life-Cycle Management

An IDC White Paper

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Introduction

Implementing a structured software development life-cycle process can have a pronounced effect on an enterprise. There are many products designed to address the various areas of the development life cycle. However, using these products together in an integrated environment is not straightforward for an organization.

What is the value of using a suite of integrated products throughout the development life cycle? For this study, IDC interviewed selected users of Rational Software's Rational Suite product family, a multiplatform, integrated software development life-cycle solution for cross-functional teams. The interviews were specifically constructed to elicit quantitative measures of the return on investment (ROI) attributable to the use of Rational Suite products.

Market Trends

Software applications are becoming increasingly vital to the survivability of a wide range of companies. Enterprise applications are no longer tools to *support* the business; increasingly, they are the business. At the same time, software development and deployment is becoming much more complex. Multiplatform, multitier distributed environments are becoming the norm. Also, development teams are often geographically dispersed, but the members' activities need to be tightly coordinated. And, of course, requirements for quality, productivity, and time to market are becoming more stringent. Given both the complexity and criticality of today's software applications, the historical process of "design it, deploy it, fix it" is no longer adequate. Solutions that address complexity, quality, productivity, and collaboration are crucial to success.

As the role of software in organizations expands to encompass more business-critical and mission-critical activities, the technology for building and deploying applications has become more sophisticated. Application development is now far more infrastructurally centric, with an emphasis on application servers, open software standards, and

componentized application development and deployment. Just as the process of developing and deploying applications has evolved, so has the software development life cycle. Management (of requirements, code, configurations, content, and projects) and testing are now all key activities that help ensure the creation and support of high-quality applications and systems. These activities, once the focus of only the most complex applications and embedded systems, are now finding their way into mainstream application development as organizations seek to address more critical business needs with software applications.

Solutions to address the full range of development and deployment and life-cycle requirements are consequently gaining in popularity. Rational Software's solution, Rational Suite, supports a variety of development environments and team sizes that span key market segments: ebusiness, infrastructure, and devices/embedded systems.

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Rational Suite

The overall Rational solution encompasses best practices, tools, and services. The company's mission is to provide unified tools for the project team. Life-cycle activities supported include requirements and analysis, software development, content management, and system testing. All of these activities are integrated and coordinated via the Rational Suite Team Unifying Platform. With the Rational Suite Team Unifying Platform, development teams realize more effective collaboration because they have a common view of how to develop software and can easily share and manage all artifacts, including requirements, visual models, documentation, code, defects/change requests, and test assets. This integration can offer substantial relief from the pain associated with integrating a myriad of individual point products while providing automation of software development best practices, which Rational enumerates as:

- **Develop iteratively.** To identify and eliminate risks before they threaten projects
- **Manage requirements.** To ensure resilience in the face of inevitable change
- **Use component architectures.** To make architectures tangible to all practitioners
- **Model visually.** To attain and preserve a high-quality architecture
- **Continuously verify quality.** To ensure quality throughout the development life cycle

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- **Manage change.** To enable efficient parallel development within teams and across the enterprise

The Rational products that support this solution are collectively designated Rational Suite. Products are packaged as product sets — called studios — targeted at the various constituencies of the project team (alternatively, products may be purchased individually). Rational Suite provides the tools to manage software projects from inception (i.e., requirements and analysis) through development, testing, deployment, and ongoing maintenance and enhancement.

The focus of this study was to ascertain the benefits obtained from the integration of various components of Rational Suite utilized by the interviewed organizations, not the benefits of the individual or sets of products.

ROI Case Study Methodology

IDC employed a structured interviewing methodology to collect qualitative and quantitative ROI data for two Rational Suite customers.

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ROI Defined

To assess the benefits of Rational Suite, it is first important to define what is meant by ROI. For the purposes of this study, ROI is defined as follows:

The ROI is defined as the net quantifiable benefit (NQB) associated with the use of Rational Suite as a percentage of the net cost (NC) associated with the usage of Rational Suite.

ROI Components Defined

Net quantifiable benefit (NQB) is the difference between the savings achieved through the implementation of Rational Suite versus either not implementing the solution at all or implementing equivalent solutions in a different way. NQB can be either direct, in terms of incremental revenue gained or expense saved, or indirect, from the redeployment of resources to tasks that the organization would alternatively have had to hire new and like resources to perform. These benefits were projected to future years, for which a present value was calculated.

Net cost (NC) is the difference between the total cost and expenses associated with Rational Suite (e.g., human and other resources used, costs of licenses, additional equipment required) and the similar costs associated with the most likely alternative solution (which can be none at all).

ROI is the ratio of total net benefit divided by total net cost.

ROI Calculation

ROI is the ratio of total net benefit divided by total net cost. This ratio is equal to 1 when net benefits equal net cost, which represents stasis, equilibrium, or no improvement. A ratio of less than 1 reflects a negative improvement, and a ratio of greater than 1 reflects a positive improvement.

ROI is frequently expressed as a percentage, in which case the ROI result is multiplied by 100. The percentage ROI calculation can thus be represented as:

$$\text{ROI} = (\text{NQB}/\text{NC}) \times 100\%$$

Other ROI Considerations

ROI is also a relative measure in that the benefits and costs of Rational Suite are compared with an alternative solution, which is typically what the organization had been doing to address this business problem before the implementation of Rational Suite. It follows that NQB and NC will be defined differently for each interviewee situation, and, in some cases the results will not be as quantifiable as in others.

Typically, to perform “true” ROI analysis, a savings or revenue that is recognized in terms of personnel resources can only be included in the ROI analysis if those resources have been eliminated as a result of the product implementation. However, that is rarely the case. Resources are more likely to be assigned to other projects or areas where they are needed. It can still be said that the savings are real because if the staff had not been reassigned, additional resources would have to have been hired.

In the following case studies, increased productivity, shortened development cycles, and reduced testing times have not led to the elimination of personnel. Instead, these gains have been used to facilitate additional releases or allow alternative tasks to be performed by the existing staff.

In the following case studies, increased productivity, shortened development cycles, and reduced testing times have not led to the elimination of personnel. Instead, these gains have been used to facilitate additional releases or allow alternative tasks to be performed by the existing staff. The argument can be made that to achieve the same levels of productivity, additional personnel would have to be hired. Therefore, although this is a more qualitative form of ROI analysis, the benefits derived by the use of Rational Suite are quite real.

ROI Data Collection Methodology

To collect the data, IDC conducted telephone interviews in January and February 2001. The purpose of the interviews was to understand the business problems these organizations were seeking to solve, the role of Rational Suite in solving these business problems, and the ROI associated with the implementation of Rational Suite.

IDC established a series of predefined questions for use in the ROI interviews. These questions were designed to enable the collection of complete ROI data as well as to provide a consistent framework for analyzing the ROI data. These questions enabled IDC to understand

the organization's general approach to development and deployment as well as evaluate the relative attributes, benefits, and costs associated with Rational Suite.

A three-year "ROI horizon" was employed. Therefore, all of the ROI data shown is for accumulated actual and projected savings over a fixed three-year period, from 1999 through 2001.

All ROI calculations and numbers generated for the case studies have been generated by IDC.

Case Studies

Two Rational Suite customers were interviewed for this study. The case studies are presented below (in alphabetical order).

Choice Hotels

Company Overview and Business Environment

Choice Hotels International franchises more than 4,392 hotels in 43 countries under brands such as Comfort Inn, Quality Inn, and Econo Lodge. Choice Hotels has been in business for more than 50 years, and the smooth operation of its facilities — from online reservation systems to efficient guest services — depends on the development of well-crafted, rapidly deployable applications.

Current IT Environment

Choice Hotels prefers to develop its own hospitality applications, and this approach allows the company to differentiate itself within the industry. Within the IT environment, applications have been written in numerous languages, including PowerBuilder, Delphi, Visual C++, Java, and XML. While all of these are supported by the organization, the current technology thrust of Choice Hotels is toward Java and Internet applications. By moving from a client/server architecture to a Web-based architecture, Choice Hotels increases maintainability and dramatically cuts the cost of software distribution. Its usage of the Web to conduct ecommerce transactions shows its commitment to connecting with employees, customers, and partners in the most efficient and up-to-date manner possible.

Emerging Needs and Role of Rational Suite

Choice Hotels software development started, as it often does in non-centralized organizations, with an informal development environment and methodology. While this works when the development group and projects are small, problems develop as the group and projects scale upward. Choice Hotels found that the lack of a formal requirements process, formal defect tracking, or formal development life cycle was costing the organization time and money. The absence of an integrated set of development tools and methodology led to inefficiencies in both development practices and internal and external communications.

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Convinced that change was required, Choice Hotels standardized on Rational tools based on past experience with Rational ClearQuest. Now, in addition to using Rational ClearQuest, Choice Hotels also utilizes Rational Suite AnalystStudio, Rational Suite TestStudio, and Rational Suite Enterprise, as well as a customized version of the Rational Unified Process. Through these product suites, Choice Hotels has recognized several benefits, of which two were particularly far-reaching.

First, bringing more structure to its development life cycle increased developer productivity, facilitating the delivery of more applications in shorter time frames. Furthermore, better management of the requirements process resulted in better and more consistent application quality as well as improved customer satisfaction with applications delivered.

The Rational tools offer increased flexibility with better control.

The second key benefit, still gaining momentum, is the reduction in test times and increase in quality assurance resource productivity through the use of Rational Robot. Automated testing has dramatically reduced the time and effort spent on testing, allowing for the allocation of resources to additional projects and activities. While the tools offer many advantages in themselves, it is the integration of the tools that enables the entire life cycle to proceed efficiently. Information is passed between the tools, enabling all project participants to easily share data and eliminate the need for and potential errors in data re-entry. This unified approach enables the organization to quickly pinpoint the status of a project, allocate tasks, and proactively respond to any required changes. The Rational tools offer increased flexibility with better control.

ROI Analysis

Net quantifiable benefits. Choice Hotels has realized a substantial NQB through the use of Rational Suite. Rational Suite enabled Choice to implement a unified development life cycle with tools to support key areas such as requirements management, defect tracking and change management, and automated testing. The benefits realized came in the form of reductions in the time expended to perform the required tasks.

Through these integrated tools, Choice Hotels recognized increased developer and quality assurance productivity. Increased developer productivity accounted for just more than \$1.5 million in net benefits. Increased productivity of quality assurance staff resulted in just more than \$2.7 million in net benefits.

At the same time, application and Web availability increased as a result of better quality releases, delivering an NQB of nearly \$5.3 million.

Total net benefits therefore amounted to \$9.534 million.

Net costs. The total NC to Choice Hotels over the three-year ROI horizon for software and training amounted to \$179,000. In addition, personnel costs associated with support brought the overall net cost to

Choice Hotels recognized an ROI of 1,440% using Rational Suite, which means for each dollar invested, Choice Hotels sees a return of \$14.40.

\$662,000. The investment costs for Rational Suite are not reflected because the initial implementation took place before the ROI time frame examined in this study.

Return on investment. Choice Hotels recognized an ROI of 1,440% using Rational Suite, which means for each dollar invested, Choice Hotels sees a return of \$14.40. This is an impressive ROI that can be attributed to both reasonable ongoing costs and significant benefits. A small percentage increase in application availability can have a dramatic impact on revenue, leading to substantial financial benefits.

Qualitative Benefits Associated with Using Rational Suite

By using Rational Suite, Choice Hotels has achieved the following additional benefits:

- Improved development productivity
- Improved quality assurance productivity
- Increased application availability
- Increased Web availability
- Improved customer satisfaction
- Better requirements tracking
- Improved team coordination and project control

Lockheed Martin Canada

Company Overview and Business Environment

A leader in systems integration, software development, and the design and manufacture of advanced electronic systems, Lockheed Martin Canada employs more than 600 employees at facilities in Kanata (head office), Montreal, Halifax, Victoria, Denver, Esquimalt, Dartmouth, Valcartier, Petawawa, and Wainright, Alberta. Core lines of business include the Army, the Air Force, the Navy, Intelligent Transportation Systems (ITS), and Information Systems and Support (IS&S). Lockheed Martin Canada is a division of Systems Integration, Owego, New York, and is a unit of the Lockheed Martin Corp., headquartered in Bethesda, Maryland. The corporation's core businesses are systems integration, space, aeronautics, and technology services.

Current IT Environment

The group that initiated the use of Rational Suite at Lockheed Martin Canada is the Information Systems and Services (ISS) group. This group comprises 40 employees who are responsible for satellite communications, project management, and information technology. Dealing primarily with commercially available packaged applications, the ISS group acts as system integrators for its clients in the government, military, and industry sectors. ISS uses its ISO 9001 certification

as a framework for obtaining customer approvals, creating a statement of works, and specifying projects. ISS has extensive project management experience and is especially qualified to handle projects that are highly complex, process centric, and integration oriented.

Lockheed Martin Canada began evaluating Rational Suite while examining tools to meet the needs of a specific customer in the military sector that was looking for an integrated environment for software engineering and program management.

Rational tools enabled Lockheed to easily sort and report on the requirements analysis process, distribute ownership of various risks, ease data collection from project members, and quickly identify, evaluate, and resolve issues as they arose. Consequently, the ISS group was able to accomplish more in shorter time frames, allowing new tasks to be undertaken with the time that was freed.

Emerging Needs and Role of Rational Suite

Lockheed Martin Canada began evaluating Rational Suite while examining tools to meet the needs of a specific customer in the military sector that was looking for an integrated environment for software engineering and program management. Through that evaluation, Lockheed selected Rational Suite as a key dimension of its integration project in the military sector. At the same time, Lockheed Martin Canada decided to use Rational Suite as a tool to help manage this particular project due to its large size and complexity. Lockheed anticipated that the experience gained with Rational Suite on this project would help its ISS group assess whether Rational Suite should become an internal standard for all projects by this group.

For Lockheed Martin Canada, the Rational tools had the biggest impact in the area of risk management. The project for which Lockheed adopted Rational tools was in the military sector and focused on providing an integrated environment for software engineering and program management. This project involved reviewing and categorizing more than 1,300 requirements according to the estimated time required to accommodate each relative to schedule goals. Rational tools enabled Lockheed to easily sort and report on the requirements analysis process, distribute ownership of various risks, ease data collection from project members, and quickly identify, evaluate, and resolve issues as they arose. Consequently, the ISS group was able to accomplish more in shorter time frames, allowing new tasks to be undertaken with the time that was freed.

ROI Analysis

Net quantifiable benefits. The ROI calculations in this case measure benefits derived from automating workflow and knowledge capture, which are facilitated by all of the Rational products in Rational Suite Enterprise. The net benefits realized by Lockheed Martin Canada reflect the reduction in labor costs that occurred from the automation of the risk-management process by Rational's tools. This net benefit was calculated by comparing the time necessary to address risk-management activities between 1999 and 2001 using manual means (without using Rational tools) and automated means (using Rational tools). Since the ROI for this project is calculated through the end of 2001, it is important to recognize that 2001 benefits and costs are forecast based on historical values and trends.

Use of Rational Suite Enterprise enabled Lockheed Martin Canada's ISS group to eliminate 9.4 person years of effort over the three-year

ROI time horizon, which equates to a reduction of more than \$409,000 in labor costs.

Net costs. Net costs associated with the use of Rational's tools included costs for licensing, maintenance, training, and hardware upgrades. Total net costs for this three-year ROI time horizon were \$184,000. Most of this net cost was incurred in 1999 due to significant one-time licensing, training, and hardware upgrade costs. Therefore, ROI payback, while only about 2:1 in 1999, increased to 12:1 in 2001.

Return on investment. The overall ROI for the three-year period was 222% (2.2:1), reflecting a large proportion of the risk-management activities that occurred in 1999. Lockheed's experience in automating the risk-management process for large projects will undoubtedly carry over into smaller projects. It is anticipated that had the ROI time horizon been longer, the ROI experienced by Lockheed would have increased.

Qualitative Benefits Associated with Using Rational Suite

By using Rational Suite, Lockheed Martin Canada has achieved the following additional benefits:

- Greater ease of data collection
- Improved sorting and reporting on projects
- Quicker and easier identification of project bottlenecks
- Streamlined distribution of ownership on various risks
- Improved project communications, both internally and externally
- Increased speed with which project tasks can be executed

IDC Analysis and Conclusion

From the case studies, IDC has found that there is a clear and quantifiable benefit to be gained from employing Rational Suite integrated tools to perform software development and deployment.

From the case studies, IDC has found that there is a clear and quantifiable benefit to be gained from employing Rational Suite's integrated tools to perform software development and deployment. While there were a wide range of advantages cited by the organizations interviewed, the quantifiable benefits were most evident in the form of productivity gains. These gains were achieved in the form of reduced testing and development cycles, more efficient team interaction, and better requirements management. For these organizations, the productivity gains did not result in the reduction of personnel but rather in reallocation of resources for additional tasks and projects.

The ROI factor experienced by the organizations interviewed varied from 222% to 1,440%. It is therefore important to examine the causes of these differences.

Lockheed Martin Canada was rather unique in that Rational Suite was used by only one group for one particular customer. That company accrued the investment costs during 1999 at the same time that many

of the benefits were experienced, leading to an ROI of 2:1. However, during 2001 the ROI increased six times to 12:1, indicating that an extended ROI period may have yielded a larger ROI overall.

The most significant ROI was experienced by Choice Hotels, which had accrued Rational Suite investment costs before the three-year ROI time frame examined. In this case, a small percentage increase in a Web-based application's availability resulted in a dramatic impact on revenue, leading to substantial financial benefits. These factors, in combination with reasonable ongoing costs, contributed to the largest ROI in the study performed.

While an ROI study focuses on quantifiable benefits and costs, qualitative benefits associated with using Rational Suite were significant to the organizations and included areas such as:

- Increased reportability, traceability, and visibility on projects
- Increased accuracy in requirements management
- Reliable, error-free life-cycle process

The common thread through the discussions, regardless of how it was recognized, was one of productivity gains achieved through product integration and improved team interaction.

Both of the organizations in the study confirmed that the use of Rational Suite had provided a wide range of positive effects on their performance (see Table 1). The common thread through the discussions, regardless of how it was recognized, was one of productivity gains achieved through product integration and improved team interaction. Due to the Rational Suite integrations, the companies profiled were able to reduce the need to re-enter project data, enabling these companies to accomplish more in less time.

Table 1
Benefits Achieved by Rational Suite Respondents

Company	Critical Business Issue	Quantifiable Benefits from Rational Suite	Return on Investment
Choice Hotels	Adopt a formal, scalable life-cycle development process	Improved application quality, availability, and customer satisfaction	1,440%
		Reduced test times	Total net benefits = \$9.534M
Lockheed Martin Canada	Integrate environment for software engineering and program management Automate process for managing risk	Improved requirements management	222%
		Better project and risk management Eliminated 9.4 person years of effort, resulting in reduction in labor costs	Total net benefits = \$409,000 reduction of labor costs

Source: IDC, 2001

One of the most difficult aspects of software development is the efficient sharing of information among team members. This is also one of the most crucial factors in success. Effective communication can ensure that the right tasks are accomplished successfully, that issues are addressed quickly, and that project status is discerned rapidly and easily. IDC believes that this is the central benefit of Rational Suite. Clearly, companies can find point solutions that will perform the same functions as the Rational tools. But it is the integration of the Rational Suite tools and the productivity gains that are made possible that sets them apart.

In summary, IDC has demonstrated that an integrated set of software development life-cycle tools — in this case, Rational Suite — can have a substantial and quantifiable impact on an organization's development processes.

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