

The real cost benefits of IBM Rational development software

White paper

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Rational software

How can IBM Rational PurifyPlus software improve your bottom line?

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Introduction

IBM Rational® PurifyPlus™ software helps to empower developers to deliver software with the reliability, performance and quality that users expect. Rational PurifyPlus provides triple the benefit by combining the bug-finding capabilities of IBM Rational Purify®, the performance-tuning effects of IBM Rational Quantify® and the testing rigors of IBM Rational PureCoverage® software. The benefits of these combined products can be measured in better code, faster development times and fewer errors. In this white paper, IBM takes the analysis one step further by translating the benefits to the bottom line.

Rational PurifyPlus for UNIX ROI: the bottom line

Annual savings	US\$23,450
First-year return on investment (ROI)	414%
Payback period	2.9 months

Table 1

The calculations shown in table 1 are based on information obtained through a survey conducted by an independent consultant. The goal was to measure and document actual experiences using Rational tools. Forty-three companies participated, representing manufacturers (automobiles and components, computers and components, aircraft, and medical equipment), software companies (CAD, CASE, database, systems software and medical imaging), service companies (banking, finance, insurance and hospitals) and universities. Most respondents were employees of large organizations (more than 500 employees, with revenues over US\$100 million annually). And most were from North America. The majority of the respondents had titles such as technical lead, project leader or senior software engineer.

Rational PurifyPlus for UNIX ROI: methodology

The Rational PurifyPlus ROI was calculated based on a survey that examined savings resulting from the use of Rational Purify, Rational Quantify and Rational PureCoverage products individually (the Rational PurifyPlus offering provides these three products in a single package). The results for the three individual products (shown in table 2) were obtained from an analysis of the survey. The last row is the result of applying this data to Rational PurifyPlus, as described in this document.

Product average	Payback period (months)	Average ROI
Rational Purify	2.5	460%
Rational Quantify	3.4	335%
Rational PureCoverage	2.57	447%
Rational PurifyPlus	2.90	414%

Table 2

These results include only quantifiable additive results. No attempt was made to extrapolate a value for synergistic effects. For example, Rational PureCoverage, when used in conjunction with Rational Purify, identifies sections of code that have not been fully tested with Rational Purify. This information can be used to create more thorough tests and a higher ROI in terms of Rational Purify usage. This additional ROI would be realized when using the combined products in Rational PurifyPlus, but it was not included in these calculations. In actual use, Rational PurifyPlus offers an even faster and higher ROI than the numbers shown. But you can see from the numbers here that Rational PurifyPlus saves time and money.

In the following paragraphs, we'll show you how Rational PurifyPlus can save a developer 4.5 weeks a year by eliminating time that would have been spent fixing bugs or addressing performance issues. We'll also show you how Rational PurifyPlus can save US\$7,000 per developer per year by catching bugs before shipment.

Spend less time fixing bugs! Save 2.6 weeks per developer per year

Research has shown that three critical memory access errors occur per month per team, assuming a median working team of five developers. That amounts to 0.6 errors per month per developer. On average, it takes 16 hours to find memory access errors using conventional tools.

0.6	x	16	=	9.6
errors per month per developer		hours per error		hours per month spent fixing memory errors

Table 3

When using Rational PurifyPlus to find run-time errors, 60 percent of the respondents estimated a productivity gain of a factor of 10, which means that errors that previously took 10 hours to find and correct could be corrected in 1 hour. By applying this “Purify Productivity Factor” of 10, the average developer would spend 1 hour each month fixing memory errors: 9.6 hours spent using conventional tools \times 1/10 (Purify Productivity Factor) = 0.96 hours per month. That represents a savings of 8.64 hours per month per developer (9.6 - 0.96 = 8.64). Annualizing the savings yields 103.7 hours per year (8.64 hours per month \times 12 months = 103.7 hours per year). With a 40-hour week, this translates into a savings of 2.6 weeks per year (103.7 hours \div 40 hours = 2.6 weeks).

Spend less time addressing performance issues! Save 1.96 weeks per developer per year
Research has shown that the average programmer spends around five percent of his or her time on the task of optimizing or improving performance. That amounts to 2.4 weeks per year without Rational PurifyPlus: 0.05×48 weeks per year = 2.4 weeks per year. When using Rational PurifyPlus to address performance issues, there was an estimated productivity gain of a factor of five, which means that performance bottlenecks that previously took developers five hours to correct could be corrected in one hour.

After achieving this “Quantify Productivity Factor” of five, the average developer would spend only 0.48 weeks per year addressing performance issues: 2.4 weeks spent using conventional tools $\times 1/5$ (Quantify Productivity Factor) = 0.48 weeks per year. That represents a savings of almost two weeks per developer per year ($2.4 - 0.48 = 1.92$).

Save US\$7,000 annually by catching bugs early!

Rational PurifyPlus improves error detection by highlighting the parts of code that have not been thoroughly tested and may still contain bugs or performance issues. By detecting bugs early, Rational PurifyPlus provides significant savings. The accepted industry norm holds that bugs fixed before software is shipped are 10 times less costly to fix. On average, developers using Rational PureCoverage caught an additional 10 bugs per developer per year, compared to developers not using the product.

Cost to fix a bug after software shipment was estimated to be US\$700, compared to US\$70 when fixed before shipment. By catching bugs early, Rational PurifyPlus saves US\$7,000 per developer per year:

$$\begin{array}{r} 10 \times \text{US\$700} = \text{US\$7,000} \\ \text{bugs} \quad \text{cost after shipment} \end{array}$$

Table 4

Rational PurifyPlus for UNIX ROI: details

The combined savings in using Rational PurifyPlus in its entirety includes 2.6 developer weeks for using Rational Purify and 1.9 developer weeks for using Rational Quantify for a total of 4.5 developer weeks or US\$16,480 (see table 5 for calculations). Adding the annual US\$7,000 saved by catching bugs early results in an annual dollar return of US\$23,450. This annual savings, along with the following figures, provides the baseline from which the Rational PurifyPlus ROI was calculated.

Annual programmer cost	US\$175,000
Weekly programmer cost	US\$3,646 (assuming 48 weeks per year)
Price of Rational PurifyPlus	US\$5,660 (including 12-month support)
Yearly maintenance cost for Rational PurifyPlus	US\$1,099
Productivity savings	4.5 weeks per year per programmer
Dollar value of savings	US\$23,450 per year per programmer
Payback period	2.9 months
First-year ROI	414% <i>(Note: ROI for future years is significantly higher.)</i>
Net present value (three years; eight percent rate)	US\$52,960

Table 5

Summary

By including Rational PurifyPlus in your software development process, you'll be well poised to improve the productivity of your software developers; enhance the quality and reliability of your software; and save money. Download a free trial version of Rational PurifyPlus today.

For more information

To learn more about how IBM Rational PurifyPlus software can help your bottom line, visit:

ibm.com/software/awdtools/purifyplus



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