



Smarter Enterprise Modernization with Rational Developer for System z and Problem Determination Tools for z/OS: Proof points in enterprise application development solutions

John Kaemmerer, IBM Rational Enterprise Modernization z Solutions Marketing Manager

Marty Shelton, IBM Application and Integration Middleware product line manager for Problem Determination Tools

Scott Davis, IBM Deutschland Rational z Software Technical Sales Specialist

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Introduction

The realities of our world's economic changes are driving conflicting pressures on organizations that develop and deliver IT services. Executives still want more use of technology and upgrades to stay ahead of the competition, while financial management says to do more with less because budgets are being cut. Productivity must increase 3 to 6 percent each year just to keep up with inflation rates. The realities also state that COBOL continues to be a dominant force in data processing environments. According to a *Computerworld* survey, 62 percent of respondents say COBOL is still used in their organizations, with 58 percent indicating that COBOL is used to develop new applications.¹ Clearly, a big part of making improvements in IT must involve the development environment tooling itself to maintain and debug existing product code, extend and reuse code in more modern ways, and integrate technologies for new workloads. Application modernization needs to help high IT spenders become effective business enablers.

More than nine years ago, IBM Problem Determination Tools (PD Tools) began the journey of becoming a dominant force in the IBM System z® problem determination arena. This came about by diligently developing yearly versions, with significant functional enhancements, which allowed IBM to surpass our competitors. Likewise, the Eclipse-based IBM Rational® Developer for System z (RDz) has evolved to provide an application development platform that is second to none. The combining of PD Tools and RDz technologies, along with IBM's entire application development portfolio, has allowed modernization, utilization and deployment of service-oriented architecture (SOA), as well as allowing IBM CICS® Web services to become integral parts of today's application development environment.

Highlights

A retail superstore in the United States achieves a six-digit annual savings on the cost of software maintenance fees when it replaces its existing tools with IBM PD Tools for z/OS.

Today, IBM offers the tooling that can help System z developers accomplish their job tasks more efficiently and productively than traditional green screen tools, and help in the development of new technologies such as Web 2.0 and SOA. This paper will discuss not only the challenges that developers face in today's resource constrained development environment, but also how modernizing your existing applications with both RDz and the IBM Problem Determination Tools can yield enormous benefits for our enterprise customers. These tools are part of an even broader IBM System z Application Development portfolio designed to support your overall application development strategy.

Challenges in doing more with less

The world economic crisis is increasing the pressure on costs, specifically with a renewed focus on IT budgets. According to CNET, "Because of the worldwide financial crisis, IDC expects spending on technology by enterprises to grow by just 2.6 percent this year. IDC has also revised the 2009 U.S. spending growth rate to just 0.9 percent. Cisco, Nortel, Dell and others have already indicated that they've seen or expect to see IT spending drop."²

A recent statement from Gartner indicates that changing the cost structure of IT will become a business imperative for most CIOs. "The message for IT is clear; business needs and expects greater agility from IT. The current approaches to project prioritization, resourcing, agility and governance are clearly not satisfying customer needs. A new approach to IT delivery models and sourcing options is required that allows IT organizations to be more responsive to the needs of the business."³

Today, many enterprises are hampered by underperforming software development projects and the slow speed of software development. There are many reasons why software projects are unsuccessful. There are **application challenges**, including architectural complexity, poor quality and performance, and regulatory and compliance risk. There are **people challenges** because of incompatible tools and repositories, increased learning curves, and multiple languages, technologies and platforms. There are also **team challenges** because of the lack of effective collaboration, weak project governance, and project delays.

To stay competitive, today's enterprises have to decrease application development and maintenance costs while maintaining and enhancing mainframe applications. They have to reduce the number of defects despite working with applications that are more complex than ever. They have to find ways to modernize legacy applications for new Web-based or SOA applications without creating an integration nightmare. The defining challenge in optimizing value in software development is to deliver successful solutions while reducing the total cost of ownership (TCO).

Defining your total cost of ownership

TCO can be broken down as the cost of implementation and the cost of operations. The cost of implementation includes startup costs, software licenses, hardware acquisition, and costs to design, build and test. The cost of operations includes code maintenance, application upgrades, software maintenance fees, and infrastructure support and administration. Often, the cost of operations is three times as much as the cost of implementation because a company has to maintain its core code assets.

Knowing these areas of cost, what are the industries' related solutions in continuing to deliver software but at a lower cost? More specifically, how do enterprise modernization solutions help them in relation to their business challenges?

What comprises enterprise modernization?

Enterprise modernization requires a software delivery platform that can accelerate software innovation for the entire enterprise while working within the budgets available. Companies need to understand and manage their software assets to understand impacts when code is changed, in order to minimize risk. Requirement management is necessary to process the right business needs and handle stakeholder's changes. Architecture and construction is the core of a company's application development. Quality management must help prevent defects and performance problems from getting into production, and a more automated change and release management system needs to work across platforms to reduce redundancy and provide reliable, repeatable auditing capabilities. The whole process of governance and lifecycle management should also include collaborative teaming best practices so that all geographically diverse teams are aware of and can contribute to a better project.

So when we think of lowering the total cost of ownership as part of modernization goals, we need to focus on these areas of the software delivery platform, and understand how we can remain competitive through our modernization efforts, while keeping within our smaller budgets.

“The IBM Rational Developer for System z [application] makes end-to-end debugging possible for us regardless of the platform. That alone eases the programming for us immensely.”

— Bayerische Landesbank

Elements of productivity with Rational Developer for System z

The IBM Rational Software Delivery Platform is the answer to the complete enterprise-level development and delivery environment needed by mainframe and distributed companies today. To understand how, let's focus on one core component of that Rational platform: architecture and construction.

Rational's flagship enterprise modernization product is Rational Developer for System z. It has numerous traditional development features, IBM z/OS® Web service and flow creation functionality, and mainframe and System z runtime support, and it is presented with the customizable Eclipse platform technology.

RDz can help improve z/OS application development in numerous ways to help lower your costs and increase productivity:

- *Modern user interfaces for z/OS developers can help **reduce training costs** because they are simpler to understand and because colleges teach Eclipse-based tooling. The Microsoft® Windows® Explorer-like feel simplifies interaction with z/OS. Just point and click to allocate, copy and move z/OS files and data sets. This feature makes the product more attractive to younger developers.*
- *The Eclipse-based open source IDE can help **increase productivity** by enabling more relevant information to be readily available. Specialized editors and code generation wizards help to speed development, with code assists for COBOL, PL/I, C/C++, and Visual editors for BMS and MFS maps. Users can even generate COBOL code from UML and IBM DB2® database schema.*

- *Workstation real-time syntax checking can help **reduce host CPU usage**. Fewer COBOL and PL/I program compiles would be required on z/OS since developers can catch their syntax errors on the workstation before compiling it on z/OS. Simplified help with language constructs also helps prevent coding errors.*
- *Integrated business development language can help **reduce training costs and increase productivity**. Rational Developer for System z with EGL provides a business language (EGL) that lowers the skill requirements for Web 2.0 and multi-platform development.*

ISPF versus Eclipse-based development

Traditional mainframe development in the ISPF 3270-based development environment is limited in screen content, requiring multiple screen switching. The lack of productivity aids often means more development effort. Figure 1 shows how tedious it can be to find an error and update the code in this environment.

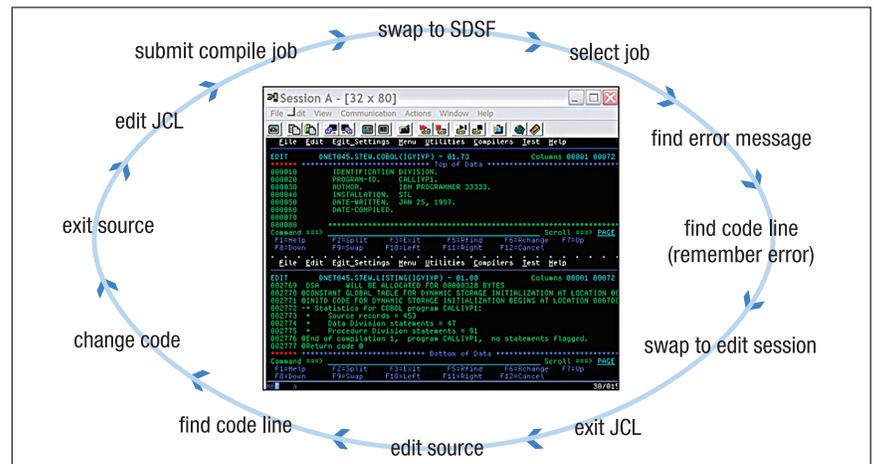


Figure 1: The typical ISPF development flow involves movement between multiple green screens.

However, RDz Eclipse-based development includes capabilities that provide business value. More information is readily available to the developer, while productivity aids simplify and eliminate developer tasks. Local syntax checking eliminates host compile MIPS. Figure 2 shows multiple window views that developers might use to edit their source and understand errors.

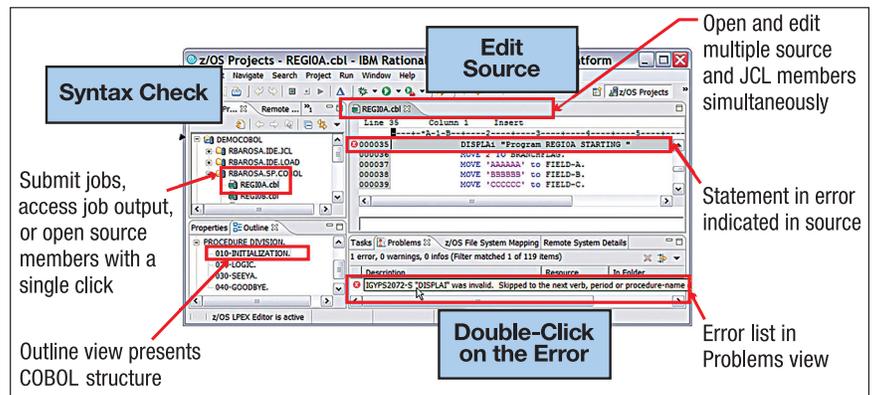


Figure 2: This condensed view of RDz's visual interface for source code development shows how a developer can use a single view to accomplish normal edit and compile steps.

“RDz offers a uniform, open programming environment for both J2EE™ and PL/I developers. RDz accelerates PL/I development with its local syntax checker and debugging tool.”

— KfW Bankengruppe

It is the mix of workstation wizardry and integration into the z/OS development environment that leads to the success of RDz. Several ISVs try to bring the same wizardry into development by off-loading the host development to a client. The side effect is the necessary offloading of resources, as well as the simulation of the z/OS platform and sub-systems. This capability is also within RDz but it is not the major focus. Within just the German-speaking countries of Europe, RDz installations have been integrated into all the major software configuration management (SCM) tools customers are using. This provides an Eclipse-based interface not only to the z/OS tooling but also to the customer's resources, regardless of SCM.

Offerings to drive Web 2.0 development

But how does RDz improve Web 2.0 development? RDz is offered in two package options: RDz with Java™ and RDz with EGL. Both offerings include the traditional mainframe software (COBOL, PL/I, etc.) development tooling for editing, compiling, debugging, building Web services and integrating with other key IBM offerings such as PD Tools. The RDz offering with Java includes Rational Application Developer support for Java EE, JSF, Web 2.0, Visual Designer and more. The RDz offering with EGL includes Rational Business Developer support for EGL, Rich UI, and COBOL generation as well as others. Each packaged offering provides business value:

- *RDz with Java can help **simplify delivery** of modern user interfaces such as JSF and Rich UI (Web 2.0) on top of System z applications. Visual programming speeds the design and coding, with fewer errors. Users can generate code from UML models to speed application development. A common IDE is shared between Java and z/OS developers.*
- *RDz with EGL can help **reduce training costs**. Current business-based developers can use their existing skills. There's no Java coding required, yet it can be deployed as Java.*

Improving Web services development

Rational Developer for System z can help improve Web services development. It generates XML conversion programs, WSDL and other deployment artifacts. This can help reduce developer training costs, increase developer productivity, produce higher quality applications, reduce risk of project delays, and maximize reuse of existing z/OS applications.

Highlights

RDz code generation options depend on what you have to start with:

- *If starting with an existing z/OS program, RDz can generate WSDL (SOA message definition file) and the XML converter based on CICS/IMS program input.*
- *If starting with the program and client WSDL, it can generate the XML converter.*
- *If starting with just the client WSDL, it can generate the XML converter and CICS/IMS code.*

Improve your CICS business services development

The CICS Service Flow feature can help ***optimize application investment***. One can aggregate multiple CICS transactions into reusable CICS business services. Using CICS business services can result in ***reduced network cost and development risk***. Using RDz's Service Flow Modeler to develop CICS business service can also help ***increase productivity***.

IBM Problem Determination Tools for z/OS

IBM PD Tools have powerful functions and features to help practitioners modernize System z applications and transform your System z environment into an SOA infrastructure. The PD Tools offerings include:

- *IBM Debug Tool for z/OS helps examine, monitor and control the execution of application programs.*
- *IBM Fault Analyzer for z/OS helps developers analyze and fix application and system failures. Fault Analyzer gathers information about an application and the surrounding environment at the time of an ABEND.*
- *IBM File Manager for z/OS provides comprehensive, user-friendly tools for working with z/OS data sets, DB2 data, CICS data, or IMS data. These tools include the familiar browse, edit and copy.*

A Swedish bank realizes a 50 percent savings in licensing and maintenance costs when it implements IBM Fault Analyzer and IBM File Manager for z/OS to perform its software management and fault resolution processes.

- *IBM Application Performance Analyzer for z/OS is a non-intrusive performance analyzer that aids developers in design, development and maintenance cycles.*
- *IBM Workload Simulator for z/OS and OS/390® enables you to conduct stress, performance, regression, function and capacity planning tests, while eliminating the need for large amounts of terminal hardware.*
- *IBM Optim™ Move for DB2 offers highly selective data copying capabilities that simplify the complex task of populating test environments, or migrating applications to new or additional environments.*

The first three PD Tools are integrated with RDz. The benefits of this integration are explored in the next section.

The sum is bigger than the parts

Tooling integration using the Eclipse IDE offers **increased productivity** and **higher code quality** using IBM WebSphere® Test Environment, Web Services Explorer, and Data Explorer.

Other integration extends and allows customization of the development experience for additional **productivity, code quality, and risk reduction** with:

- *IBM Rational Transformation Workbench (RTW) Analyzer for Eclipse.*
- *IBM Rational ClearCase®, IBM Rational ClearQuest® and IBM Rational Build Forge® for change, configuration and release management.*
- *IBM Problem Determination Tools for z/OS.*

Looking at the integration of PD Tools with RDz, we can identify business benefits that customers have achieved. These PD Tools products are all-inclusive versus similar products from other vendors. For example, the IBM Fault Analyzer includes WebSphere Application Server (WAS) for System z support while similar analyze/solve ABEND solutions require add-on tooling to support WAS or other runtime environments. In addition, modern user interfaces can help *increase productivity* by making information more readily available.

These integrated PD Tools offer capabilities that facilitate development of *higher quality code*. Using Debug Tool, one can set breakpoints, alter storage values, and step through code to find problems faster. It supports CICS, IMS, DB2, Batch, and end-to-end debugging of composite applications. Using File Manager, we see simplification in creating test data towards improving end-user quality of service. Using Fault Analyzer, we can find code problems (ABENDs) faster and remove errors before they hit production.

RDz on the workstation works with the existing PD Tools on the host—not different versions. RDz accesses the PD Tools function as you would see it on the green screen and exposes and enhances it through the client windows. As seen in Figure 3, it facilitates easy access to all three PD Tools at the same time for an integrated desktop development experience.

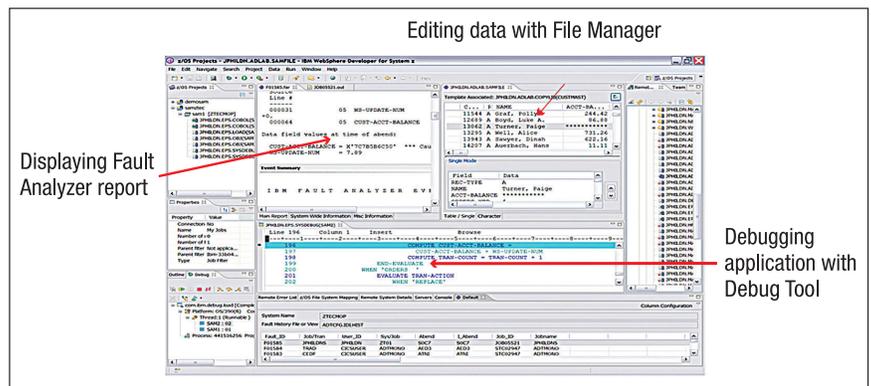


Figure 3: Developers can use a single interface with multiple windows to display a Fault Analyzer report, debug an application with Debug Tool, and edit data with File Manager.

Highlights

HVB IS can now use a similar development environment for COBOL and Web applications. The new environment is helping the organization attract younger developers, while developers currently using Rational Developer for System z are seeing an estimated 15 percent increase in development productivity and 10 percent increase in testing productivity.

Companies realize the benefits

UniCredit Group's HVB Information Services has been HypoVereinsbank's IT service provider since May 2006. With more than 170,000 employees, 40 million customers and 9,000 branches, UniCredit Group is one of the largest financial services organizations in Europe. UniCredit Global IS is the IT provider of UniCredit whereas HVB IS is the IT service provider of HypoVereinsbank. HVB IS serves two major core business segments: application development, and IT operations and services.

HVB IS develops core financial business applications that run on its mainframe platform. This includes IBM System z servers with CICS, DB2, and IMS software, and they are responsible for maintaining legacy COBOL and assembler applications.

HVB IS adopted Rational Developer for System z and PD Tools such as Debug Tool and File Manager to accelerate their mainframe development, improve the efficiency of its COBOL development teams, and move to a similar environment for mainframe and Web development. Another goal was to make mainframe and COBOL development more attractive to younger programmers and new talent. RDz with its Eclipse platform provides an interface that is familiar to younger practitioners.

By adopting RDz and PD Tools, HVB IS could move to a single environment for developing, debugging and testing batch and online applications. This common workbench with integrated tools supports end-to-end development. Almut Geiger, Product Specialist at HVB IS (UniCredit Group) says, "Debugging in particular is much faster. Features like syntax checking, content assist, multiple views and error identification make

Highlights

RACON is 200 percent convinced that people coming out of Universities are totally excited and motivated by the RDz interface. They already know about Eclipse-based tools with debugging, build, file navigation and the zOS environment. They come to work, receive a 30-minute introduction to the tool and environment, and then are able to work. Further training with CICS may be necessary, but the typical developer tasks of editing, building, and testing are already familiar. — Guenther Schollhammer, Host Development Manager at RACON

development easier. For example, when there were coding errors before, a developer had to find the correct line number in the code and then try to determine what was wrong with the code. Now they just click on an icon, and they are led directly to the position of the error.” Debugging is much easier with features that allow programmers to set breakpoints, monitor variable values, and step through the execution of the application.

As Geiger concludes, “Our team now develops, debugs and tests with more confidence, and it is clear that more and more people here will be using Rational Developer for System z.”

Other companies have found similar benefits with RDz and PD Tools in their efforts to consolidate software development environments to better support the organization’s central applications. A large leading financial institution in Germany wanted to modernize its development platform, which involved programming in PL/I and Java environments. Rational Developer for System z, along with IBM System z Debug Tool, helped them develop and test their multi-language applications with just one tool. RDz made it possible to exploit individual designers’ skills more effectively because it allows development within both centralized and decentralized environments. It made end-to-end debugging possible, regardless of the platform.

Another large federal banking group was suffering from low productivity and high development costs with its 200 software designers developing within Java front-end and PL/I backend environments. The bank was able to deploy RDz in combination with Debug Tool to integrate their Java and PL/I environments. This simplified their development environment, thereby improving productivity, reducing costs, and enhancing product quality.

Conclusion

IT development faces challenges to do more with less, yet do it more efficiently, with fewer failures, and with smaller, more geographically diverse and less skilled teams. Enterprise customers realize the benefits of IBM's complete development environment with RDz and PD Tools in attacking these challenges. Viewing your ABENDS, debugging information, source code, and backend data side by side in the same workstation development environment can help improve development productivity, quality and time to market.

Rational Developer for System z is a comprehensive development environment with strong integration value with IBM PD Tools. It can help IT organizations lower solution costs by helping to speed the efficiency of System z development, Web development, and integrated, mixed workload development; improve quality through earlier detection and removal of ABENDs and performance issues; and simplify and facilitate collaboration between developer silos through a single solution across all platforms.



For more information

To learn more about IBM Enterprise Modernization solutions for System z, please contact your IBM sales representative or IBM Business Partner, or visit:

ibm.com/rational/modernization

For more information about IBM Problem Determination Tools, visit:

ibm.com/software/awdtools/deployment

For the executive summary of an independent analyst's perspective of both Rational Developer for System z and IBM Problem Determination Tools,

visit: ftp://ftp.software.ibm.com/software/http/pdtools/PD_Tools_ES_1st-ed_Jan09.pdf

To see demos of RDz with PD Tools, visit:

http://rational.dfw.ibm.com/atdemo/atdemo_rdz_zosad_recorded.html

To quickly try practical scenarios guided by self-paced exercises 24x7 with our free System z sandbox, visit:

ibm.com/developerworks/downloads/emsandbox

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¹ "Cobol: Not Dead Yet," *Computerworld*, October 4, 2006. www.computerworld.com/action/article.do?command=viewArticleBasic&articleId=266156

² "IDC's Analyst firm lowers the IT spending forecast for 2009," CNET, November 12, 2008. news.cnet.com/8301-1001_3-10095258-92.html

³ "Gartner says Changing the Cost Structure of IT Will Become a Business Imperative for Most CIOs," Gartner, October 14, 2008. www.gartner.com/it/page.jsp?id=776812

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Software Group
Route 100
Somers, NY 10589
U.S.A.

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