



The New zEnterprise – A Smarter System For A Smart Planet

Unify Mainframe and Distributed Development

PulseANZ2010

Meet the people who can help
advance your infrastructure





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Fit For Purpose Strategy For zEnterprise Requires Common Development Tools

zEnterprise is a great platform but ... my distributed developers don't talk to my mainframe developers and I have too many sets of tools



Customer

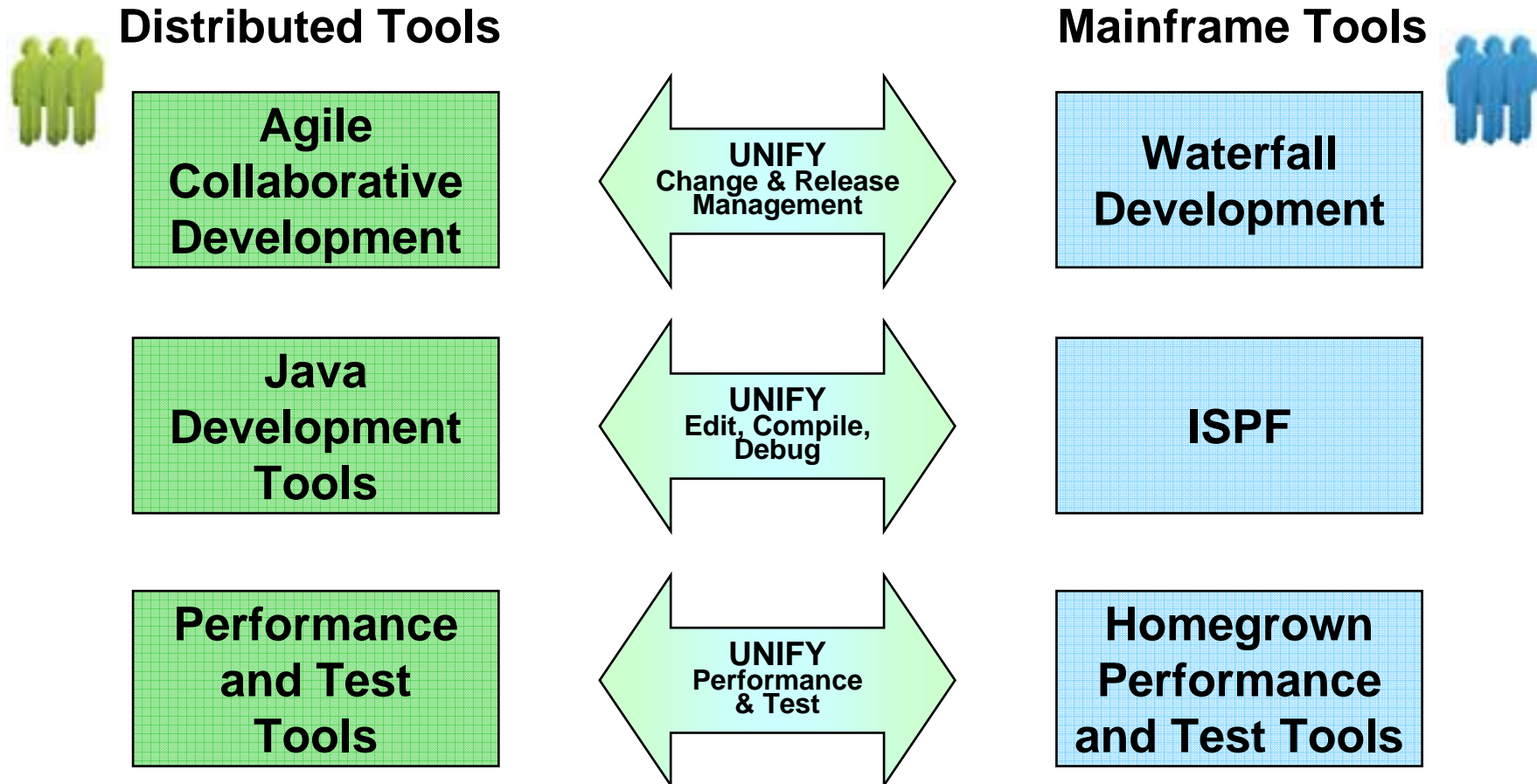
A unified development environment will enable your fit for purpose strategy . . .

And improve collaboration and skills transfer



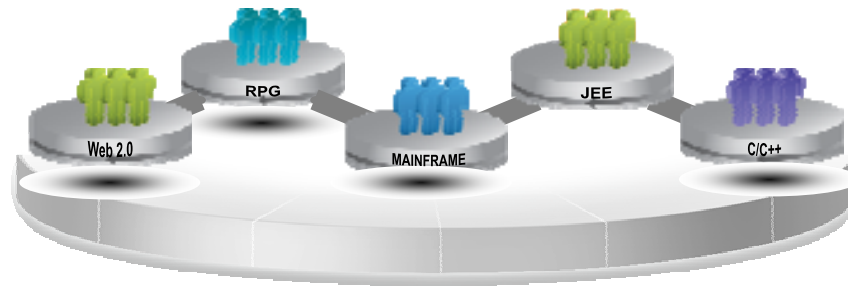
IBM

zEnterprise Combines Mainframe And Distributed Environments In One Platform

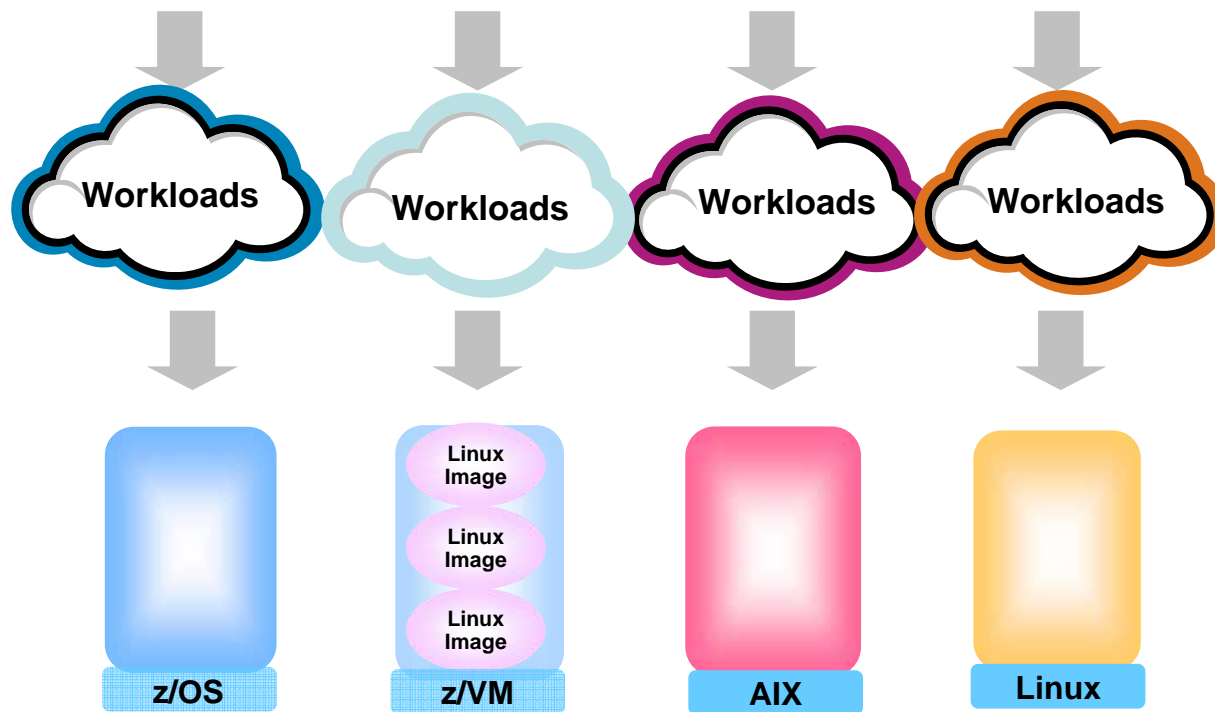


- Common shared tools and processes that look and behave in the same way for all platforms

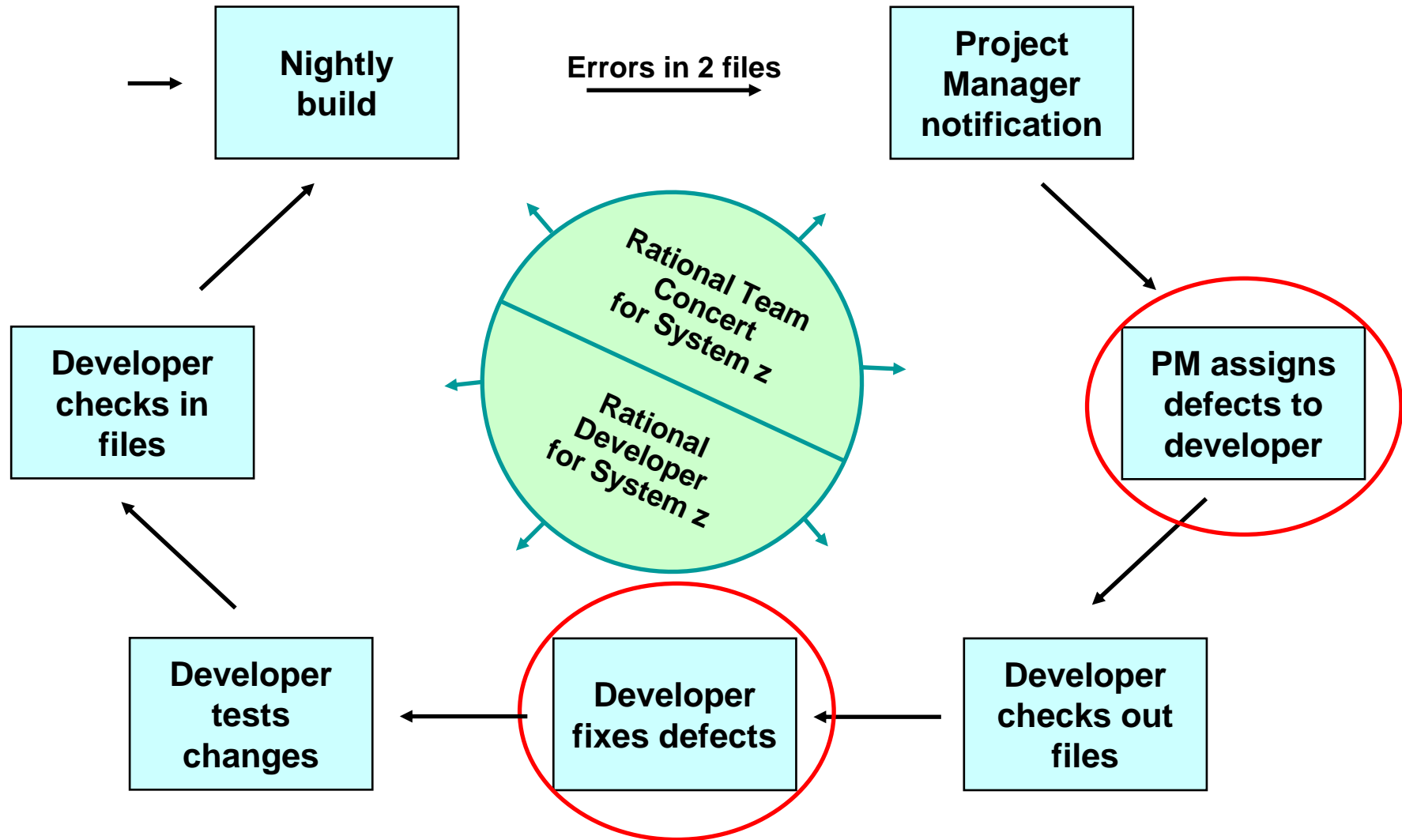
Rational Delivers A Unified Development Tool Set For All These Environments



Unified development processes
Unified edit, compile, debug
Unified test



Demo Scenario With Unified Tools



Unified Change And Release Management

- **Rational Team Concert for System z**

- ▶ Server-based collaboration software for development teams
- ▶ Runs on z/OS, Linux on System z, or distributed servers

- Accessed from Eclipse-based tools or browsers

- ▶ Same tool for z/OS, Linux on System z, AIX, Linux

- Key capabilities

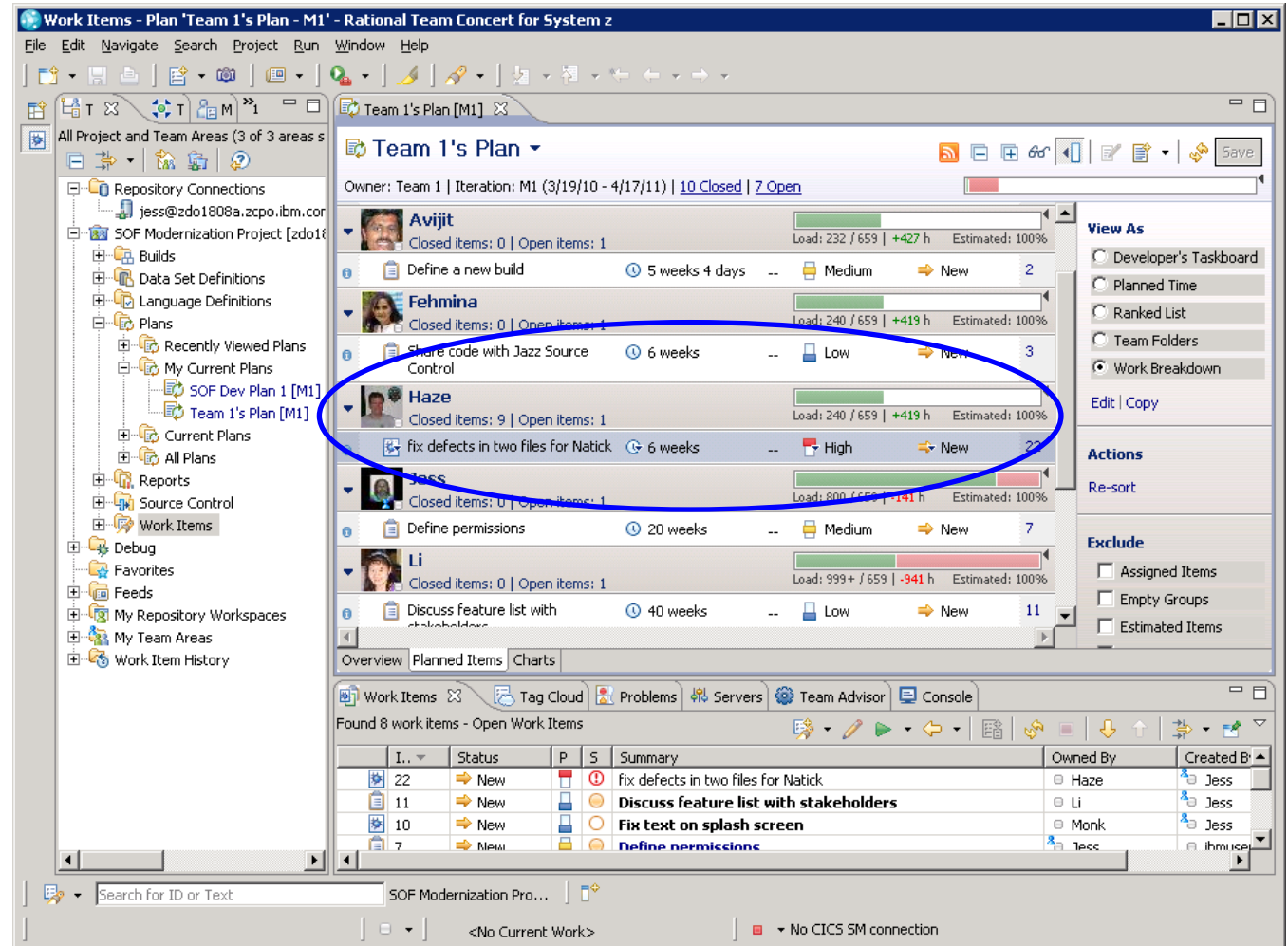
- ▶ Repository for source code control
- ▶ Track change activity with status and visibility
- ▶ Built-in customizable processes
- ▶ Drive builds by activity
- ▶ Process governance

- Unified development tools for all your development teams



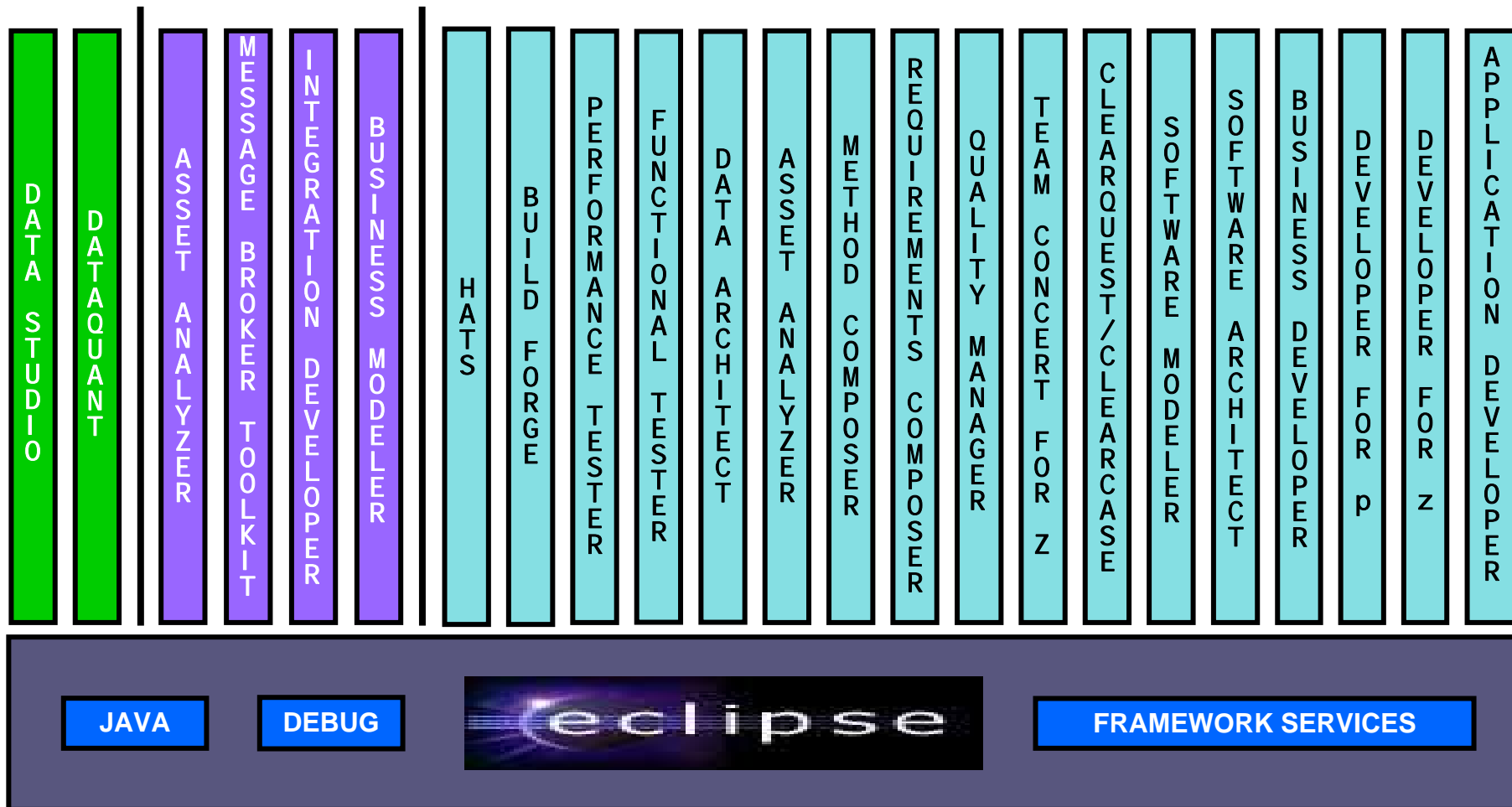
Rational Team Concert For System z

1. In this scenario the Project Manager creates a new Work Item and assigns it to a Developer
2. In the next scenario the Developer will find the newly assigned Work Item and complete it



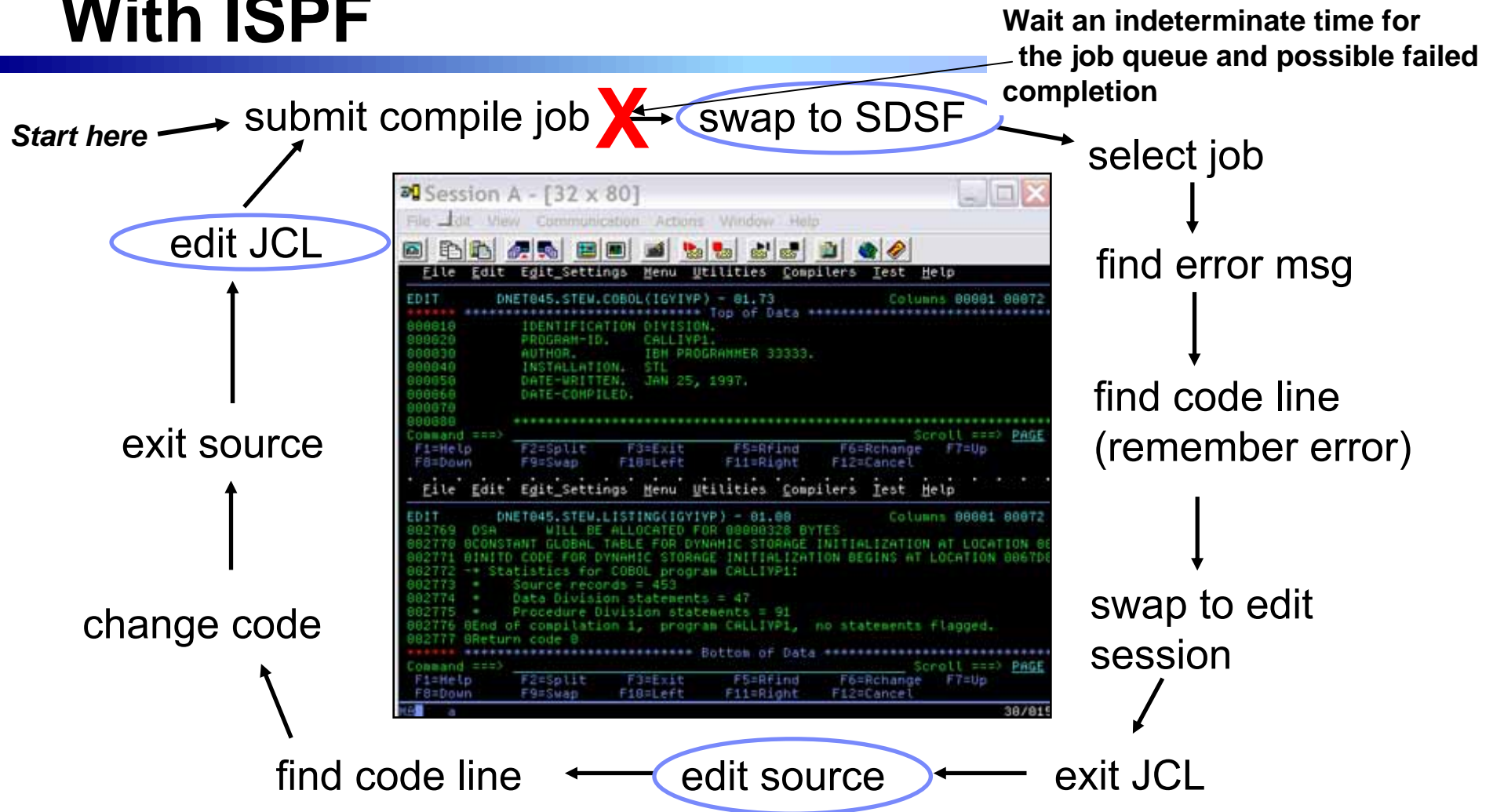
Unified Edit, Compile And Debug Tools

- Rational Team Concert and Developer for System z are built on Eclipse
- Open Source Eclipse framework enforces consistent tool behavior and consistent user interfaces



A subset of tools is shown!

Edit, Compile And Debug With ISPF



- Programmer goes through a sequence of screens in order to get the job done
 - ▶ ISPF 3.4 listings, job listings, SDSF outputs, etc.
- Programmer is constantly flipping back and forth between these ISPF screens
 - ▶ Easy for experienced mainframe programmers but not for newbies

Edit, Compile And Debug With Rational Developer For System z

- **Modern development for System z**

- ▶ Works like other IBM tools for distributed platforms

- **RDz supports development and reuse of Enterprise assets**

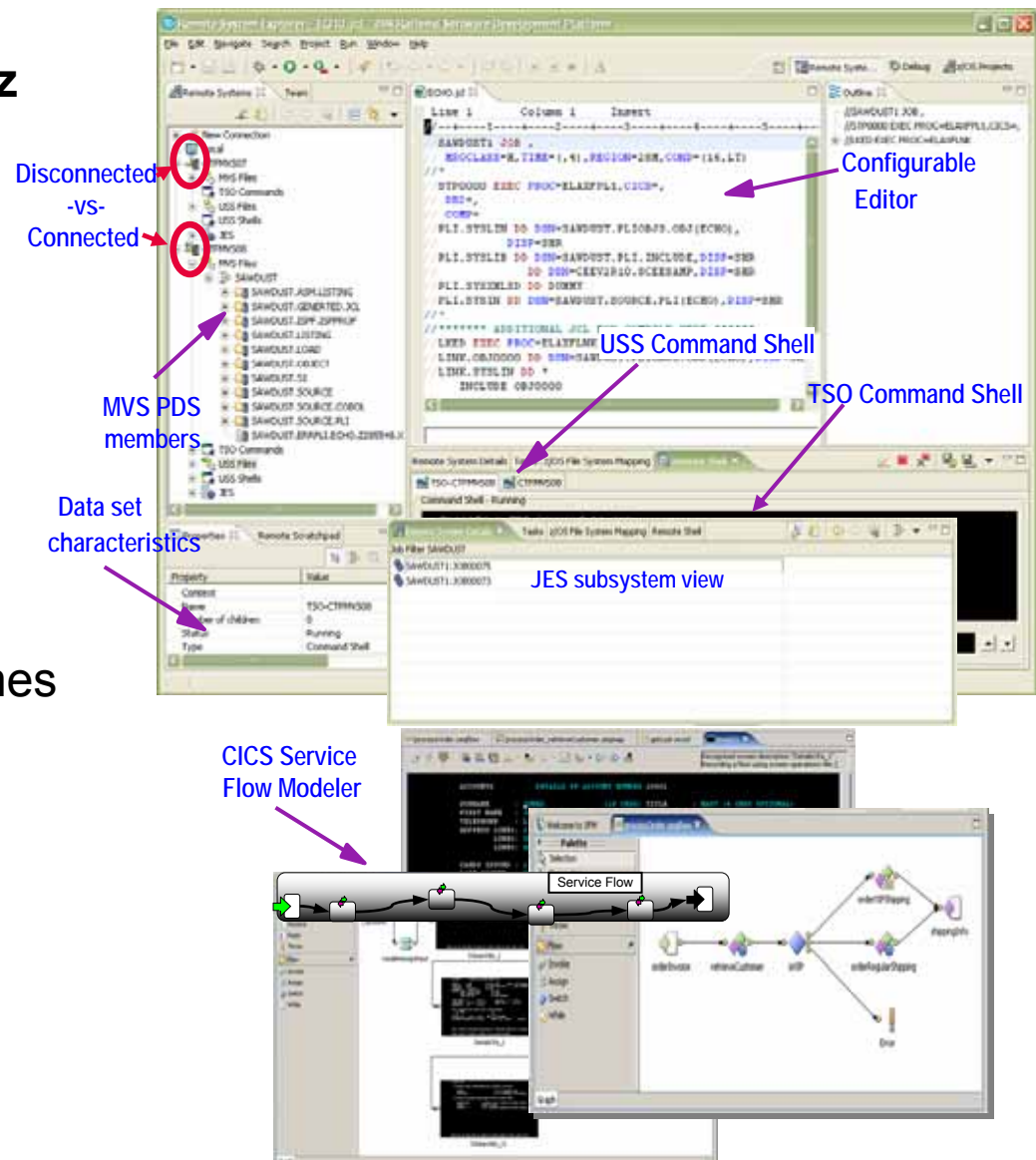
- ▶ Support for COBOL, PL/I, C, C++, HLASM, Java, EGL and Web services

- ▶ Supports existing and new runtimes

- CICS, IMS, Batch, USS, DB2, WAS

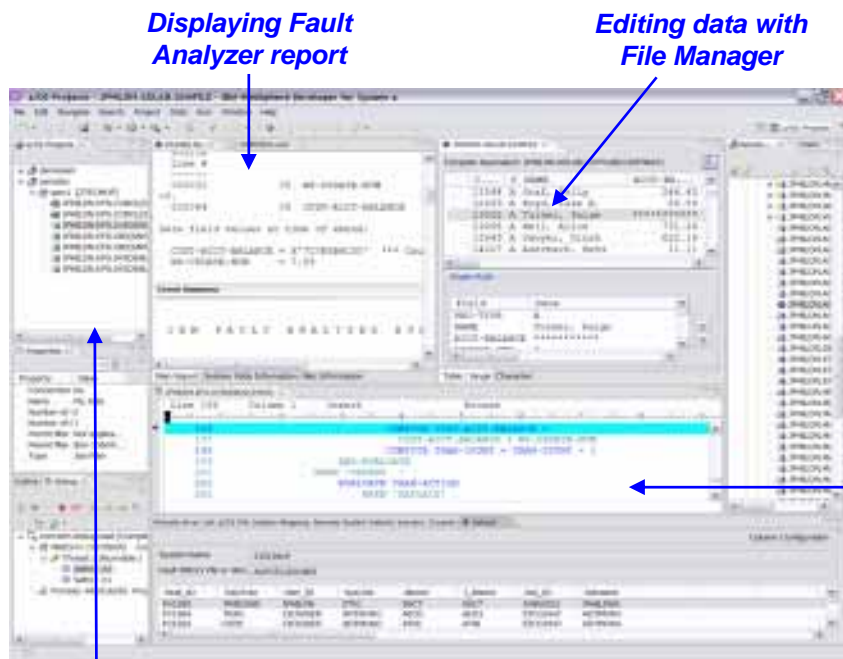
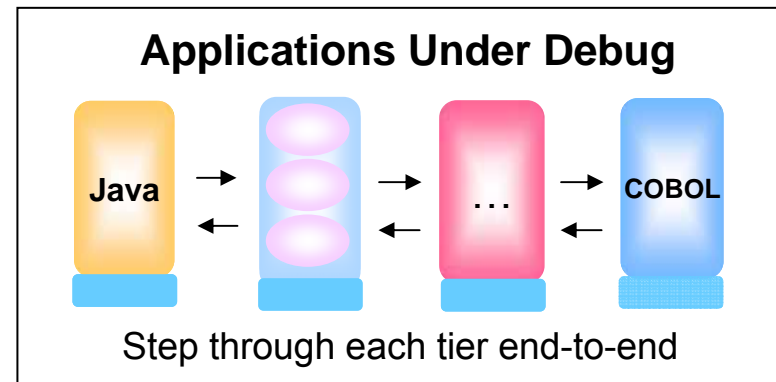
- ▶ Interactive access to z/OS for

- Development, debug, job generation, submission, monitoring, command execution



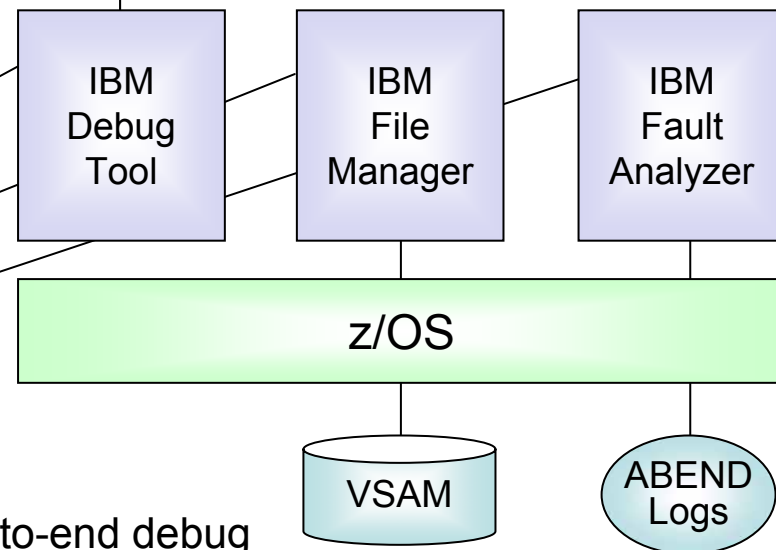
Interactive Problem Determination: RDz Integrates With Host-based Tools

- Work with the PD Tools through the RDz client
- Easy access to all three tools at the same time
- Debug and step through multi-tier applications
 - ▶ Distributed *and* mainframe
 - ▶ Same debugger as for distributed systems



RDz Workstation

Developing System z application with RDz

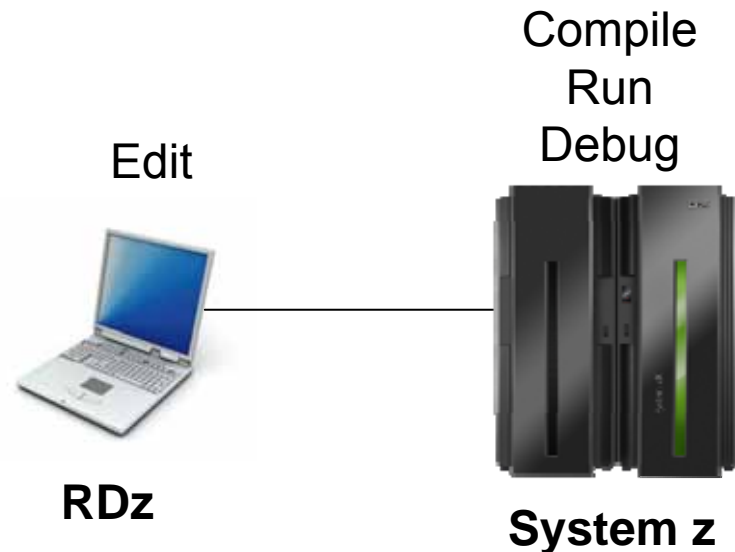


- End-to-end debug
- Edit VSAM data
- Analyze ABEND logs!

DEMO: Work With COBOL And Java Using Rational Developer For System z

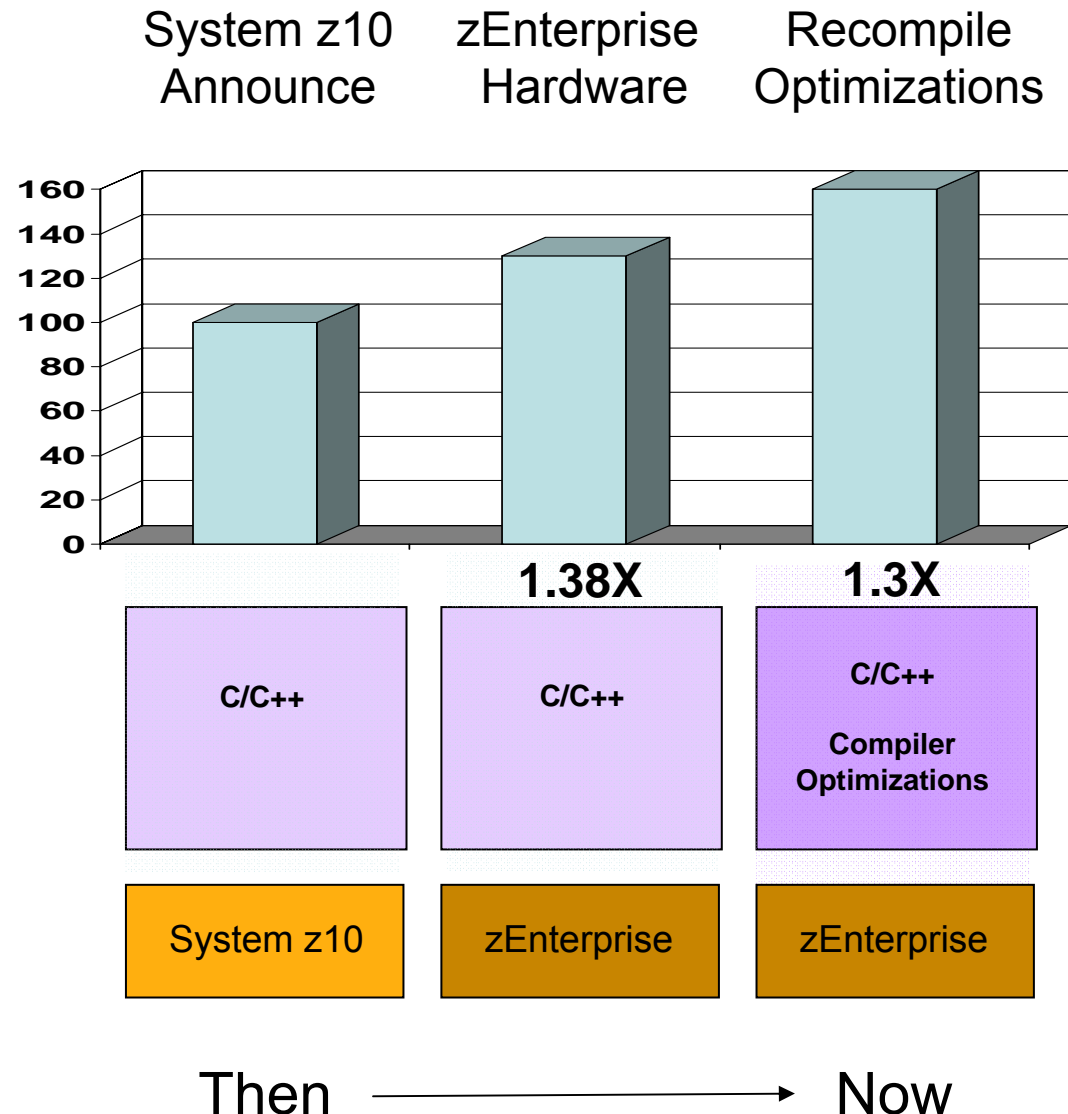
- Perspectives and views
- Remote System Explorer
- Working with host datasets
- Productivity features

- Based on the assigned work item, the Developer will fix the problem code using the language-sensitive COBOL and Java editors



Continued C/C++ Compiler Optimizations For z/OS – From Then To Now

- Continued investment to optimize key software for z/OS environment
 - ▶ Uplevel to zEnterprise hardware produces 1.38 times performance improvement
 - ▶ Recompile C/C++, PL/1 using compiler optimization produces 1.3 times performance improvement
 - ▶ From then to now – almost **1.8** times performance improvement



COBOL And PL/I Compiler Functional Optimizations For z/OS

- COBOL V4.2 (GA 9/2009)
 - ▶ Unicode improvements
 - ▶ High speed XML parsing offloadable to zAAP
 - ▶ Tighter Java integration for batch and transaction processing with end-to-end dynamic debugging in RDz
- PL/I V4.1 (GA 9/2010)
 - ▶ Debug tool support improvements
 - ▶ XML validation using the XML System Service Parser
 - ▶ Leverages the same optimization technology as C/C++ for full zEnterprise processor support

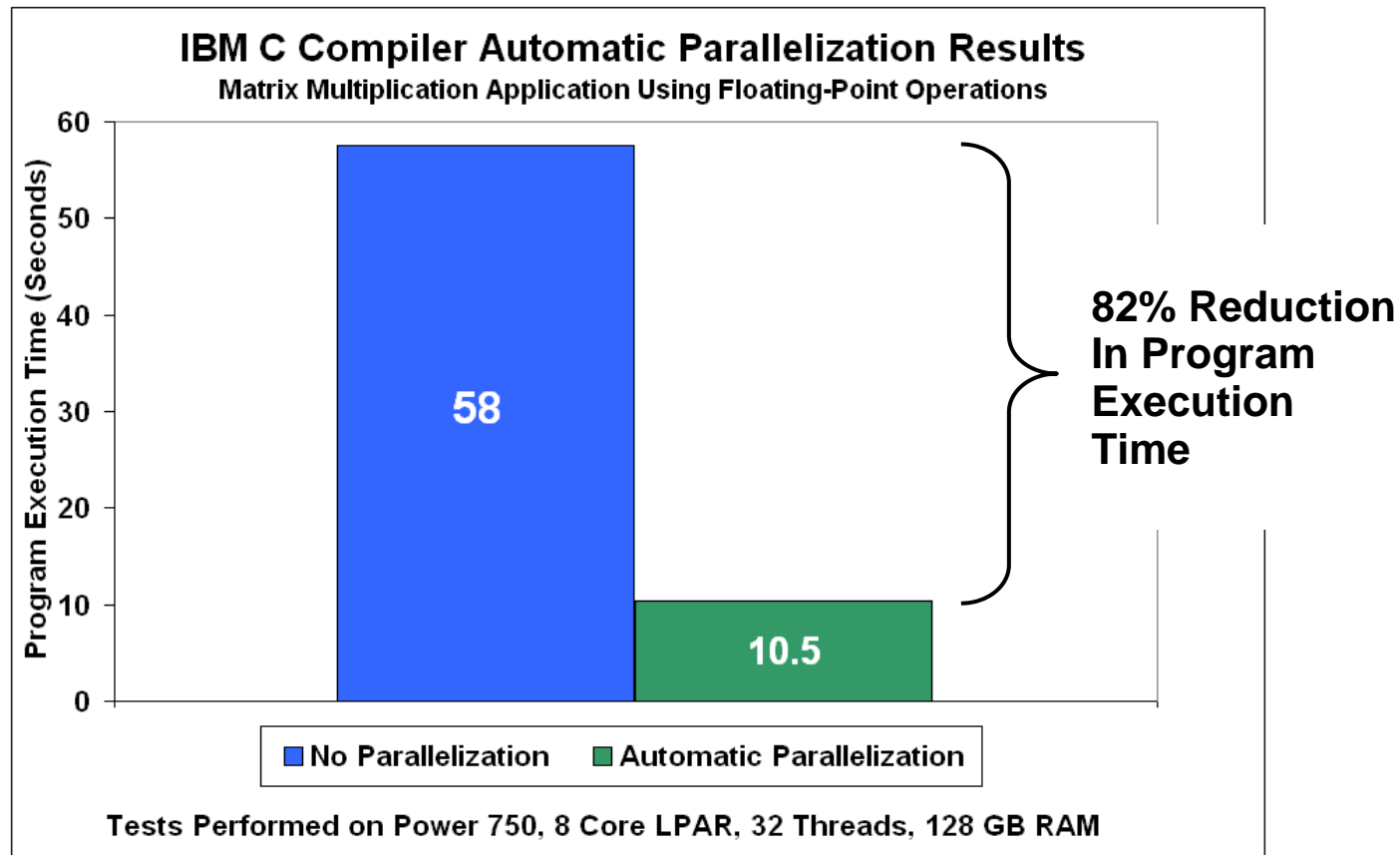
Java Exploits The z196 Processor

- Java 6
 - ▶ Exploits z9 and z10 instructions on zEnterprise
 - ▶ Over 50% performance improvement on SPECjvm
 - ▶ Over 30% performance improvement on both zLinux and z/OS on SPECjbb

Compiler Optimizations For Power Blade On zEnterprise

- **Optimizations** for improving performance (no code changes needed)
 - ▶ Elimination of redundant code
 - ▶ Loop optimization
 - Better loop scheduling
 - High-order loop analysis and transformations
 - ▶ Vectorizes calls to system math functions by calling the equivalent MASS vector functions
 - ▶ Elimination of compile-time memory usage limits
 - ▶ Reorganization or elimination of global data structures
- Parallelization improves performance on multi-core systems
 - ▶ **Automatic parallelization** of iterative program loops (eg. do, while, for, etc.)
 - Iterations are executed concurrently on all available processor cores
 - No code changes needed
 - ▶ **Explicit parallelization** using the OpenMP Application Program Interface Version 3.0 specification
 - Must add API calls

IBM Compiler Automatic Parallelization Improves Scientific Workload Performance On Multi-Core Power Systems Without Code Changes

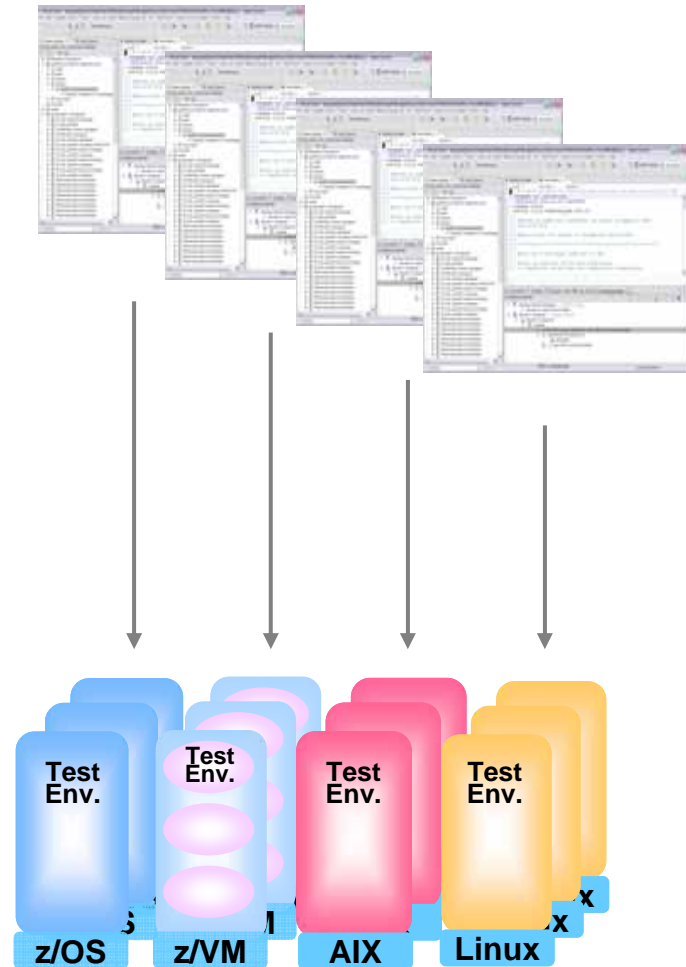


- Automatic parallelization of iterative program loops
- Iterations are executed concurrently on all available processor cores and threads
- No code changes needed

Source: Internal CPO Study

zEnterprise Virtualization Provides Runtimes For Compile And Test In All Environments

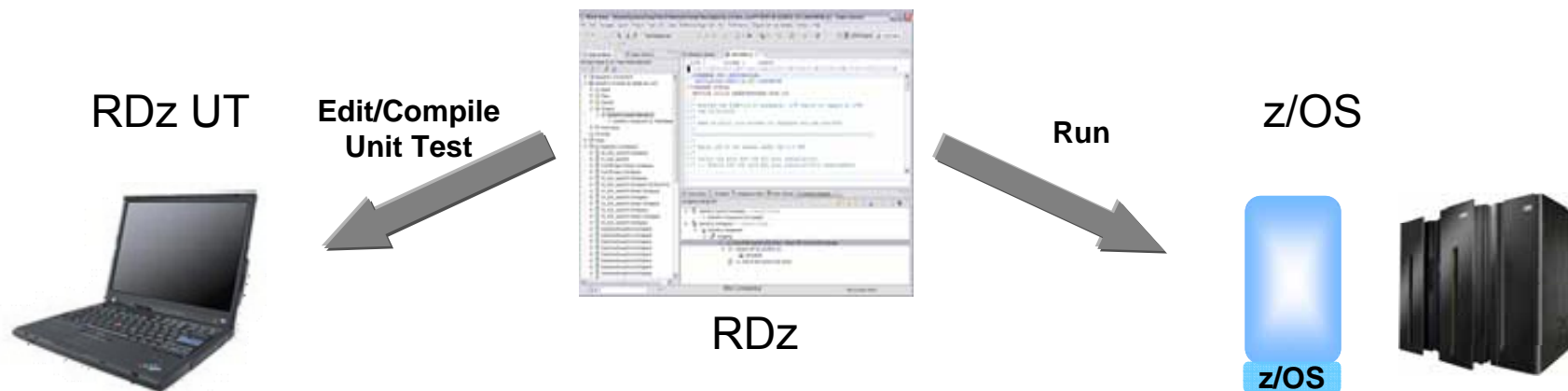
- Virtual machines provisioned for compile and test in each environment
- Special lower cost offerings:
 - ▶ **System z Solution Edition for Application Development**
 - LPAR-based addition of a customized package of hardware, compiler, middleware, and maintenance for 3 years
 - For compile, unit and system test with z/OS
 - ▶ **The Solution Edition for Enterprise Linux**
 - LPAR-based addition of hardware, z/VM, and maintenance for 3 years
 - Can be used for compile, unit and system test with Linux on System z



Unit Test Option for z/OS Applications On The Workstation

Rational Developer for System z Unit Test (RDz UT)

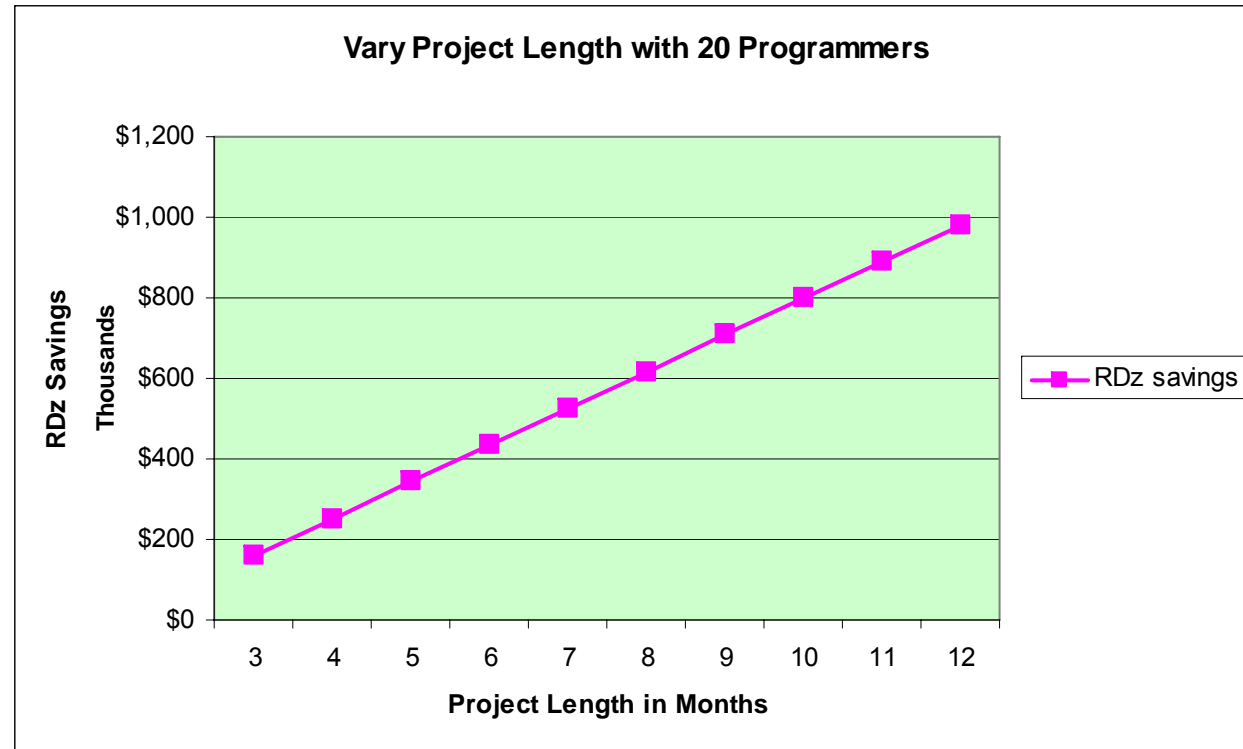
- z/OS runtime environment runs on x86 Linux workstation
 - ▶ **Compile and unit test** on the workstation - no zEnterprise HW needed
 - ▶ Emulates System z general purpose processors, zIIPs, and zAAPs
- Reduce development MIPS for z/OS applications
 - ▶ Lower cost and better productivity
 - ▶ Enable new skills quickly
- Includes compilers, middleware, RDz & RTCz server load modules
- USD \$4k / user license (in addition to \$5,670 for RDz)



Cost Savings Due To RDz Programmer Productivity And CPU Cycle Reductions

Vary project length
for 20 programmers

Months	RDz savings
3	\$160.4k
4	\$251.7k
5	\$342.9k
6	\$434.2k
7	\$525.5k
8	\$616.7k
9	\$708.0k
10	\$799.2k
11	\$890.5k
12	\$981.8k



RDz savings = ISPF cost – RDz cost

Cost Savings Of RDz Over ISPF

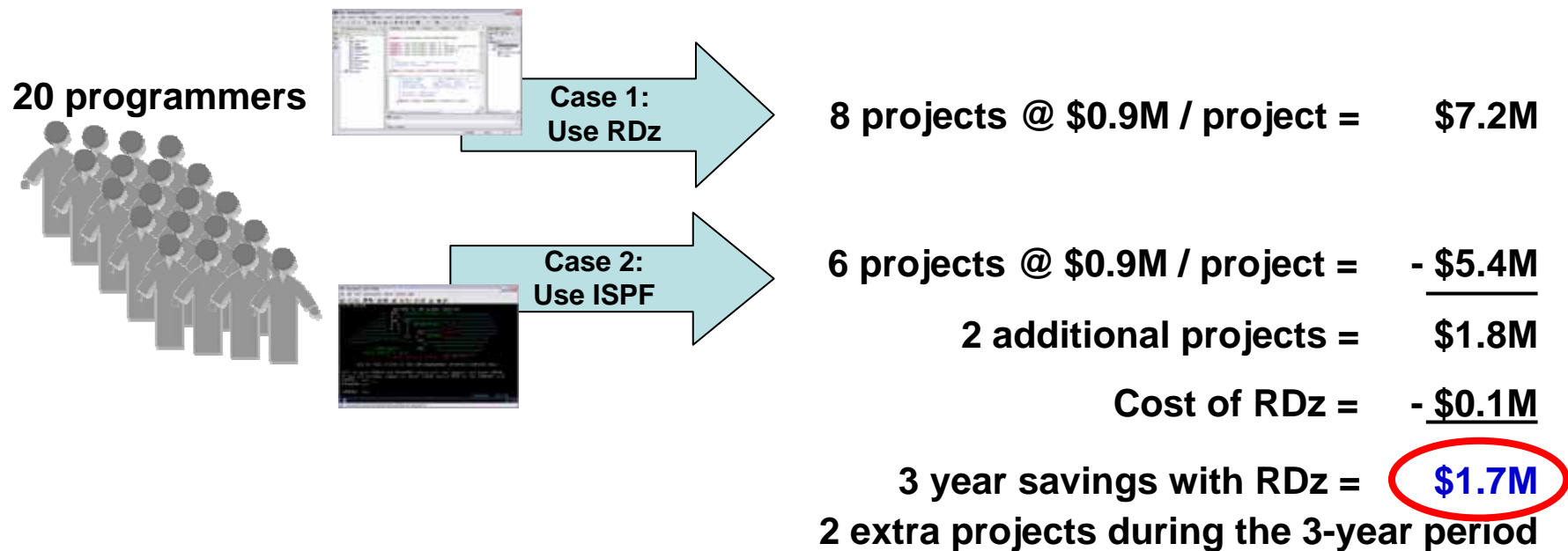
Assumptions table

Factor	Assumed value	Rationale
Number hours in workday:	8	(More than actual programming time)
Cost of a developer MIPS per hour:	\$0.40	Estimate from 2 sources
Cost of a developer's MIPS per day:	\$3.20	
Cost of RDz license:	\$5,670	
Time reduction ISPF to RDz:	30%	For ISPF aces, 1 minus these two used in formulae
MIPS reduction ISPF to RDz:	50%	Per WDz study, at 80% for compiles, adjusted lower for other tasks
Number of programmers:	20	
Annual salary per programmer:	\$120,000.00	Burdened (used \$90k burdened in previous ex.)
MIPS per programmer:	25	# based on SE for AD assumption
Project length in months:	6	Average
Avg. days per month:	30	

3-Year Savings Due To Programmer Efficiency Using RDz Vs. ISPF -- Each On The Solution Edition for AD

Assumptions

- 6 months per project with ISPF
- Programmers paid US \$90k / year
- RDz license US \$5.67k for 20 programmers = \$113.4k
- Cost per ISPF project is \$7.5k/month * 6 months * 20 programmers = \$0.9M
- 33% increase in efficiency with RDz¹
- **6 ISPF projects * 133% efficiency = 7.98 RDz projects, or 8 RDz projects in 3 years**



¹Based on IBM study, [IBM "IDE Efficiency" Study - ISPF versus RDz](#)

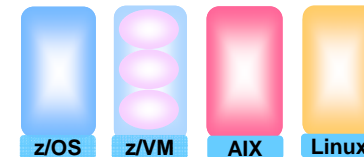
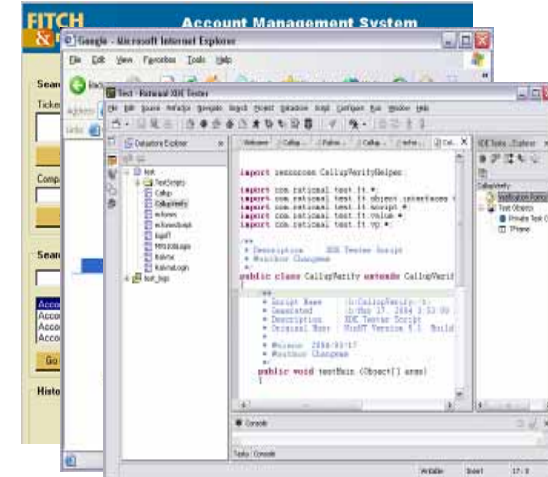
Cost of RDz for 20 is \$113.4k, actual 3-year savings \$1.68M

Unified Testing With Rational Functional Tester And Rational Performance Tester

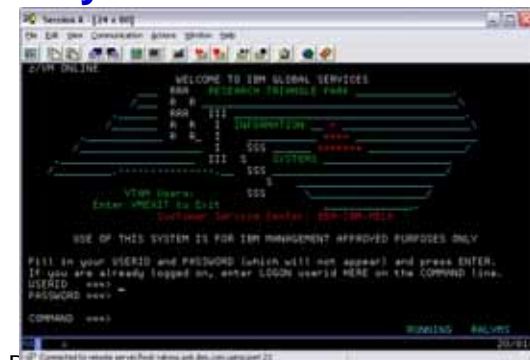
- Eclipse-based tools
- Use **Rational Functional Tester**
 - ▶ Record/Enhance/Execute scripts on Windows/Linux
 - ▶ Functional test any .NET, Web, or Java application (z or non-z)
 - ▶ Use Rational Functional Tester Extension for Terminal-based Applications
- Use **Rational Performance Tester** for z/OS
 - ▶ Develop scripts on Windows or Linux
 - ▶ Execute scripts on z/OS
 - ▶ Performance test any **Web application** (z or non-z)
 - ▶ Use IBM Workload Simulator for z/OS and OS/390 to test terminal-based applications



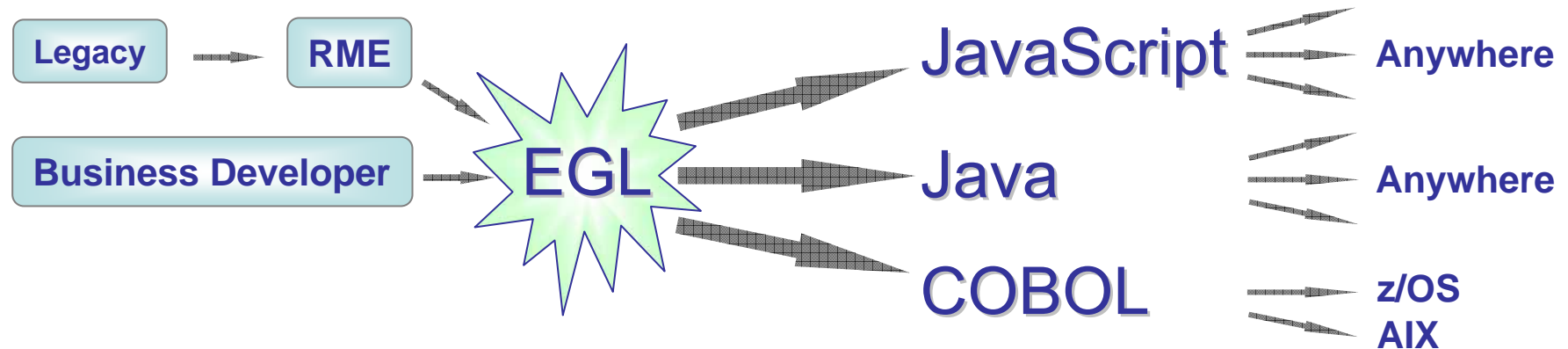
Web and GUI Applications



System z Terminal UI



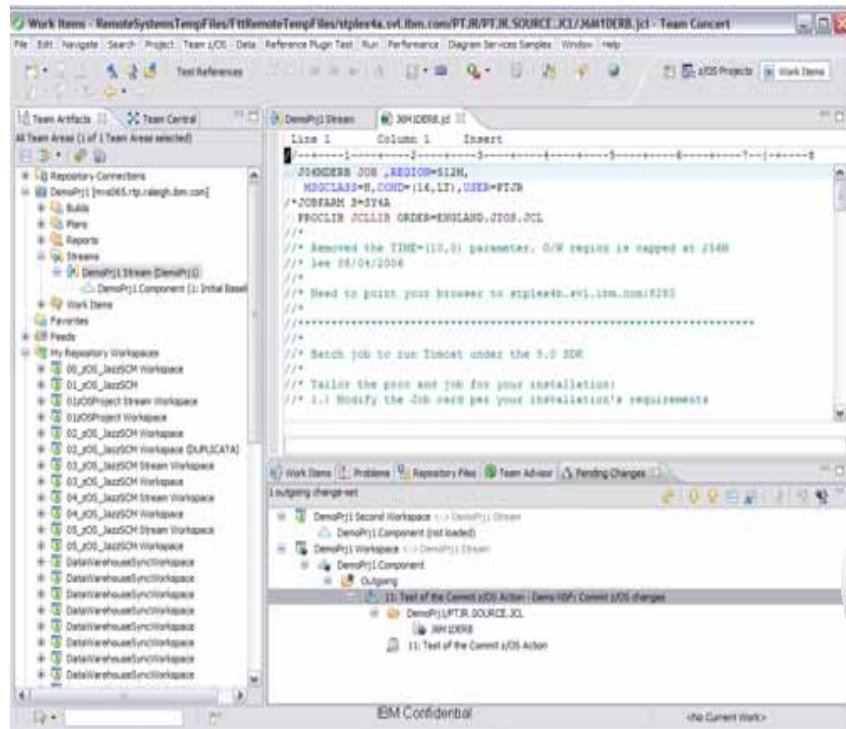
Enterprise Generation Language (EGL)



Enterprise Generation Language

- 4th generation business language
- Deploy everywhere based on best fit for purpose
- **Rational Business Developer** (RBD) and RDz and RDp
 - ▶ EGL development tools for System z and Power Systems
 - ▶ For Business Developers
 - ▶ Tools for Web, Web Services, & Web 2.0 designers and developers
- **Rational Migration Extensions (RME)** provide on average over 95% automated migration to EGL from legacy Synon RPG and COBOL, CA Cool:Gen, Natural Adabas, and green screens

One Set Of Software Delivery Tools For All Developers on zEnterprise



- Same look and feel
- Same UI concepts
- Modern productivity accelerators
- Lower the threshold for newer mainframe developers to be productive

