The New zEnterprise – A Smarter System For A Smart Planet

Unify Mainframe And Distributed Development

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 they use different tools

Development Manager

A unified development environment will get everyone on the same page. . .

And improve collaboration and skills transfer

IBM

zEnterprise Combines Mainframe And Distributed Environments In One Platform

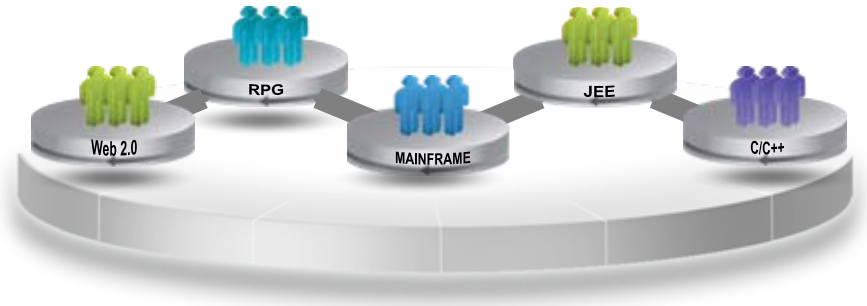
Distributed Teams

Mainframe Teams

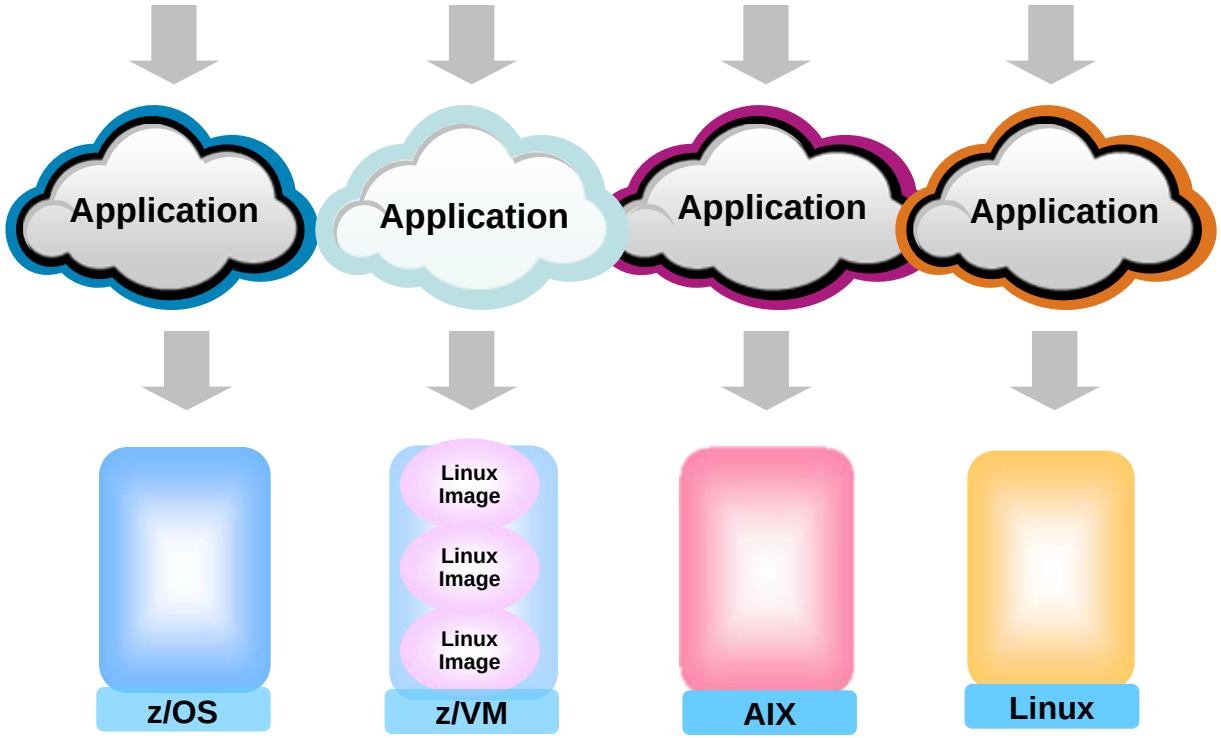
Agile Collaborative Development	**UNIFY** Development Process Management	**Waterfall Development**
Java Development Tools	**UNIFY** Edit, Compile, Debug	**ISPF**
Ad Hoc Testing	**UNIFY** Performance & Test	**Quality Assurance**

Common processes and shared tools that look and behave 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

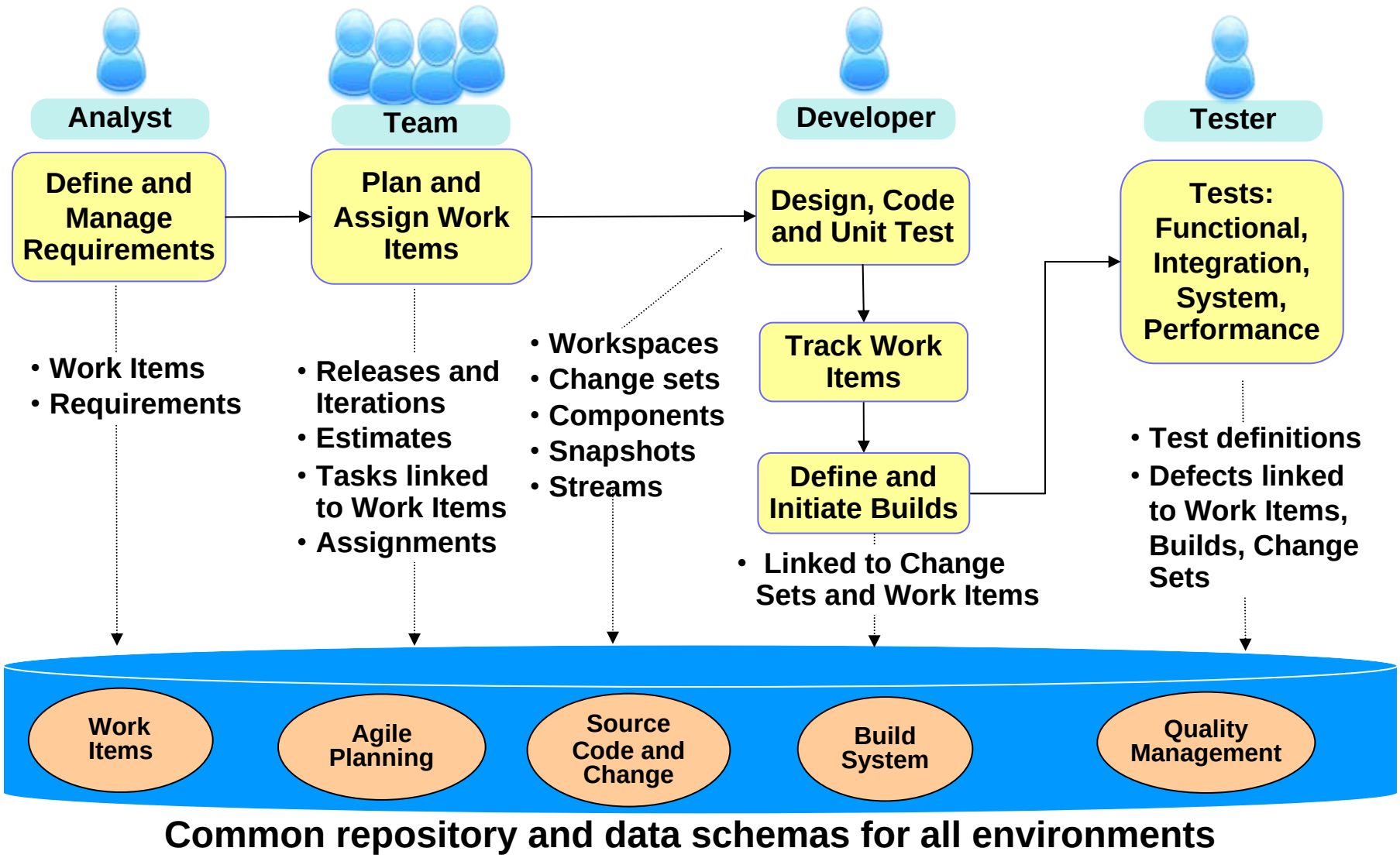


Best fit deployment

Rational Unified Development Tools For zEnterprise

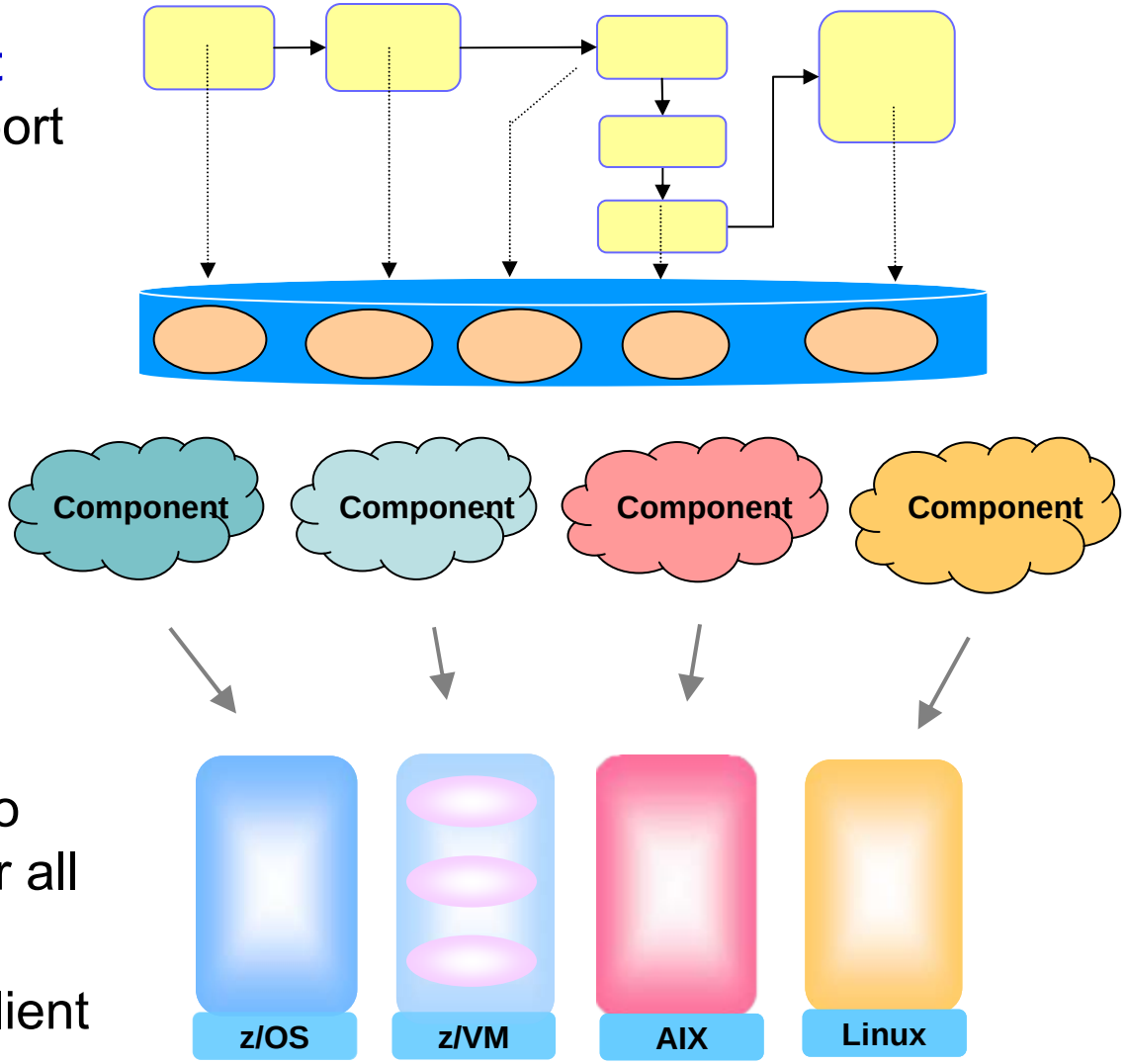
- **Consistent processes for change and release management**
  - Rational Team Concert For System z
  - Same process for each component in a hybrid application
- **Consistent edit/compile/debug tools**
  - Rational Eclipse plug-ins for all environments
  - IBM compilers optimized for System z and Power environments
  - Reduce cost, enhance productivity, and encourage skills transfer
- **Common test tools**
  - Rational Functional Tester and Performance Tester
  - Rational Quality Manager
  - Enable test case reuse and skills consolidation
- **Special features to enhance development for z/OS and Linux on System z**
  - Rational Developer For System z Unit Test
  - System z Solution Edition for Application Development (z/OS)
  - Enterprise Linux Server (Linux on System z)
  - Reduce cost of development for z196 environments

Rational Team Concert Supports Agile Development Processes

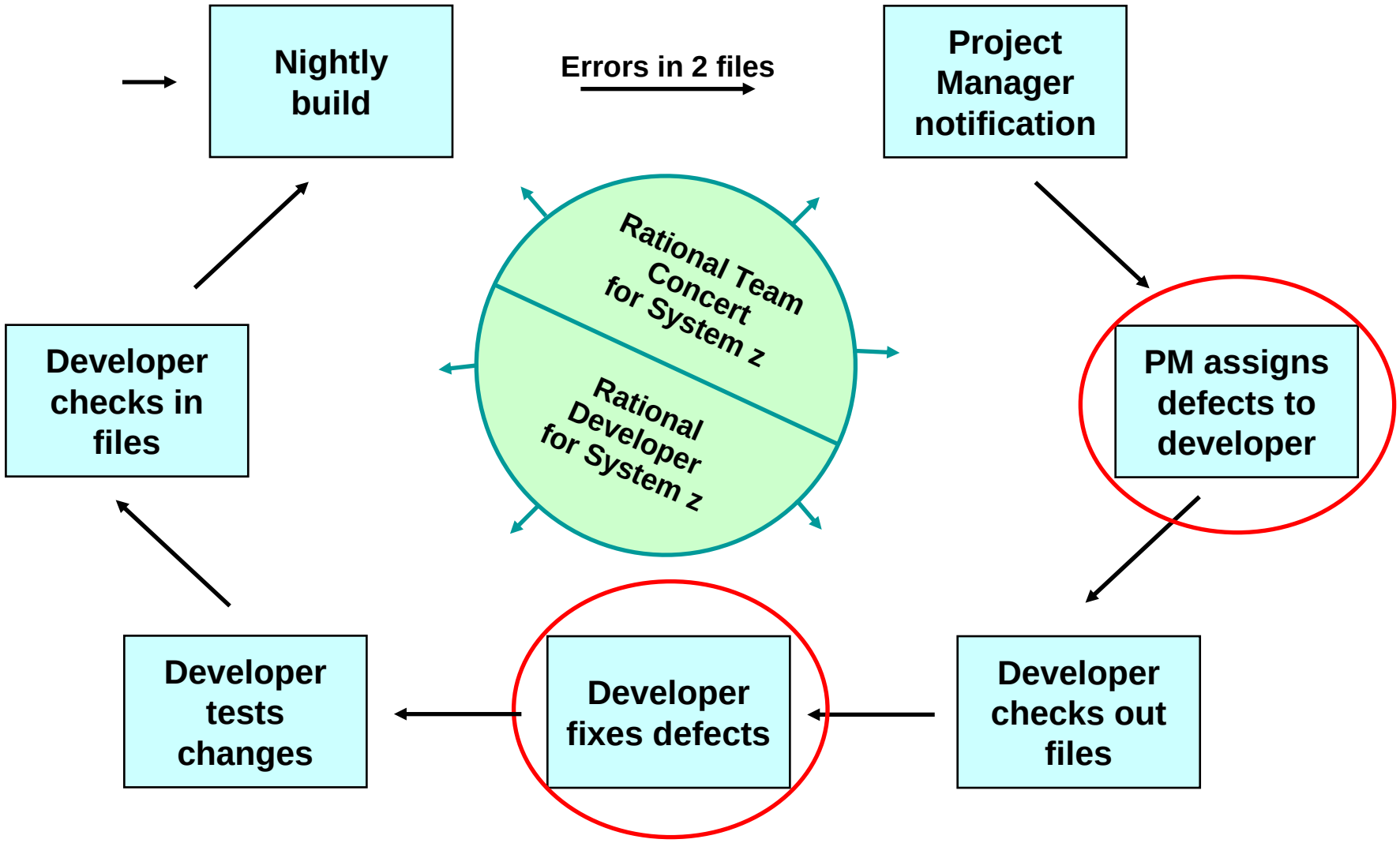


Unified Development Process Management For All Your Development Teams

- **Rational Team Concert for System z** team support
  - Team Processes
  - Project tracking
  - Collaboration
  - Repository
- Same tool for
  - z/OS
  - Linux
  - AIX
- A single User Interface to manage development for all environments
  - Browser or Eclipse client



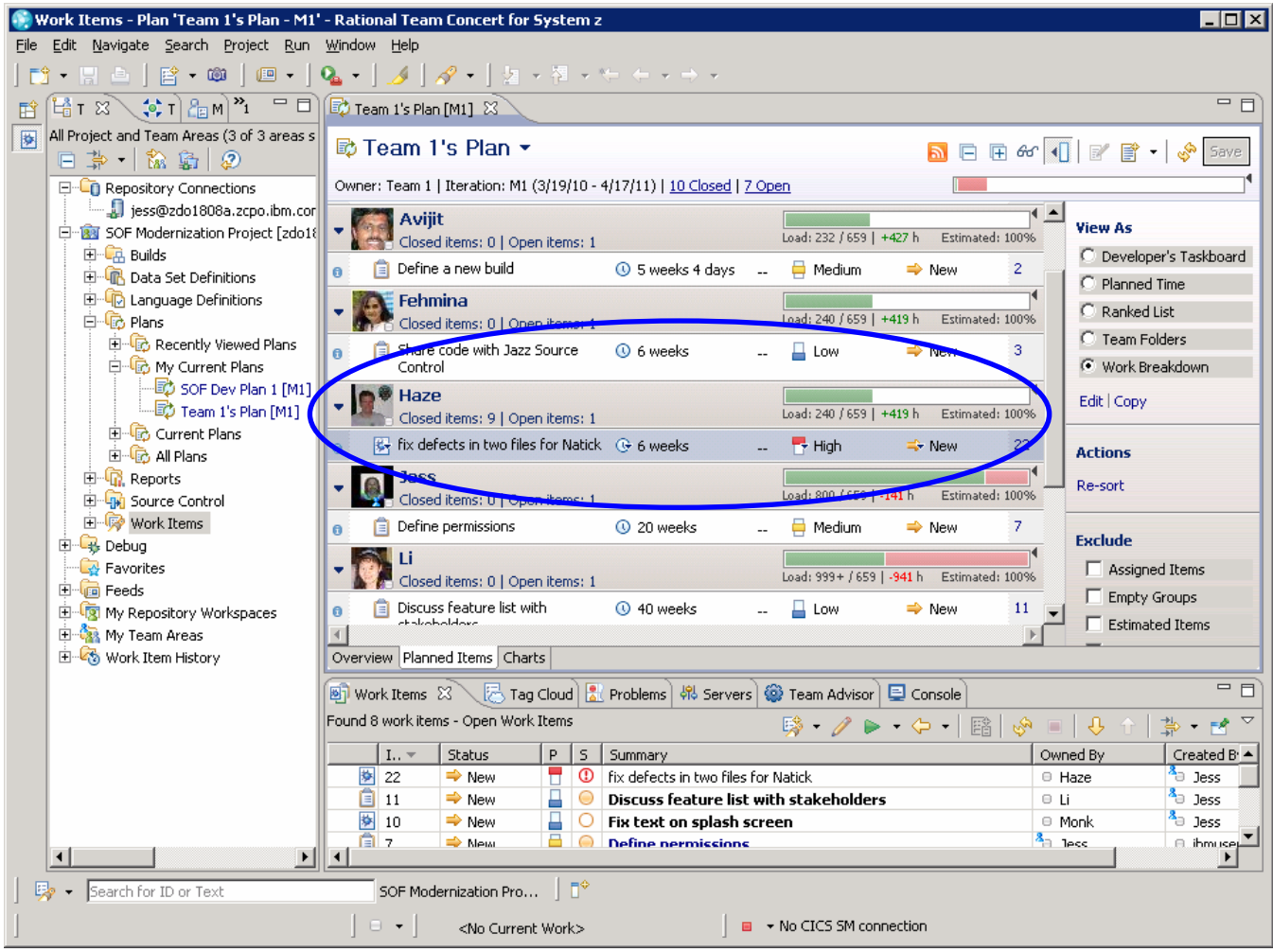
Demonstration Scenario



DEMO: Rational Team Concert For System z

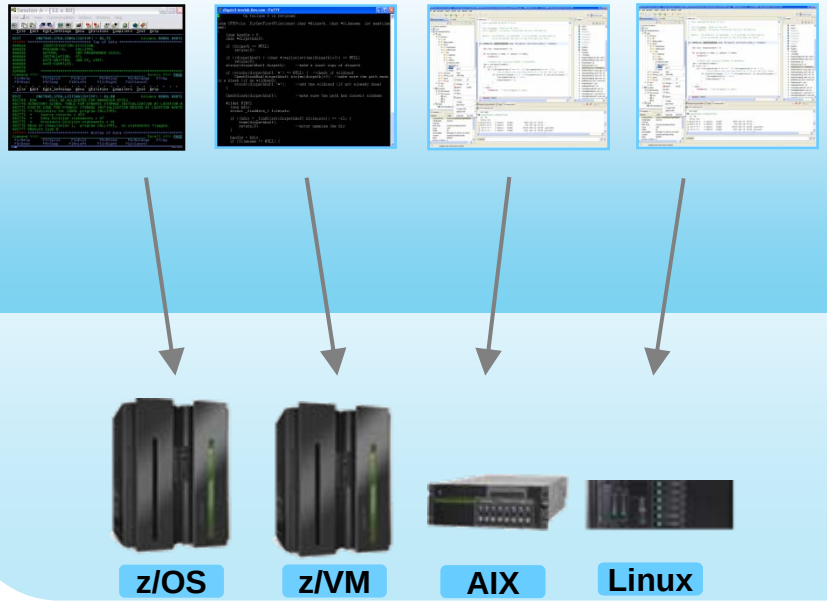
1. In this demo the Project Manager will create a new Work Item and assign it to a Developer

2. In the next demo the Developer will find the newly assigned Work Item and complete it



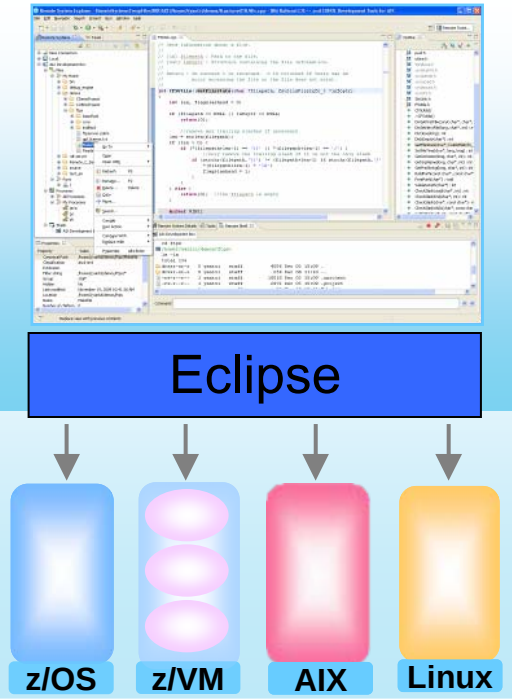
Rational Developer Tools For zEnterprise

Before…



- Separate tools for each platform
- Green screen/command-line editors
- GUI editors

Rational Developer Tools

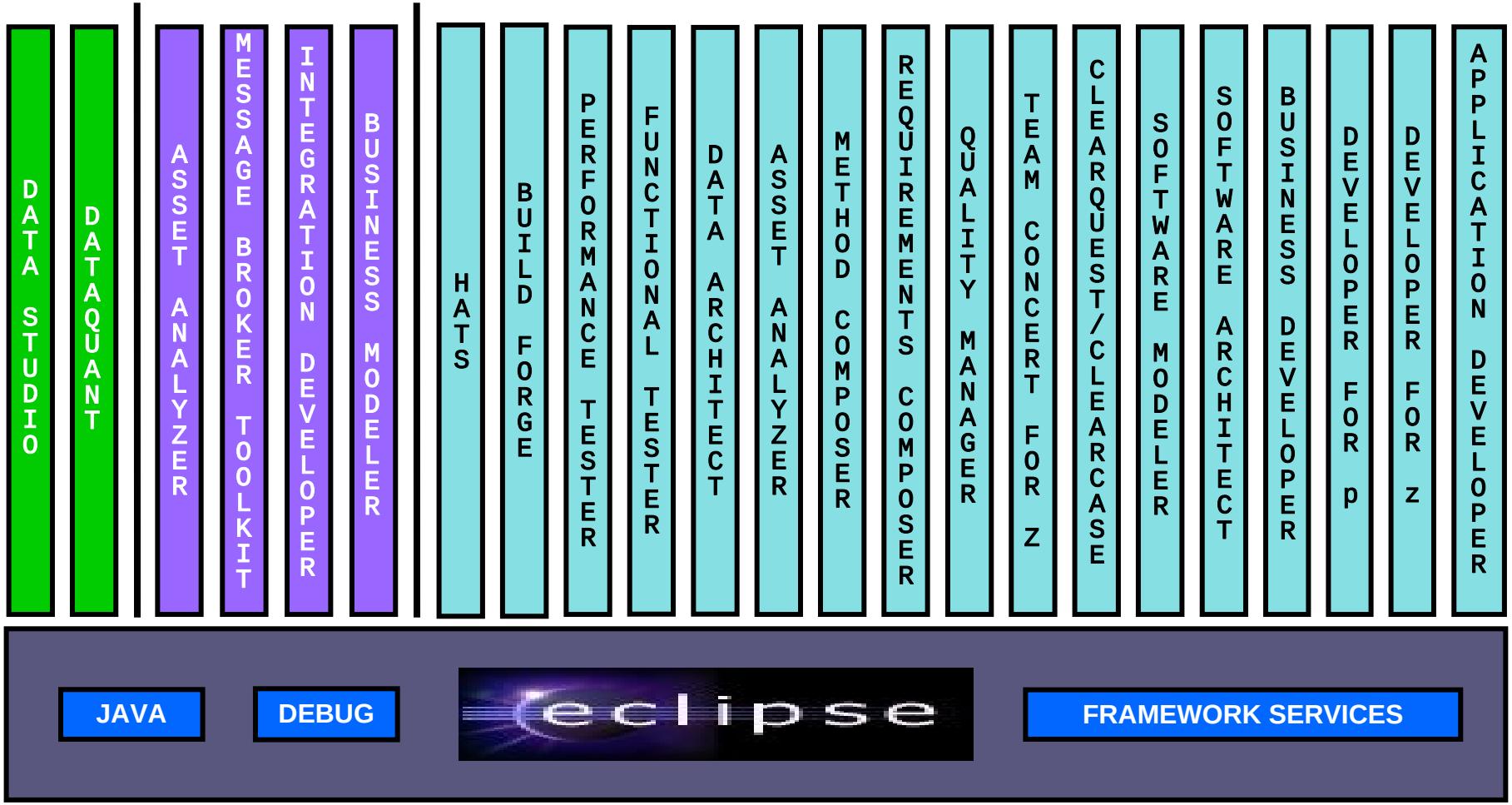


- Eclipse-based IDEs with modern GUI
- Plug-ins support all environments
- 30% or more improvement in developer productivity[1]

[1]Based on IBM customer study, *"Making a Business Case for IBM Rational Developer for z"*

Eclipse Plug In Framework

- Rational Edit, Compile, and Debug tools are built on Eclipse
- Open Source Eclipse framework enforces consistent tool behavior and consistent user interfaces

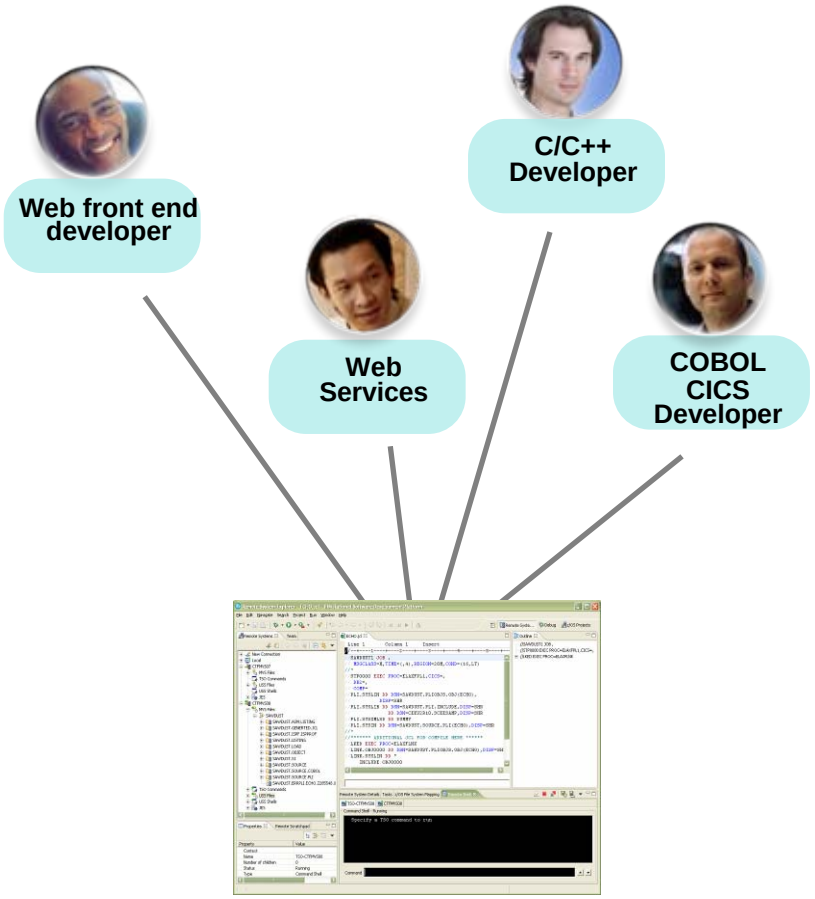


A *subset* of tools is shown!

Rational Developer For zEnterprise Family Of Products

The IBM Rational Developer Family of products includes integrated development tools for the major development workloads on z/OS, Linux on System z, AIX, and Linux

- Rational Application Developer (RAD)
  - Develop Java, JEE, and JavaScript
  - Tools for Web, Web Services, and Web 2.0 designers and developers
  - WebSphere Application Server Test Environment
- Rational Developer for System z (RDz)
  - Develop traditional C/C++, COBOL, HLASM, CICS, and IMS applications
  - Tools for Web, Web Services, and SOA designers and developers
  - Provides remote file system access and includes C Developer Tools (CDT) for Linux
  - Can include RAD
- Rational Developer for Power Systems Software (RDp)
  - C/C++, COBOL and Fortran development tools for AIX
  - Can include RAD



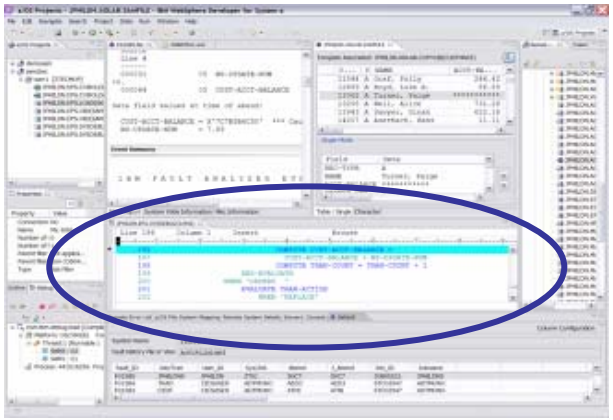
Rational Developer For zEnterprise Family Of Products

Plug-in:	RAD 7.6	RDz 7.6	RDp 7.6
Based on Eclipse 3.4	X	X	X
Installation Manager install and updates	X	X	X
Cheatsheets, tutorials, samples, content assist	X	X	X
Java development tools (JDT) - non-JEE	X	X	X
JEE development tools	X	X	X
JEE Web development tools	X	X	X
WAS test environment	X	X	X
Portal development tools	X	X	X
Data tools (database connectivity, SQL, etc.)	X	X	X
WAS Feature Pack for Web 2.0 (Dojo, ReST adapter for JEE apps)	X	X	X
Rational Team Concert client	X	X	X
XML development tools	X	X	X
Code Quality, Testing and Deployment tools		X	X
EGL tools: Web 2.0 Rich UI, Java, Java Web application (AIX), COBOL (zNext) generators		X	X
Editors/debuggers for C/C++ (z/OS), COBOL (z/OS), PL/I, HLASM, JCL		X	
Eclipse CDT editor/debugger for C/C++ (Linux on System z, Linux)		X	
Editors/debuggers for C/C++ (AIX), COBOL (AIX), FORTRAN (AIX), Assembler development tools			X

Debug zEnterprise Applications From The Workstation

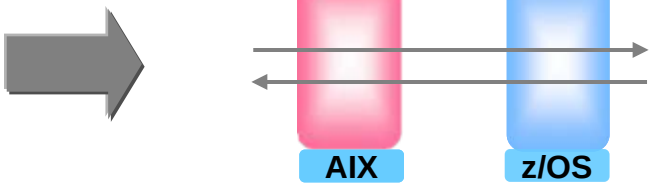
- Debuggers built on the common Eclipse framework enable
  - Debug step across languages
  - Debug step across environments
- Collaborative debugging when integrated with RTC

Work with code in the debugger here



Workstation-based
RAD, RDz, RDp

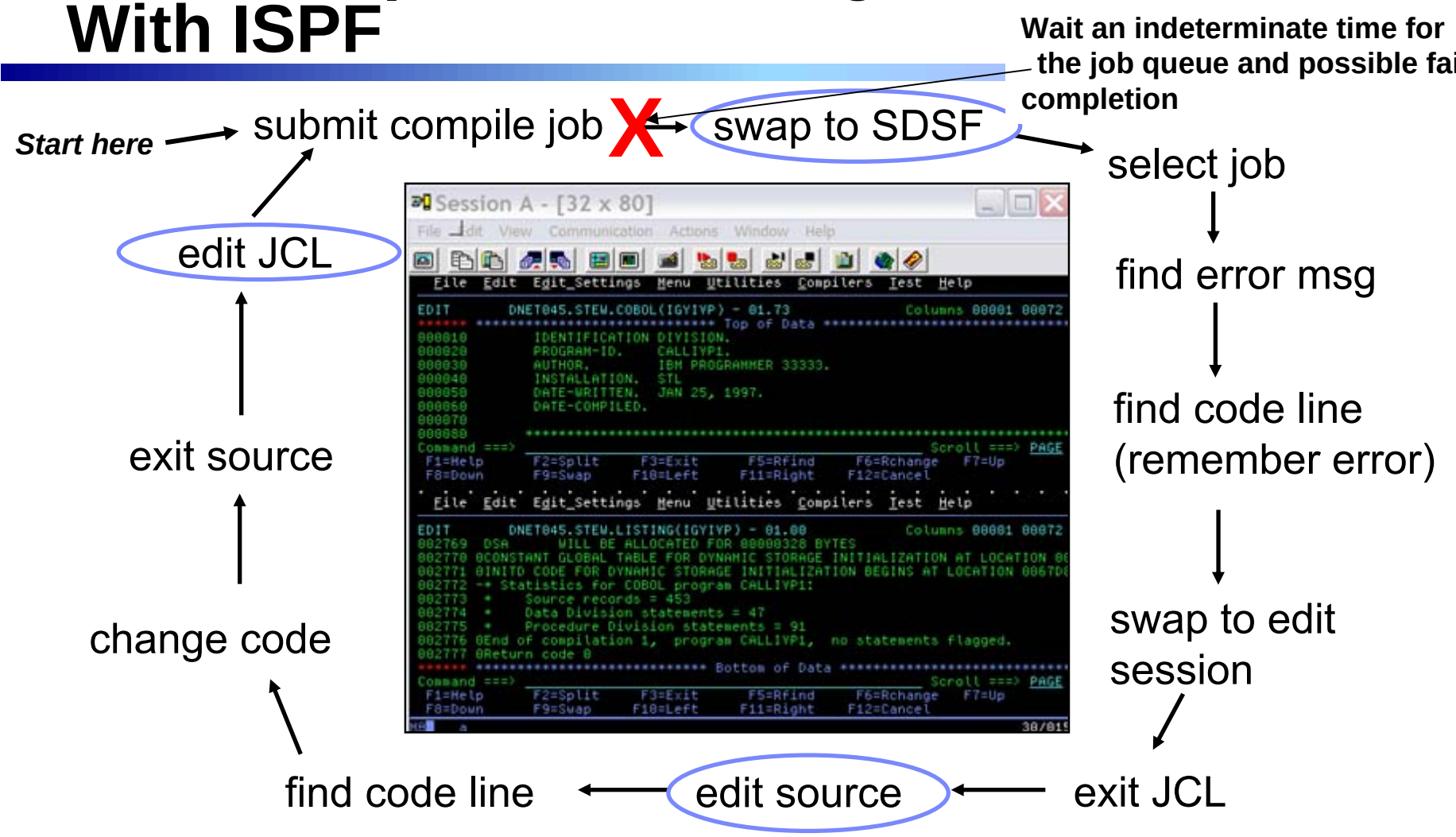
Debug applications running here



Java
Web
front
end

CICS
COBOL
back
end

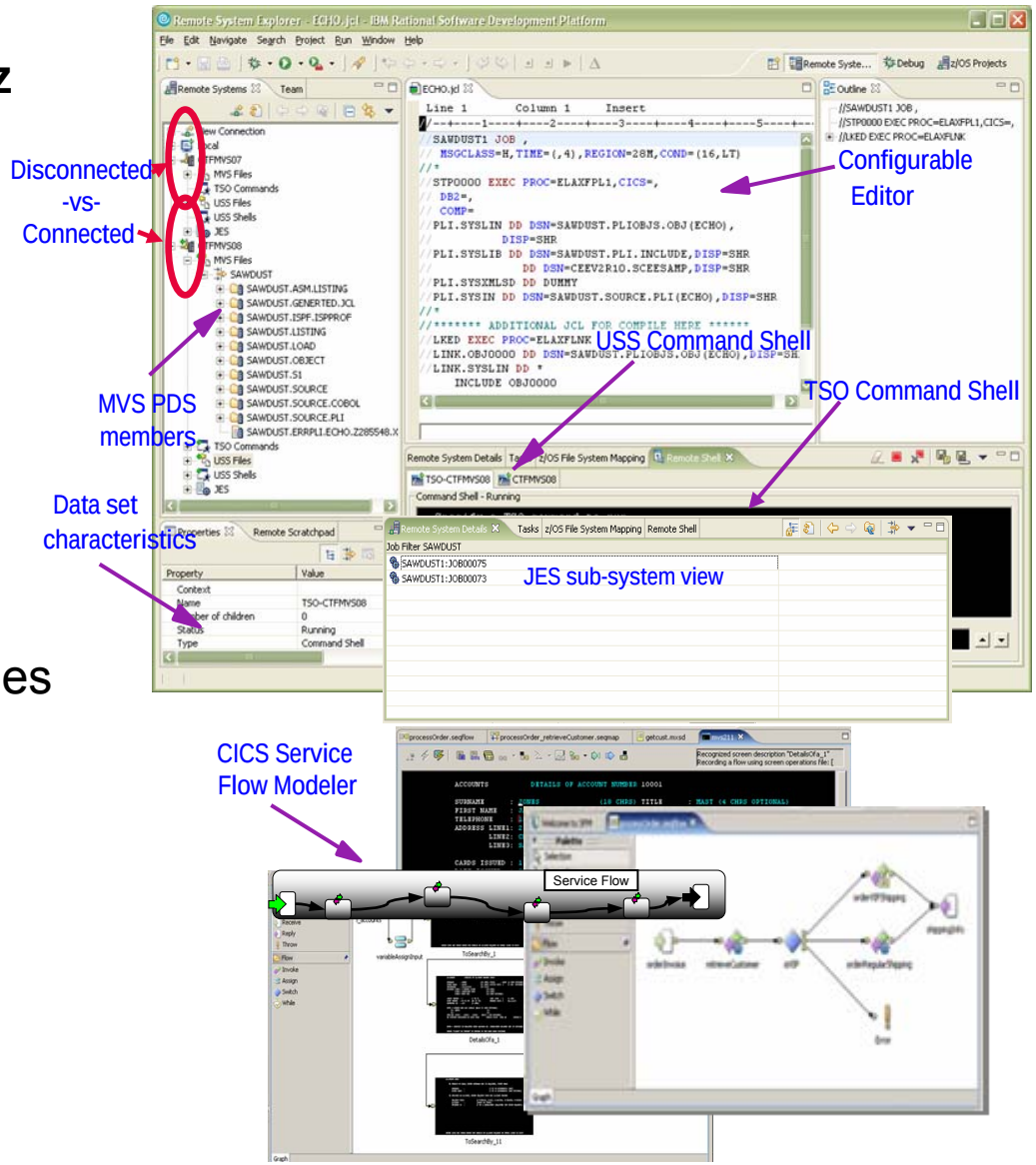
Edit, Compile And Debug With ISPF



- 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

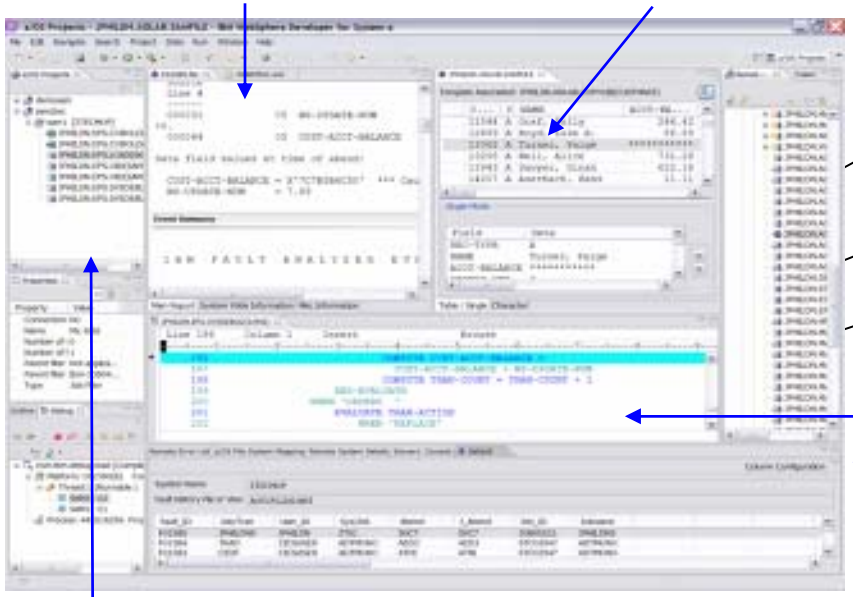
Edit, Compile And Debug With Rational Developer For System z

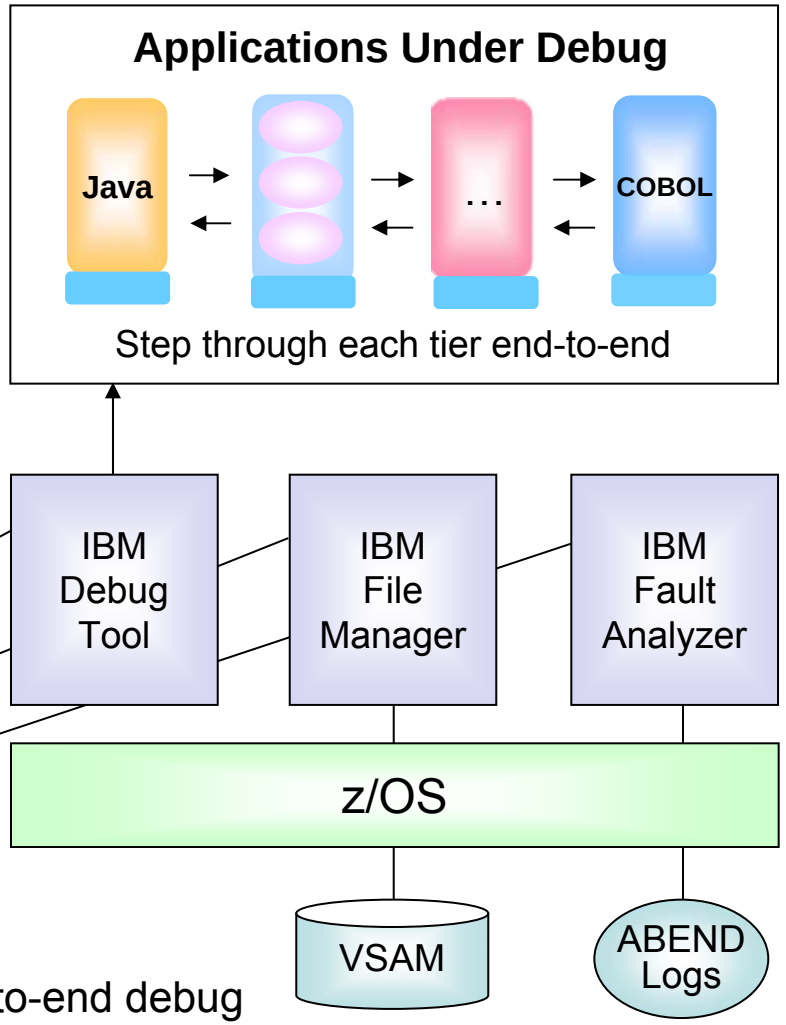
- **Modern development for System z**
  - Works like other IBM tools for distributed platforms
- **RDz supports development and reuse of Enterprise assets**
  - Support for COBOL, PL/I, C, C++, HLASM, Java, EGL and Web services
  - Supports existing and new runtimes
    - CICS, IMS, Batch, USS, DB2, 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



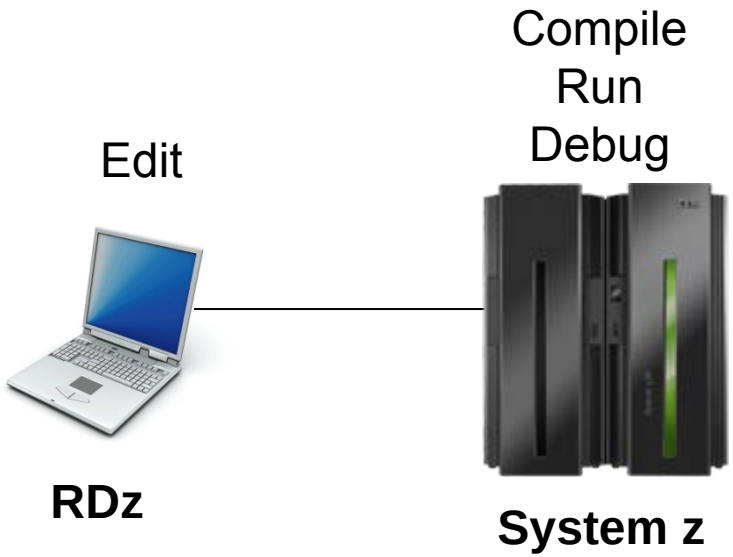


- End-to-end debug
- Edit VSAM data
- Analyze ABEND logs!

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

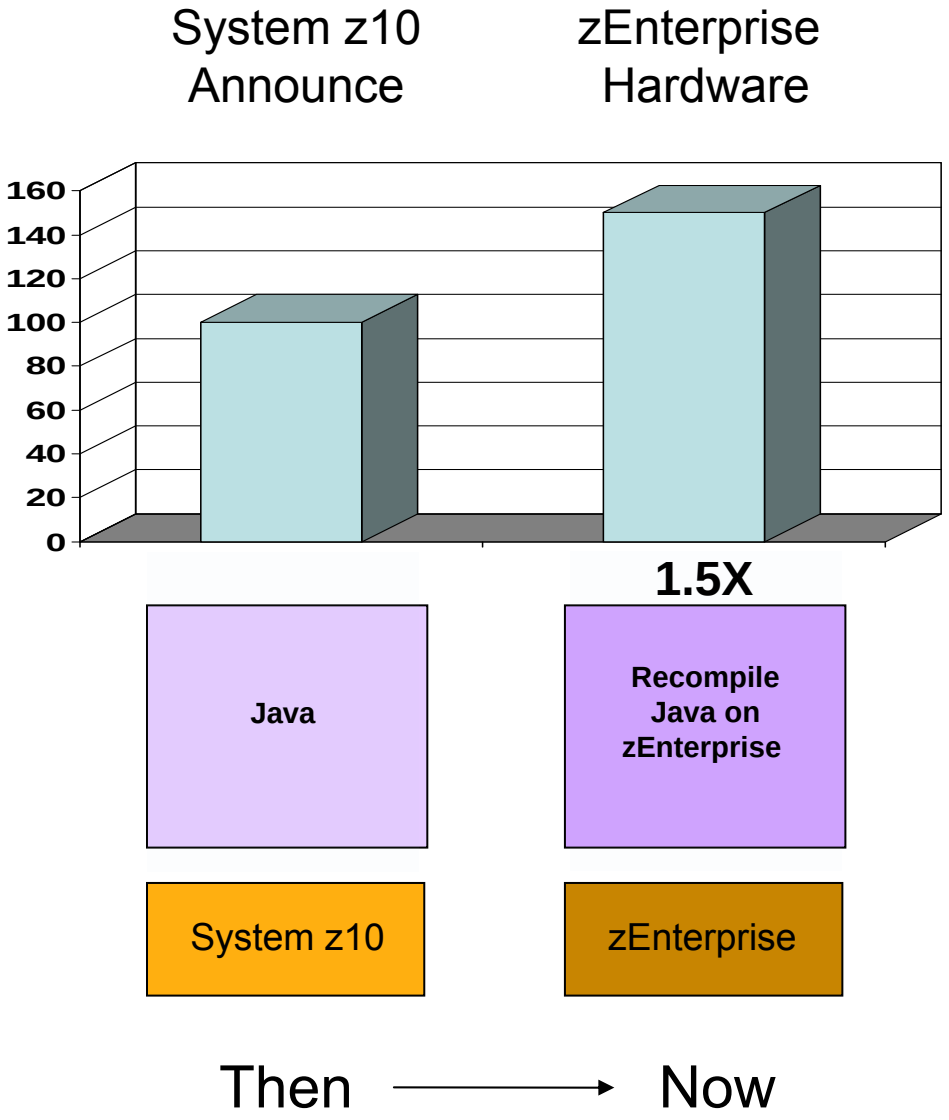
- Perspectives and views
- Remote System Explorer
- Working with host datasets
- Productivity features

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



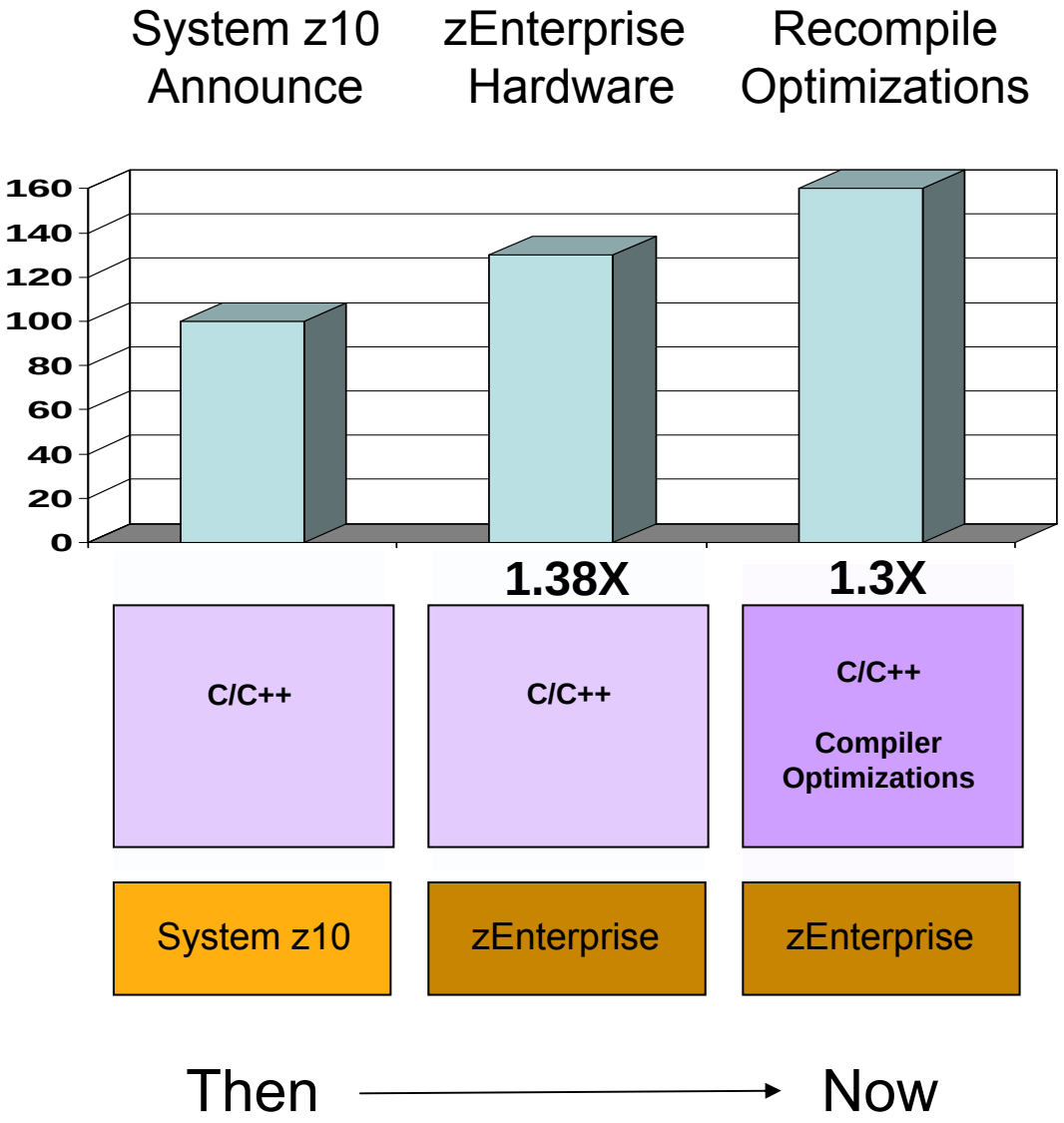
Continued Java Optimizations For z/OS – From Then To Now

- Continued investment to optimize Java software for z/OS environment
  - Uplevel to zEnterprise hardware and recompile Java produces an average of 1.5 times performance improvement
  - Per thread performance with Java6SR8
    - CPU-benchmark +63%
    - Multi-threaded +45%
    - ILOG/CONfirm +45%



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++ using compiler optimization produces 1.3 times performance improvement
  - From then to now – almost **1.8** times performance improvement

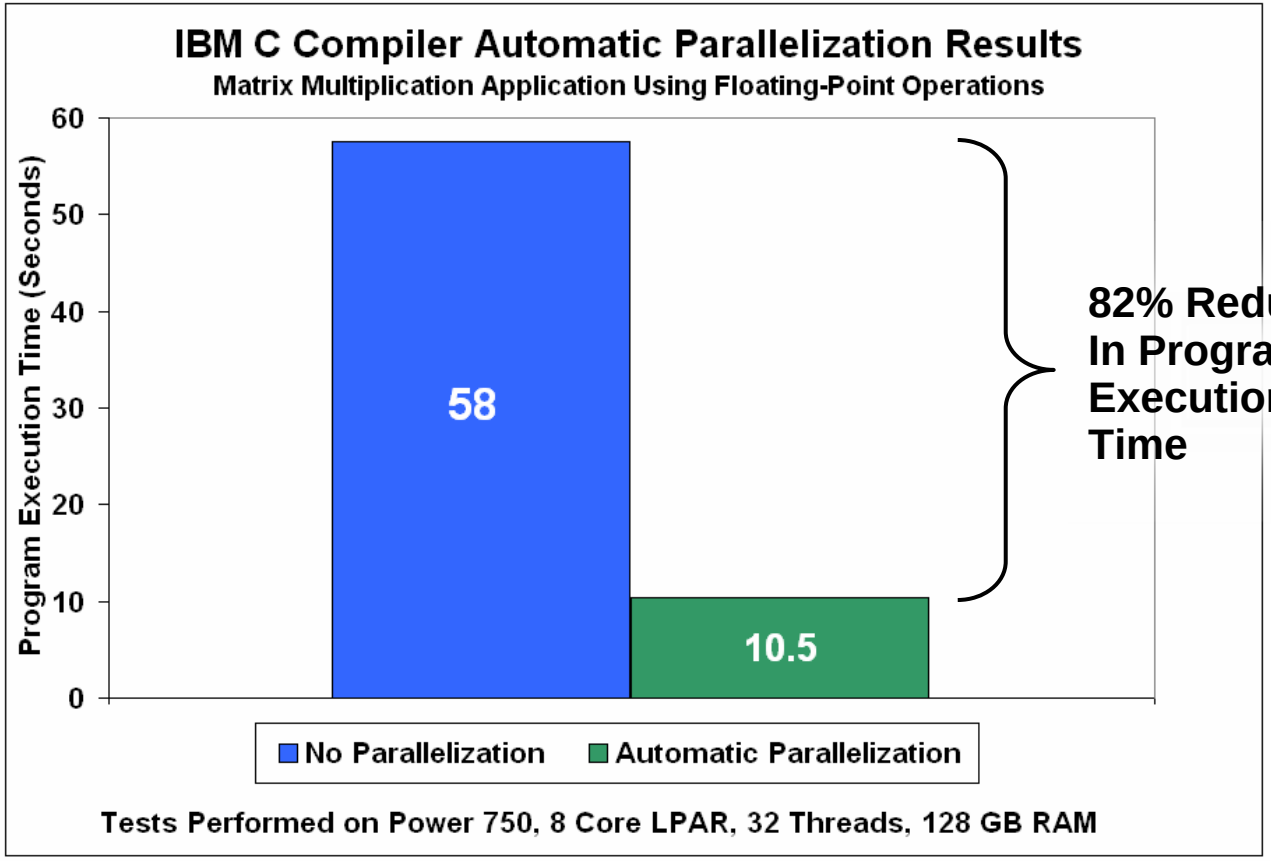


C/C++ Compiler Optimizations For Power Blade On zEnterprise

- **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



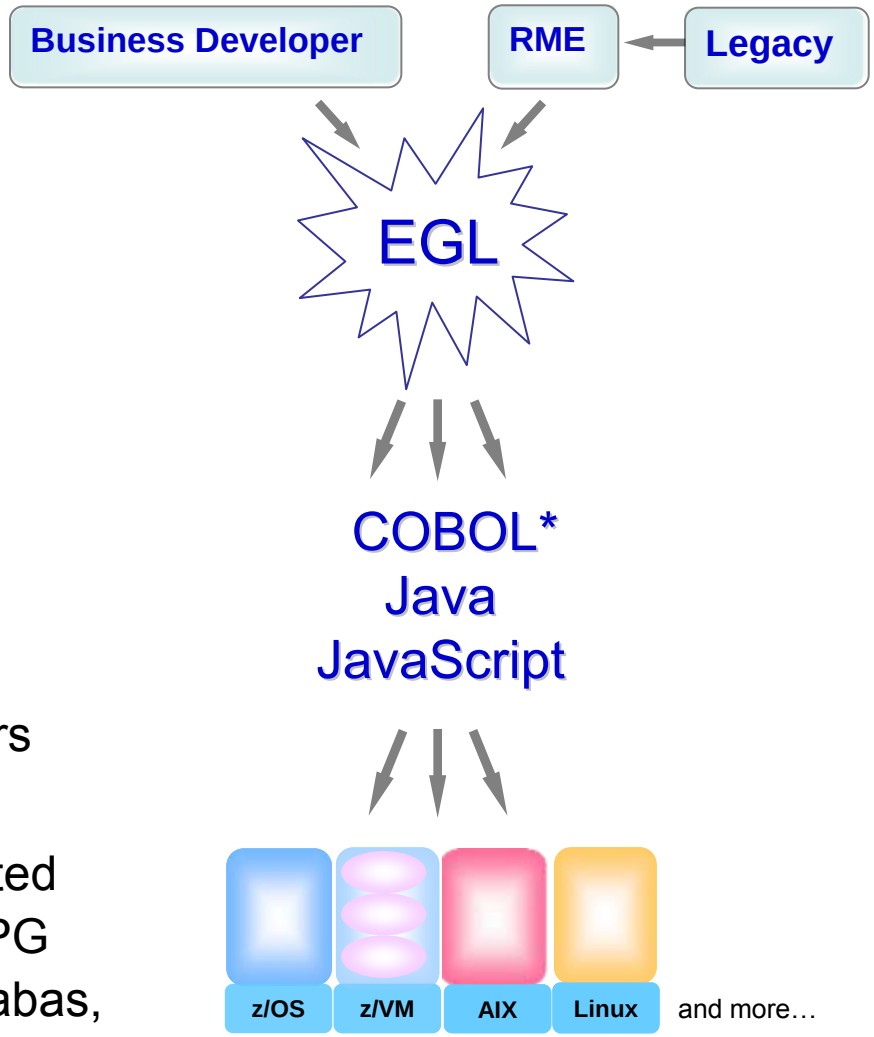
- Automatic parallelization of iterative program loops
- Iterations are executed concurrently on all available processor cores and threads
- No code changes needed

Source: Internal CPO Study

EGL – One Language Fit for Every Purpose

Enterprise Generation Language

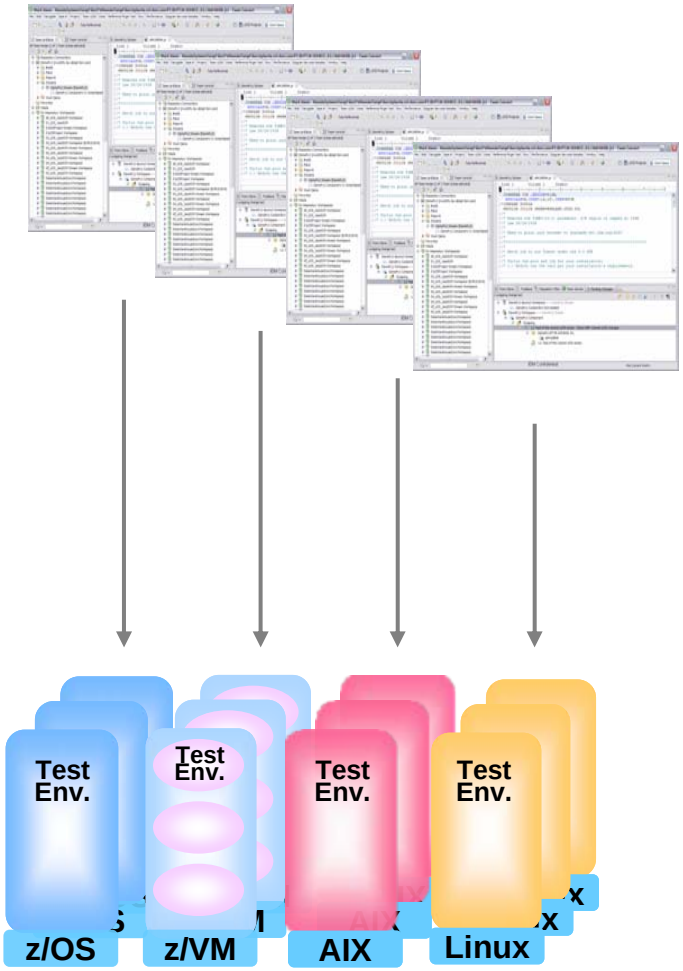
- 4th generation business language
- Deploy everywhere based on best fit for purpose
- **Rational Business Developer** (**RBD**) And RDz and RDp
  - EGL development tools for System z and Power Systems
  - For Business Developers
  - Tools for Web, Web Services, & Web 2.0 designers and developers
- **Rational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



* COBOL on z/OS, (IBM i)

zEnterprise Virtualization Quickly Provides Runtimes For Compile And Test In All Environments

- **Virtual machines provisioned for compile/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
  - 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

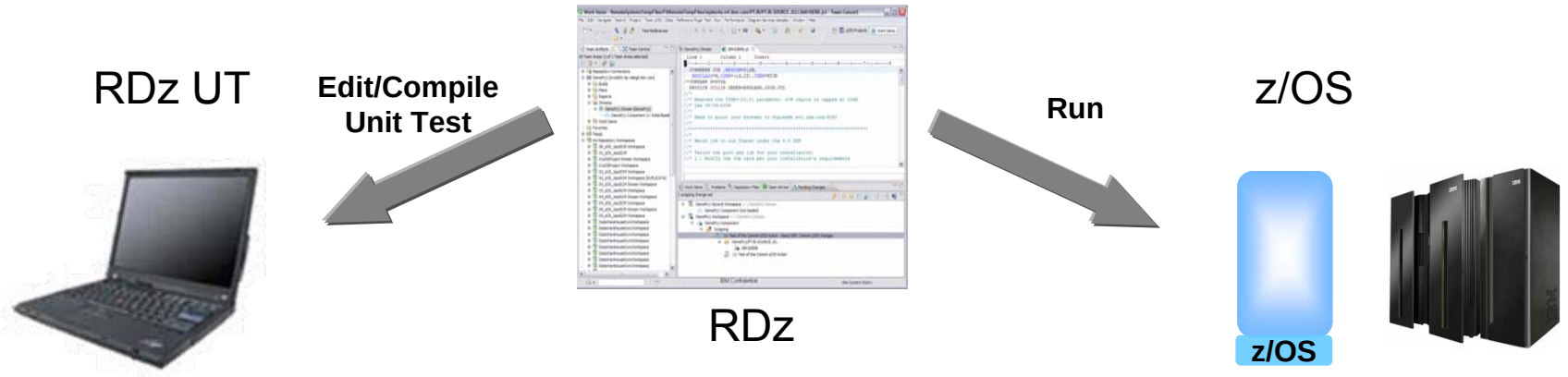


Unit Test Option For z/OS Applications On The Workstation

New!

Rational Developer for System z Unit Test (RDz UT)

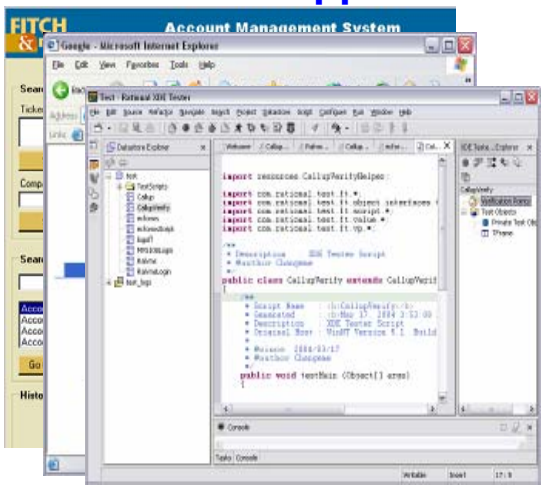
- z/OS runtime environment runs on x86 Linux workstation
  - **Compile and unit test** on the workstation - no zEnterprise hardware needed
  - Emulates System z general purpose processors, zIIPs, and zAAPs
- Reduce development MIPS for z/OS applications
  - Lower cost and better productivity
  - Enable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

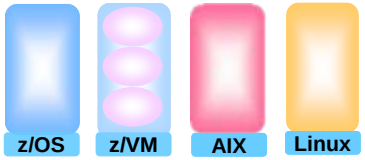


Unified Testing with Rational Functional Tester And Rational Performance Tester

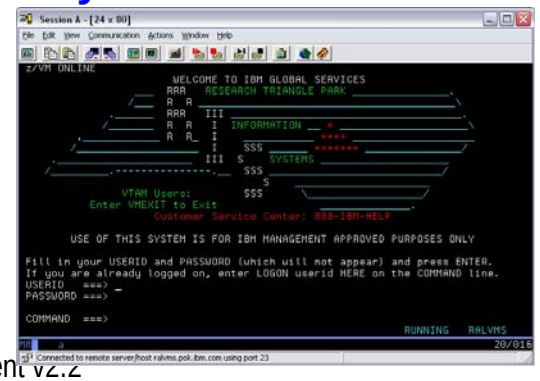
- Eclipse-based tools
- Use **Rational Functional Tester**
  - Record/Enhance/Execute scripts on Windows/Linux
  - Functional test any .NET, Web, or Java application (z or non-z)
  - Use **Rational Functional Tester Extension for Terminal-based Applications**
- Use **Rational Performance Tester** for 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
- Manage tests with **Rational Quality Manager**

Web and GUI Applications



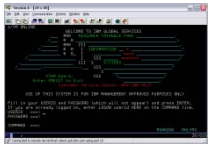


System z Terminal UI



Compare Development Costs Over Three Years

CASE 1



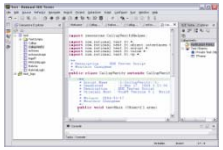
20 programmer team
@ $140K/yr/person

ISPF for Edit, Compile, Debug

Use production MIPS

- Normal programmer productivity
- Consume MIPS for edit, compile, debug and test
- High cost production MIPS

CASE 2



20 programmer team
@ $140K/yr/person

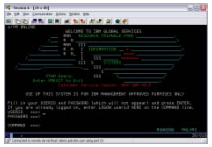
RDz for Edit, Compile, Debug

System z Solution Edition for Application Development

- 30% better programmer productivity
- No MIPS consumed for edit
- Significantly lower cost MIPS for compile, debug and test

Compare Development Costs Over Three Years

CASE 1



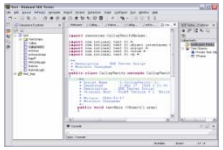
20 programmer team
@ $140K/yr/person

ISPF for Edit, Compile, Debug

Use production MIPS

- Programmer cost $8.4M
- MIPS cost $4.5M
- Total cost $12.9M

CASE 2



20 programmer team
@ $140K/yr/person

RDz for Edit, Compile, Debug

System z Solution Edition for Application Development

- Programmer cost $6.7M
- Net MIPS cost $0.2M
- Total cost $6.9M

47% less

Benefits Of Rational Common Development Tools

- Unify development teams via common development tools for zEnterprise
- Enhance cross-platform development skills
  - Easier for Java developers to learn COBOL skills
  - Easier for COBOL developers to learn Java skills
- Structured common processes, tools, and special offerings can reduce development costs by up to 47%