IBM System z Technology Summit

zEnterprise – The First System Of Systems

Unified Enterprise Application Development

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Challenges Of Enterprise Software Development

I need Application Lifecycle Management tools that support *ALL* my platforms

I need to remove the barriers between development on different platforms

I need to easily reuse, extend and test what I already have

I need to keep older applications but migrate them to newer languages

Development Manager

zEnterprise Combines Mainframe And Distributed Environments In One Platform

Distributed Teams

Agile Collaborative Development

Java Development Tools

Ad Hoc Testing

UNIFY Development Process Management

UNIFY Edit, Compile, Debug

UNIFY Performance & Test

Mainframe Teams

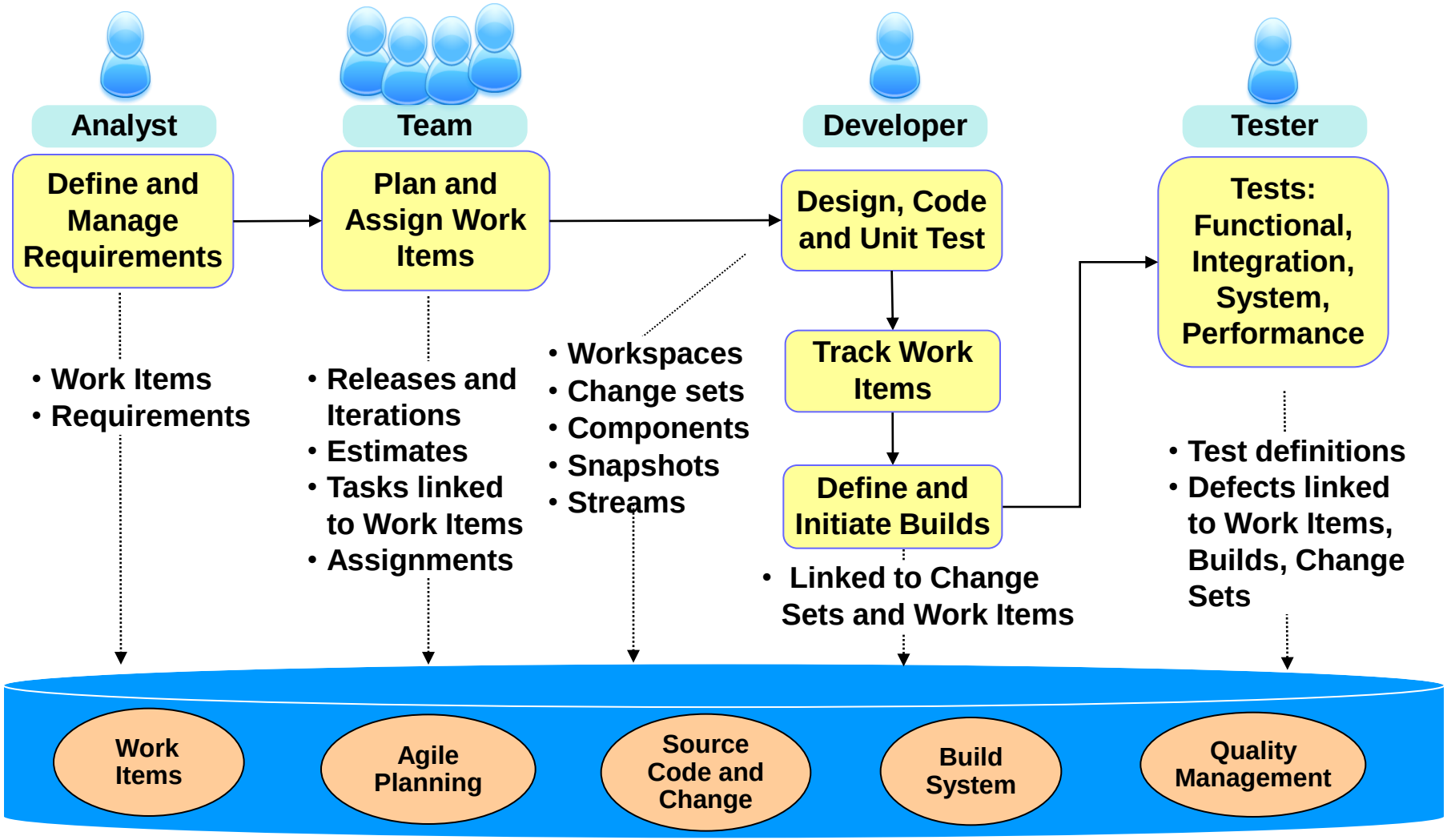
Waterfall Development

ISPF

Quality Assurance

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

Rational Team Concert Supports Unified Development Processes

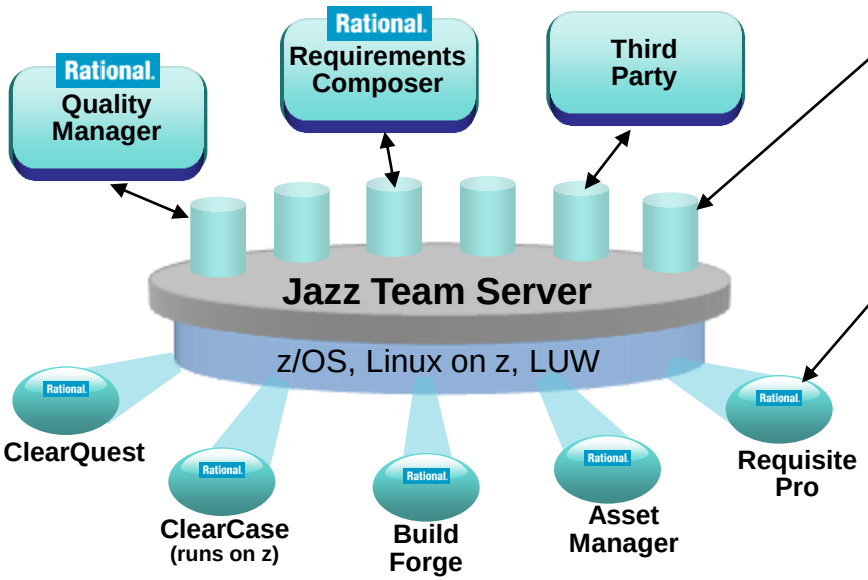


Common repository and data schemas for all environments

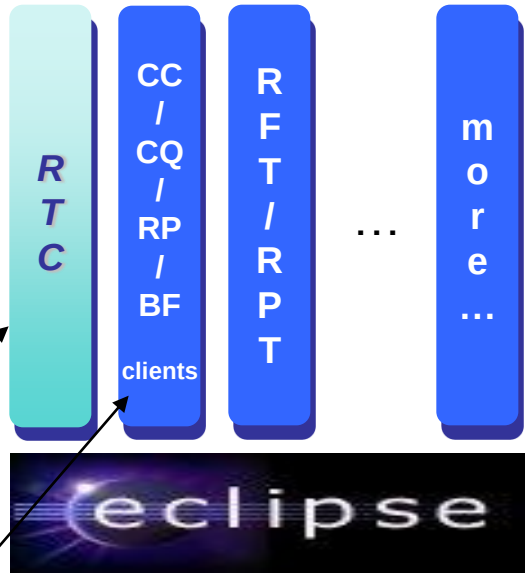
Agile Collaboration And Project Management Is Integrated Across All The Eclipse-based Tools

Rational Team Concert

- Based on the ***Jazz Platform***
  - Next generation, open collaborative development platform
- Eclipse-based *agile* client of Jazz
- Integrates with other tools
  - At server and client



Client-side integration

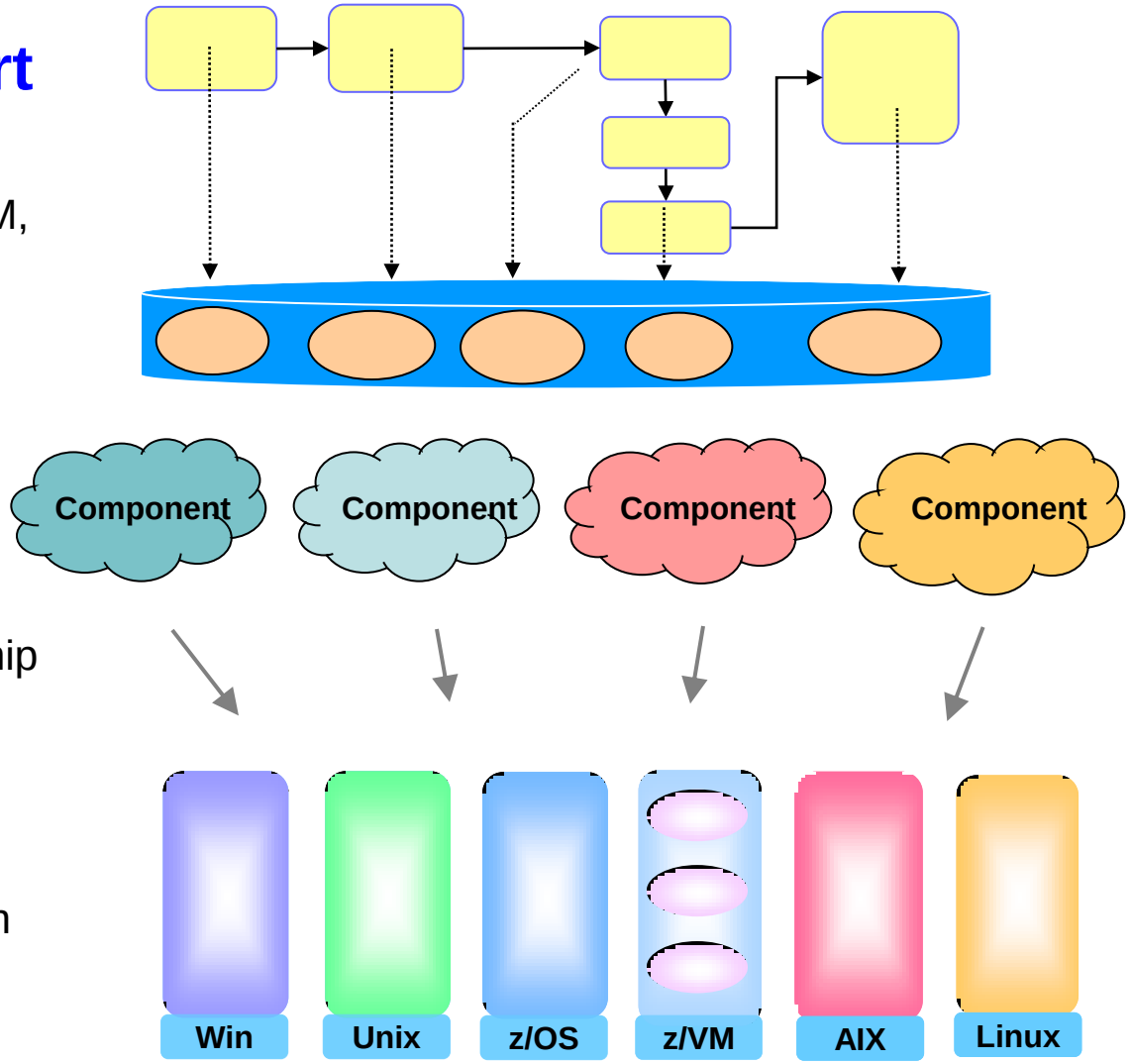


Server-side integration

Unified Development Process Management For All Your Development Teams

Rational Team Concert

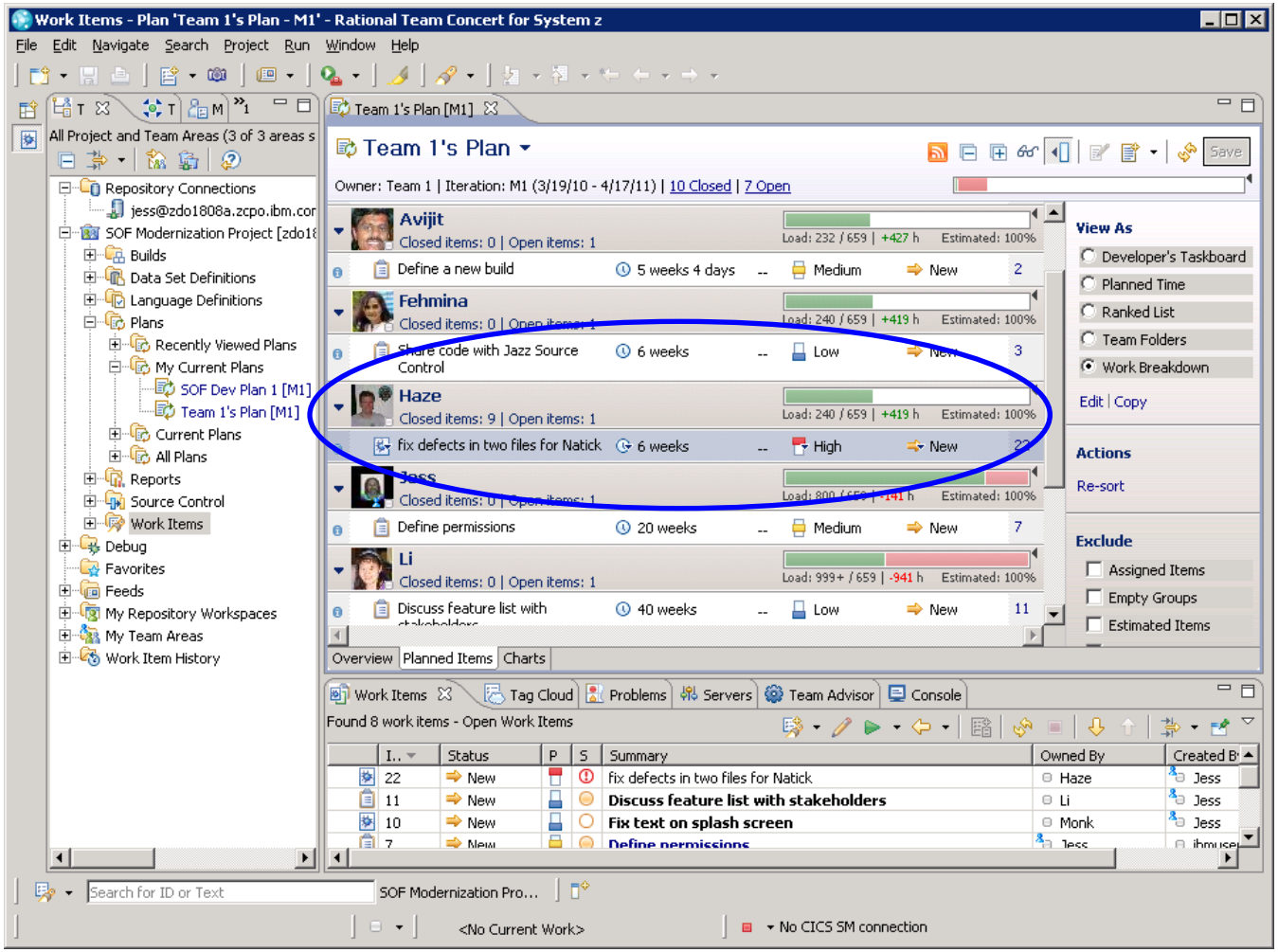
- One tool for ***all*** platforms
  - Work Items, Planning, SCM, Build Management and Reporting team processes
  - Live collaboration
  - Project tracking
  - Unified storage
  - Dependency-based build
- Delivers lower Cost of Ownership
  - Low administrative cost
  - Low training costs
  - Easy to customize
  - Rapid deployment/adoption
- Manage all environments from a single console
  - Browser, Eclipse, ISPF clients



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



Remove Barriers Between Mainframe And Non-Mainframe Programming

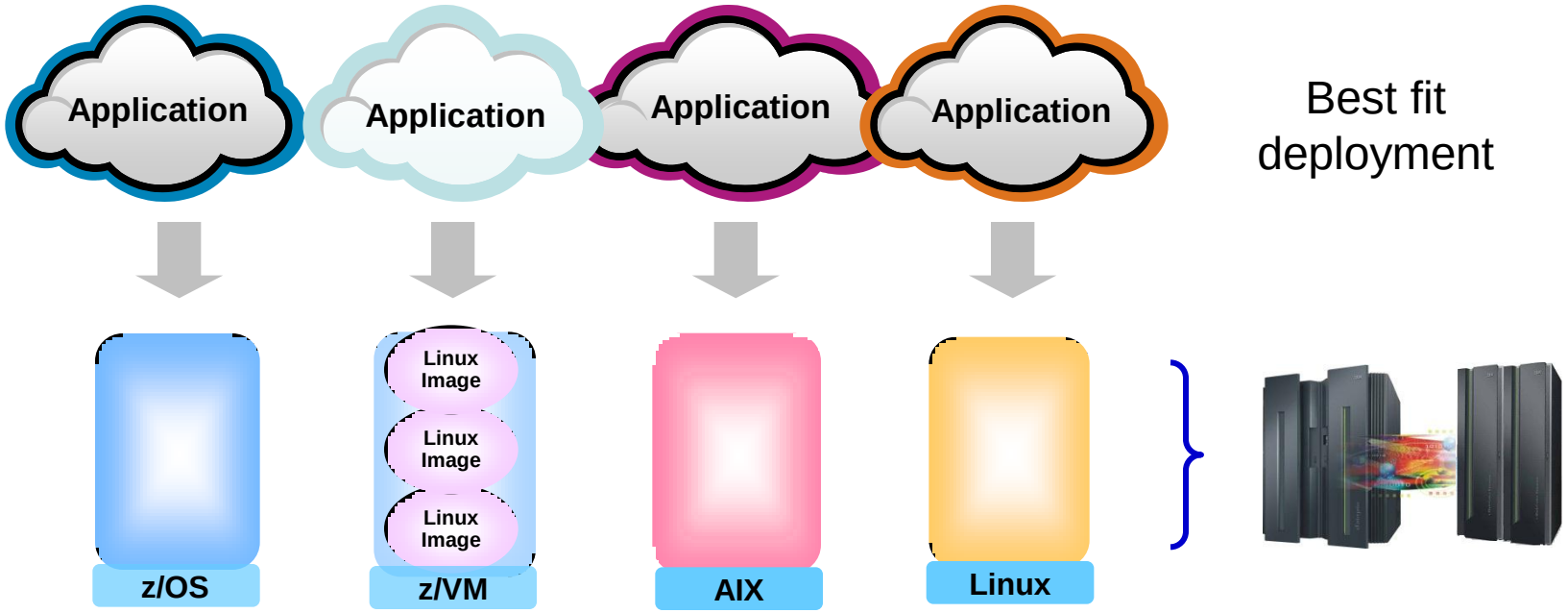
I need my mainframe programmers and distributed developers to use the same tools so they can work together

Development Manager

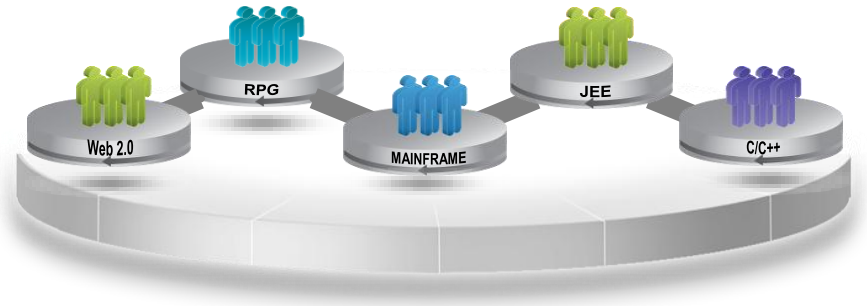
The Rational tools enable end-to-end development and debugging helping to make all developers more efficient

IBM

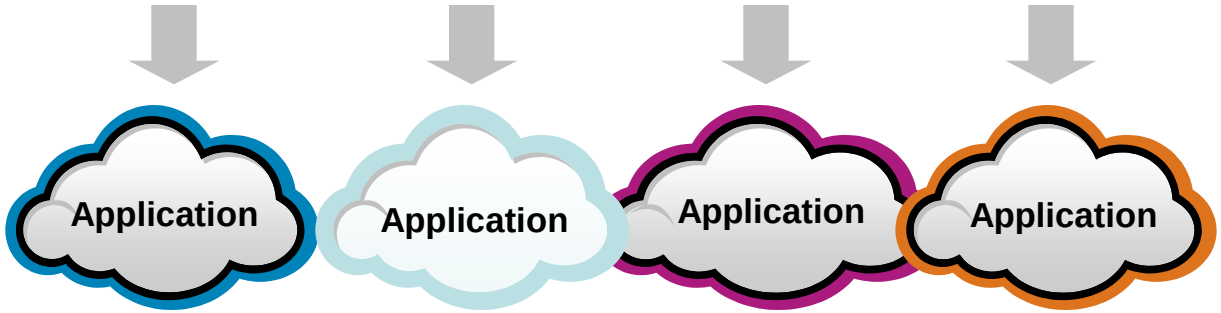
IBM zEnterprise Combines Mainframe And Distributed Environments In One Platform



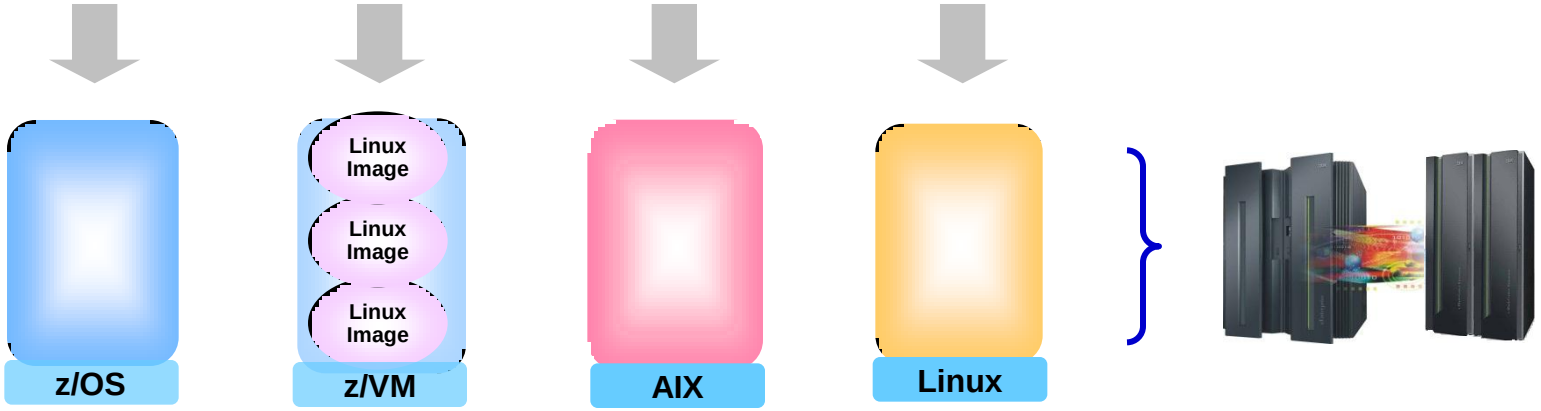
Rational Delivers A Unified Development Tool Set For All These Environments



Unified processes
Unified edit, compile, debug
Unified test

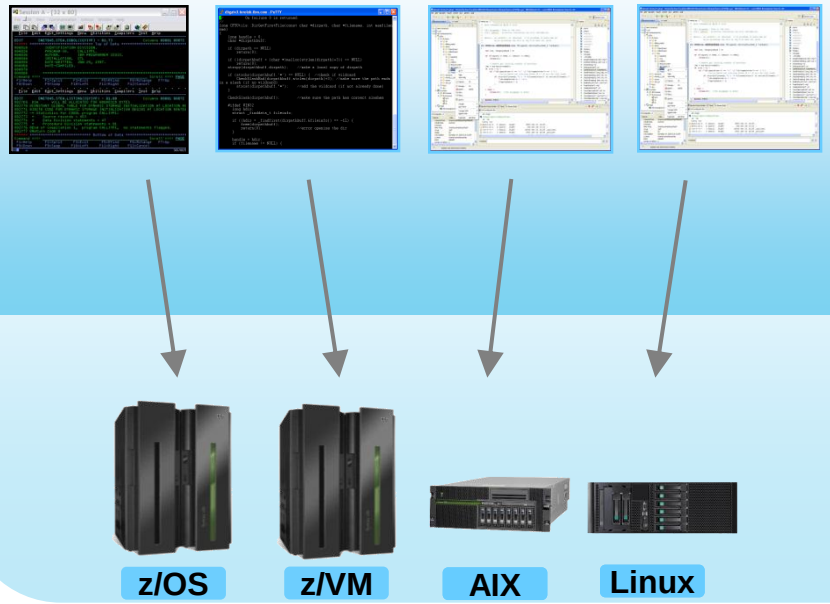


Best fit deployment



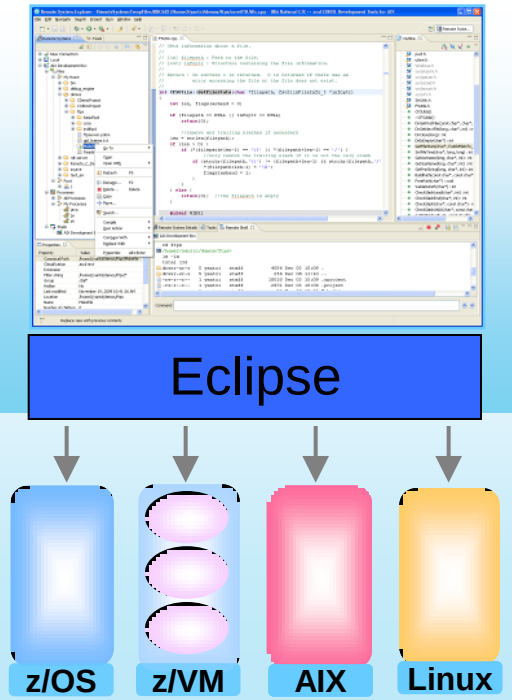
Rational Development Tools For zEnterprise

Before…



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

Rational Developer Tools



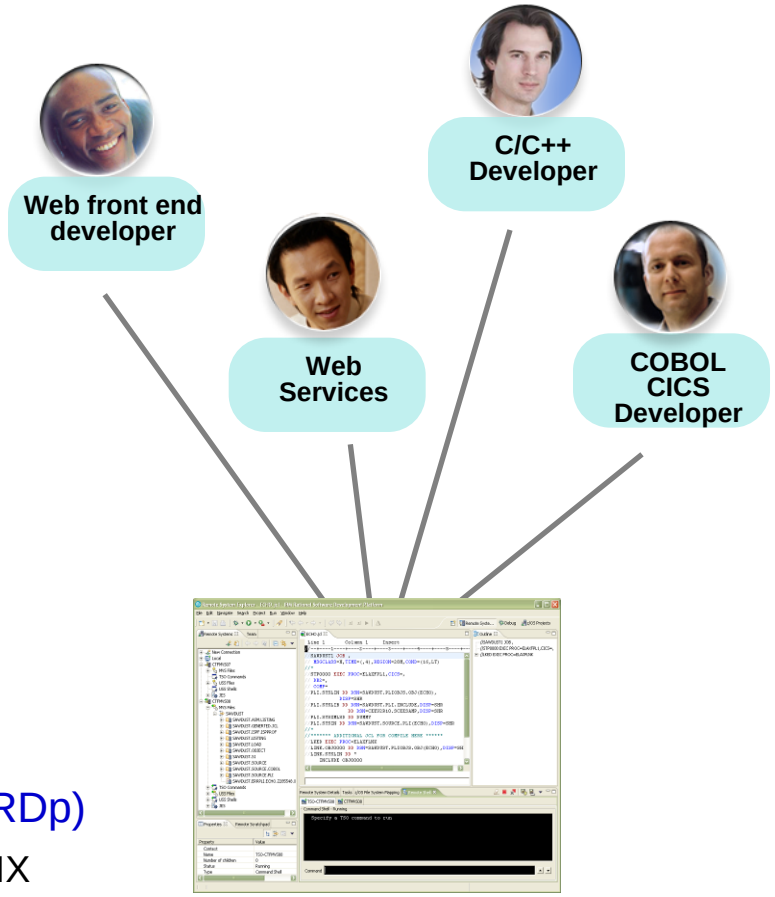
- Eclipse-based IDEs with modern GUI
- Plug-ins support all environments
- Up to 30% improvement in developer productivity based on studies[1]

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

Rational Development Tools

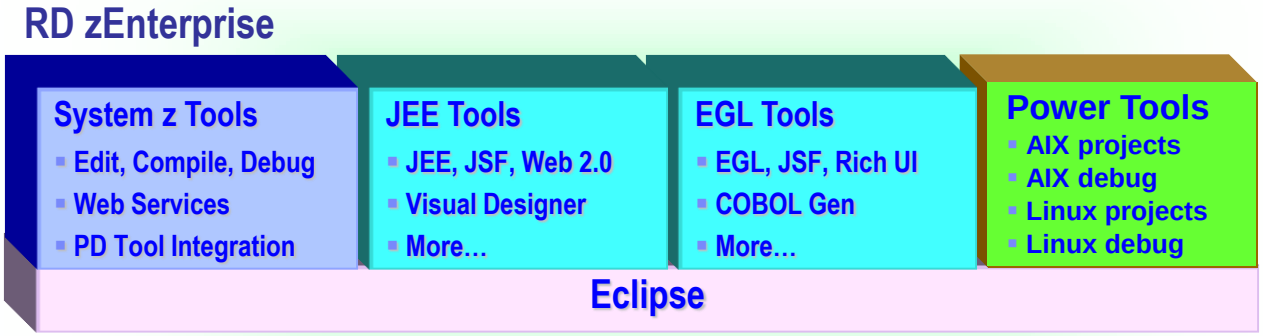
The IBM Rational Developer family of products includes integrated development tools for the major development workloads on z/OS, AIX, and Linux

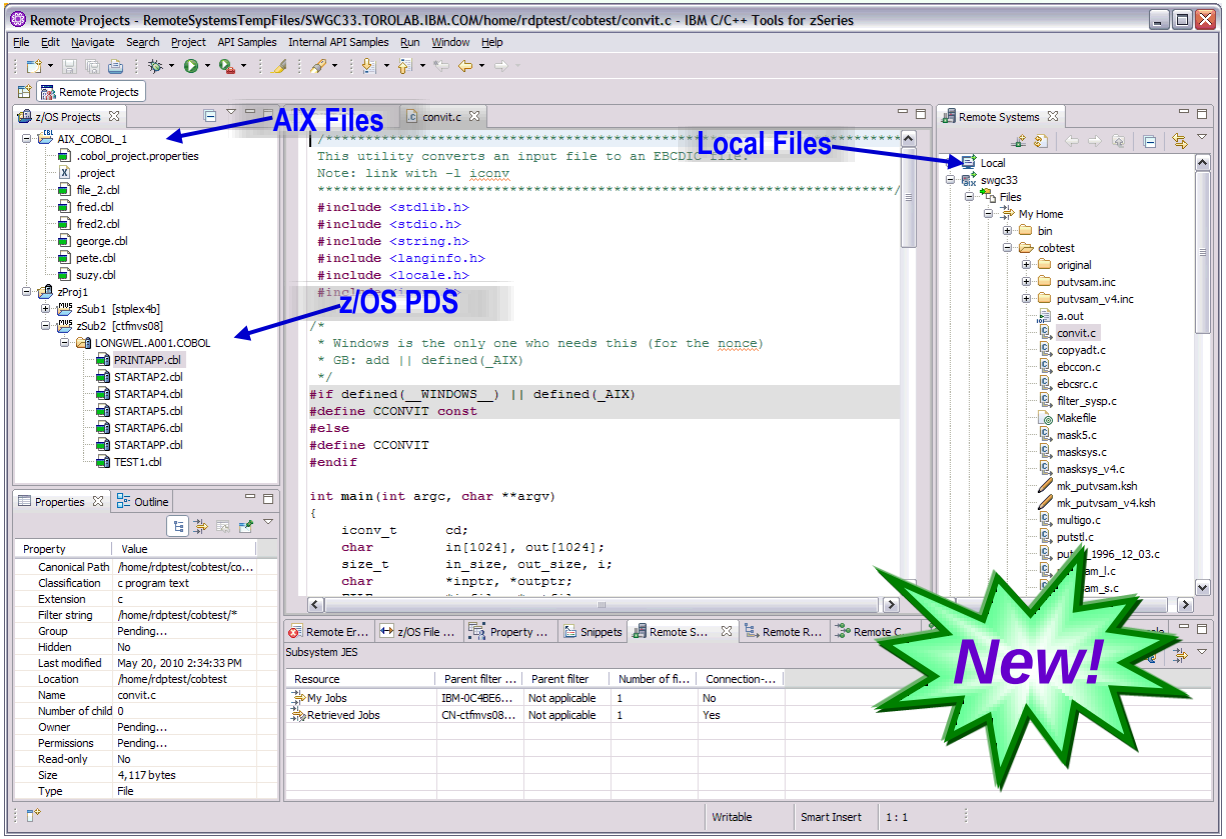
- Rational Application Developer (RAD)
  - Develop Java, JEE, and JavaScript
  - Tools for Web, Web services, and Web 2.0 designers and developers
  - WebSphere Application Server Test Environment
- Rational Developer for System z (RDz)
  - Develop in traditional mainframe languages, CICS, and IMS applications
  - Tools for Web, Web services, and SOA designers and developers
  - Remote file system access and can include C Developer Tools (CDT) for Linux
  - Includes RAD or RBD
- Rational Developer for Power Systems Software (RDp)
  - C/C++, COBOL and Fortran development tools for AIX
  - Includes RAD or RBD



Rational Developer For zEnterprise

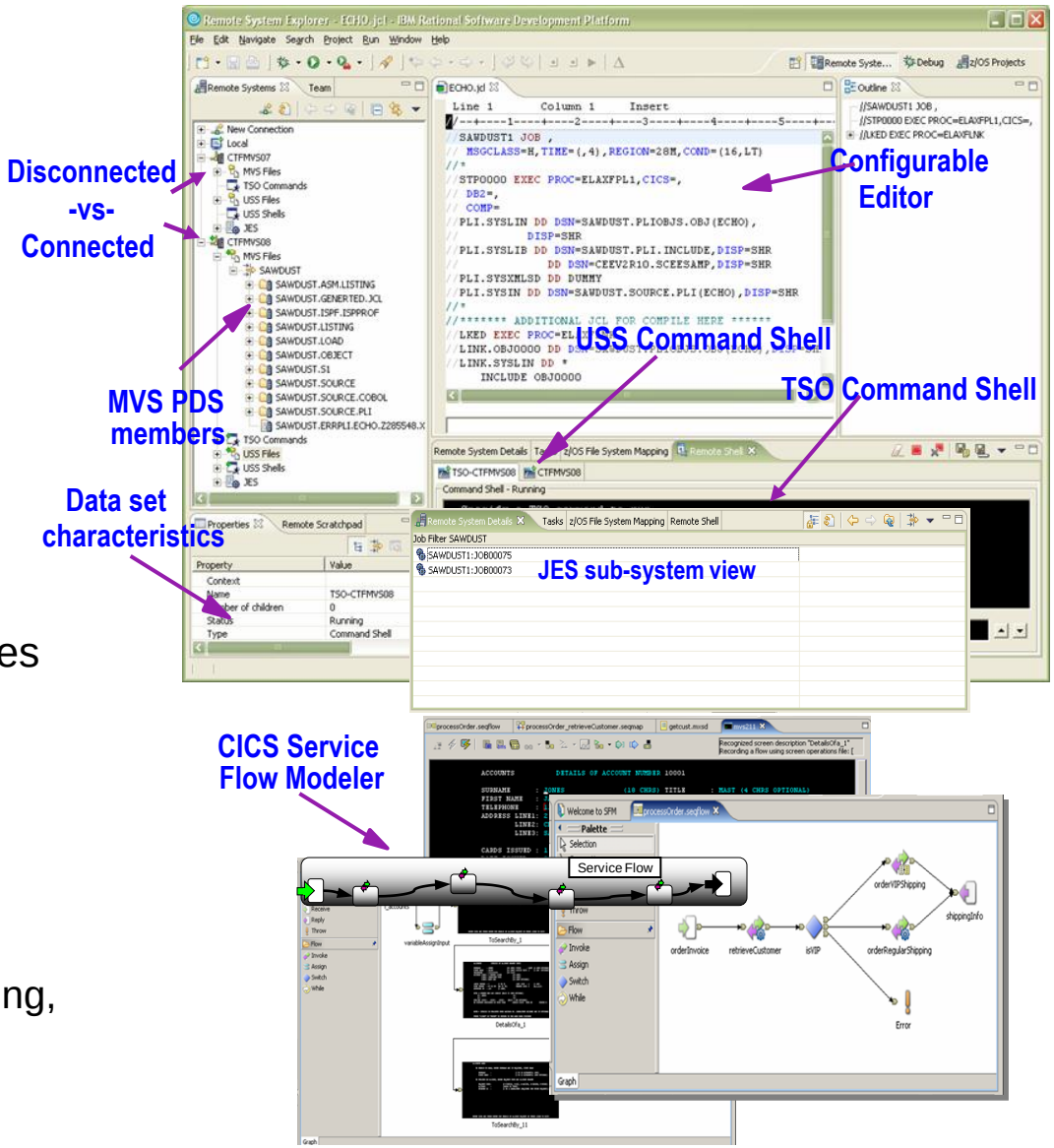
- Combined functionality
  - RDz with JEE (RAD)
  - Power Tools (RDp)
  - EGL (RBD)
- Addresses unique capabilities of the zEnterprise
  - z/OS, AIX
  - Linux on x86, Power, System z
- Perfect for the "multiplatform developer"
- End-to-end debugging across all environments





Edit, Compile And Debug With Rational Developer For zEnterprise

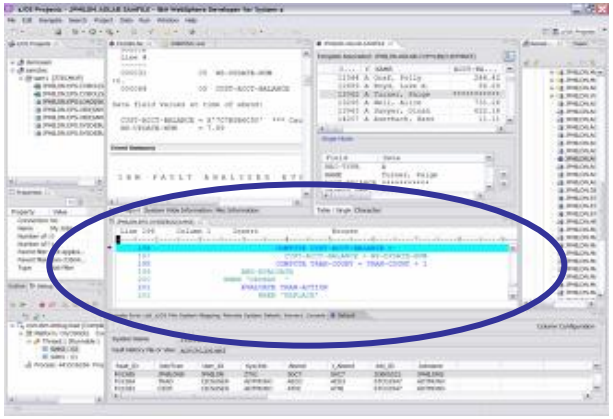
- **Modern development for System z**
  - Works like other IBM tools for distributed platforms
- **RDz supports development and reuse of Enterprise assets**
  - Support for COBOL, PL/I, C, C++, HLASM, Java, EGL and Web services
  - Supports existing and new runtimes
    - CICS, IMS, Batch, USS, DB2, WAS
  - Interactive access to z/OS for
    - Development, debug, job generation, submission, monitoring, command execution



Debug zEnterprise Applications From The Workstation

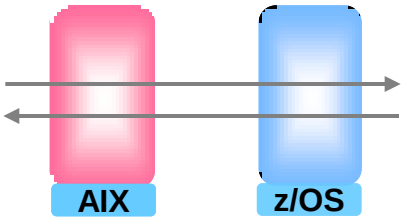
- Debuggers built on the common Eclipse framework enable
  - Debug step across languages
  - Debug step across environments
- Collaborative debugging when integrated with RTC

Work with code in the debugger here



Workstation-based
RAD, RDz, RDp, RD zEnterprise

Debug applications running here

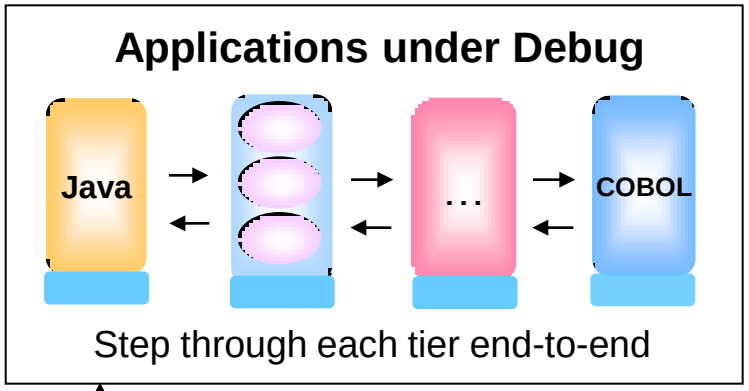


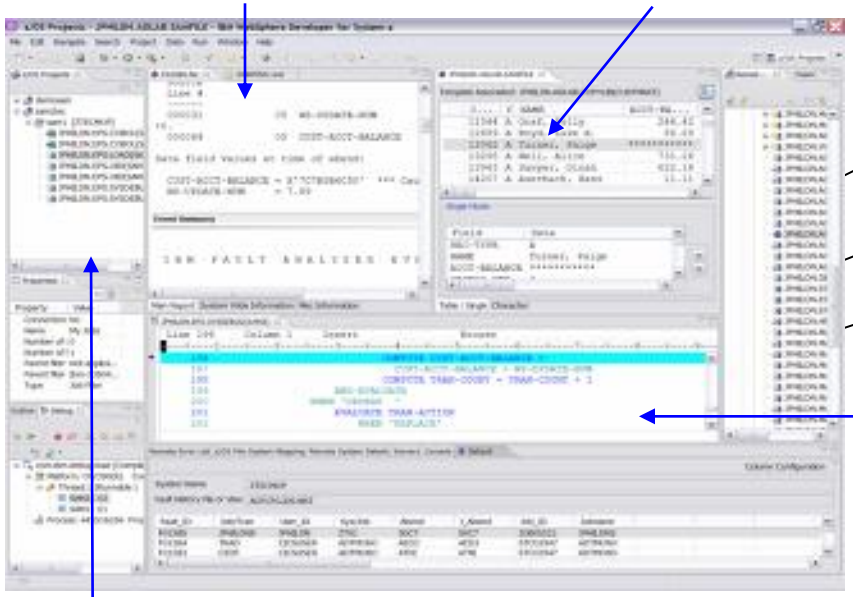
Java Web front end

CICS COBOL back end

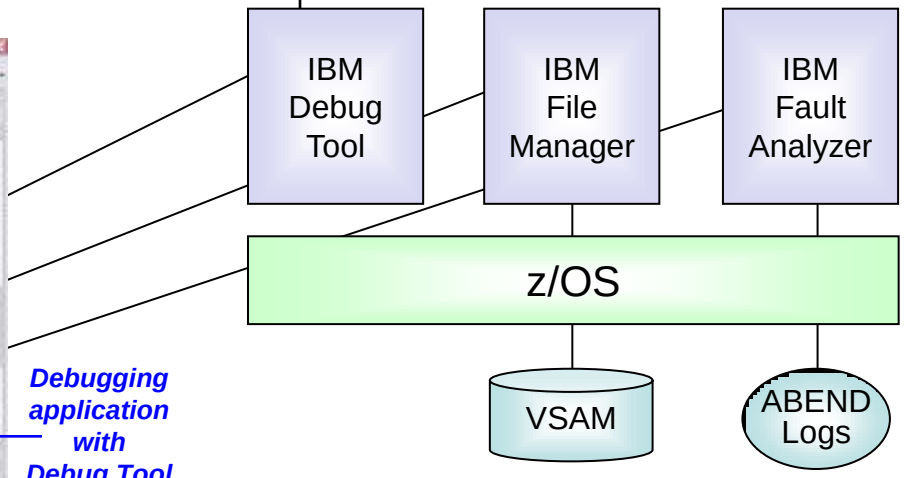
Interactive Problem Determination: RDz Integrates With Host-based Tools

- 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

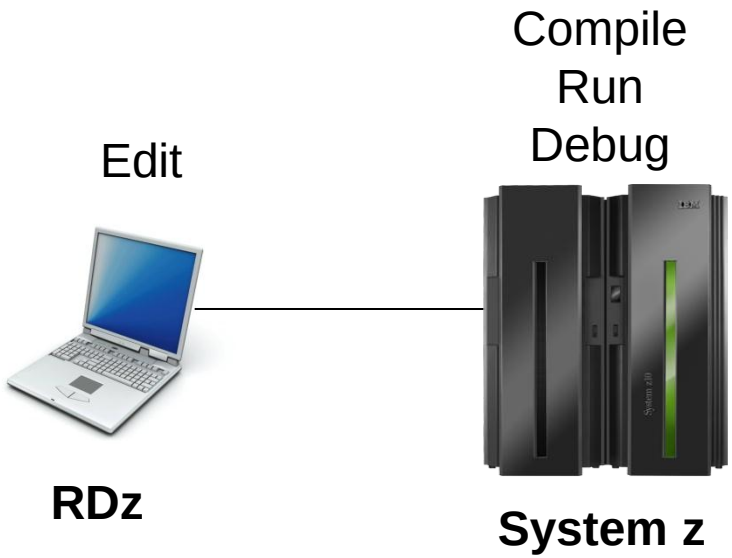


- End-to-end debug
- Edit VSAM data
- Analyze ABEND logs!

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

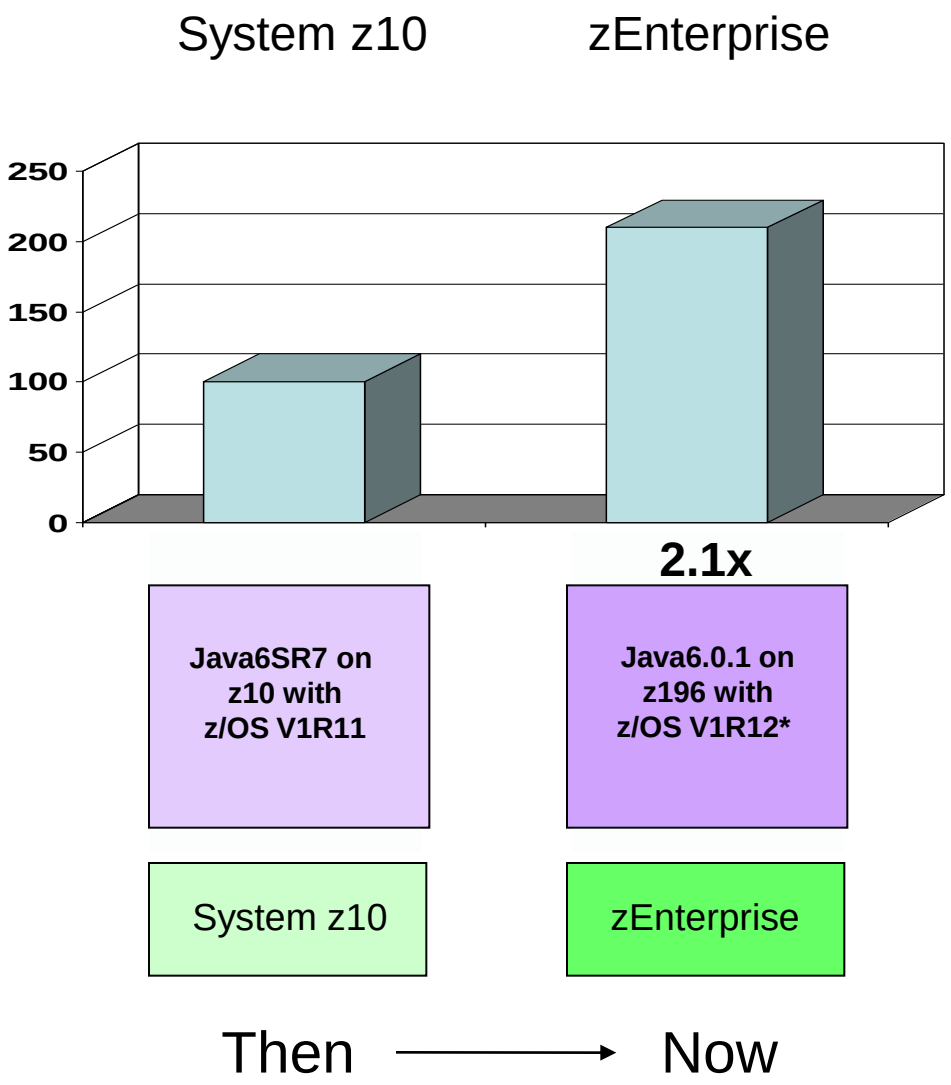
- Perspectives and views
- Remote System Explorer
- Working with host datasets
- Productivity features

- 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

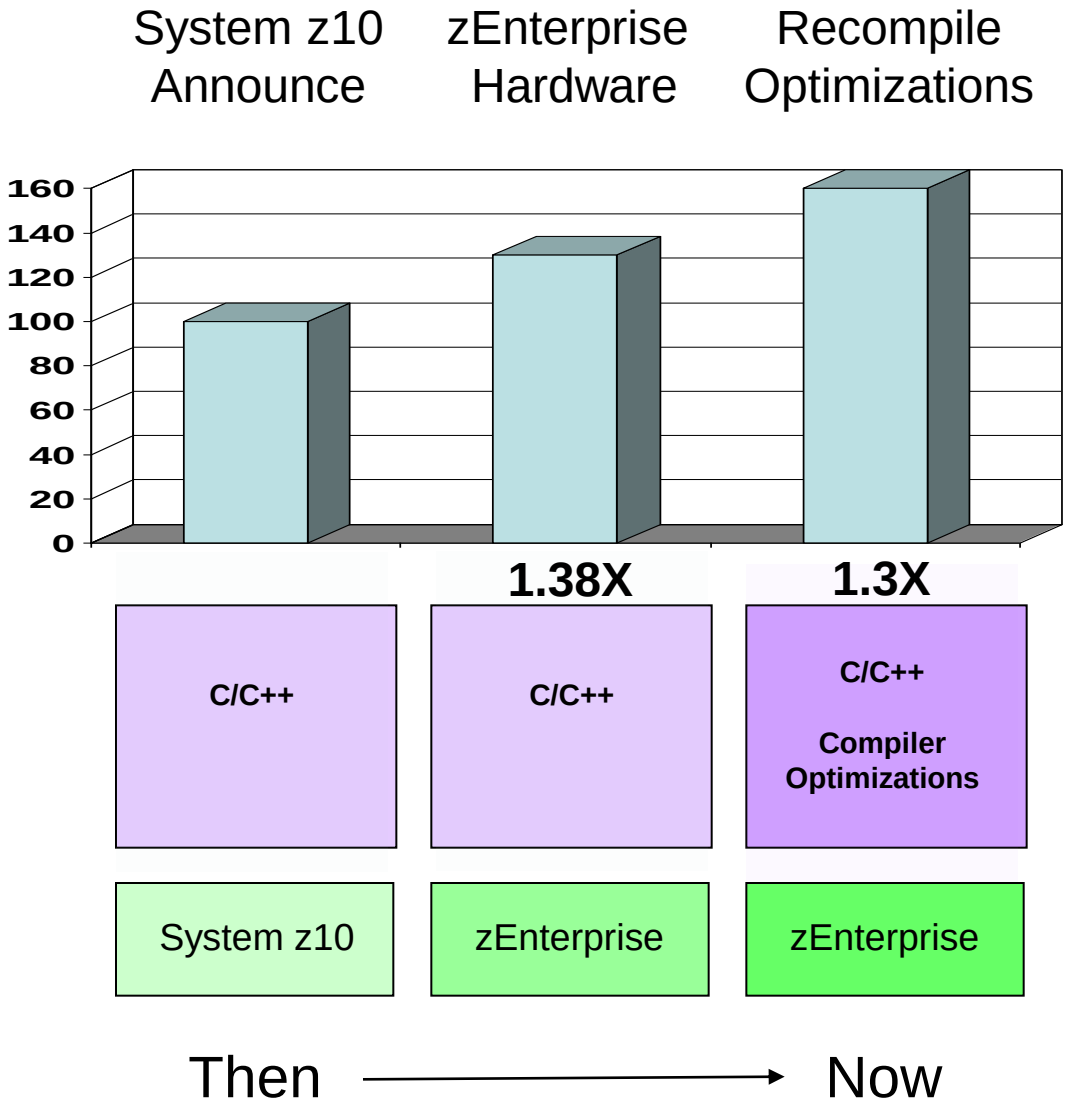
- Continued investment to optimize Java software for the z/OS environment
  - Uplevel to z196 hardware and newest Java produces up to 2.1 times performance improvement
    - z196, Java 6.0.1, z/OS 1.12*
  - Performance improvements
    - Multi-threaded 2.1x
    - CPU-benchmark 1.93x



*using IEASYSxx new option TIMESLICE=64

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

Use Tools To Quickly Reuse, Modernize And Test Code To Extend What You Already Have

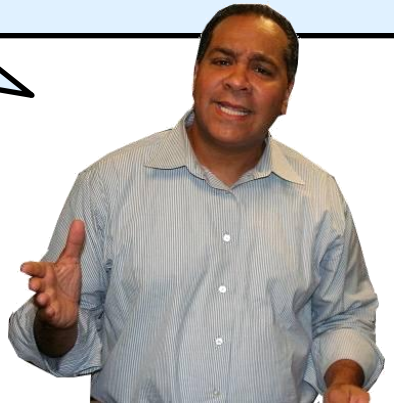
a) I need tools that let me easily reuse, modernize and *extend* what I've got now using my existing staff

b) And I have applications I need to keep that are written in old code that I can't maintain

Development Manager

a) It's easy to *transform 3270 green screens* to extend them to a Web browser

b) And EGL and Rational Migration Extension enable you to migrate that old code to Java and COBOL



IBM

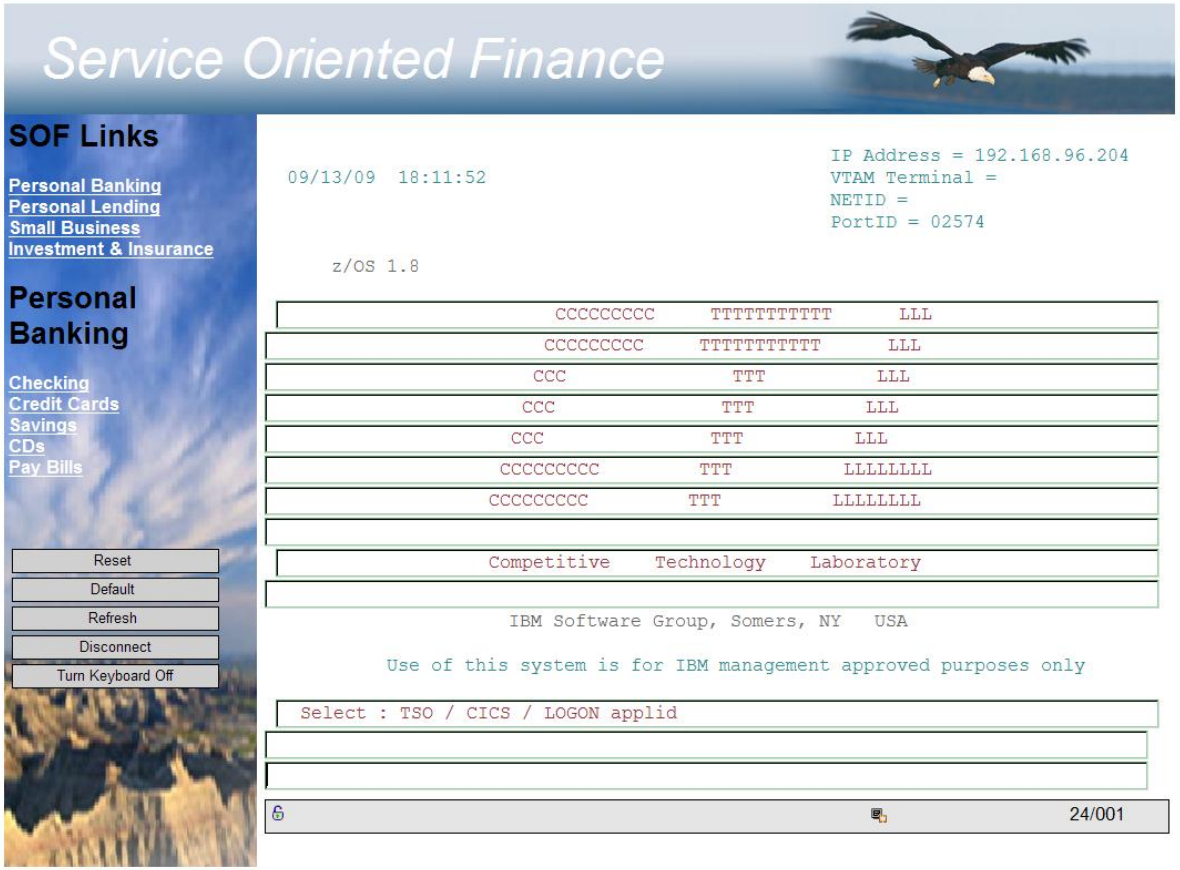
Extend Existing Applications With Minimal Cost Using HATS – *Host Access Transformation Services*

What can you do with HATS?

- Quickly and easily create Web, portal, mobile or rich client applications from green-screen applications
  - Without programming
  - Low skills requirement
  - Transformation “on the fly”
  - Iterative development process
  - Highly customizable
- Reuse existing assets
  - As Web services, in an SOA
- Create work flow from multiple apps
- Integrate with other Web, portal, and rich client applications

DEMO: HATS Green Screen Transformation

Let's look at HATS and see how easy it is to take a green screen app and transform it into a Web application



Migrate Older Code To Newer Languages With EGL And RME

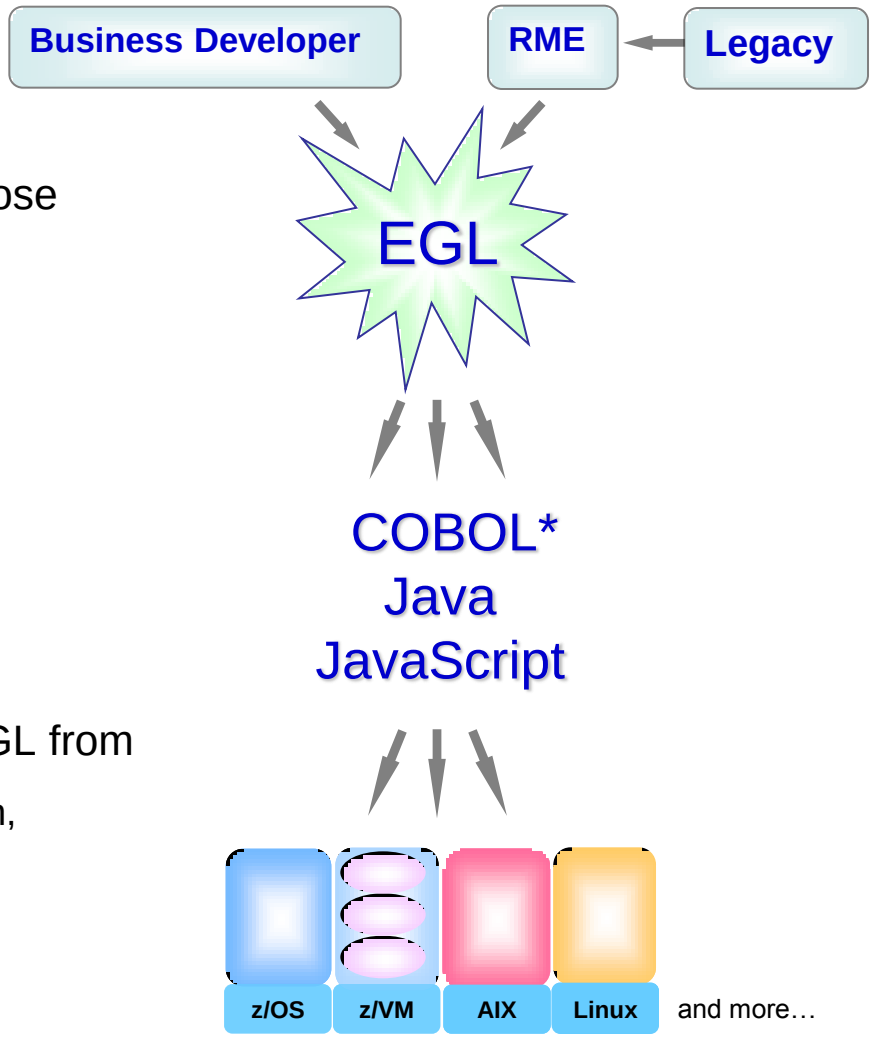
Enterprise Generation Language (**EGL**)

- 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 Web, Web Services, & Web 2.0 designers and developers
- **Rational Migration Extension** (**RME**)

  Average over 95% automated migration to EGL from
  - Legacy Synon RPG and COBOL, CA Cool:Gen, Natural Adabas, and green screens
- EGL is **open source** at

  http://eclipse.org/proposals/egl
- Generate z/OS COBOL with WebSphere **ILOG Rules for COBOL**

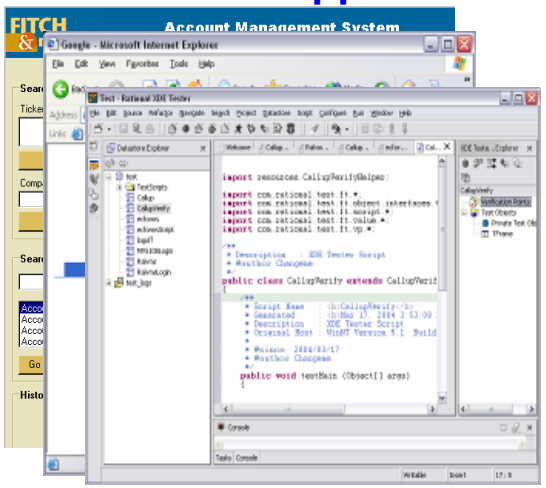


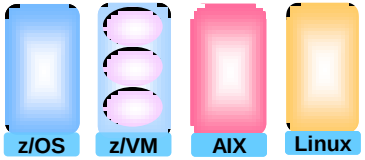
* COBOL on z/OS, IBM i

Unified Testing With Rational Testing Tools

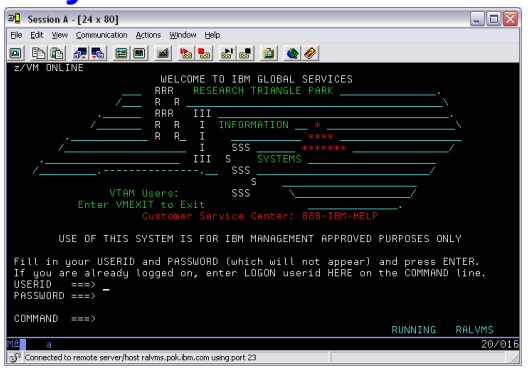
- Eclipse-based tools
- Use **Rational Functional Tester**
  - Record/Enhance/Execute scripts on Windows/Linux
  - Functional test any .NET, Web, or Java application (z or non-z)
  - Use **Rational Functional Tester Extension for Terminal-based Applications**
- Use **Rational Performance Tester** for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



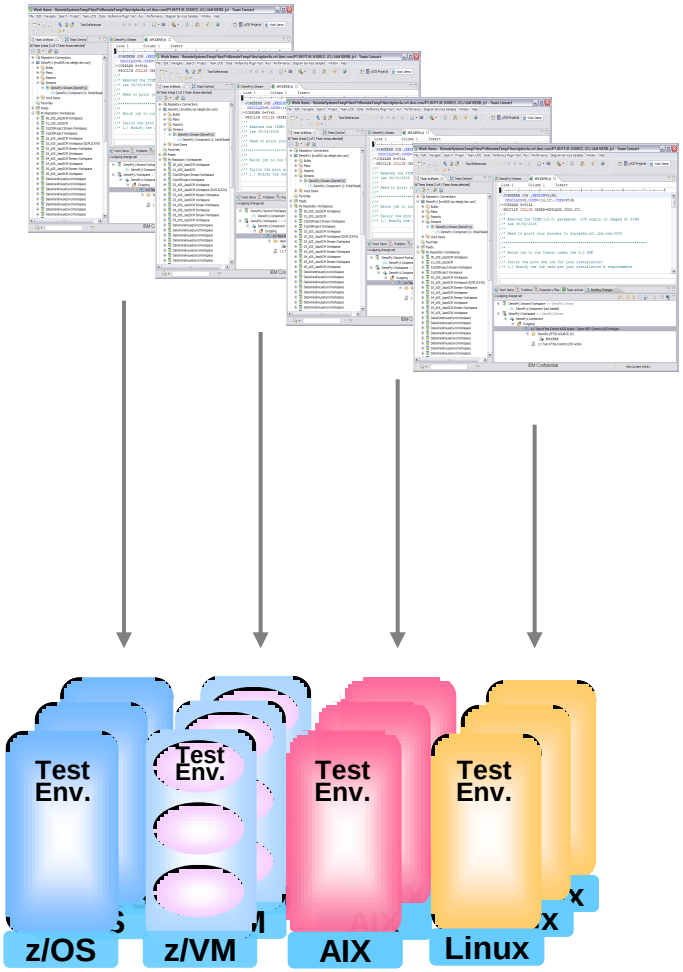


System z Terminal UI



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

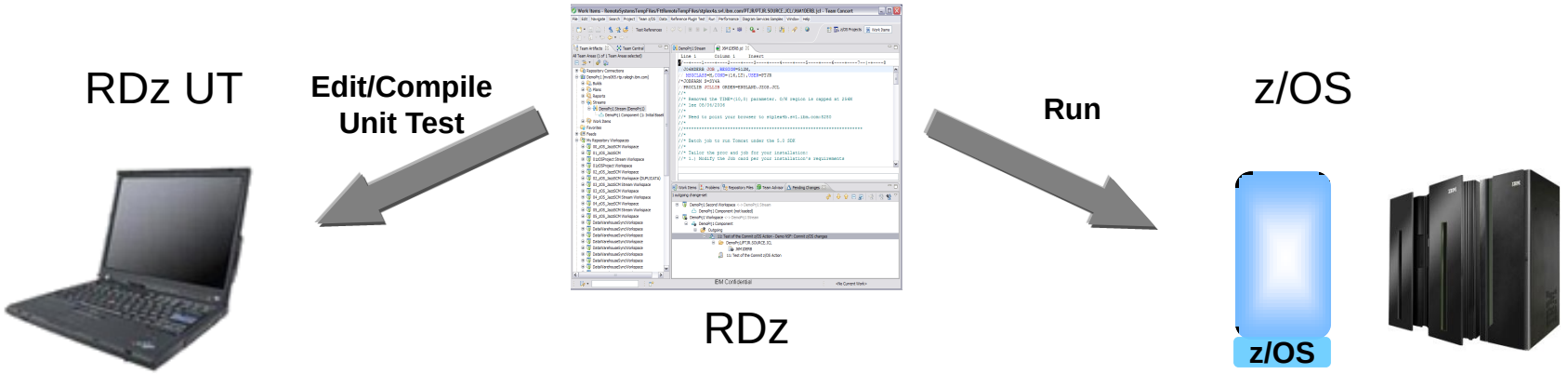
- **Virtual machines provisioned for compile/test in each environment**
- Special lower cost offerings:
  - System z Solution Edition for Application Development
    - LPAR-based addition of a customized package of hardware, compiler, middleware, and maintenance for 3 years
    - For compile, unit and 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

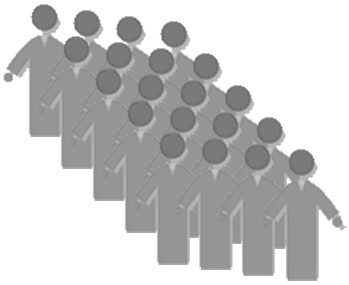
Rational Developer for System z Unit Test (RDz UT)

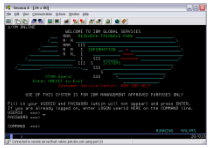
- z/OS runtime environment runs on x86 Linux workstation
  - **Compile and unit test** on the workstation - no zEnterprise hardware needed
  - Emulates System z general purpose processors, zIIPs, and zAAPs
- Reduce development MIPS for z/OS applications
  - Lower cost and better productivity
  - Enable new skills quickly
- Includes latest compilers, middleware, server load modules for RDz & RTC
- Also available for educational institutions



Compare Development Costs Over Three Years

CASE 1





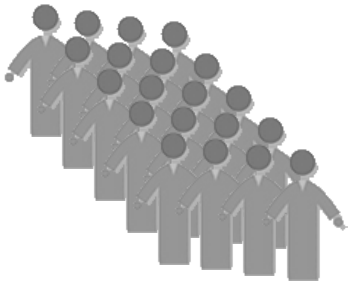
20 programmer team
@ $140K/yr/person

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

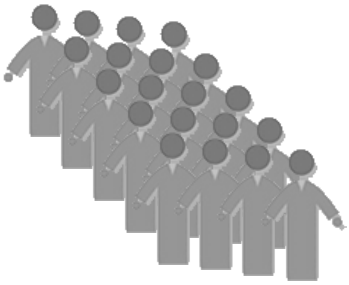
RDz for Edit, Compile, Debug

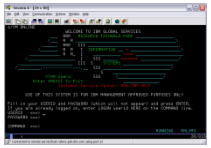
System z Solution Edition for Application Development

- 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





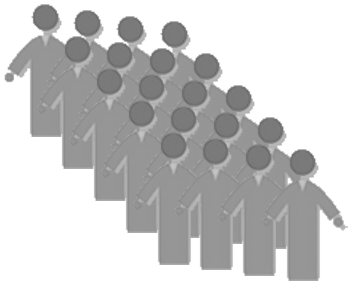
20 programmer team
@ $140K/yr/person

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

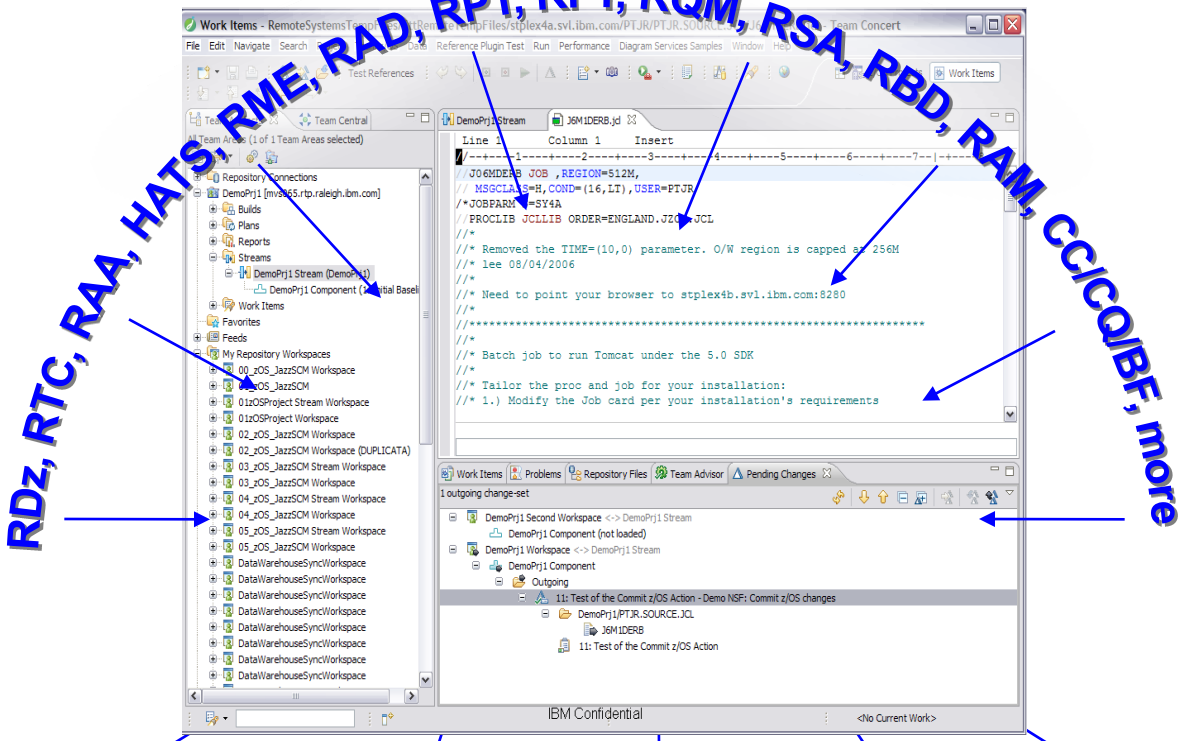
RDz for Edit, Compile, Debug

System z Solution Edition for Application Development

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

47% less

Unified Tools For Unified Development



- Same look and feel
- Same UI concepts
- Modern productivity accelerators
- Structured common processes
- Facilitates skills transfer

z/OS z Linux Power LUWi Other

For Your New zEnterprise

- Reduce labor costs and increase efficiencies
- Enable and encourage organizational improvement
- Provide unified processes and development procedures across the spectrum of platforms
- Offer virtualized environments with a single point of management for all teams
- Rational Tools are the ONLY tools that support ALM, development and testing across ALL the platforms of zEnterprise and more

+ ***Rational*** = ***Savings!***