Jeff Miller – Sr. Software Engineer, SWG CPO

5 January 2012

Developing Hybrid Applications for zEnterprise

Presenter Title Here
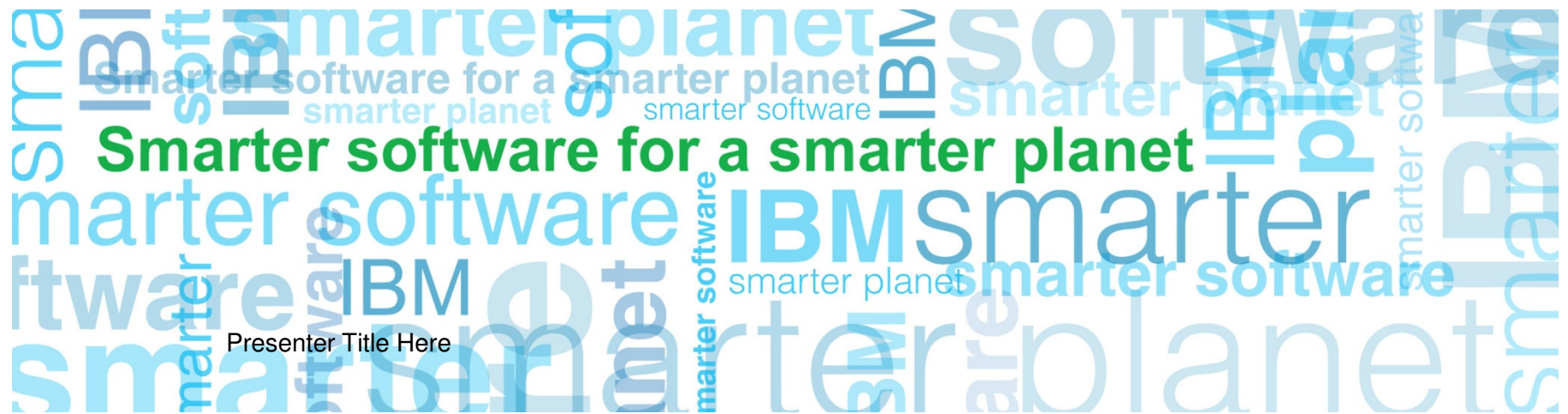
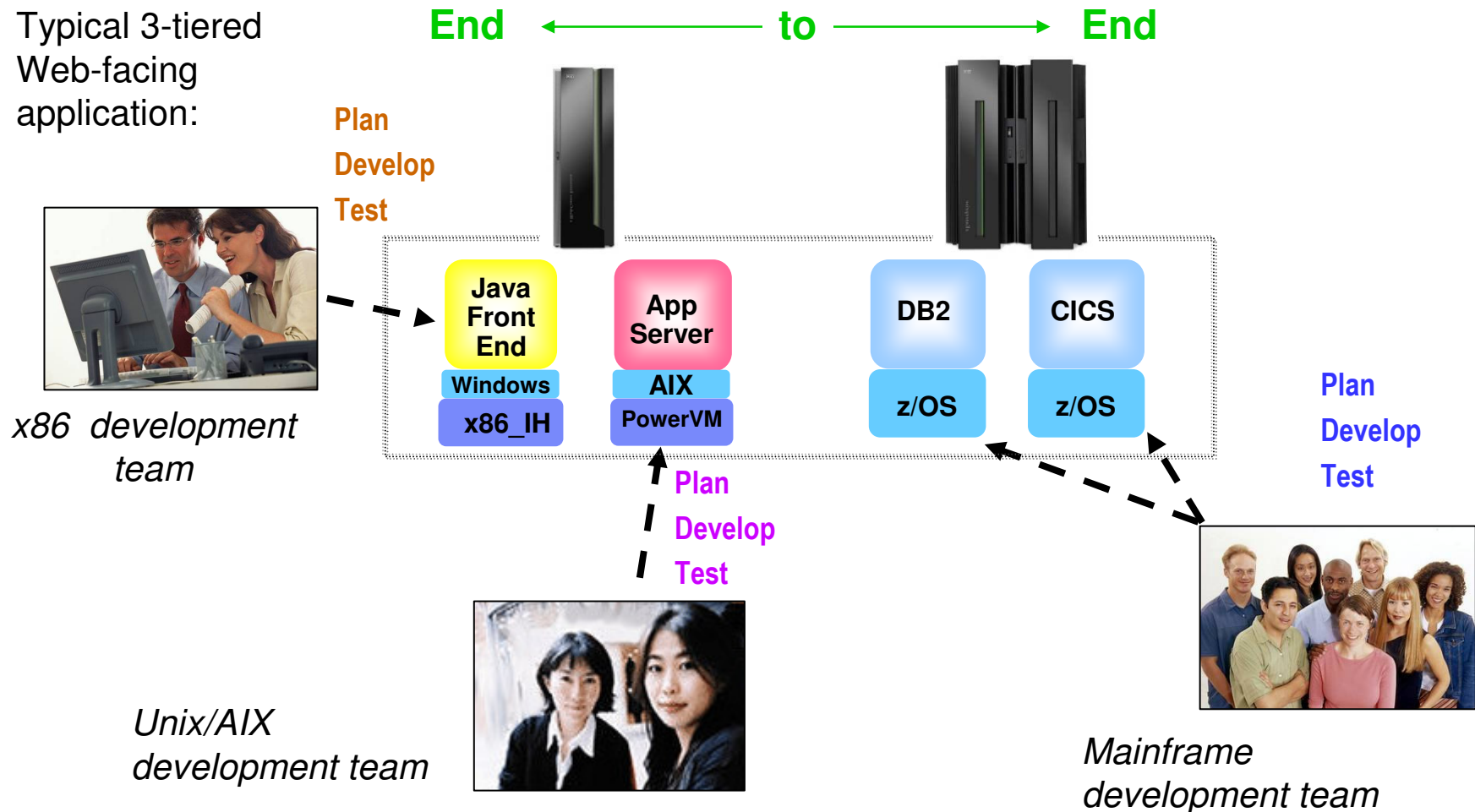# Learning objectives: include in all LFG sessions

- After completing this Web lecture, you will be able to:
  - Identify the challenges of cross-platform development
  - Learn how the Rational tools support development across all the platforms of zEnterprise
  - Be able to show customers how Rational tools help them save money and solve their cross-platform—and single platform—development needs
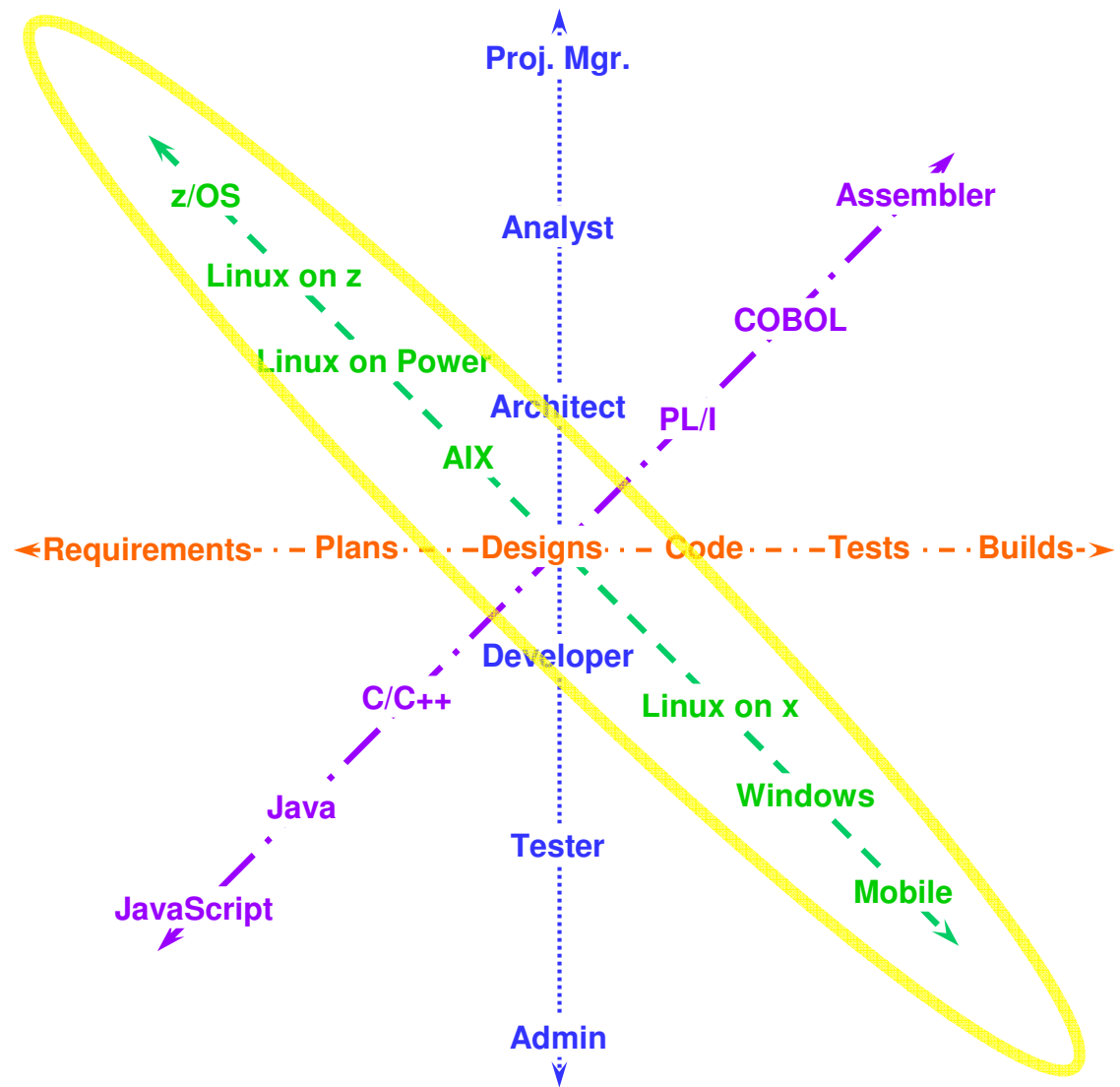
How Will These Different Teams Productively Coordinate A zEnterprise Solution?

- Today's business applications are complex and multi-tiered

Typical 3-tiered Web-facing application:

End ←——— **to** ———→ **End**

Plan
Develop
Test

x86 development team

Java Front End	App Server		DB2	CICS
Windows	AIX		z/OS	z/OS
x86_IH	PowerVM			

Plan
Develop
Test

Unix/AIX development team

Plan
Develop
Test

Mainframe development team

End-To-End Software Delivery Along All Axes

On zEnterprise

Rational Tools are the ONLY tools that support ALM, development and testing across ALL the platforms of zEnterprise and more!

Importance Of Collaboration In Solutions Development

- 63% of stakeholders are *not* satisfied with the speed of internal application development[1]…
- 58% are *not* satisfied with the quality[1]…
- 50% of outsourced projects <u>expected</u> to *under-perform*[2]…

- Collaboration-based development yields **better quality** and **more timely delivery**:
  - Align project teams that are geographically dispersed
  - Insure more efficient parallel development
  - Collaboration-based process rules lead to fewer mistakes
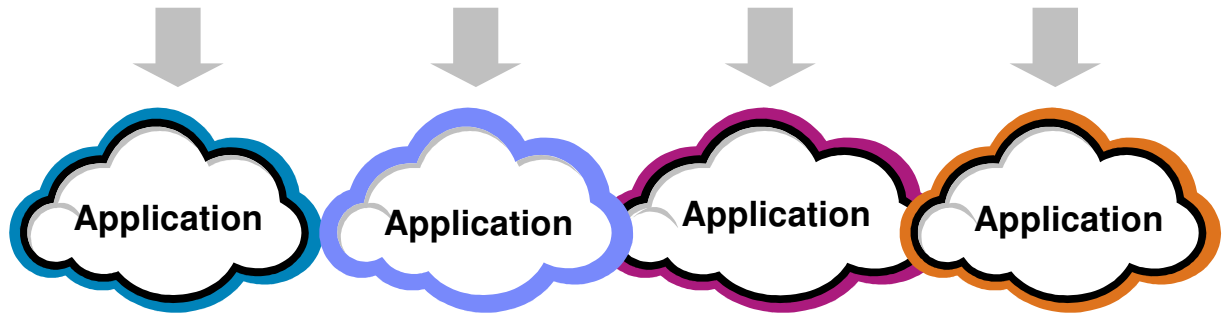 - For hybrid applications, collaboration across teams means shared knowledge and skills
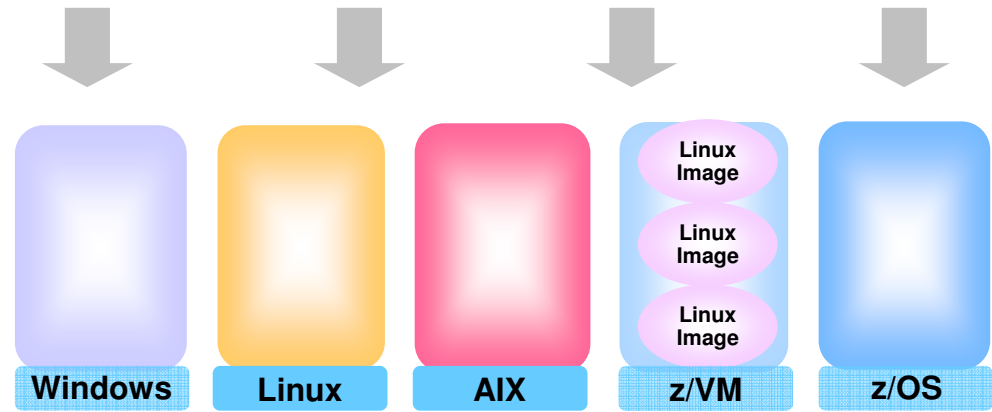
Source: [1]Forrester, [2]Gartner

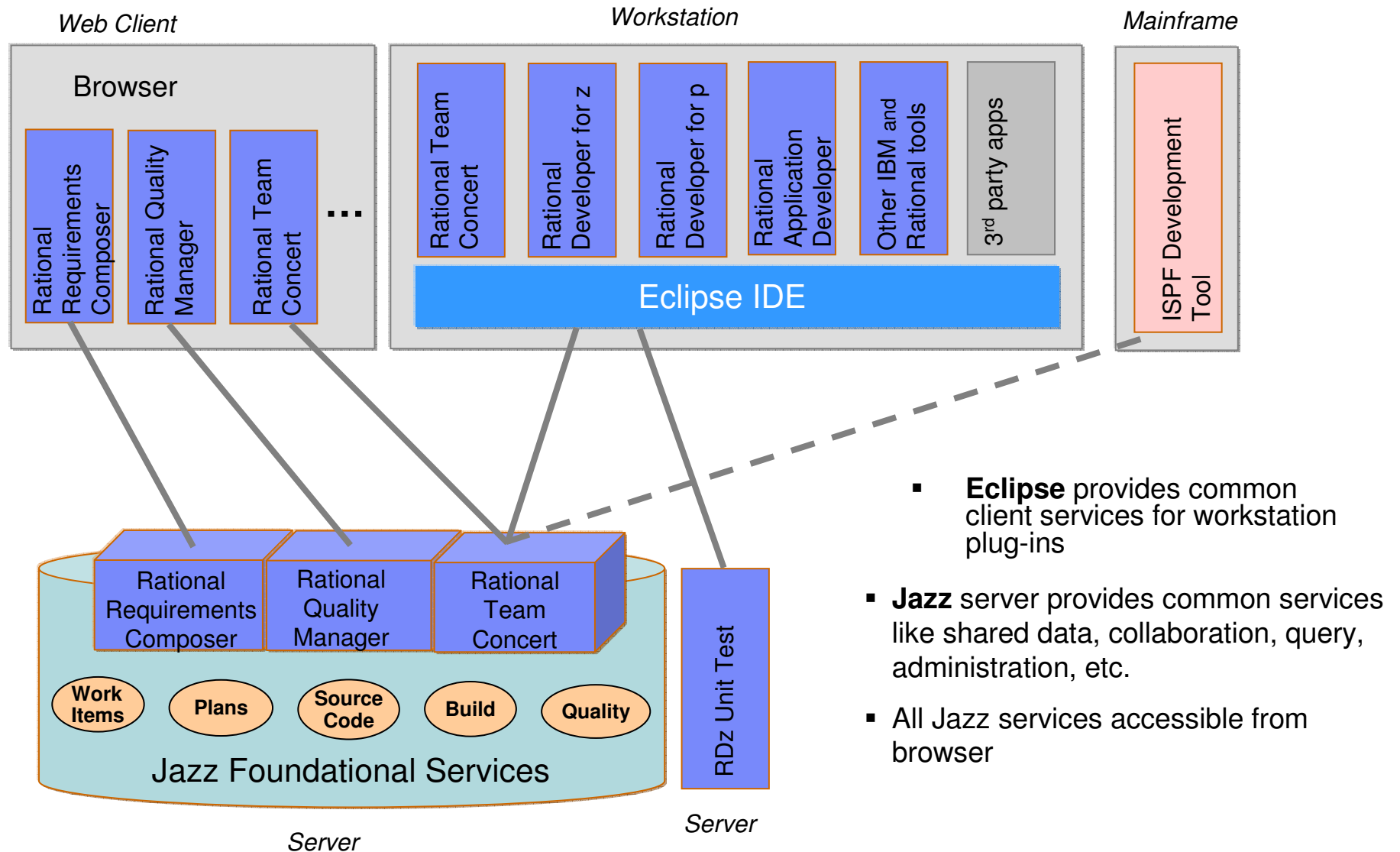# Rational Delivers A Unified Development Tool Set For All These Environments
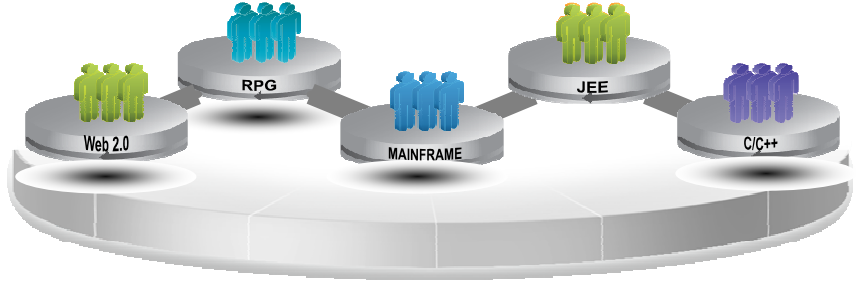
Unified processes
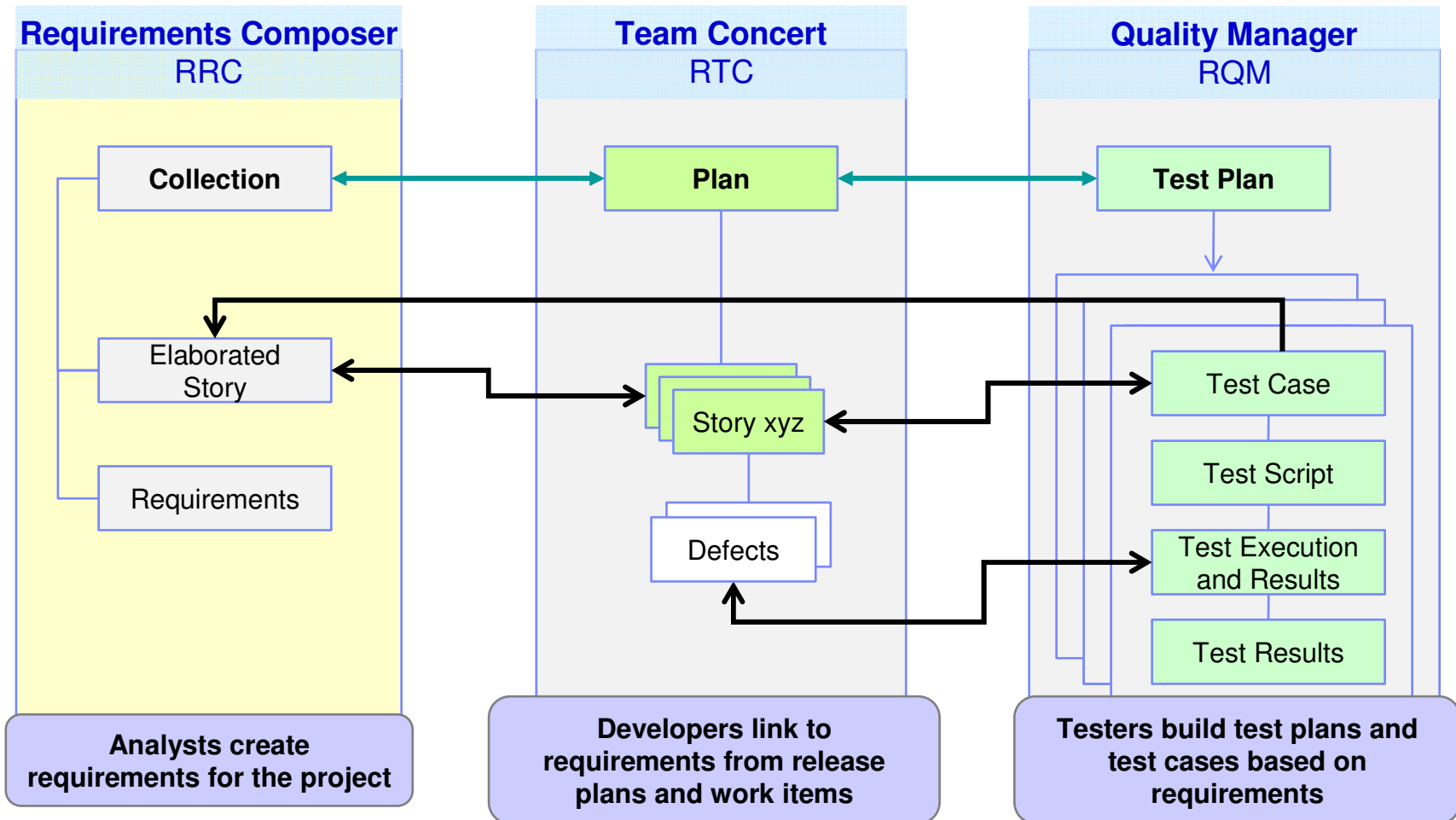Unified edit, compile, debug
Unified test

Best fit deployment

zEnterprise

Develop zEnterprise Hybrid Applications With Rational

Web Client

Workstation

Mainframe

Browser

Rational Requirements Composer

Rational Quality Manager

Rational Team Concert

...

Rational Team Concert

Rational Developer for z

Rational Developer for p

Rational Application Developer

Other IBM and Rational tools

3rd party apps

ISPF Development Tool

Eclipse IDE

Rational Requirements Composer

Rational Quality Manager

Rational Team Concert

RDz Unit Test

Work Items

Plans

Source Code

Build

Quality

Jazz Foundational Services

Server

Server

- **Eclipse** provides common client services for workstation plug-ins

- **Jazz** server provides common services like shared data, collaboration, query, administration, etc.

- All Jazz services accessible from browser

Collaborative Software Projects Begin With Requirements And Plans on Jazz

- Requirements collections, release and test plans, activities all *linked* across the application lifecycle with communication among all roles

Requirements Composer RRC	Team Concert RTC	Quality Manager RQM
Collection	Plan	Test Plan
Elaborated Story	Story xyz	Test Case
Requirements	Defects	Test Script
		Test Execution and Results
		Test Results
Analysts create requirements for the project	**Developers link to requirements from release plans and work items**	**Testers build test plans and test cases based on requirements**

smarter planet SOFTW
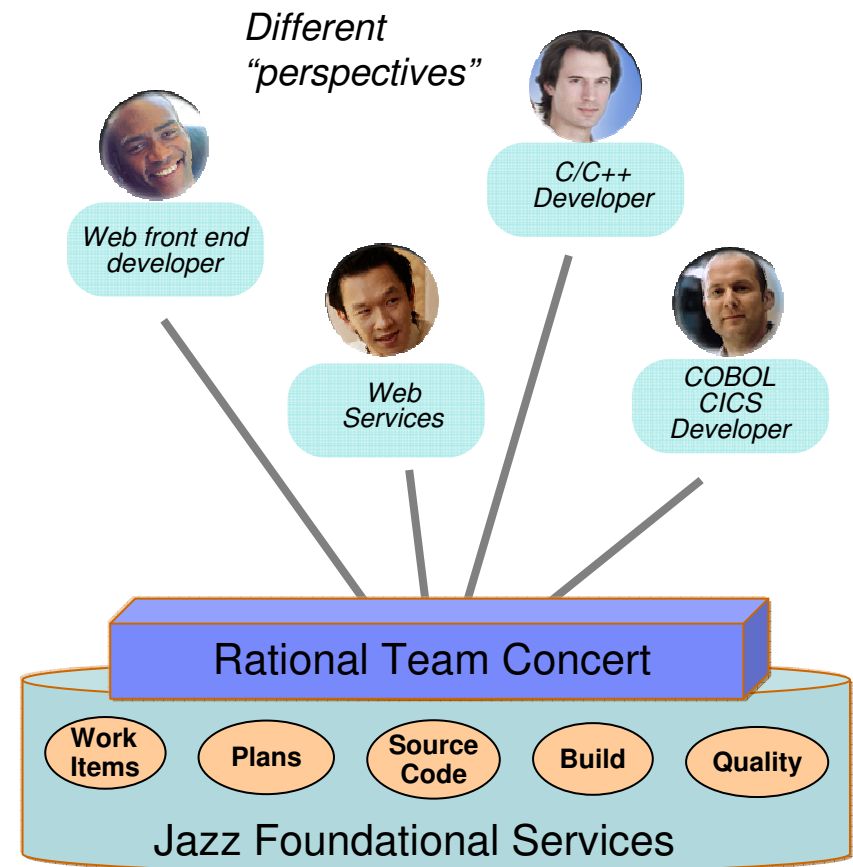smarter software for a smarter planet smarter so
IBM

Manage Complete Application Lifecycle From A Single Unified Environment

- Once requirements are defined, project managers can create and assign work items across all teams

- **Rational Team Concert** provides common shared repository of application assets, and data schemas for all environments

- All team members work on the same integrated set of project assets, using a common UI

- From one platform, develop components for multiple environments

- New v3.0.1.1
  – Fixpack
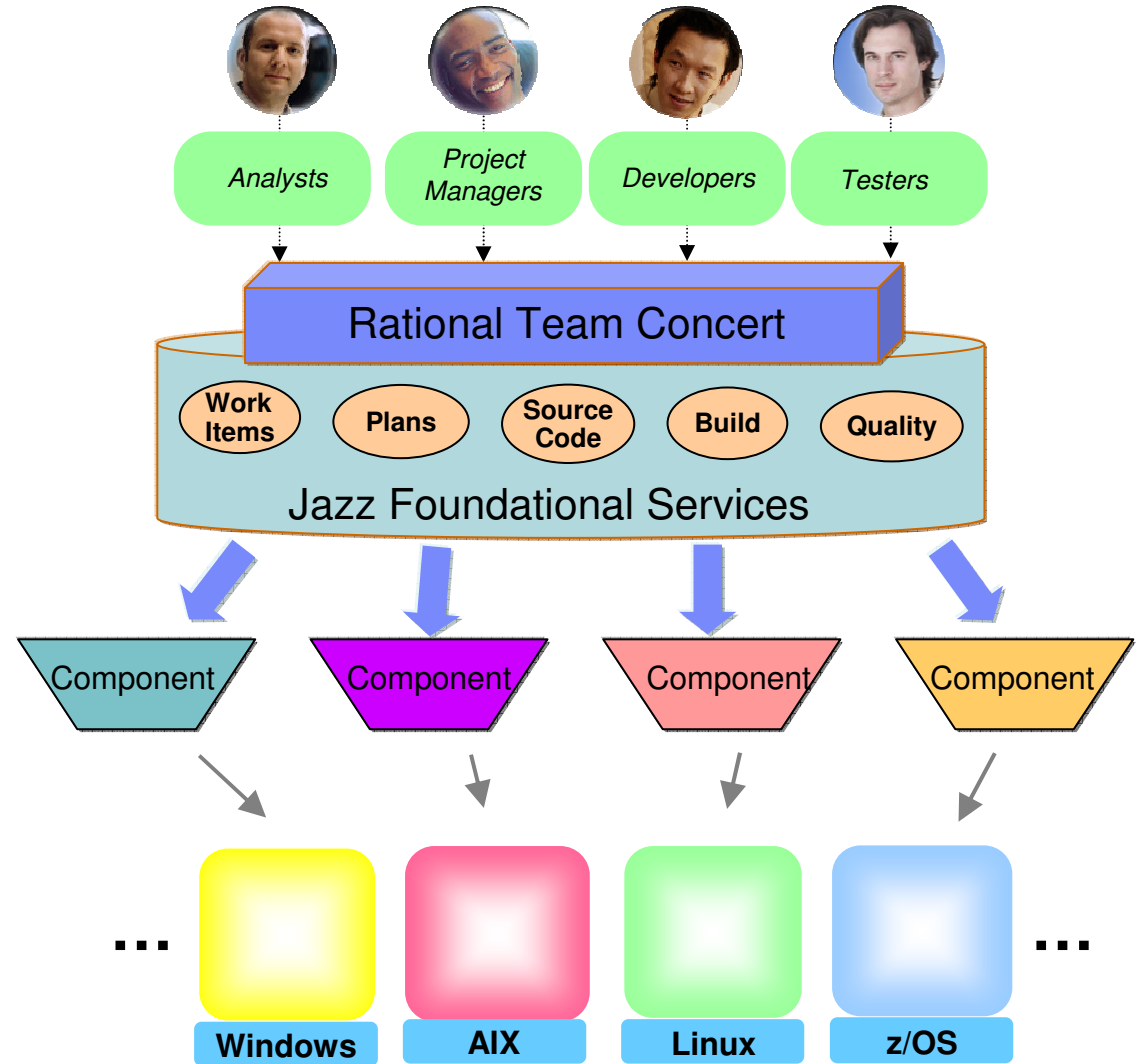
Integrated Development Environment Means Common Tools For All Platforms

- Develop cross-platform hybrid applications using *integrated* tools that support z/OS, AIX, and Linux

- Applications, Web and script developers use **Rational Application Developer (RAD)**

- Traditional mainframe developers use **Rational Developer for System z (RDz)**

- Unix / AIX developers use **Rational Developer for Power Systems (RDp)**

- Collaborating with Rational Team Concert (RTC)

Different "perspectives"

C/C++ Developer

Web front end developer

Web Services

COBOL CICS Developer

Rational Team Concert

Work Items Plans Source Code Build Quality

Jazz Foundational Services

Integrated Eclipse plug-in framework supports all developers

Mainframe Programmers Can Continue To Develop Using Traditional Tools If Desired

- Traditional ISPF programmers can continue to use familiar green-screen interface…
  - **ISPF Client for Team Concert**

- … but can integrate with Rational team services for software change management (SCM) functions
  - Use repository workspaces, change sets, link to work items, build requests, etc.

- Check out/check in code to native z/OS file system

- Facilitates phased implementation

- Reduces dependency on RDz deployment

ISPF SCM Client

More Productive System z Software Development

- Mainframe developers move to a graphical integrated development environment
  - Rational Developer for System z provides full support for development and reuse of all mainframe 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 debug, job generation, submission, monitoring, command execution, etc.

- New v8.0.3
  - New COBOL Analysis tools
  - Improved compatibility with ISPF
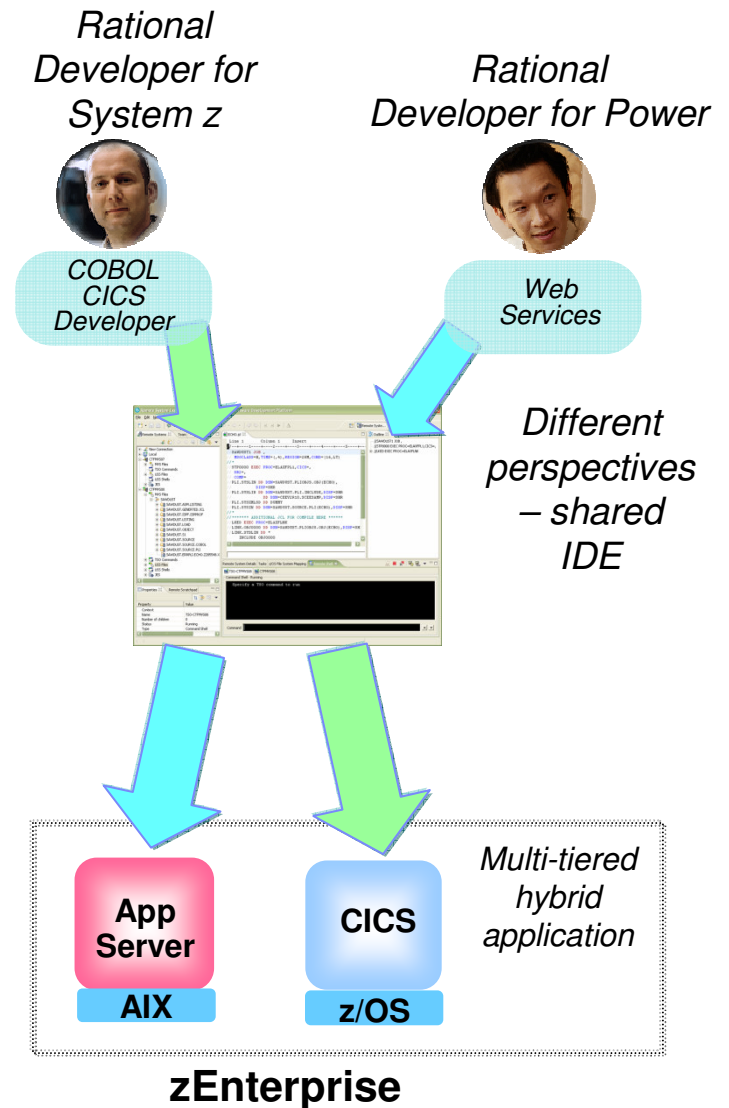 - New Code Quality tools
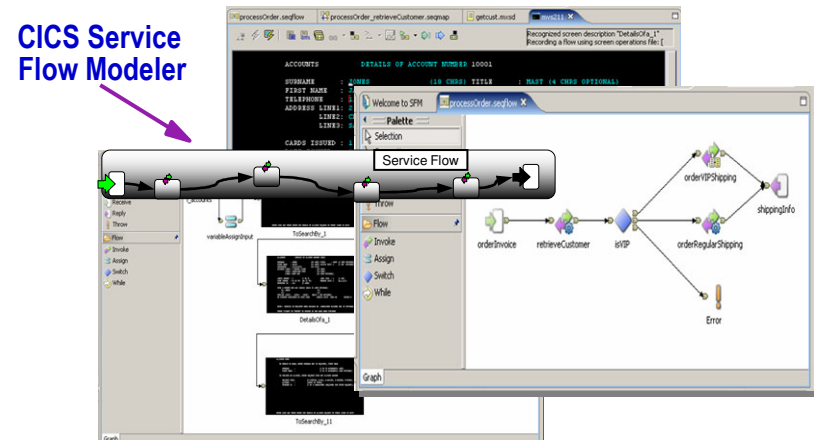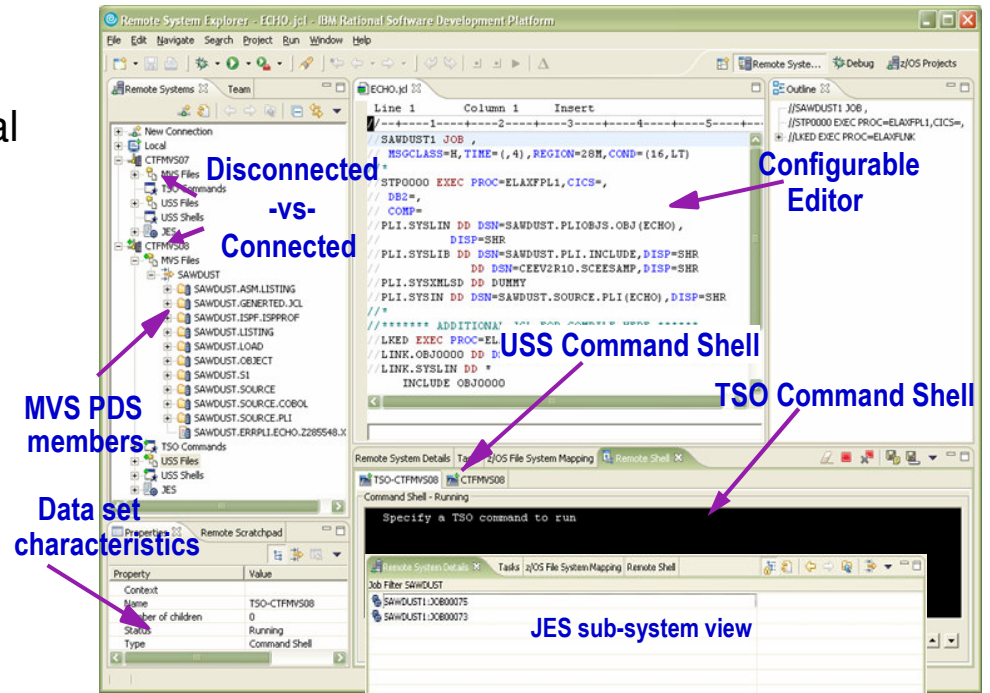
zEnterprise Power Developers Use The Same Integrated Development Environment

- Develop C/C++ and COBOL apps for AIX
  - **Rational Developer for Power**
    - Also supports Linux and IBM i OSes, plus RPG, Java, EGL, etc.
  - Same graphical IDE, shared resources and collaborative team services as for System z

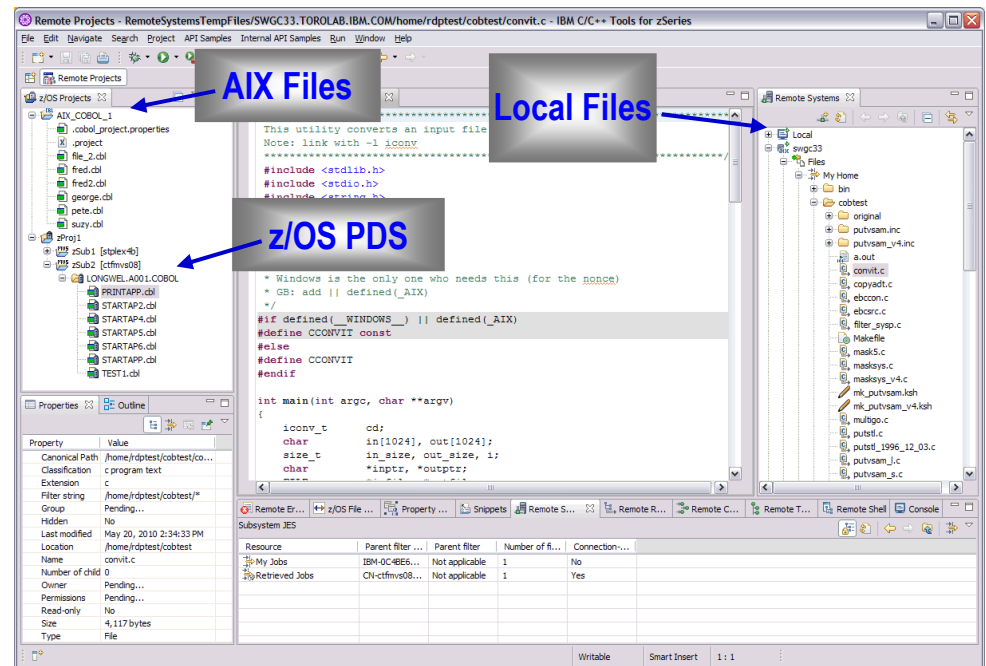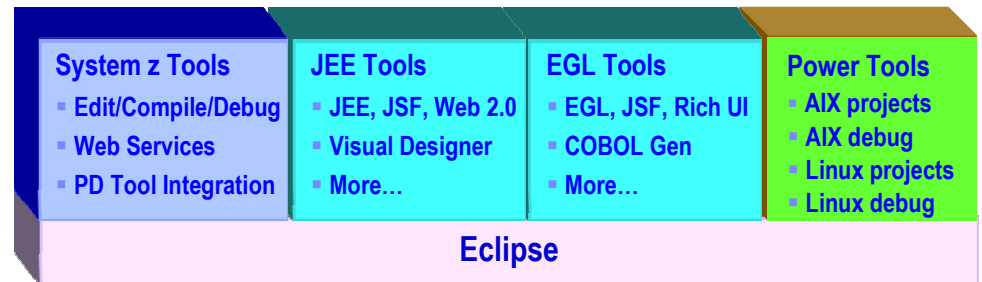- Develop on workstation (remote), then upload to Power server to compile, execute & debug

- Includes compilers that exploit Power's parallel thread execution capability
  - Optimizations help to maximize performance
  - Data shows parallelization can reduce application execution times by 82%[1]

- New v8.0.3
  - Secure host connection for IBM i
  - Migration and porting assistance framework
  - Enhanced debugging for AIX and Linux
  - Support for GNU C and C++ compilers
  - Support for 64-bit client OS (Win,Lin)
  - New charge metrics: (fixed term and token)

Rational Developer for System z

COBOL CICS Developer

Rational Developer for Power

Web Services

Different perspectives – shared IDE

App Server

AIX

CICS

z/OS

Multi-tiered hybrid application

zEnterprise

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[1]Source: IBM internal study

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Rational Delivers Integrated Development For zEnterprise Solutions

- Specifically designed for solutions development on zEnterprise
  - Rational Developer for zEnterprise

- Combines the functionality of z, Power Systems, x86 and applications development

- Addresses unique capabilities and requirements of zEnterprise

- Includes end-to-end debugging across all environments

- Lowers the cost of traditional mainframe application development
  - Uses selective workload offloading
 - Reduces MIPS used for common development activities

System z Tools
- Edit/Compile/Debug
- Web Services
- PD Tool Integration

JEE Tools
- JEE, JSF, Web 2.0
- Visual Designer
- More…

EGL Tools
- EGL, JSF, Rich UI
- COBOL Gen
- More…

Power Tools
- AIX projects
- AIX debug
- Linux projects
- Linux debug

Eclipse

AIX Files

Local Files

z/OS PDS

Work with artifacts on multiple platforms in one GUI

Hybrid Multi-tiered Applications Are Easily Debugged

- Debuggers built on the common Eclipse framework enable
  - Debug step across languages
  - Debug step across environments

- Collaborative debugging when integrated with RTC
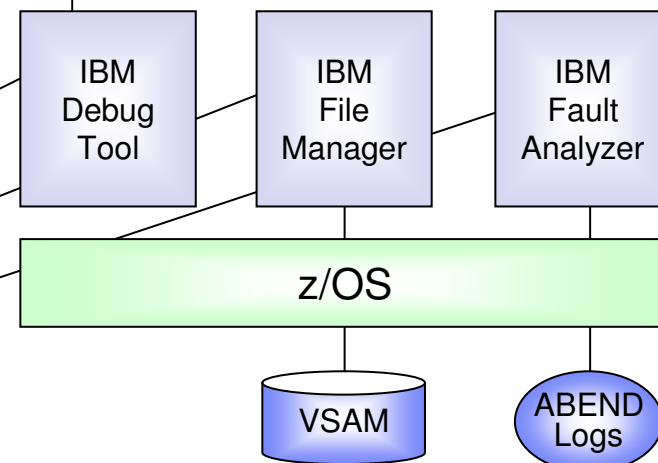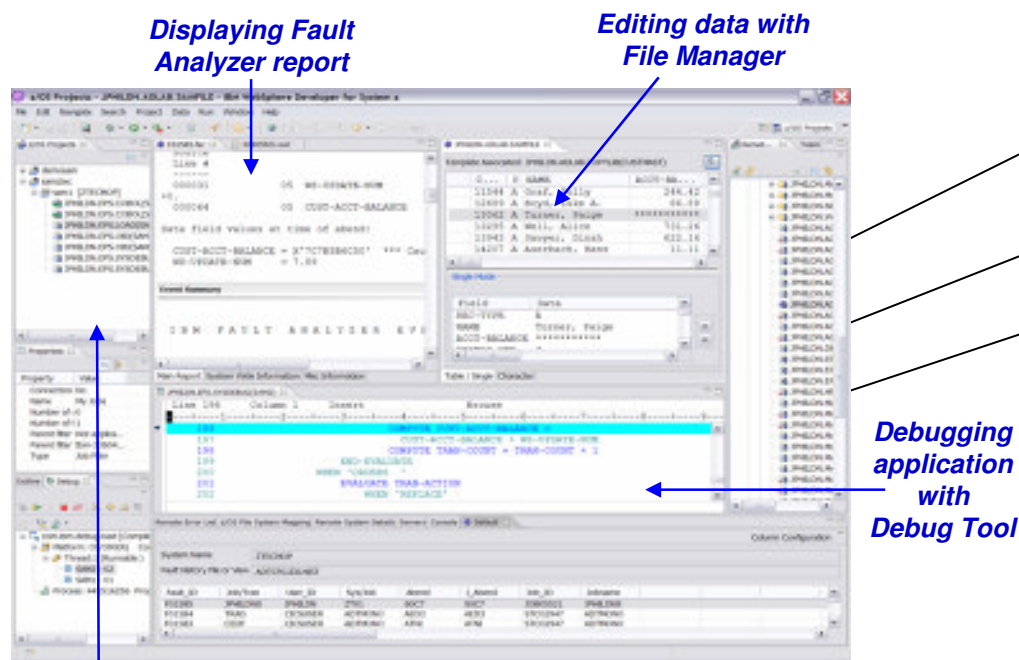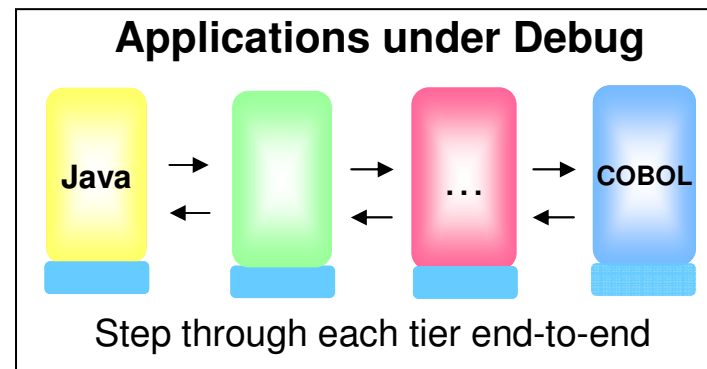
Work with code in
debugger on workstation
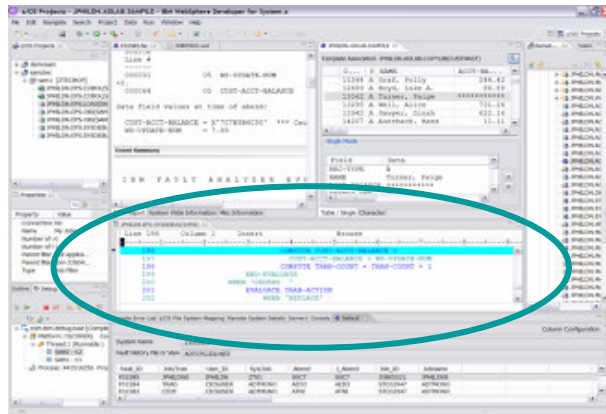
Debug applications running
on all zEnterprise platforms

AIX

z/OS

Java
Web
front
end

CICS
COBOL
back
end
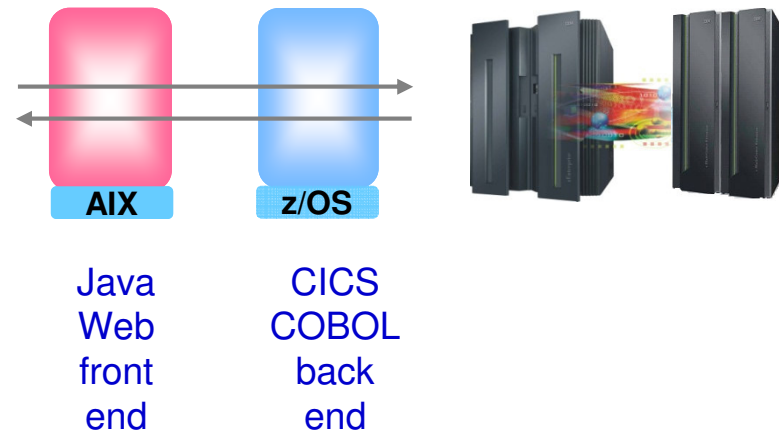
Debugging Includes Integration With Mainframe Problem Determination Tools

- Work with the PD Tools through the RDz client

- Easy access to all PD tools at the same time

- Debug and step through multi-tier applications
  - Across distributed *and* mainframe
  - Same debugger as for distributed systems

Applications under Debug

Step through each tier end-to-end

Displaying Fault Analyzer report

Editing data with File Manager

Debugging application with Debug Tool

Developing System z application with RDz

Workstation

IBM Debug Tool

IBM File Manager

IBM Fault Analyzer

z/OS

VSAM

ABEND Logs

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

Unit Test Option For z/OS Applications Can Reduce Testing Costs

- 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

- Reduces 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
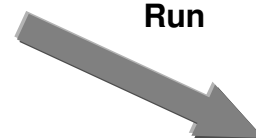
- Also available for educational institutions

New v8.0.3
- More flexible license administration
- More middleware options

Rational Developer For System z Unit Test

Edit/Compile Unit Test

RDz

Run

z/OS
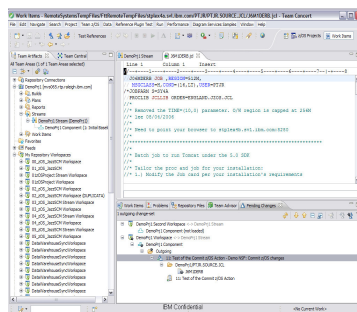
Test All Aspects Of Applications Using Integrated Quality Management Tools
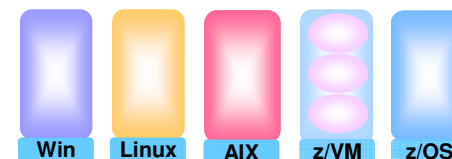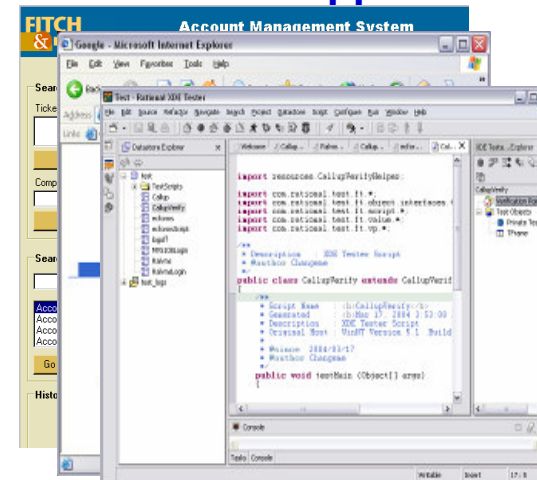
- Manage tests with **Rational Quality Manager**

- 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**
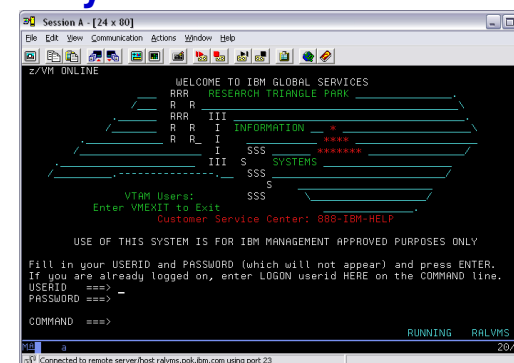
- Use **Rational Performance Tester** for z/OS
  - Develop scripts on Windows or Linux
  - Execute scripts on z/OS
  - Performance test any **Web application** (z or non-z)
  - Use **IBM Workload Simulator for z/OS and OS/390** to test terminal-based applications

Web and GUI Applications

System z Terminal UI

Win   Linux   AIX   z/VM   z/OS

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

- Virtual machines provisioned for compile/test in each environment
  - z/VM on System z
  - PowerVM on Power Systems blades
  - KVM on System x blades

- Developers and testers can bring up environments as needed
  - Then remove them when finished

Test Env.	Test Env.	Test Env.	Test Env.	Test Env.
Win	Linux	AIX	Linux	z/OS
KVM	KVM	PwrVM	z/VM	z/VM
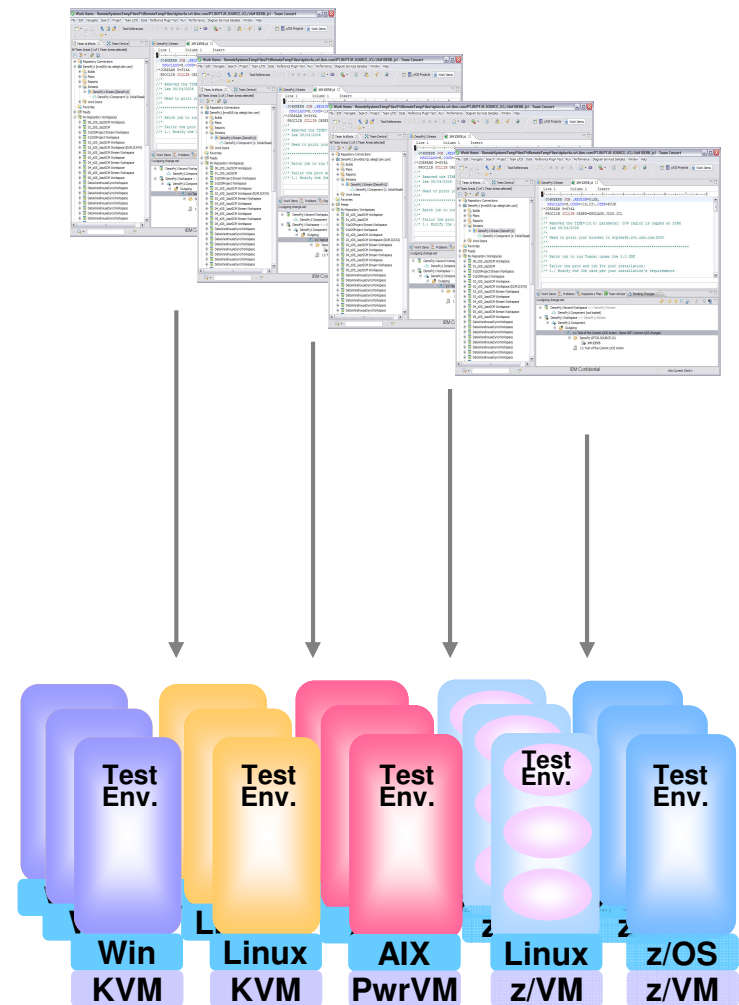
Customers Can Take Advantage Of Special Lower Cost Solution Editions

- **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

Test Env.	Test Env.	Test Env.	Test Env.	Test Env.
Win KVM	Linux KVM	AIX PwrVM	Linux z/VM	z/OS z/VM
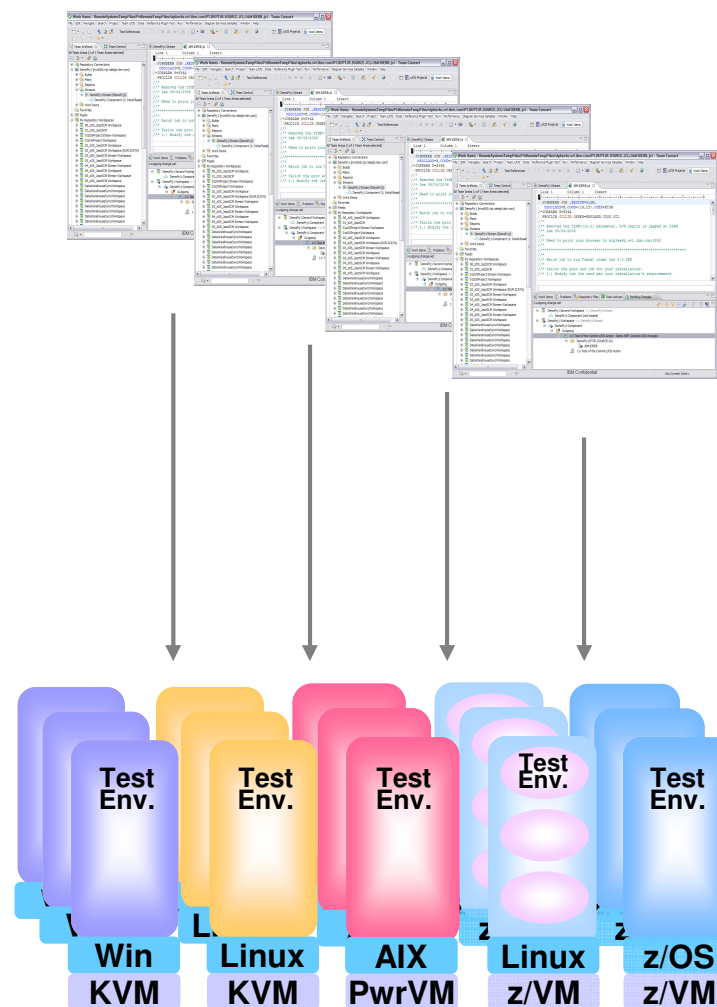
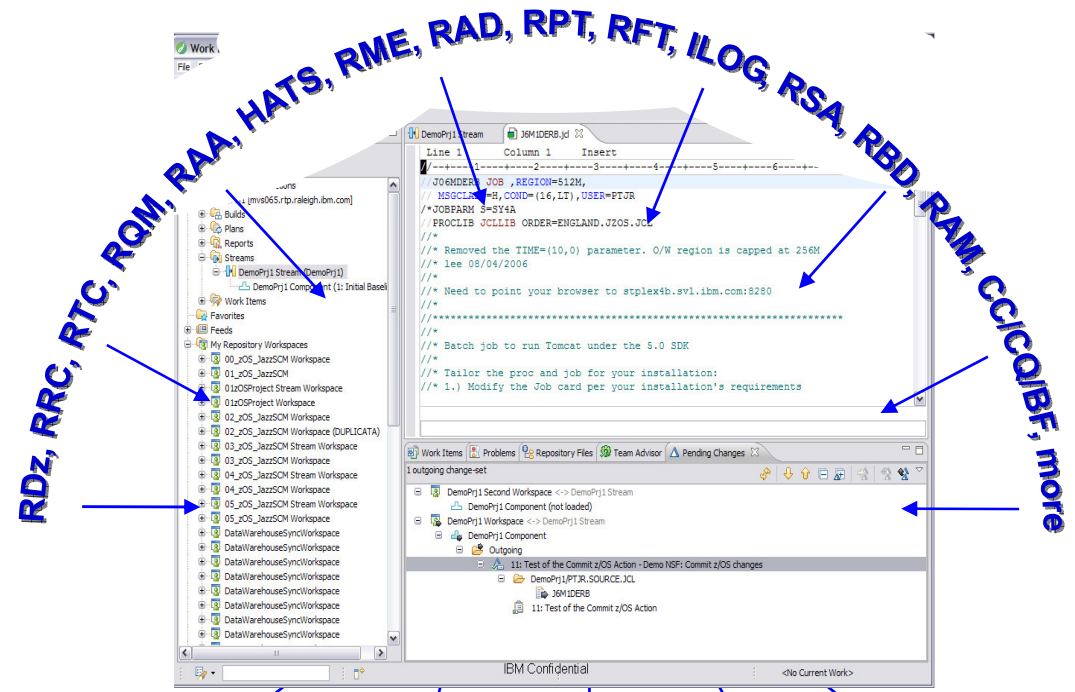# Use Tivoli And zManager To Create zEnterprise Runtimes For Compile And Test

Request for services

Tivoli Service Automation Manager (TSAM)

Service Catalog

- Create new VMs for development and test on zEnterprise platforms

- Developers bring up test environments as needed

Administrator-driven

Automated

Tivoli Provisioning Manager (TPM)

zManager

Tivoli Provisioning Manager (TPM)

Prod	Prod	Test	Prod	Dev	Test	Test	Test	Test	Test	Dev	Test

AIX	Linux	Windows	Linux
PowerVM	x86_IH	x86_IH	z/VM

zEnterprise
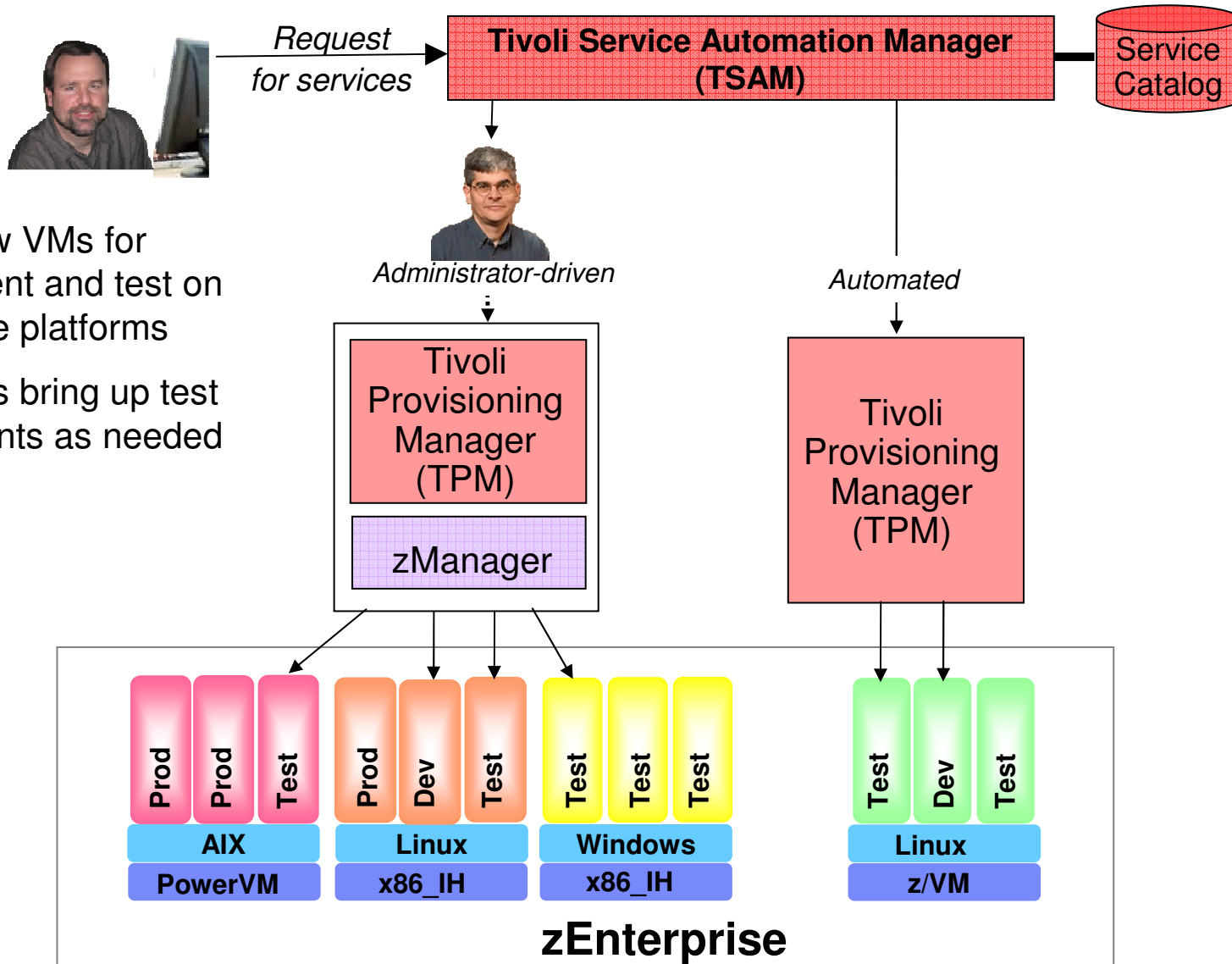
Unified Tools For Hybrid Application Development

RDz, RRC, RTC, RQM, RAA, HATS, RME, RAD, RPT, RFT, ILOG, RSA, RBD, RAM, CC/CQ/BF, more

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

z/OS   Linux on z   AIX   LUWi   Other

Rational Tools are the ONLY tools that support ALM, development and testing across ALL the platforms of zEnterprise and more!

Thank You!