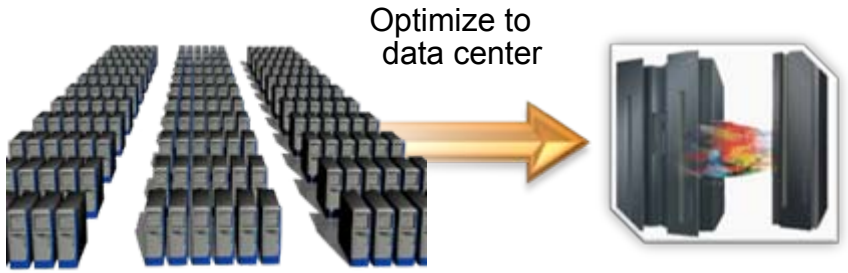
zEnterprise – The Ideal Platform For Smarter Computing

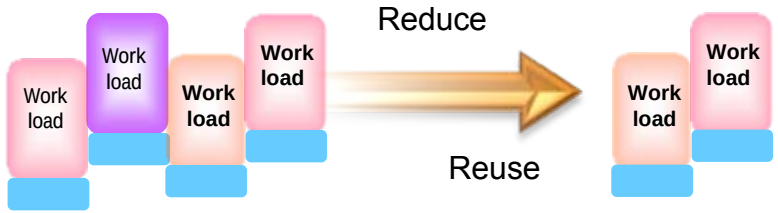
Developing Hybrid Applications For zEnterprise

Smarter Computing Is Redefining The Data Center

Consolidate Infrastructure

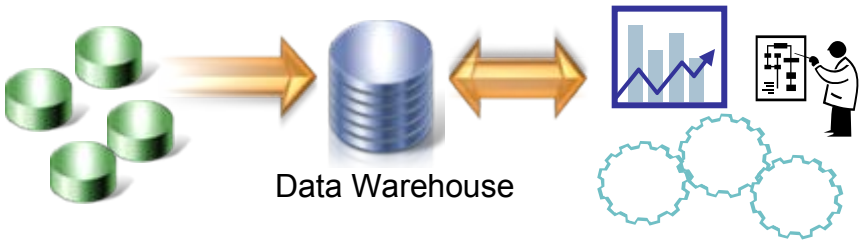


Eliminate Redundant Software



Improve Service Delivery

Leverage Data to Optimize Business



Smarter Computing Means Breaking Down Cultural Boundaries That Inhibit Optimum IT

Mainframe teams

Distributed teams

- Cultural barriers preclude fit for purpose optimizations
- Separate teams produce separate solutions
- Different skills inhibit optimum use of human resource

zEnterprise enables cultural integration

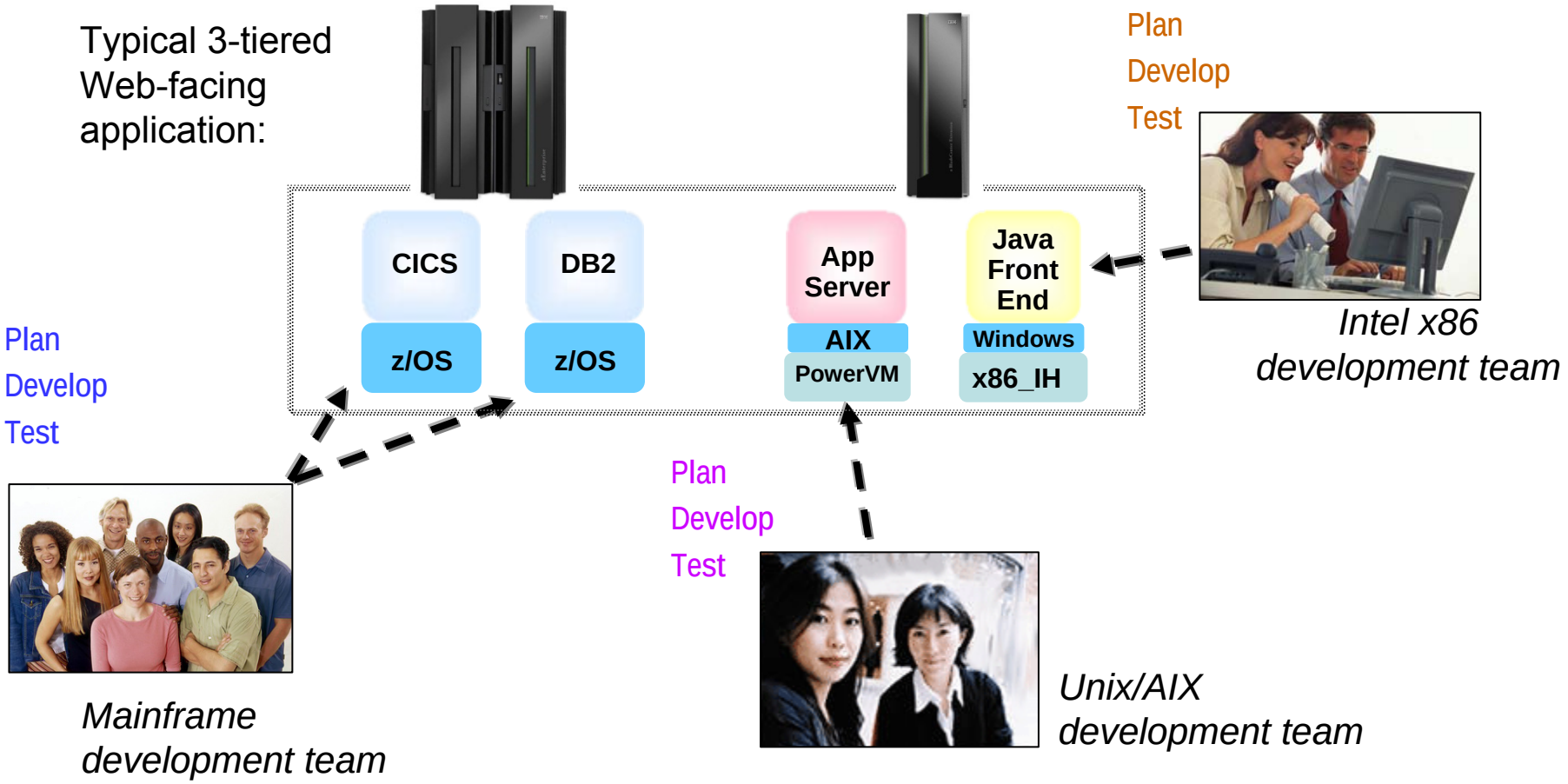
- Consolidate development and test around common tool set
- Optimize development process
- Reduce costs and overhead

Traditionally, Different Platforms Meant Different Teams, Processes And Tools

	Mainframe	UNIX	Intel /x86
Requirements gathering	Formal	Informal	Informal
Collaboration across members	Limited	More formal (e.g., Agile Programming)	More formal (e.g., Agile Programming)
Tools for edit, compile and debug	Formal (e.g., ISPF)	More formal (e.g., Emacs)	Various and informal (e.g., .NET)
Rigorous end-to-end testing methodologies	More formal	Moderate	Limited

How Will These Different Teams Productively Coordinate A zEnterprise Solution?

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



What's Needed?

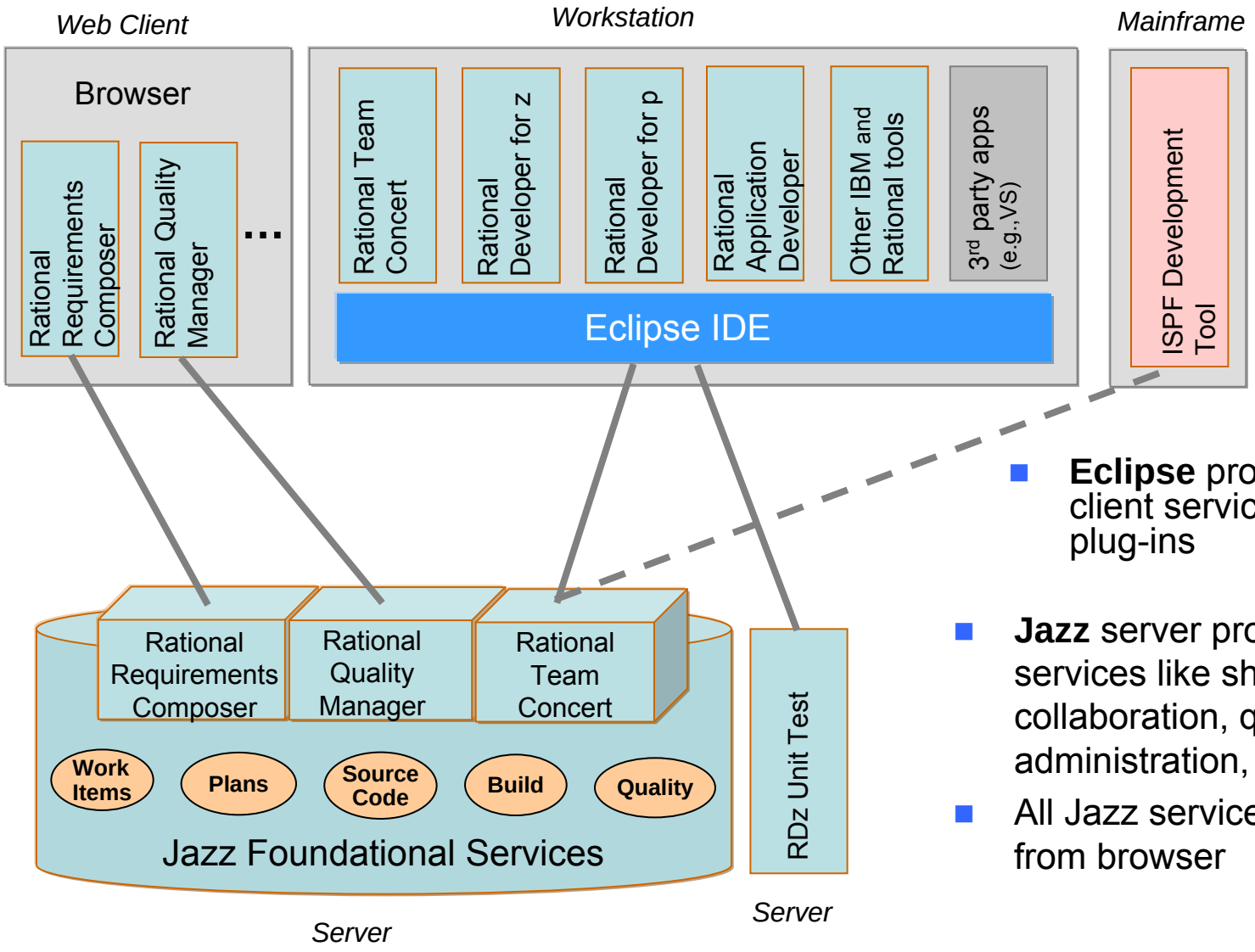
Requirements gathering	Formalized with centralized repository
Collaboration across members	Common and build-in
Tools for edit, compile and debug	Integrated across all platforms
Rigorous end-to-end testing methodologies	Extensive, high-quality

Intel/x86
UNIX
Mainframe

- Integrated platform that enables teams to develop hybrid solutions together
- Extensible and unified set of tools that support all teams and all platforms
- Lower cost, more rigorous approach to testing
- Collaborative approach

IBM Rational provides all this…

Rational Includes All Components For Developing zEnterprise Hybrid Applications



- **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

Importance Of Collaboration In Solutions Development

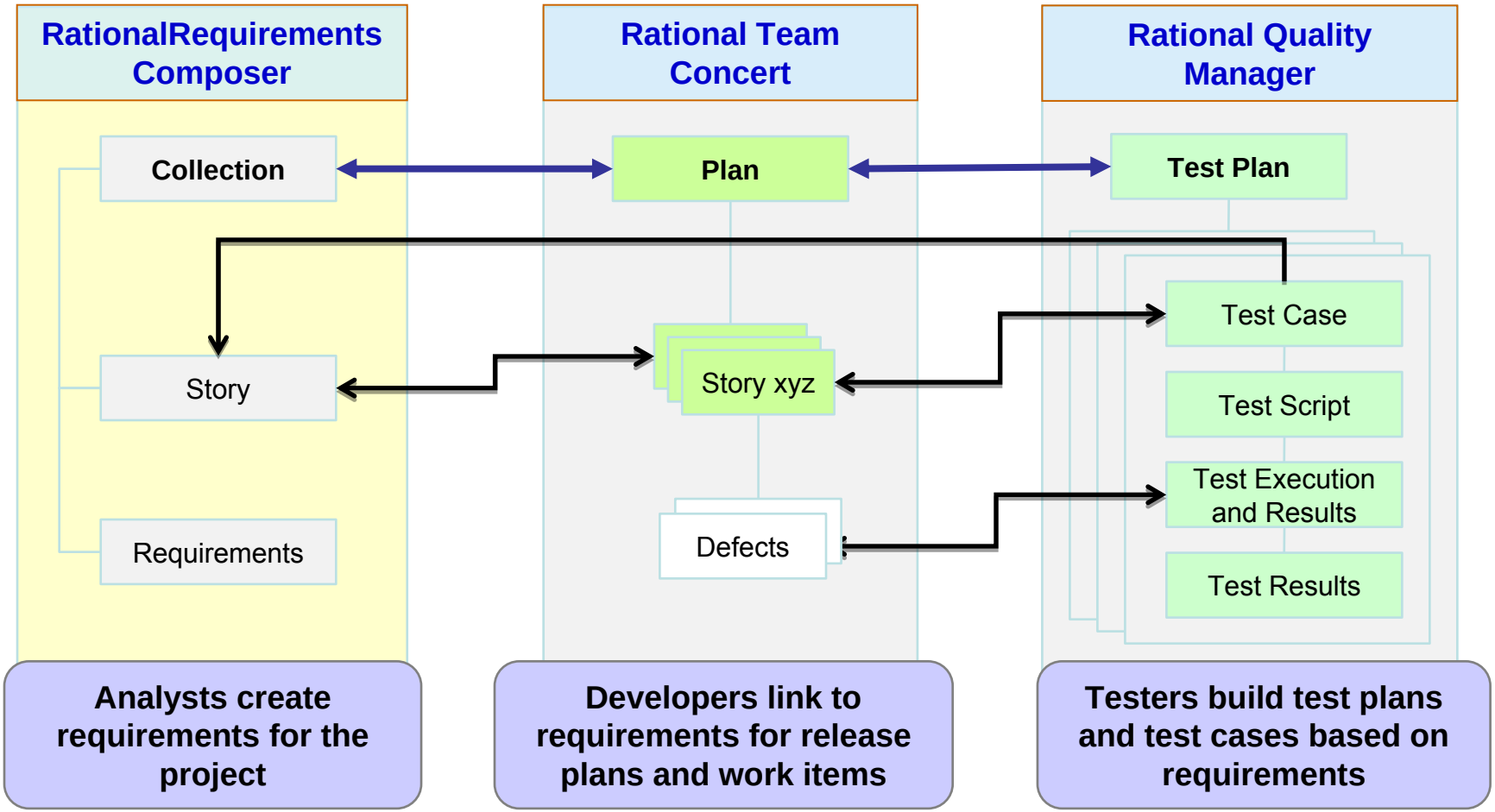
- 63% of stakeholders are *not* satisfied with the speed of internal application development1…
- 58% are *not* satisfied with the quality1…
- 50% of outsourced projects *under-perform*2…

- 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

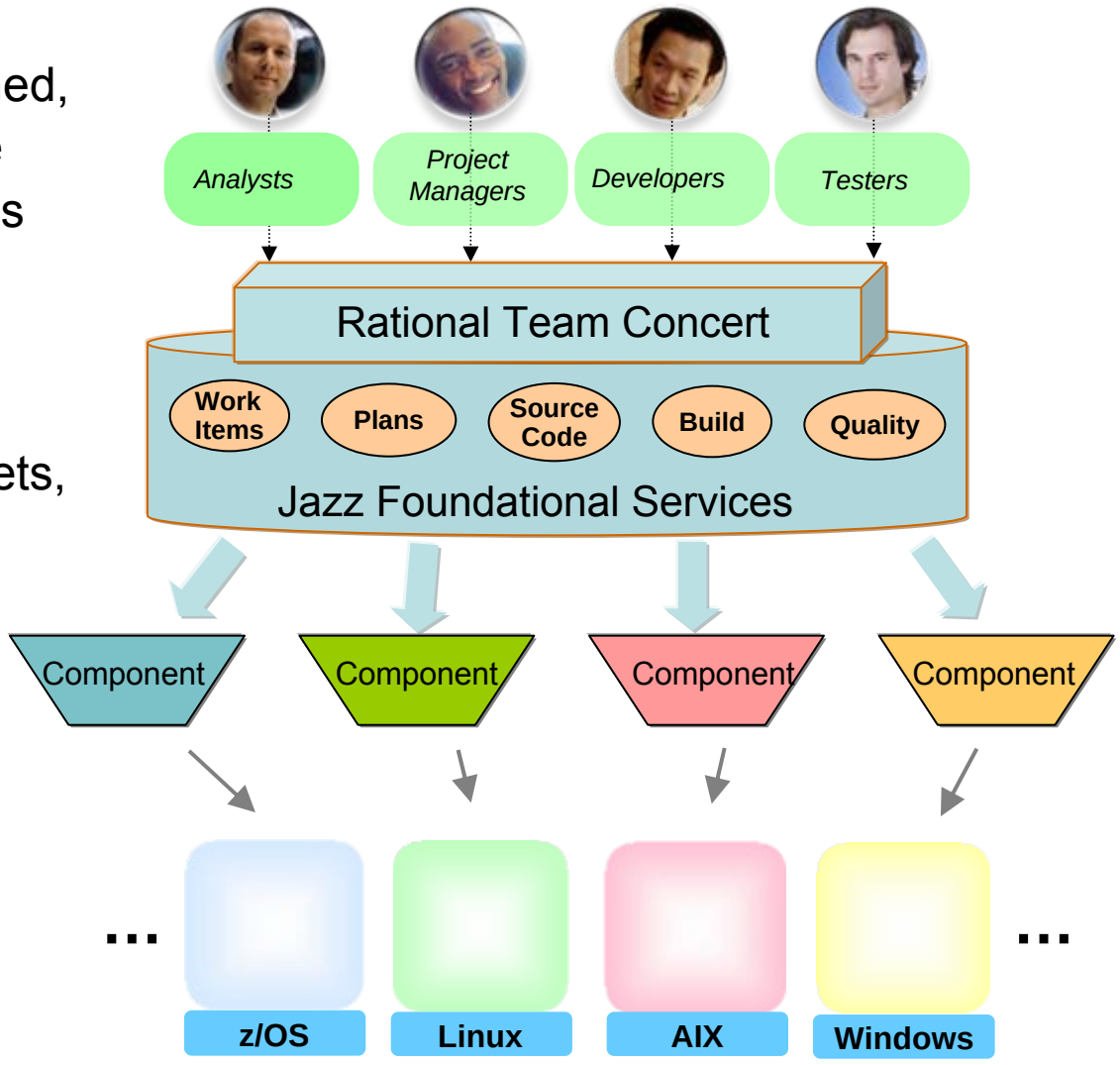
DEMO: Multi-tiered Software Projects Begin With Requirements And Plans

- Simplify the planning process through a unified effort



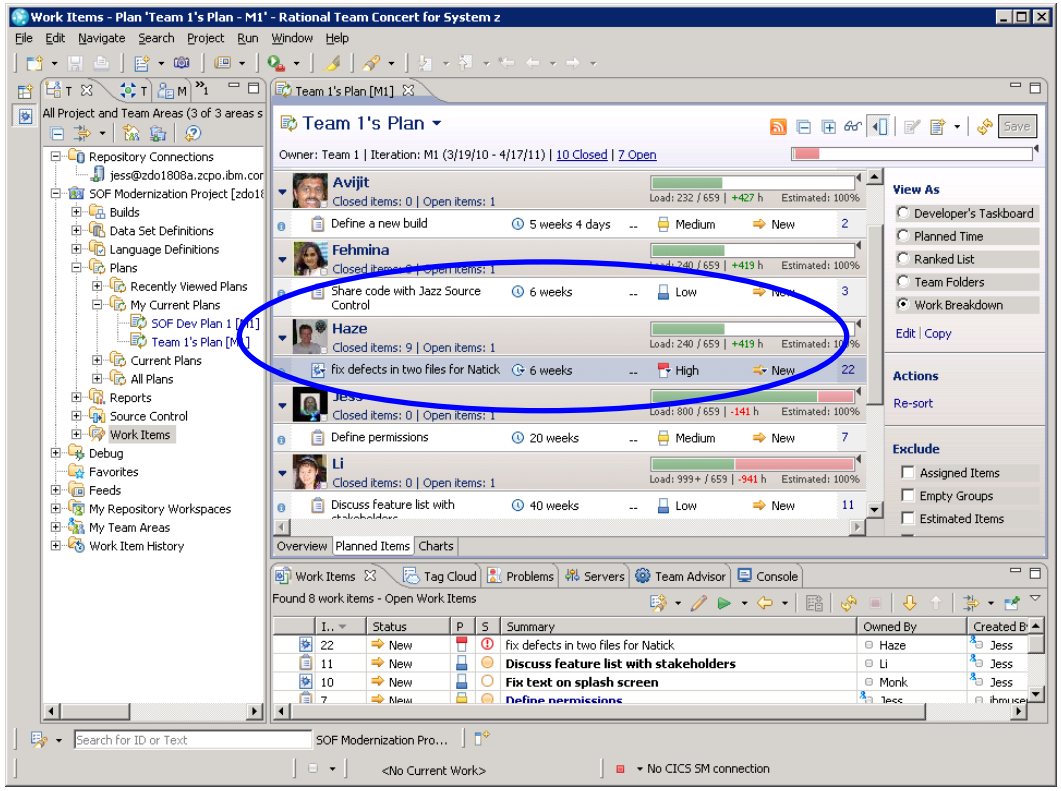
Manage Complete Application Lifecycle From A Single Unified Environment

- 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



DEMO: Project Manager Assigns Work Items To Appropriate Team Member

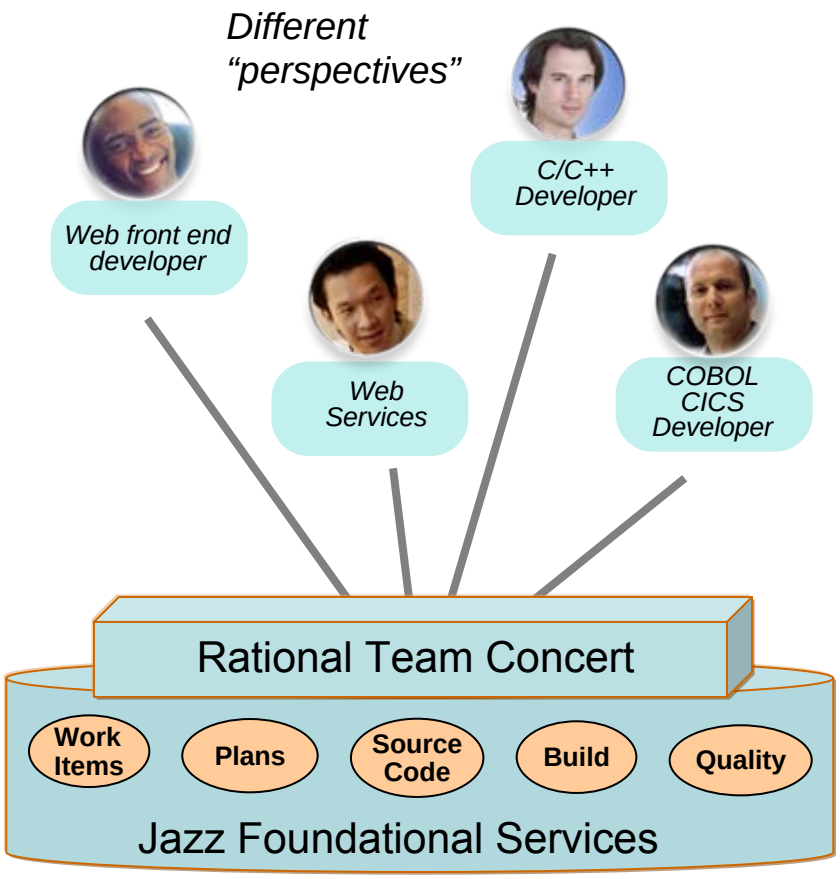
- Easily view all developers on the project
- Visually assess work load for each
- Quickly determine the best person to fix the particular issue



Rational Team Concert

Integrated Development Environment Means Common Tools For All Platforms

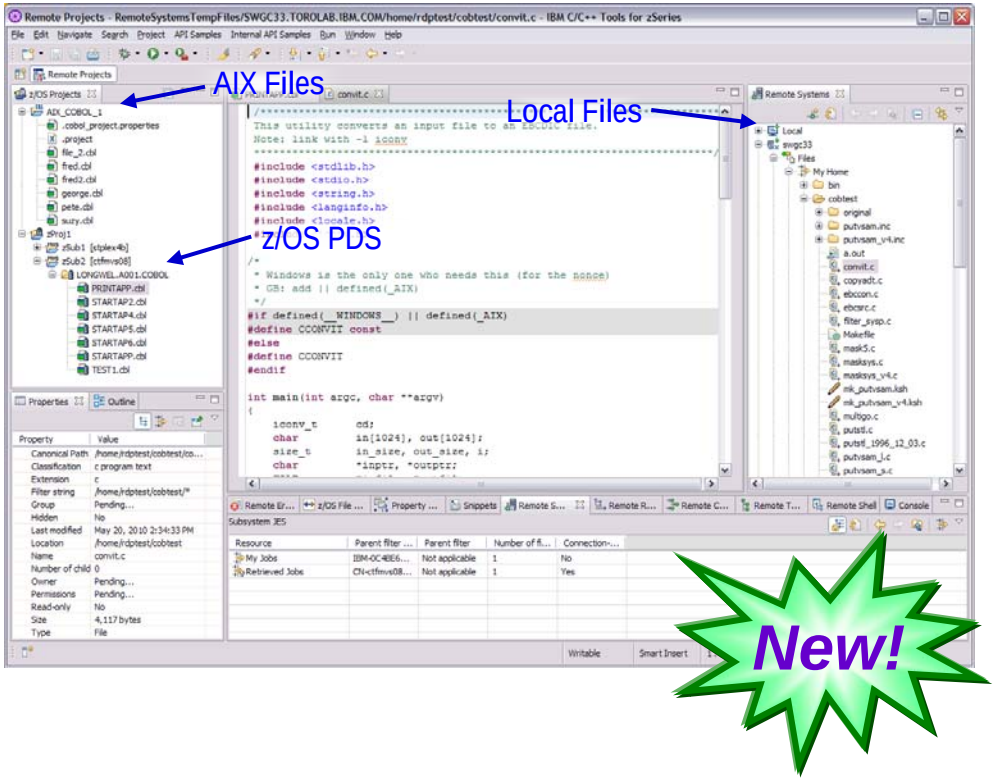
- Develop cross-platform hybrid applications using *integrated* tools that support z/OS, AIX, and Linux
- Applications, Web and script developers use Rational Application Developer (RAD)
- Traditional mainframe developers use Rational Developer for System z (RDz)
- Unix / AIX developers use Rational Developer for Power Systems (RDp)



Integrated Eclipse plug-in framework supports all developers

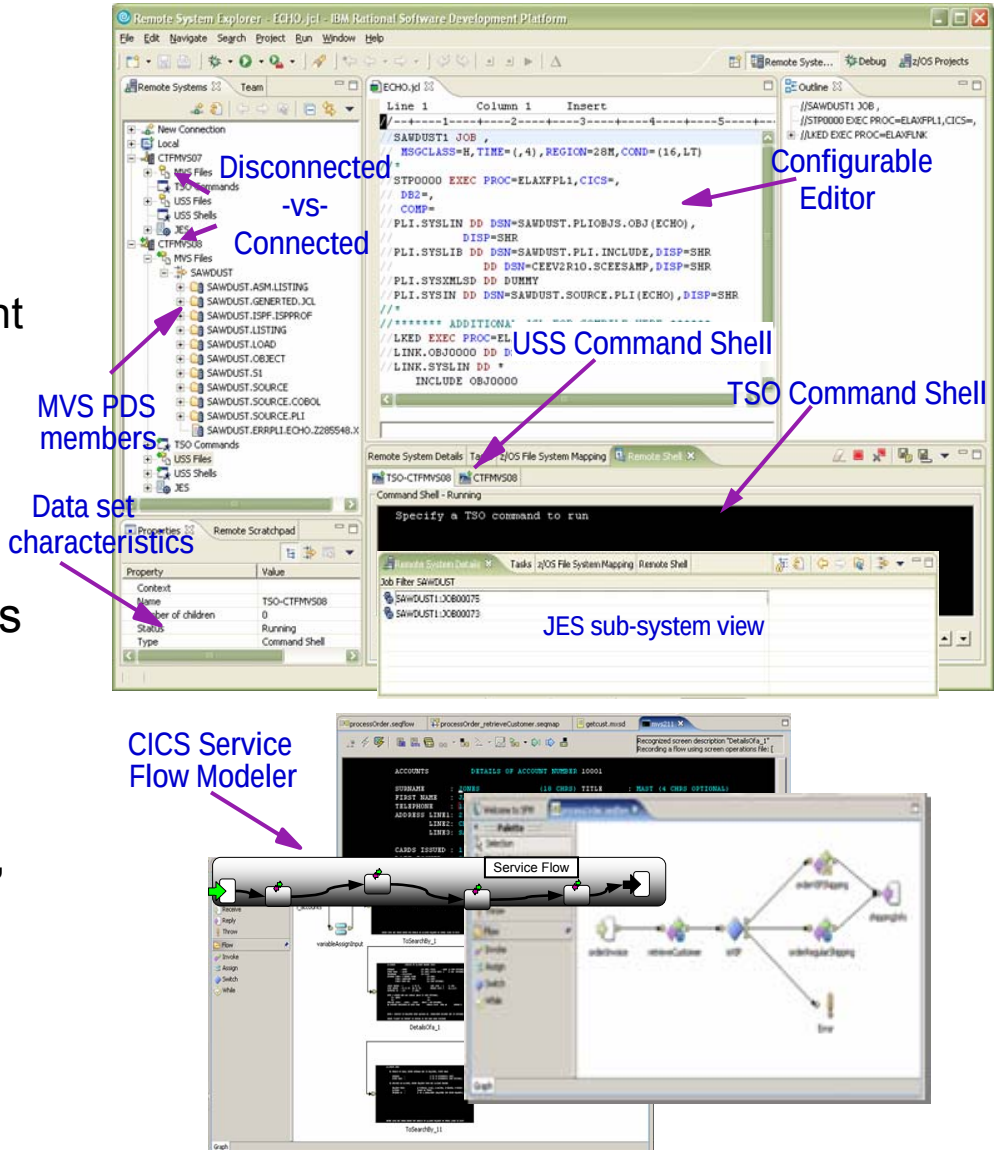
Rational Delivers Integrated Development For zEnterprise Solutions

- 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 dev activities



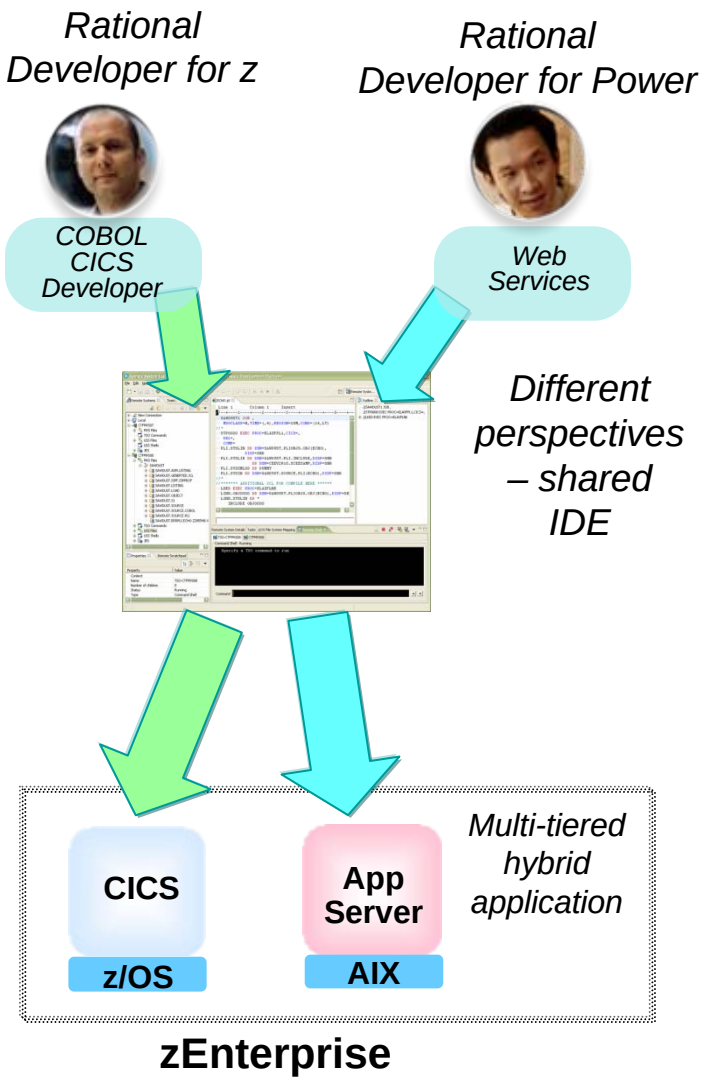
More Productive System z Software Development

- 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.



zEnterprise Power Developers Use The Same Integrated Development Environment

- Develop C/C++ and COBOL application components for AIX on Power
  - Rational Developer for Power
    - Also supports Linux and IBM I operating systems, plus RPG, Java, EGL, etc.
  - Same graphical IDE as System z developers, with same shared resources and collaborative team services
- Develop on workstation (remote), then upload to Power server to compile, execute and 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]

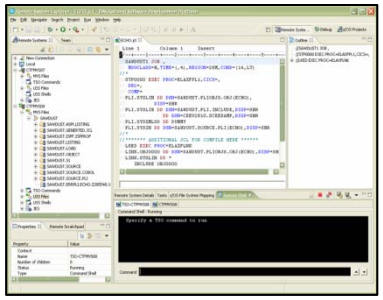


[1]Source: IBM internal study

DEMO: Work With COBOL And Java Using The Same IDE

- Both COBOL and Java developers use the same integrated development environment
- Share skills, share knowledge, cross-train
- Can lead to reduced development overhead

- One developer easily moves between Java and COBOL code to isolate and fix assigned defects



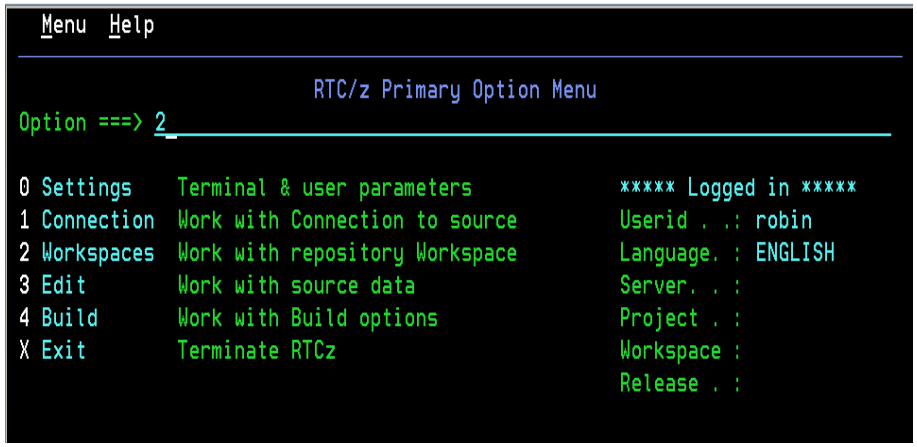
Uses Rational Developer for z to isolate and fix defects

zEnterprise

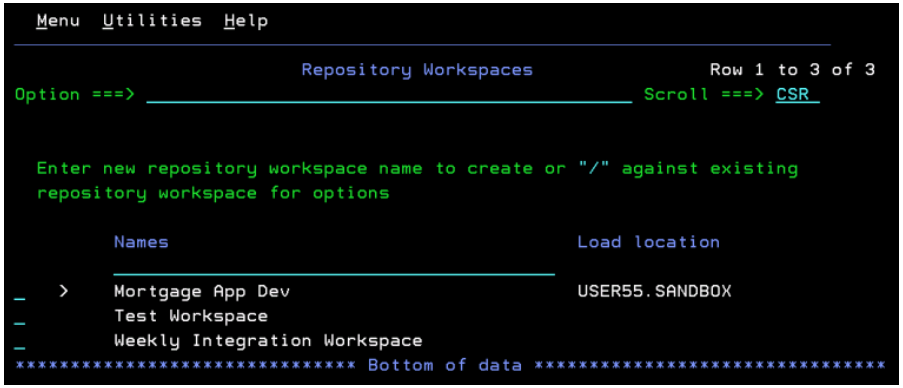
Submit for compile and run

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



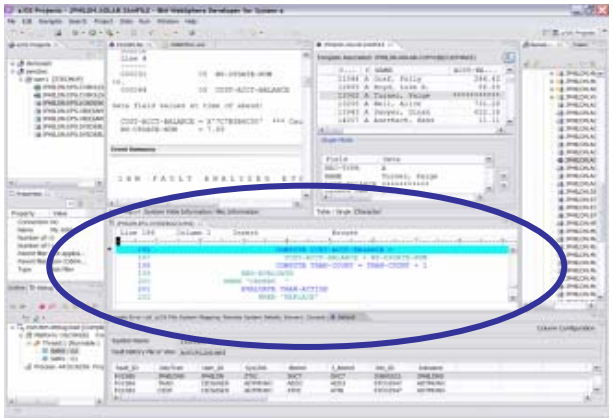
ISPF SCM Client



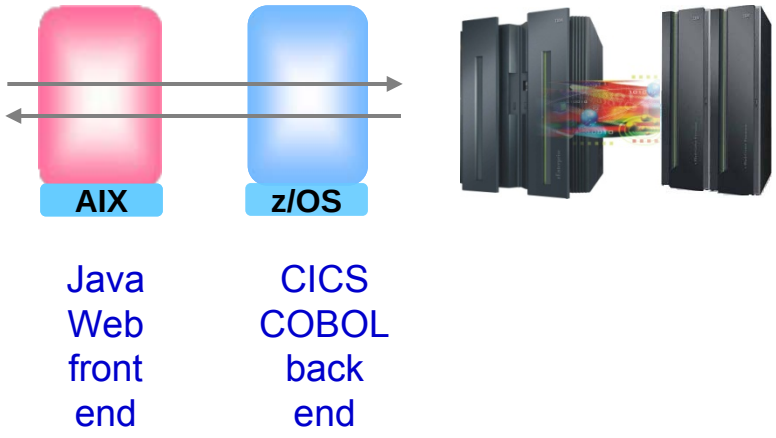
Hybrid Multi-tiered Applications Are Easily Debugged

- All Rational developer tools include integrated debuggers
  - Debug step across languages
  - Debug step across environments
- Team services add collaborative aspects to debug efforts

Work with code in debugger on workstation

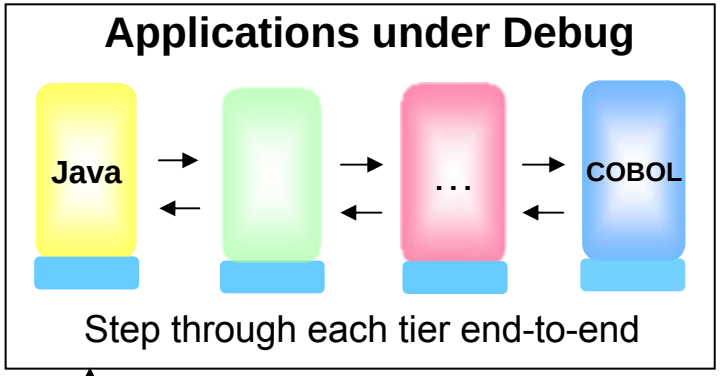


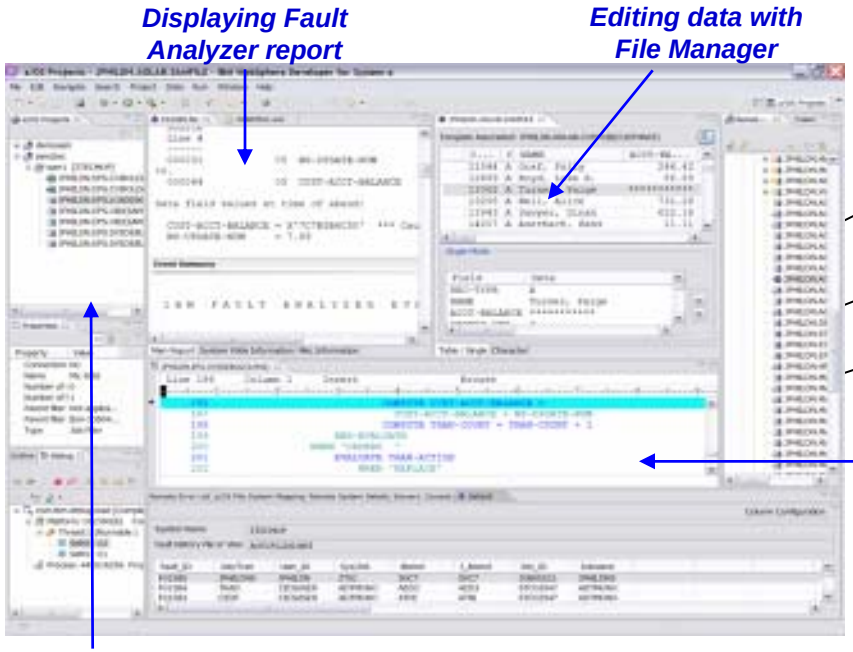
Debug applications running on all zEnterprise platforms

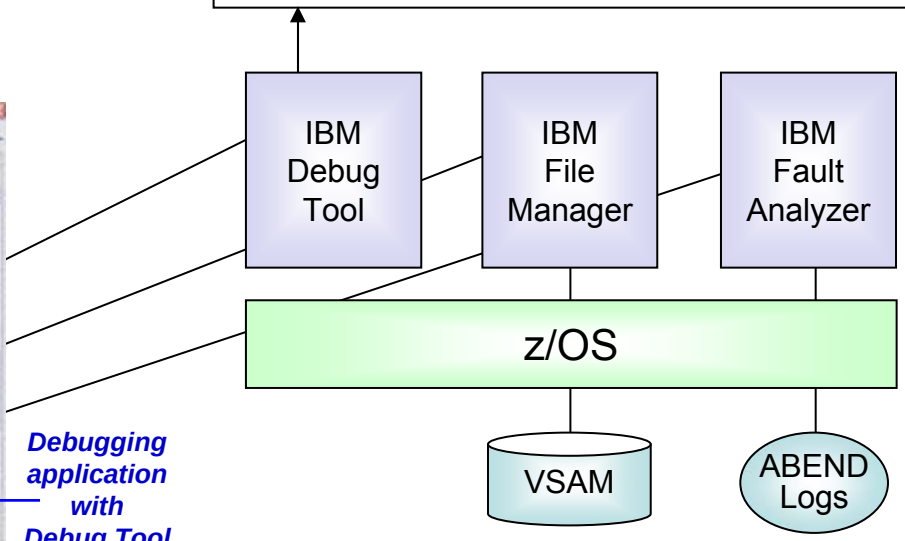


Debugging Includes Integration With Mainframe Problem Determination Tools

- 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



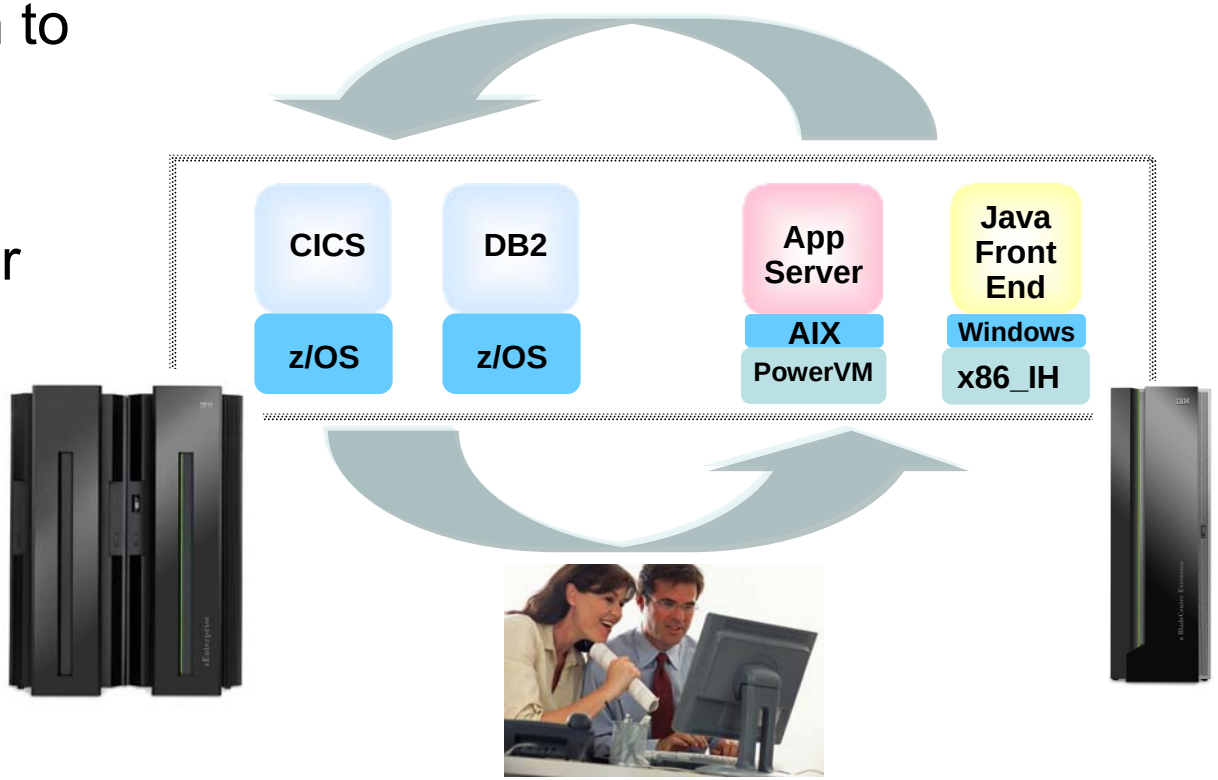




- End-to-end debug
- Edit VSAM data
- Analyze ABEND logs!

DEMO: End-To-End Debugging Of A Typical Multi-tiered Application On zEnterprise

- Example of end-to-end debugging
  - Start in middleware tier (JSP)
  - Step through to COBOL tier
  - Step back to beginning tier



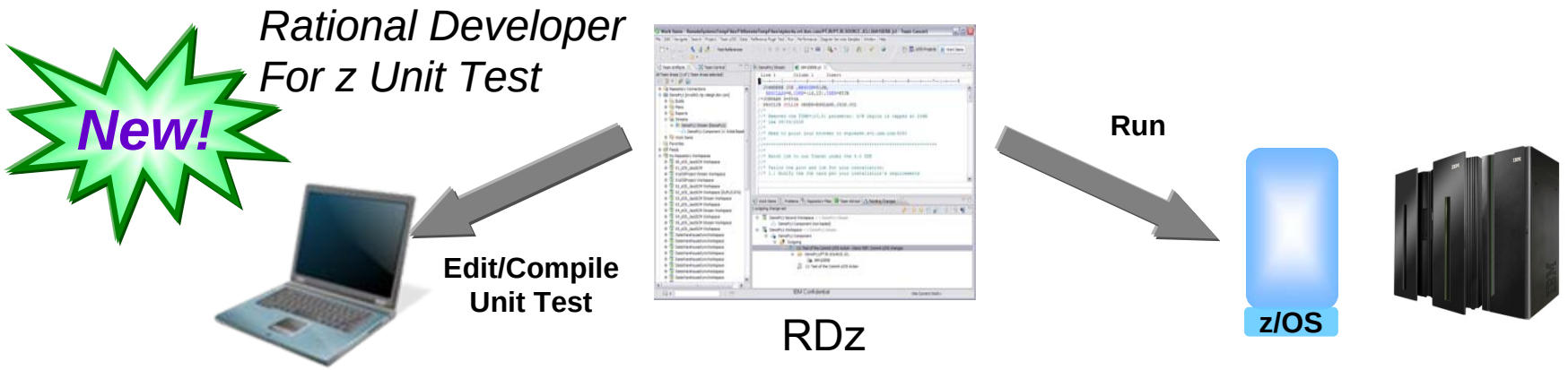
Testing The Full Extent Of A Multi-tiered Application Is Critical

- Application quality is measured at many levels
  - Unit test, functional test, system test, performance test, etc.
- Quality needs to extend to all platforms (Mainframe, Power, System x, etc.)
- Test procedures need to seamlessly step across platforms for complete end-to-end debug

- Need to continue to use existing System z problem determination and debug capability…
- … but it's critical that cost of testing be reduced if possible

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

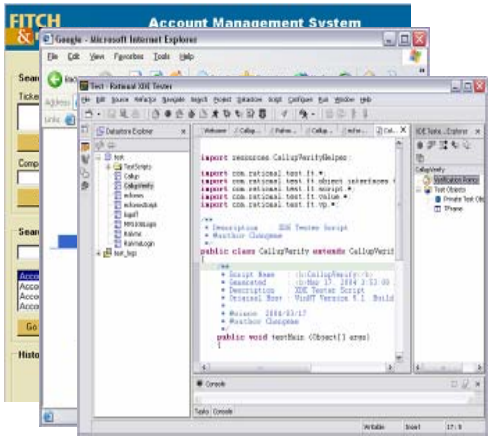
- Simulated z/OS runtime environment runs on x86 Linux workstation
  - **Compile and unit test** on the workstation - no zEnterprise hardware needed
  - Emulates System z general purpose processors, zIIPs, and zAAPs
- **Reduces development MIPS** for z/OS applications
  - Lower cost and better productivity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

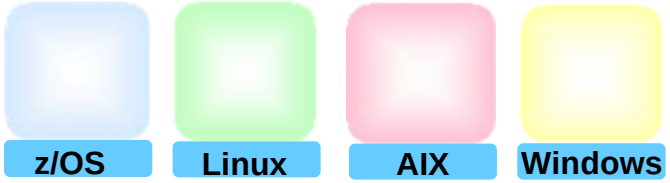


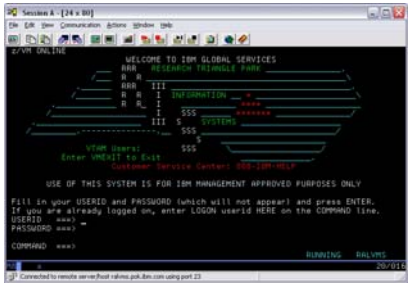
Test All Aspects Of Application Using Integrated Quality Management Tools

- Manage all integrated tests from one management tool
  - Rational Quality Manager
- Use script functions on Windows/Linux to functionally test any .NET, Web, or Java application (z or non-z)
  - Rational Functional Tester
  - Rational Functional Tester Extension for Terminal-based Applications
- Performance test any Web application (z or non-z)
  - Develop scripts on Windows/Linux and execute scripts on z/OS
  - Rational Performance Tester for z/OS
  - IBM Workload Simulator for z/OS and OS/390 to test terminal-based applications

Web and GUI Applications



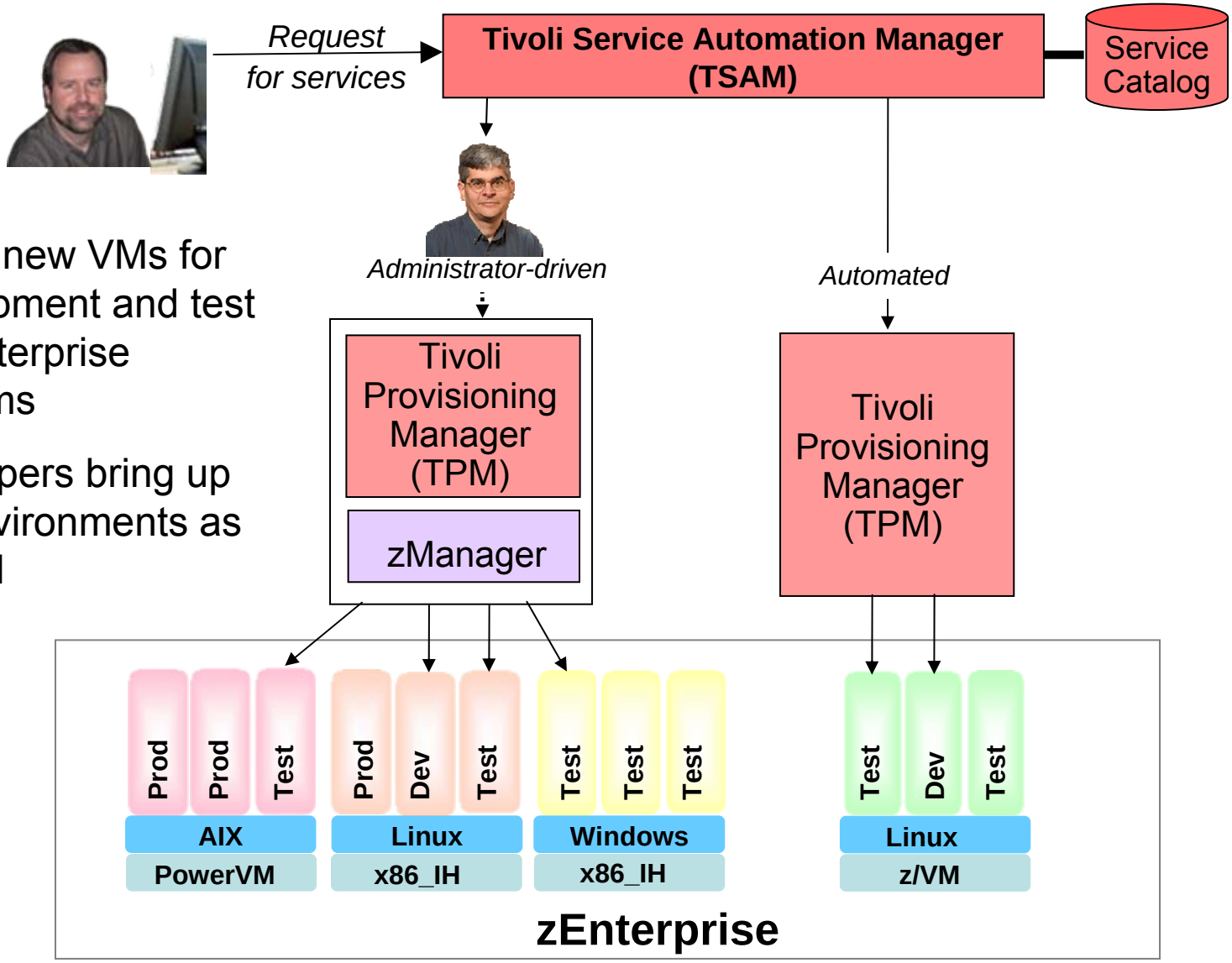




System z Terminal UI

Use Tivoli And zManager To Create zEnterprise Runtimes For Compile And Test

- Create new VMs for development and test on zEnterprise platforms
- Developers bring up test environments as needed



IBM Has Low Cost Offerings For Application Development

- 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

Studies Show Rational Tools More Productive For Developing z/OS Applications

Comparison of **Rational Developer for z** to **ISPF**:

Task	Test Results
Build a traditional CICS/COBOL/DB2 application	RDz was **1.2x** faster
Enable CICS applications for Web Services	ISPF could not complete the task
Compile, test and debug	RDz was **1.2x – 1.7x** faster

Conclusions:

- ✓ RDz was more productive for building robust real-world mainframe and Web based applications
- ✓ RDz was more productive at meeting applications requirements with minimum amount of tools

Source: The Branham Group, Inc.
http://www.branhamgroup.com/CustomContentRetrieve.aspx?ID=2002290&A=SearchResult&SearchID=2196098&ObjectID=2002290&ObjectType=35

Studies Show Rational Tools More Productive For Developing zBX Applications

Comparison of **Rational Application Developer** to **Microsoft Visual Studio**:

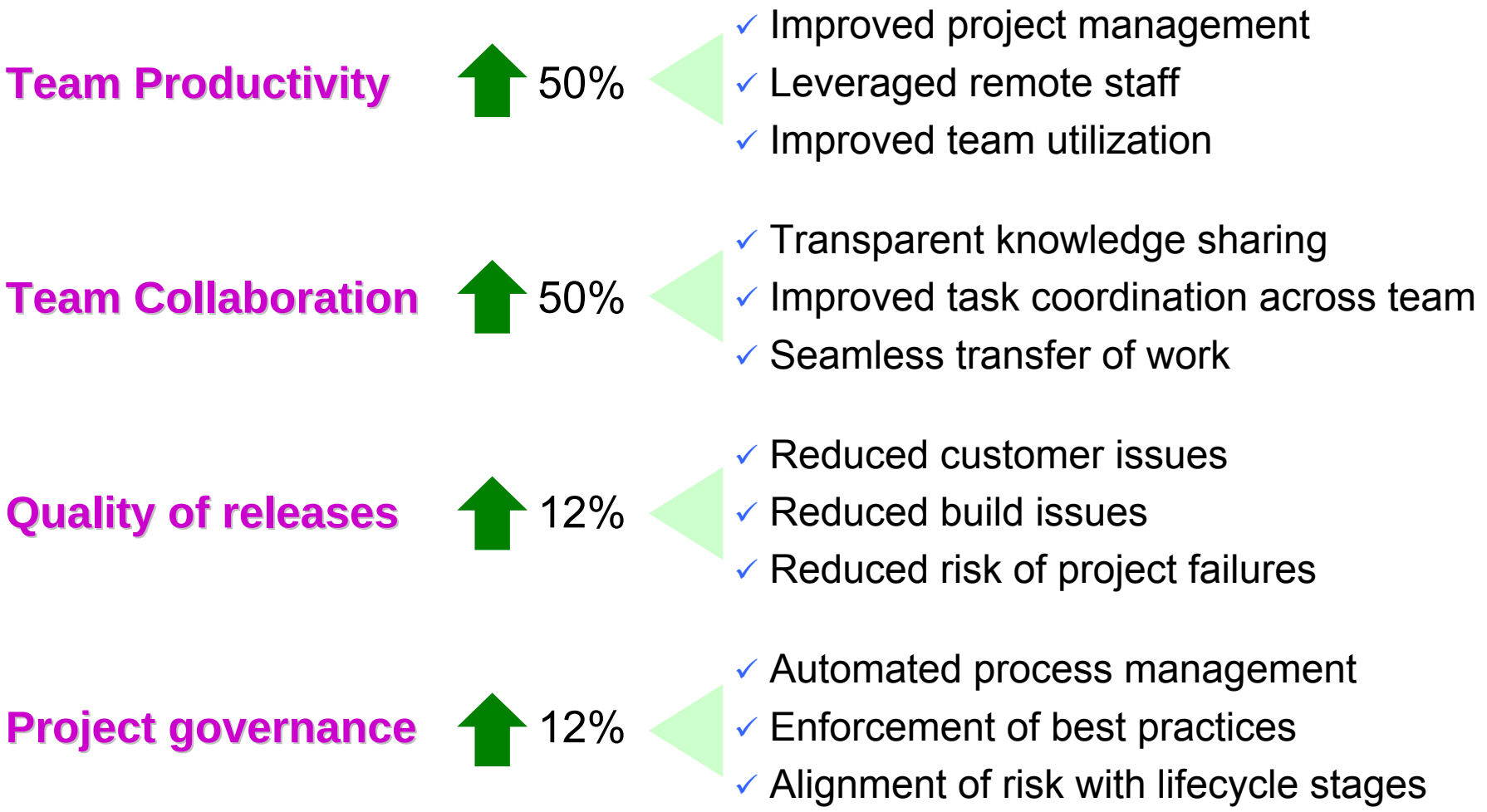
Task	Test Results
Build a Web application	Microsoft was **1.1x** faster
Build a Web Service from scratch	Rational was **2.1x** faster
Create a distributed transaction across two databases	Rational was **1.5x** faster
Model, simulate and test a workflow that consists of both an automated and human workflow	Microsoft could not complete the task
Model key components of the application	Rational was **2.4x** faster

Conclusions:

- ✓ RDz was more productive for building robust server-side distributed-based applications
- ✓ RDz was more productive with a minimum amount of tools
- ✓ Rational provided more visual interface tools and wizards, resulting in less manual hand coding, more consistent and higher quality code, and higher developer productivity

Source: The Branham Group, Inc.
http://www.branhamgroup.com/LiteratureRetrieve.aspx?ID=36699&A=SearchResult&SearchID=2196098&ObjectID=36699&ObjectType=6

Customer Data Shows Integrated Rational Tools Yield Significant Return On Investment

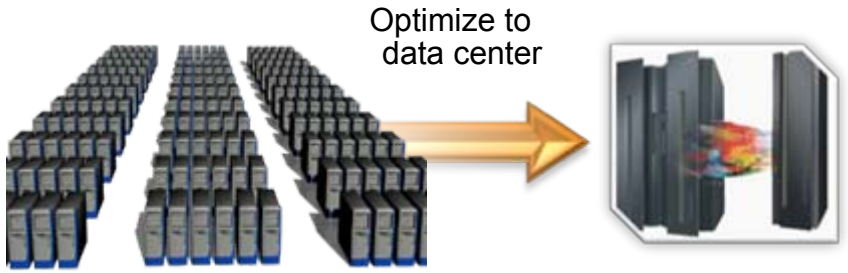


Based on IBM customer surveys

Summary of Today …

Smarter Computing Strategies To Reduce Costs And Improve Value

Consolidate Infrastructure



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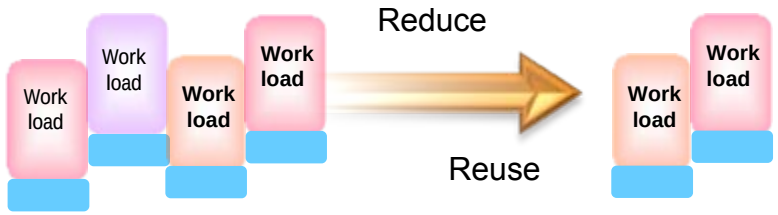

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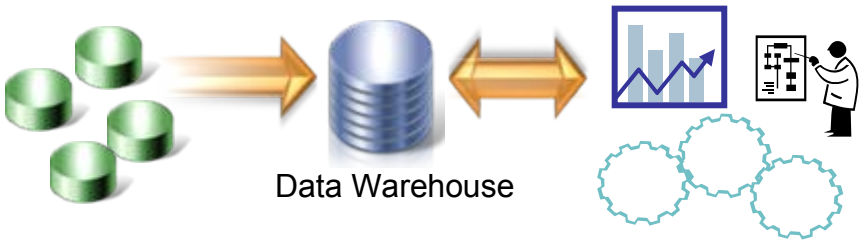
Leverage Data to Optimize Business



The IBM zEnterprise System Is The Ideal Platform For Smarter Computing

- World's first multi-architecture virtualization platform
- Workloads deployed on optimal platforms
- Unified system management
- Broad support for private clouds
- Superior platform for business analytics

zEnterprise – Optimized to deliver the lowest cost per workload

… for coming today

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the feedback forms