Extending Your Mainframe for More Business Value

Extend Development Team Productivity

Service Oriented Finance Needs Productive Development Tools

We have a lot of new solutions to build. If I build them all on System z, I will have to find more System z development skills

With modern tools from Rational, even your inexperienced programmers will be productive

Service Oriented Finance Development Manager

IBM

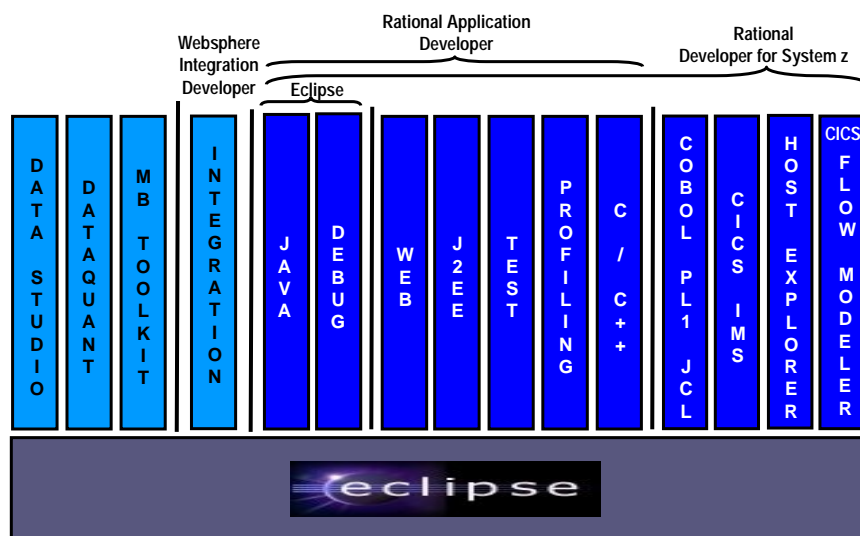# Rational Developer for System z (RDz)

- IBM's latest tool for System z development
  - ▶ Version 7.1 shipped Sep 2007

- Single integrated tool for developing mainframe applications using both traditional and newer technologies
  - ▶ Develop traditional COBOL/PL1/ASM/JCL/BMS/EGL applications
  - ▶ Develop Java/J2EE and Web applications, including JSF and struts

- Boosts developer productivity compared to green screen tools
  - ▶ Workstation tool based on Eclipse

- Leverage existing assets in a Service Oriented Architecture
  - ▶ Quickly expose CICS, IMS and DB2 assets as native services
  - ▶ Visually wire together CICS transactions into a business flow

IBM Development Tools Are Built on Eclipse

Function delivered as perspectives in eclipse – **plug-ins in blue ship with RDz**

ISPF: How Does Traditional "Green Screen" Development Work?

submit compile job → swap to SDSF → select job

edit JCL

find error msg

exit source

find code line (remember error)

change code

swap to edit session

find code line ← edit source ← exit JCL
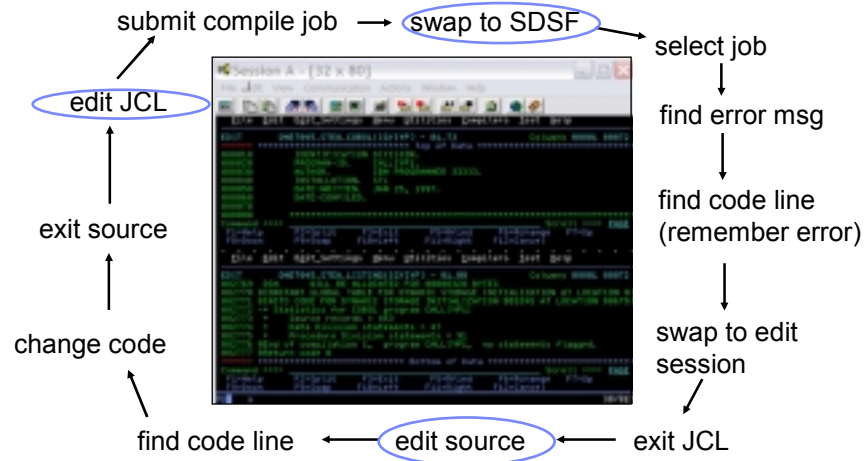
- Programmer goes through a sequence of screens in order to get the job done
  - 3.4 listings, job listings, SDSF outputs, etc.
- Programmer is constantly flipping back and forth between these ISPF screens

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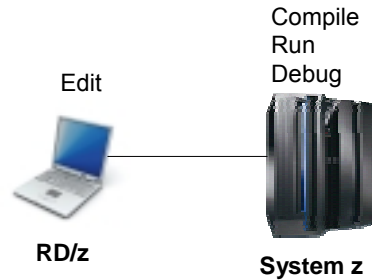## RDz Highlights for Traditional Mainframe Development

- Interactive, workstation-based environment
  - ▶ Interactive access to z/OS
  - ▶ Work with host files as though they are local

- Boosts developer productivity compared to "green screen" tools
  - ▶ Interactive edit/compile/debug on the workstation
    - − Work offline or online
  - ▶ Interactive job generation, submission, monitoring, command execution
  - ▶ Supports different runtimes (CICS, IMS, Batch, USS, DB2, WAS)
  - ▶ Language sensitive editors

- Can access different host based Source Code Management systems through a unified interface
  - − CARMA (Common Access Repository Manager)

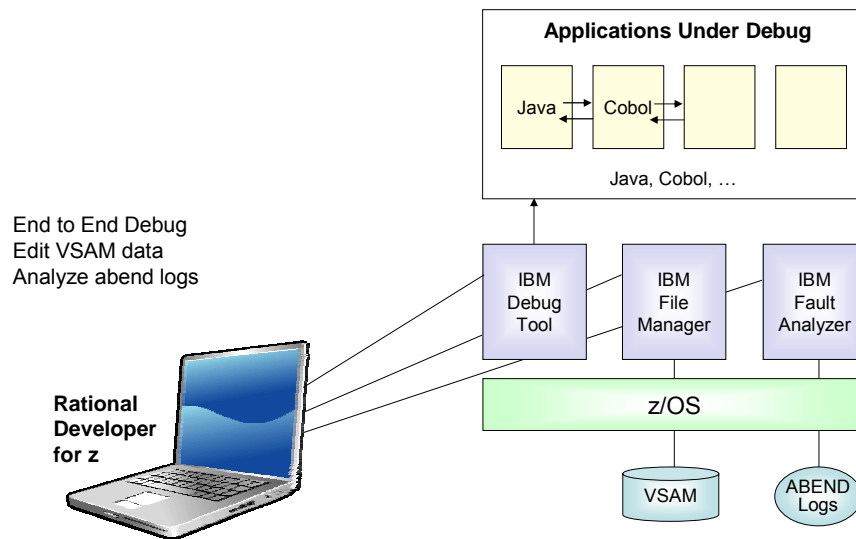## DEMO: Introducing Rational Developer for System z

- Perspectives and views

- Remote System Explorer

- Working with host datasets

- Language-sensitive COBOL editor

- Works with DB2 on z/OS

- Productivity features

- Edit/Compile/Visual Debug

Edit

Compile
Run
Debug

RD/z

System z

Interactive Problem Determination: RDz Integrates with Host-based PD Tools

Applications Under Debug

Java → Cobol →

Java, Cobol, …

End to End Debug
Edit VSAM data
Analyze abend logs

Rational Developer for z

IBM Debug Tool

IBM File Manager

IBM Fault Analyzer

z/OS

VSAM

ABEND Logs

Inexperienced Programmers Can Be Productive

- An independent study from Branham Group concluded:

  - ▶ Using RD/z, a developer with no mainframe experience can be **just as productive** as an experienced ISPF programmer

  - ▶ In addition, the RD/z developer achieved
    - 44% productivity advantage in COBOL and PL/1 edit, compile, debug activities
    - 3 times productivity advantage in creating web services

- Workstation based edit and unit test saves mainframe cycles
  - ▶ Customers at Fiducia, Deutsche, Nationwide observed an 80% reduction in the cost of compiles

http://www.branhamgroup.com/wdz_study

Customer Example   COMMERZBANK

Background:
- ▶ German bank providing financial services to private companies across Europe
- ▶ Provider of online banking services

Challenge:
- ▶ Upgrade teller workstations and ensure they continue to work with an existing third-party COBOL run-time environment

Solution:
- ▶ New application framework based on **IBM COBOL**
- ▶ **WDz** to design new COBOL and other code

"In one tool, we have a single development environment for multiple environments. I don't have to jump between different tools to do different tasks. The tool is very complete."
- Armin Schiller, transaction banking payments and cash transactions, Commerzbank AG

Another Tool to Help Inexperienced Programmers

- **WebSphere Studio Asset Analyzer** (WSAA)

- Powerful tool for Discovery and Impact Analysis
  - ▶ Search for application assets
  - ▶ Understand asset structure and relations
    - − find dependencies across applications and lines of business
  - ▶ Perform data flow and impact analysis
  - ▶ Extract code for re-use

- Supports both mainframe and distributed assets

- Results are displayed in easy-to-read graphical windows
  - ▶ Uses a Web Interface

WSAA Can Discover and Take Inventory of a Wide Variety of Mainframe Assets

- Source code: COBOL (including copybooks), PL/I, assembler, and JCL
  - ▶ Source code can be in a partitioned data set (PDS or PDSE) or controlled by a source control management (SCM) product.

- CICS online regions and transactions

- IMS subsystems and transactions

- SQL statements (DCLCURSOR, DCLTABLE, DELETE, FETCH, INSERT, SELECT, UPDATE)

- DB2 catalogs (columns, stored procedures, systems, tables, and views)

- MQ calls and queues

- J2EE assets

DEMO: WebSphere Studio Asset Analyzer

A Look at Rational Enterprise Generation Language (EGL)

- A simplified high level programming language that lets developers write full-function applications quickly
  - ▶ Supported by new development tool, Rational Business Developer (RBDe)

- Code in higher level language, then generate to language of choice (Java or COBOL)
  - ▶ Tight integration with Java Server Faces

- Well suited for "business oriented developers"
  - ▶ Who are used to using Oracle Forms, Informix 4GL, Visual Basic, and RPG

- Learn and use quickly and easily

Service Oriented Finance Needs Testing Tools

I need to make sure our new solutions are fully tested

With Rational testing tools you can be confident that the deployed applications will be of the highest quality and have the best performance.

Service Oriented Finance Test Manager

IBM

Functional Testing

Definition: Testing that ignores the internal mechanism of a system or component and focuses solely on the outputs generated in response to selected inputs and execution conditions.[1]

- Automated test scripts are more productive
- Use to test new code or for regression testing on changed code

Record Test Script   **Enhance Recorded Script**   **Execute Test Scripts**

[1][IEEE 90] Institute of Electrical and Electronics Engineers. *IEEE Standard Computer Dictionary: A Compilation of IEEE Standard Computer Glossaries.* New York, NY: 1990.

Rational Functional Tester

.NET, Browser, Java UI

- Use Rational Functional Tester
  - ▶ Record/Enhance/Execute scripts on Windows/Linux
  - ▶ Functional test any .NET, web, or Java application (z or non-z)
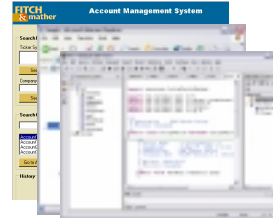
- Use Rational Functional Tester Extension for Terminal-based Applications
  - ▶ Record/Enhance/Execute scripts on Windows
  - ▶ Functional test System z terminal based applications

System z Terminal UI
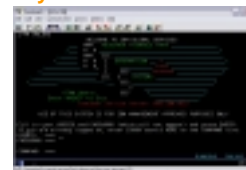
Performance Testing

Definition: Testing conducted to evaluate the compliance of a system or component with specified performance requirements. [1]

- The evaluation of a system's capability to provide acceptable response times and function while serving a large number of clients
- Also goes by the names of Load Testing, Capacity Testing, or Stress Testing
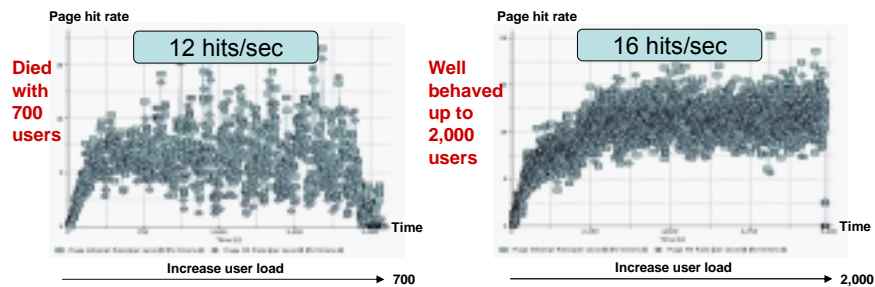
Page hit rate — 12 hits/sec — Died with 700 users — Time — Increase user load — 700

Page hit rate — 16 hits/sec — Well behaved up to 2,000 users — Time — Increase user load — 2,000

[1][IEEE 90] Institute of Electrical and Electronics Engineers. *IEEE Standard Computer Dictionary: A Compilation of IEEE Standard Computer Glossaries.* New York, NY: 1990.

Rational Performance Tester and Workload Simulator

- 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)

Any Web Application

- Use IBM Workload Simulator
  - Develop scripts on z/OS
  - Execute scripts on z/OS
  - Performance test any System z terminal application

System z Terminal Application
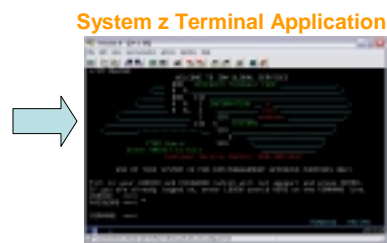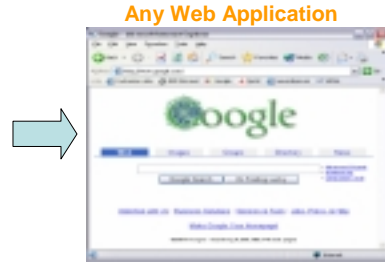
Service Oriented Finance Needs Better Change and Release Management Tools

Our different development teams use different change and release processes

Rational has modern tools that can help unify your Change and Release Management Processes

Service Oriented Finance Development Manager

IBM

Service Oriented Finance Development Teams

- Teams separated by distance and function
- Different development processes
- Little sharing of code assets
- Uneven quality control
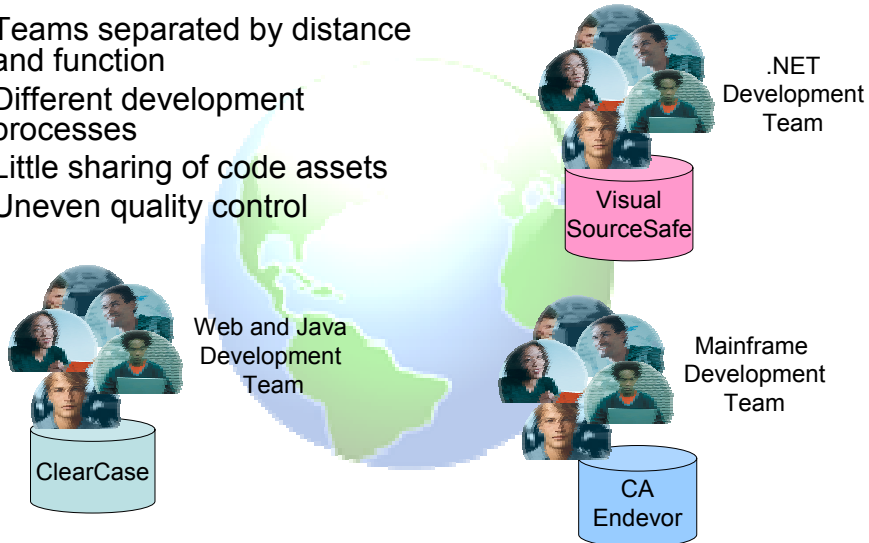
.NET Development Team

Visual SourceSafe

Web and Java Development Team

ClearCase

Mainframe Development Team

CA Endevor

Change and Release Management

Definition: A comprehensive integration of software change, configuration, build, and release management capabilities

- **Change Management**
  - ▶ Automatic tracking of fixes and change requests during the project lifecycle
- **Configuration Management**
  - ▶ Version control and parallel development support to store, manage, and control software assets (like source code)
- **Build and Release Management**
  - ▶ Automate and accelerate the creation of software executables

Rational Change and Release Management Solutions For All Your Development Teams

Requirements	Project	Develop	Testing	Build
■ Requirements ■ Use Case Analysis ■ Change request	■ Create Projects ■ Assign resources ■ Track projects	■ Compile ■ Edit ■ Debug ■ Unit Testing	■ Function ■ Regression ■ Performance ■ Stress	■ Activity ■ Directed ■ Builds

Build Forge

ClearQuest (Change Management)

ClearCase
(Configuration Management)
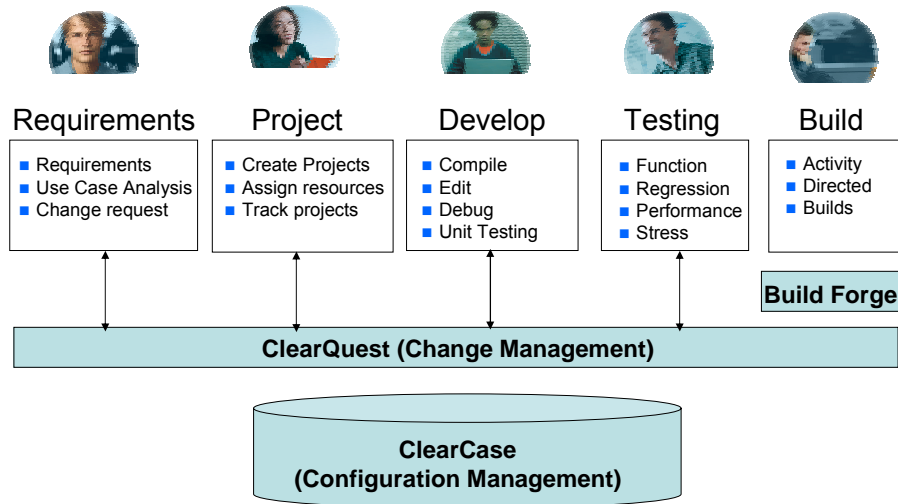
Rational ClearQuest (Change Management)

- Tracks and manages workflow of software change assignments
- Integrates with requirements, development, build, test, deployment and portfolio management tools to facilitate rapid response to change
- Tracks and updates defect records based on builds for a reliable view of release contents
- Provides real-time status, visibility and enhanced team synchronization

Requirements	Project	Develop	Testing	Build
change	assign	code	test	include
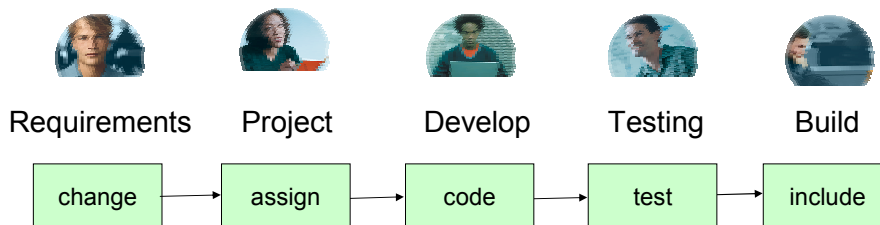
Rational ClearCase (Configuration Management)

- Provides a repository for source code and other program assets

- Supports distributed teams

- Can manage code assets for z/OS as well as many other platforms
  - ► Runs on Linux on z, AIX, Windows, …

- Connects source code changes with build and release efforts for faster problem resolution

- Integrates with leading Integrated Development Environments (IDEs) to allow you to work in your preferred environment
  - ► Rational Tools
  - ► Visual Studio

Rational Build Forge (Build Management)

- Associates ClearQuest activities with builds for better tracking and reproducibility

- Provides a detailed bill of materials that documents the contents of each release for compliance management

- Improves team efficiency by enabling more frequent, automated build iterations

GO

Build Forge directs the steps involved in a build

Build Forge

Aggregated Reports across entire Process

| 1. Provision Build System | 2. Extract Source Code | 3. Scan/ Analyze Source Code | 4. Build Source Code | 5. Package Build Results | 6. Provision Test System | 7. Deploy Build Results | 8. Execute Tests |
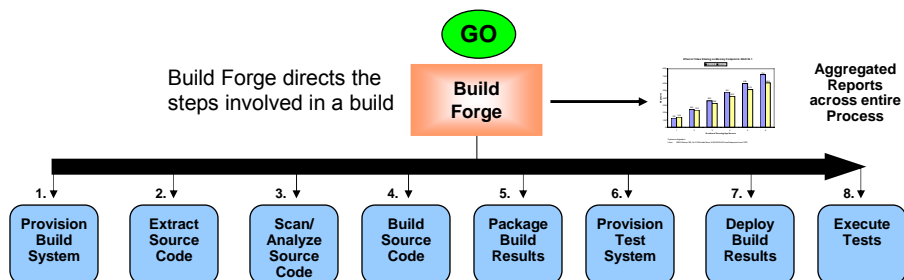
ClearQuest and Build Forge Support Activity-based Software Builds

ClearQuest

Define build to include activities 1, 2, and 3

Build Forge

Executable build with activities 1, 2, and 3 completed

Assign activities to programmers

Update files

Activity #1 (fix bug)

Activity #2 (add feature 1)

Activity #3 (add feature 2)

ClearCase

Select appropriate updated files

08 - Extend Limited Skills With Modern System z Tools v1.4.ppt

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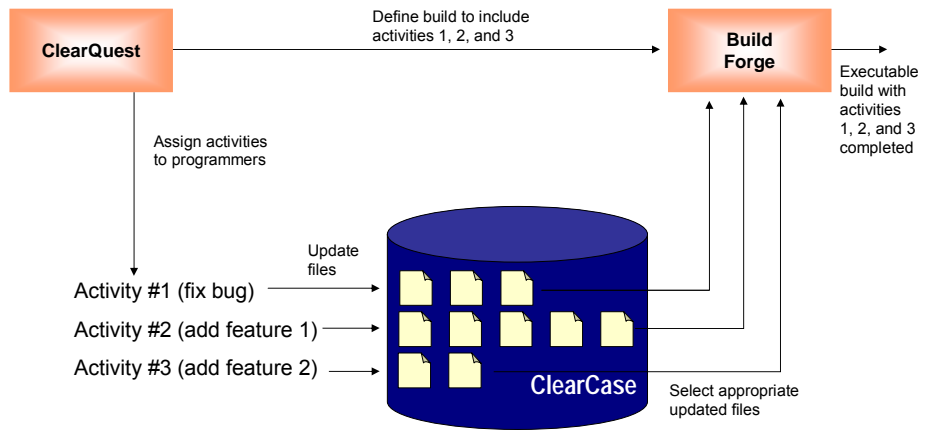
Service Oriented Finance Development Teams - Common Change Management

- Teams separated by distance and function
- Same change management process
- Extend power of ClearQuest to mainframe development
- Uniform quality control
- ClearQuest Web client can be used to assign tasks locally or remotely

.NET Development Team

.NET ClearQuest Plug-In

Database Server for ClearQuest

ClearQuest MultiSite Server

Web and Java Development Team

Mainframe Development Team

RAD ClearQuest Plug-In

ClearQuest MultiSite Server

Database Server for ClearQuest

ClearQuest MultiSite Server

Database Server for ClearQuest (Linux for z)

RDz ClearQuest Plug-In

08 - Extend Limited Skills With Modern System z Tools v1.4.ppt

28

14

Service Oriented Finance Development Teams - Linked Configuration Management

- Teams separated by distance and function

- Linked repositories are synchronized

- Easy sharing and reuse of code assets

.NET
Development
Team

.NET
ClearCase
Plug-In

ClearCase
MultiSite Server

ClearCase
Server

Web and Java
Development
Team

Mainframe
Development
Team

RAD
ClearCase
Plug-In

ClearCase
MultiSite Server

ClearCase
Server

ClearCase
MultiSite Server

ClearCase
Server
(Linux for z)

RDz
ClearCase
Plug-In

08 - Extend Limited Skills With Modern System z Tools v1.4.ppt

29
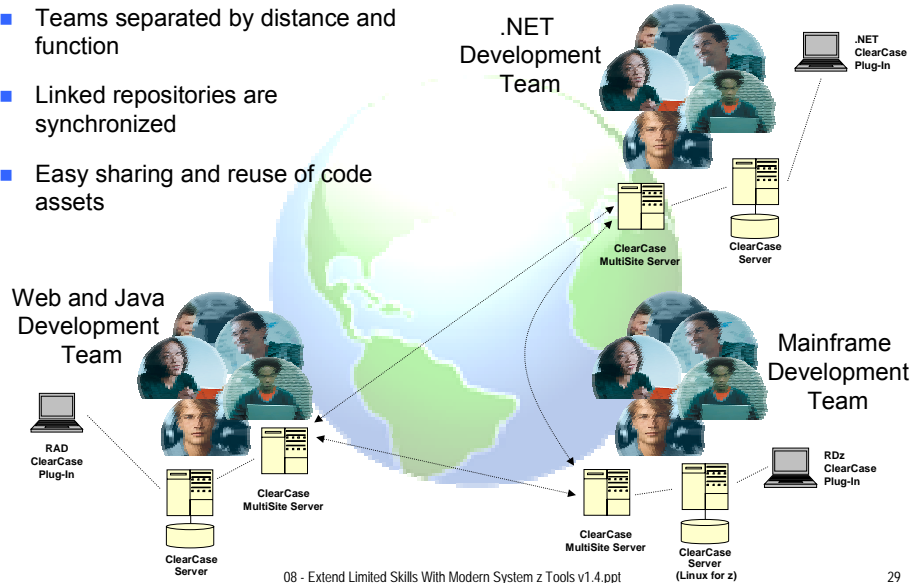
Service Oriented Finance Development Teams - Common Build Management

- Teams separated by distance and function

- Uniform activity driven builds for all development teams

- Agents invoke local compilation

.NET
Development
Team

Build Server

Build Forge
Agent(s)

Web and Java
Development
Team

Mainframe
Development
Team

Build Server

Build Forge
Agent(s)

Build Forge
Management
Console

Build Server

Build Forge
Agent(s)
(z/OS)

08 - Extend Limited Skills With Modern System z Tools v1.4.ppt

30

15
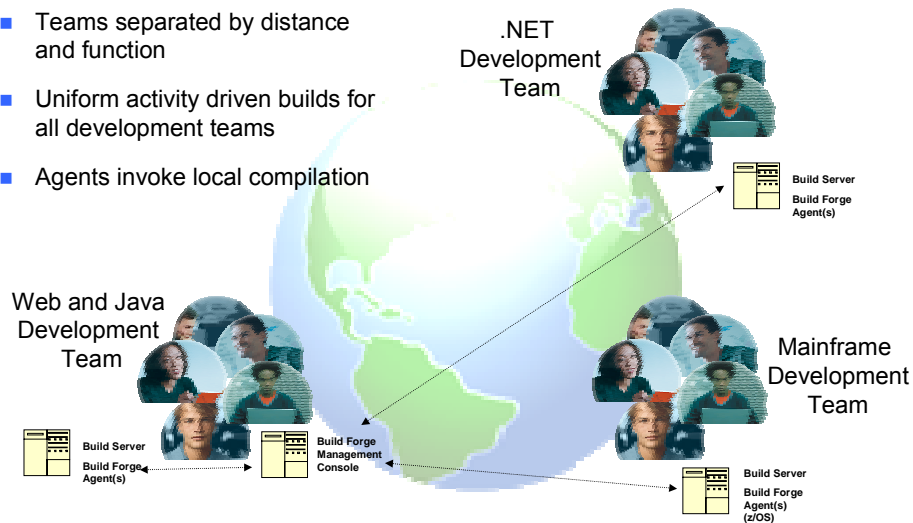
Summary

- Improve the productivity of mainframe application developers with **Rational Developer for System z, WebSphere Studio Asset Analyzer, Rational Business Developer Extension**

- Improve the quality of applications with **Rational Functional Tester, Rational Performance Tester,** and **IBM Workload Simulator**

- Achieve a common change and release management process with **Rational ClearQuest, ClearCase, Build Forge**
  - ▶ Orchestrate all problem tracking and configuration management with **Rational ClearQuest**
  - ▶ Manage enterprise assets with **Rational ClearCase**
  - ▶ Produce traceable, automated, and cross-platform builds with **Rational Build Forge**

Mainframe Extension Solution – Development Team Productivity

Web and Java Development Team

Windows   AIX

- Rational Functional Tester
- Rational Performance Tester
- RAD with ClearCase/ClearQuest plug-ins
- ClearQuest Web Client

- ClearCase
- ClearQuest
- MultiSite
- Build Forge Management Console
- Build Forge agent(s)

.NET Development Team

Windows   Windows

- Rational Functional Tester
- Rational Performance Tester
- .NET with ClearCase/ClearQuest plug-ins
- ClearQuest Web Client

- ClearCase
- ClearQuest
- MultiSite
- Build Forge agent(s)

Mainframe Development Team

Windows

- Rational Functional Tester
- Rational Performance Tester
- Rational Developer for System z with ClearCase/ClearQuest plug-ins
- ClearQuest Web Client

z/OS & Linux on z

- z/OS
  - ▶ Build Forge agent(s)
  - ▶ WebSphere Studio Asset Analyzer
  - ▶ IBM Workload Simulator
- Linux on z
  - ▶ ClearCase
  - ▶ Build Forge Agent(s)
  - ▶ Multi Site

Customer Example

GENERALI
Assicurazioni Generali

Background:
- ▶ Third largest European insurance provider
- ▶ Worldwide operations and clients

Challenge:
- ▶ Spiralling maintenance and development resource costs
- ▶ Move to a standardized solution to improve developer productivity and flexibility

Solution:
- ▶ Highly automated cross-platform solution using **Rational ClearCase**
- ▶ Manages and supports the software lifecycle for COBOL and Java development