IBM Rational Software Conference 2009
Enterprise Modernization
Lowering the cost of multi-platform application development and delivery

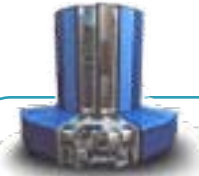**Andrew Mattingly**
Senior IT Architect, IBM Australia
andmatt@au1.ibm.com

Rational. software

Go to **IBM**

Change is the new norm

There are **1 billion** camera phones in use today

IBM Sequoia Super Computer…
It would take the entire population of the earth, about six billion, each of us working a handheld calculator at the rate of one second per calculation, more than 320 years to do what Sequoia can do in one day.

"8 of 10 CEOs see significant change ahead"
- 2008 IBM CEO Survey

The **internet of people** is over one billion strong. The **internet of things** is almost one trillion.
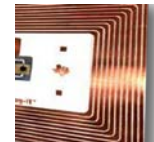
By 2010, there will be **30 billion RFID tags** in circulation

Soon there will be over **2 billion people** on the web

China sends more text messages **in a week** than the U.S. does **in 1 year**
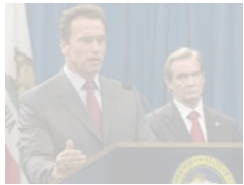
Change can be ~~very disruptive~~ an opportunity

IT skills shortage reaches **highest level** in 10 years

All software systems crashed due to software bug when F-22 flew over international dateline

50% of outsourced projects are expected to **under perform**

"The gap between expected change and the ability to manage it has almost tripled since 2006."
– 2008 IBM CEO study

COBOL thwarts California's "Governator"

North Carolina Jobless Claims Crash State's Web Site

Ohio election web site shut down after being hacked

View fashion shows and collections on your iPhone

Malta is building a smart grid to link the power and water systems

Mobile phone provider "3" launches new handset to allow users to make free calls via Skype
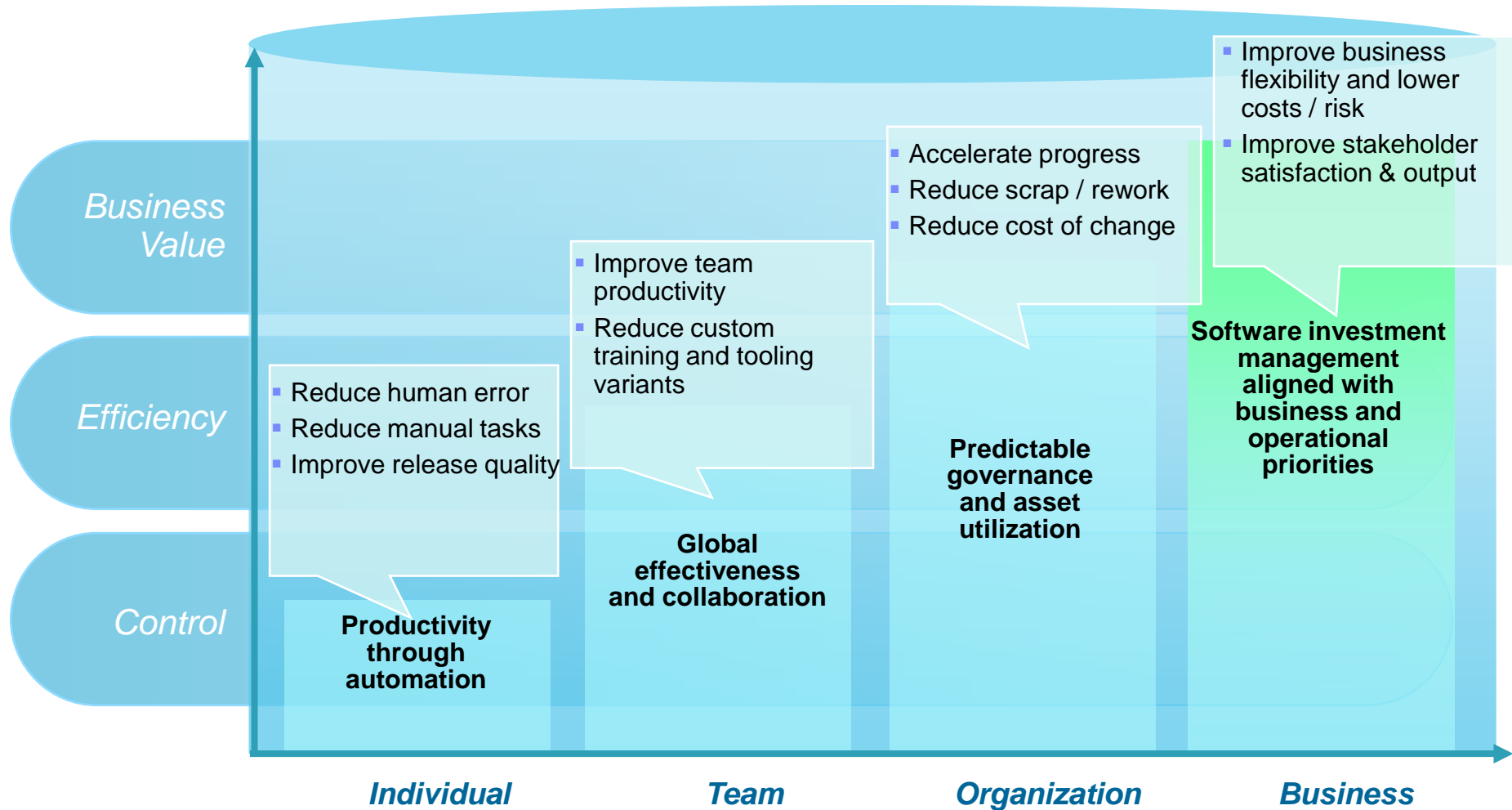
Is your IT infrastructure flexible enough?

IT Infrastructure

"The message for IT is clear; business needs and expects greater agility from IT. The current approaches to project prioritization, resourcing, agility and governance are clearly not satisfying customer needs. A new approach to IT delivery models and sourcing options is required that allows IT organizations to be more responsive to the needs of the business."

– Gartner, October 14, 2008, "Changing the Cost Structure of IT Will Become a Business Imperative for Most CIOs"

Treat your software as a strategic business process

Business Value

Efficiency

Control

- Reduce human error
- Reduce manual tasks
- Improve release quality

Productivity through automation

- Improve team productivity
- Reduce custom training and tooling variants

Global effectiveness and collaboration

- Accelerate progress
- Reduce scrap / rework
- Reduce cost of change

Predictable governance and asset utilization

- Improve business flexibility and lower costs / risk
- Improve stakeholder satisfaction & output

Software investment management aligned with business and operational priorities

Individual   *Team*   *Organization*   *Business*

Rational's 3 solution areas
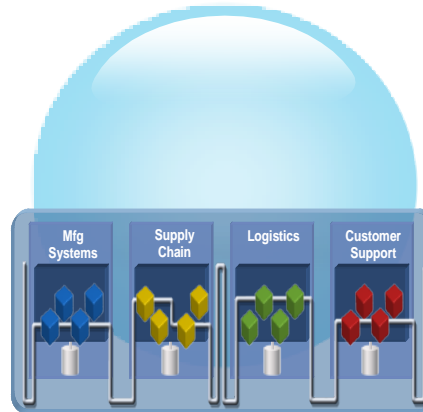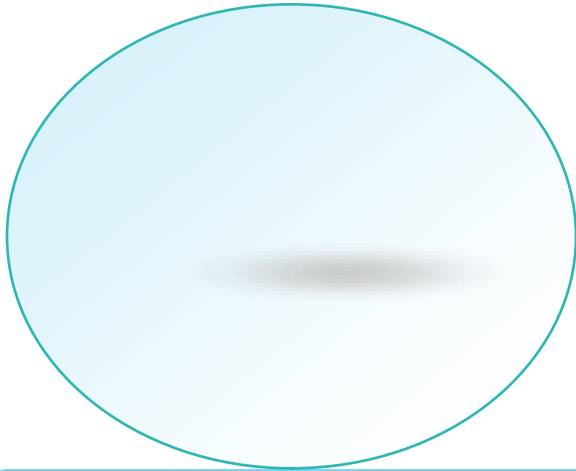
- **Enterprise Modernization** – leverage a consolidated infrastructure to harness the same power and flexibility for all types of applications, no matter what platform they are deployed on

- **IT Business Transformation** – align your IT infrastructure with your business strategy and vision to innovate new business strategies and meet long term objectives

- **Complex/Embedded Systems** – deliver innovative software for your products, while integrating across mechanical, electronic, and software domains

Key modernization challenges for IT organizations

"We don't understand the effort, risk and impact of modernizing our legacy software portfolio"

"Our skills gap just seems to keep growing. How do we stay current with all the language and technology changes?"

"Our architecture has evolved to be too complex and convoluted– we need to be flexible and agile."

"Our development teams working on different platforms are struggling to communicate. How do we collaborate in the context of our work?"

Application Challenges

- Lost application knowledge
- Architectural complexity
- Poor quality and performance
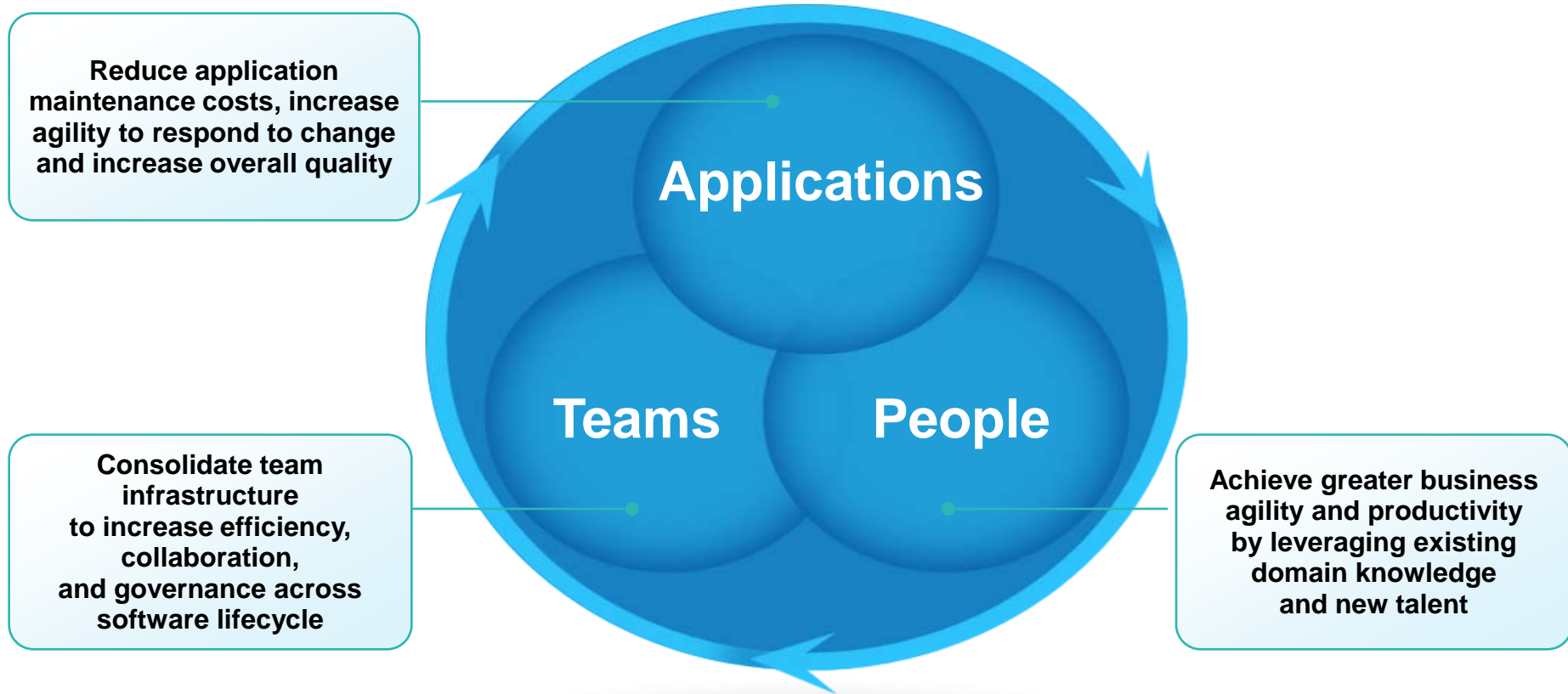- Regulatory and compliance risks

People Challenges

- Skills lock-in
- Plethora of new technologies
- Unattractive, low productivity tools
- Steep learning curve due to platform/language-unique tools

Team Challenges

- Poor communication
- Incompatible tools & processes across platforms
- Weak project oversight
- Lack of traceability across lifecycle

Enterprise Modernization solutions
A smarter way to maximize the value of your applications, people and teams

Reduce application maintenance costs, increase agility to respond to change and increase overall quality

Applications

Teams

People

Consolidate team infrastructure to increase efficiency, collaboration, and governance across software lifecycle

Achieve greater business agility and productivity by leveraging existing domain knowledge and new talent

For more information, visit:
www.ibm.com/rational/modernization

8

Application challenges

Applications

Teams **People**

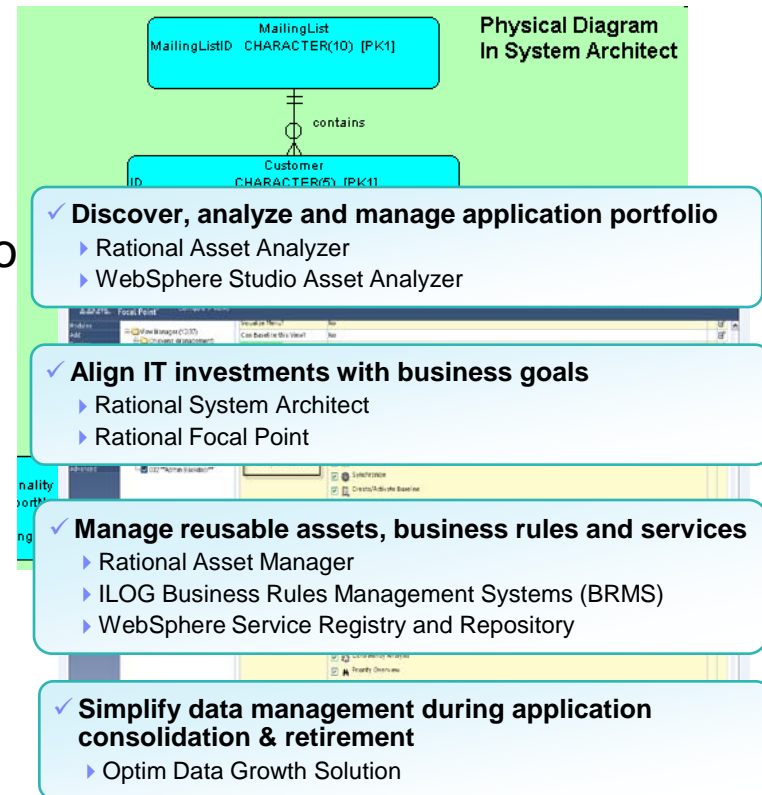|	
CIO	*"I need to reduce my annual IT budget by 10 percent. Which applications can I sunset?"*
Architect	*"Our architecture has evolved to be too complex and convoluted. Can SOA help us build applications that are flexible and agile?"*
Development Lead	*"Our distributed applications increasingly rely on access to System z data and applications. How can we determine the impact of all the changes we need to make?"*
Developer	*"We're using XML to define shared data across multiple applications. Can I use XML with my older COBOL and PL/I applications?"*
Tester	*"Changes to applications have been patched together for so many years that we now have many challenges with the quality and performance of our legacy applications."*

Manage the applications that run your business

Link your business strategy & enterprise architecture

- **Restore lost application knowledge**
  - ▶ Quickly determine full impact of proposed changes
  - ▶ Identify and eliminate dead code
  - ▶ Understand code complexity, opportunities for simplification

- **Manage the evolution of your application portfolio**
  - ▶ Make IT decisions within context of your enterprise architecture - link applications, deployed systems, organizations, business processes
  - ▶ Speed the efficiency of decision-making with up to date dashboards
  - ▶ Make decisions to sunset applications based on business value

- ▶ **Operationalize reuse**
  - ▶ Reap benefits of SOA and reuse via proactive asset management
  - ▶ Monitor the health and quality of your applications over time

Applications

Teams   People

Physical Diagram In System Architect

MailingList
MailingListID   CHARACTER(10) [PK1]

contains

Customer
CHARACTER(5) [PK1]

✓ **Discover, analyze and manage application portfolio**
  - ▶ Rational Asset Analyzer
  - ▶ WebSphere Studio Asset Analyzer

✓ **Align IT investments with business goals**
  - ▶ Rational System Architect
  - ▶ Rational Focal Point

✓ **Manage reusable assets, business rules and services**
  - ▶ Rational Asset Manager
  - ▶ ILOG Business Rules Management Systems (BRMS)
  - ▶ WebSphere Service Registry and Repository

✓ **Simplify data management during application consolidation & retirement**
  - ▶ Optim Data Growth Solution

Auto manufacturer used WSAA to automate identifying changes required to permit ordering cars with more than 16 options. Used Rational solutions to create automated test environment for changes. Saved $12M on first project.

Build flexible applications with SOA and Web 2.0

Reduce costs, improve flexibility, & modernize your UIs

Applications
Teams People

- **Reuse proven assets to lower costs 5x compared to new development**
  - ▶ Achieve fast ROI by enabling your green screen applications as services
  - ▶ Quickly create web services from EGL, C/C++, COBOL, PL/I, RPG, and Java applications, stored procedures and SQL

- **Accelerate deployment of new services, processes and user interfaces**
  - ▶ Model, architect & assemble new business processes
  - ▶ Create new platform independent services
  - ▶ Rapidly build modern Web 2.0 interfaces

Web Services for CICS - Create New Service Interface (botto...

Language structures
The language structures have been imported from the language source. Select the inbound and outbound language structures.

Inbound

Welcome to SFM | processOrder.seqflow

Sele

Reply

shippingInfo

✓ **Reuse green screen apps in a SOA**
  ▶ Host Access Transformation Services

✓ **Build new services, reuse existing code**
  ▶ Rational Application Developer
  ▶ Rational Developer for System z
  ▶ Rational Developer for i for SOA Construction
  ▶ Rational Business Developer
 ▶ Optim Development Studio

✓ **Model your processes and associated data**
  ▶ WebSphere Business Modeler
  ▶ Rational Software Architect
  ▶ WebSphere Integration Developer
  ▶ InfoSphere Data Architect (was Rational Data Architect)

"HVB IS adopted IBM Rational® Developer for System z software to accelerate mainframe development, improve the efficiency of its COBOL development teams, and move to a similar environment for mainframe and Web development." - Almut Geiger, Product Specialist at HVB IS

HVB Information Services
UniCredit Group

Deliver high quality applications
Reduce risks and cost

Applications

Teams   People
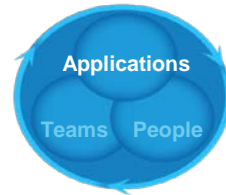
- **Coordinate end-to-end quality across all tools and platforms**
  - ▸ Elicit, capture, elaborate, discuss, manage, and review requirements
  - ▸ Identify and resolve coding errors automatically, early in the development cycle
  - ▸ Consolidate and monitor test plans, test progress

- **Automate your testing**
  - ▸ Automate functional tests
  - ▸ Find performance bottlenecks
  - ▸ Expose & remediate security vulnerabilities, privacy risks, and accessibility problems in web applications
  - ▸ Generate timely audit and compliance reports

✓ **Quality begins with good requirements**
  - ▸ Rational Requirements Composer
  - ▸ Rational RequisitePro
  - ▸ Rational DOORS

✓ **Manage quality throughout the lifecycle**
  - ▸ Rational Quality Manager
  - ▸ Rational Test Lab Manager

✓ **Find coding errors quickly**
  - ▸ Rational Software Analyzer
  - ▸ Rational Purify Plus
  - ▸ z/OS Problem Determination Tools

✓ **Automate testing to improve quality**
  - ▸ Rational Functional Tester
  - ▸ Rational Performance Tester
  - ▸ Rational Service Tester for SOA Quality
  - ▸ Optim Test Data Management Solution

✓ **Manage your online risk**
  - ▸ Rational AppScan
  - ▸ Rational Policy Tester

"… This tool [Rational Requirements Composer] enables us to extend and improve our client's requirement practices, which significantly increases the probability of a successful project." - Kenny Lew, CEO Noblestar International
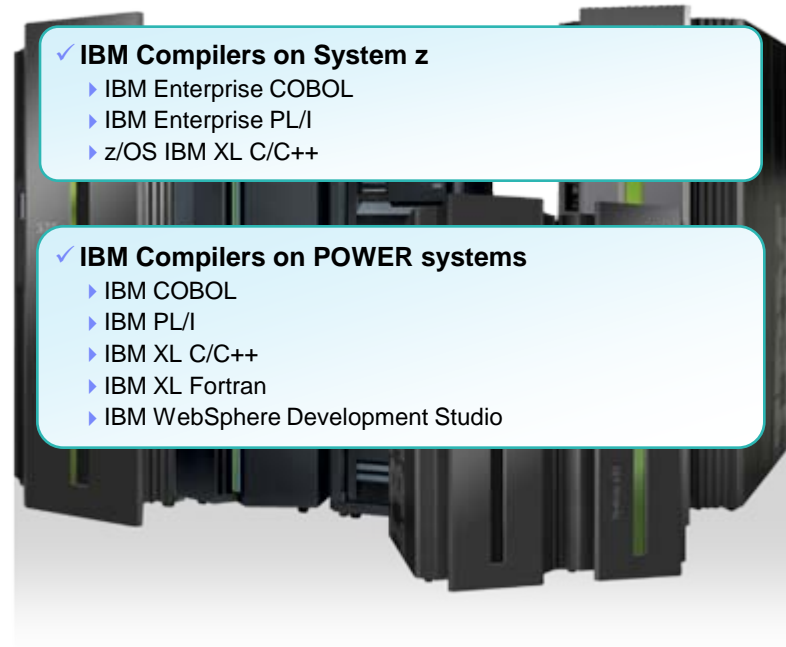
NOBLE|STAR
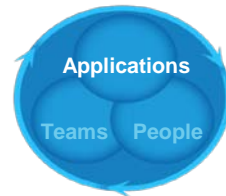
Leverage compilation technology
Improve application performance & scalability

Applications

Teams People

- Increase capacity and performance without hardware upgrades
  - Boost performance with new advanced optimization technology in C/C++, COBOL and PL/I compilers
  - Reduce cost of COBOL and PL/I XML parsing by offloading to zAAP specialty engine

- Maximize application performance on new z10 and Power6 servers
  - Exploit new hardware architectures without code changes

- Modernize legacy applications
  - Leverage XML and Java interfaces in COBOL and PL/I applications

✓ **IBM Compilers on System z**
  - IBM Enterprise COBOL
  - IBM Enterprise PL/I
  - z/OS IBM XL C/C++

✓ **IBM Compilers on POWER systems**
  - IBM COBOL
  - IBM PL/I
  - IBM XL C/C++
  - IBM XL Fortran
  - IBM WebSphere Development Studio

"Metal C optimization levels are just incredible. We're really impressed, there is no way that any of us assembler programmers can write code as efficient, keep it readable, and do it in a reasonable amount of time."
- Gregg Willhoit, Senior Assembler Architect, DataDirect

People challenges

CIO
"My budgets keep getting reduced. How can we do more work with fewer people?"

IT Manager
"College graduates aren't interested in my green screen development tools. Is there something more appealing I can offer them?"

Project Manager
"My host programmers don't seem to communicate with my web developers when building multi-platform applications. It's like they speak different languages."

Architect
"How can I architect solutions that shield developers from technical interfaces of platform and middleware technologies?"

Developer
"How can I keep pace with technology changes and keep my skills relevant to the industry?"

Applications
Teams   People

Use modern IDEs

Improve developer productivity & reduce costs

- **Use common Eclipse-based tooling across multiple platforms and languages**
  - Achieve ~15% improvement in System z developer productivity[1]
  - Reduce host CPU usage 50%-80%[1] with workstation syntax checking
  - Reduce training costs, more attractive IDE for younger developers

- **Speed development with specialized editors and code generation wizards**
  - Code assist for COBOL, PL/I, C/C++, EGL, RPG
  - Visual editors for BMS and MFS maps
  - Generate code from UML

✓ **Produce code faster, save MIPS**
- Rational Developer for System z
- Rational Developer for i for SOA Construction
- Rational Business Developer
- Rational Application Developer
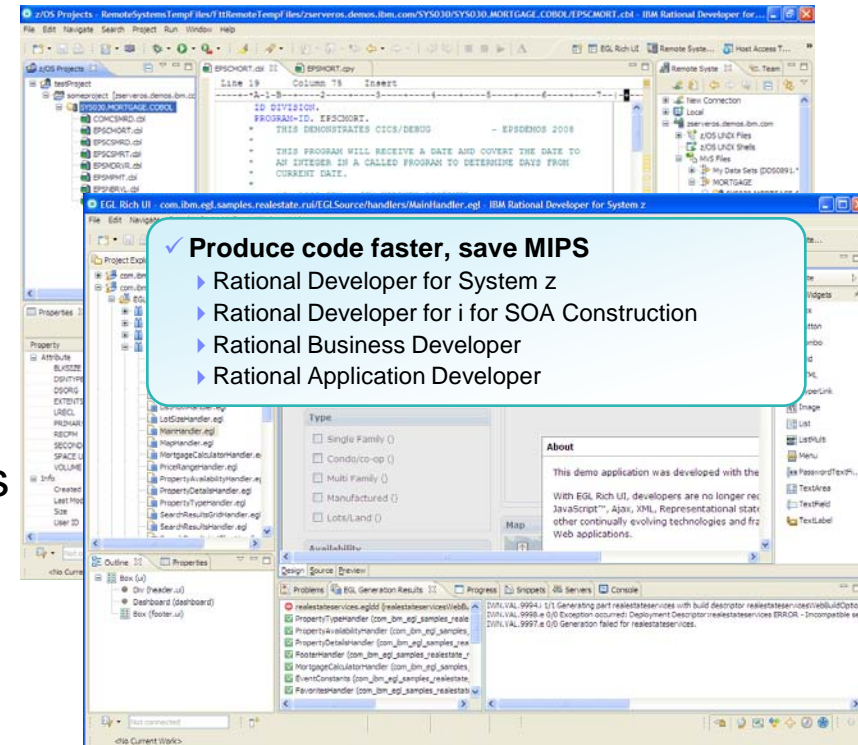
[1] Aggregation of results from a productivity study conducted by IBM System z customers.

"RDz offers a uniform, open programming environment for both J2EE and PL/I developers. RDz accelerates PL/I development with its local syntax checker and debugging tool."

- Dr. Axel Lömker, KfW Bankengruppe

Build multiplatform apps with existing/new staff
Improve workforce productivity & agility

- **Deliver multiplatform solutions quickly**
  - Leverage abstractions to hide middleware & platform complexity
  - Deploy to any platform, including J2EE™, System z, IBM i, Linux, AIX, HP-UX, Solaris, Windows
  - Interact with existing Javascript, COBOL, PL/I, Java and RPG

- **Build modern Web 2.0 user interfaces without being a technology expert**

  - Empower existing developers to build Rich Internet Applications (RIA) – WYSIWYG layout, event handling in EGL

  - Eliminate need to have skills in JavaScript, Ajax, JSON, HTML, CSS, etc.

✓ **Create multi-platform, Web 2.0 applications with EGL**
- Rational Business Developer
- Rational Developer for System z with EGL
- Rational Developer for i for SOA Construction

"Currently we have one set of developers for web applications, and another for batch systems. With EGL, the same developers can do both, and we can offer our clients a choice of deployment platforms."
- Mauricio Alvarenga, IT Manager at Montreal Informática

M.I. MONTREAL INFORMÁTICA
Integrando tecnologia aos negócios

# Extend green screen applications for new uses
Achieve faster ROI

- Use your existing staff to provide Web, portal, mobile or rich client UIs

  for your green-screen applications
  - Provide your end users with flexible, secure Web access to business applications
  - Dramatically reduce end user training and improve IT staff productivity
  - Deploy with no source code modification or application downtime

- Expose host business logic using standard web services interfaces

Extend Green Screen Applications

✓ **Modernize green screen applications**
  - Host Access Transformation Services

Web

Portals

Mobile devices
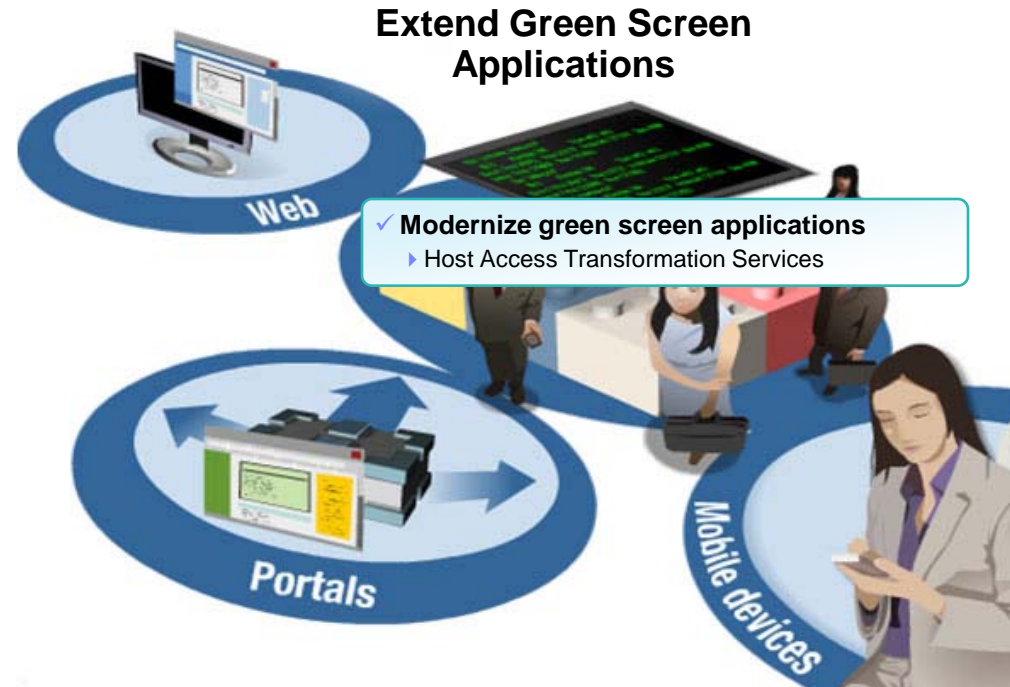
"Rational Host Access Transformation Services (HATS) makes legacy modernization a relatively easy and fast process. I estimate that HATS cut 75% of the man-hour requirements from other approaches we have used"
- Alan Jack, Director of Technology, Oxford International

Oxford INTERNATIONAL

Move to a modern development platform
Gain huge savings and flexibility

- Migrate from old, stagnant languages to modern development platforms, languages and tools

✓ **Migrate from older platforms**
  ▸ Rational Migration Extension for Natural
  ▸ Rational Migration Extension for IBM i

COBOL
RPG
SYNON *

natural ADABAS

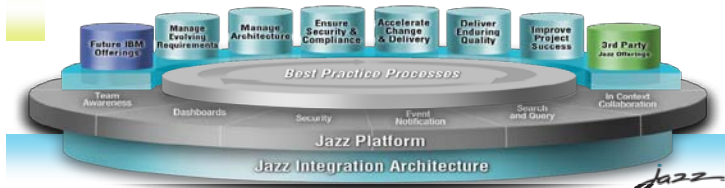ca Ideal/Datacom
COOL:GEN
COOL:Enterprise
HPS/AppBuilder   COBOL

Green Screens

EGL

Conversion Tooling

Testing, Remediation, Deployment

web 2.0

z — CICS
z — IMS
z — Linux *
z — Batch
z — WAS *
Z - VSE
i — WAS
i — Native
HP-UX
Solaris
Linux
AIX
Windows

* Eligible to run on IFL and zAAP

Get the enterprise skills you need

- Hire university students with System z, IBM i, and Rational skills
- Leverage a growing community of business partners, customers, and IBM employees on our community cafés
- Take advantage of free education sessions, product demos, tutorials, white papers, and case studies
- Play in the System z and IBM i sandboxes
  - "Try online" hosted System z and IBM i environments
  - See best practices, hands-on exercises using full version software trials

Applications
Teams **People**

✓ **Partner with universities worldwide**
  ▸ 537 schools, over 50000 students educated on System z
  ▸ Schools in 41 countries teaching POWER systems
  ▸ 2400 universities teaching IBM technologies

✓ **Stop by a Community Café**
  ▸ C/C++ Café
  ▸ EGL Café
  ▸ RPG Café
  ▸ COBOL Café

✓ **Take a class**
  ▸ Modern Application Architecture for COBOL Developers – build composite COBOL apps with CICS and WebSphere
  ▸ EGL Distance Learning – 10 days of free lectures, labs, electronic support

Learn more about
  - The IBM Academic Initiative at: http://www-304.ibm.com/jct01005c/university/scholars/academicinitiative
  - Enterprise Modernization solutions at: http://www.ibm.com/software/rational/solutions/em/
  - The Enterprise Modernization sandbox: http://www.ibm.com/developerworks/downloads/emsandbox/systemz.html

" 'Master the Mainframe Contest' helped me get a job at Bank of Montreal."

Elizabeth Bell, Georgian College

Team challenges

Applications
Teams People

CIO

"Our global software teams working on different platforms are struggling to communicate. How do we collaborate in the context of our work?"

IT Manager

"My line of business needs better access to information about the ongoing projects."

Project Manager

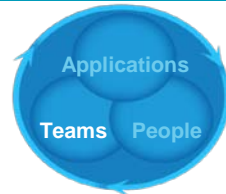*"I need a dashboard that lets me easily see if my project is on track and identify any bottlenecks."*

Team Leader

"Why are some developers not following the agreed upon processes?"

Developer

"Why and when was this changed? Is this the latest version that I should be using?"

Unify disparate IT infrastructures across teams
Reduce costs & improve operational efficiency

- Consolidate your team infrastructure
  - Eliminate redundant and duplicate tools and processes
  - Unify change management for all platforms, languages, roles, and locations
  - Ensure accurate global software delivery with a single point of control

- End-to-end software delivery automation for all platforms
  - Coordinate multi-platform builds on distributed, System z, and IBM i – produces consolidated audit trail and bill of materials
  - Centralize automation of many software development tasks, not just build activity

Applications

Teams   People

.Net
Web Front End

System z

✓ **Use common team infrastructure & processes**
  - Rational ClearCase
  - Rational ClearQuest

✓ **Produce reliable, multi-platform builds**
  - Rational BuildForge

SI Custom
App Dev

C/C++
In-house Offshore

✓ **Ease automated application deployment & configuration of WAS and Portal**
  - Rational Automation Framework for WebSphere

NEW!
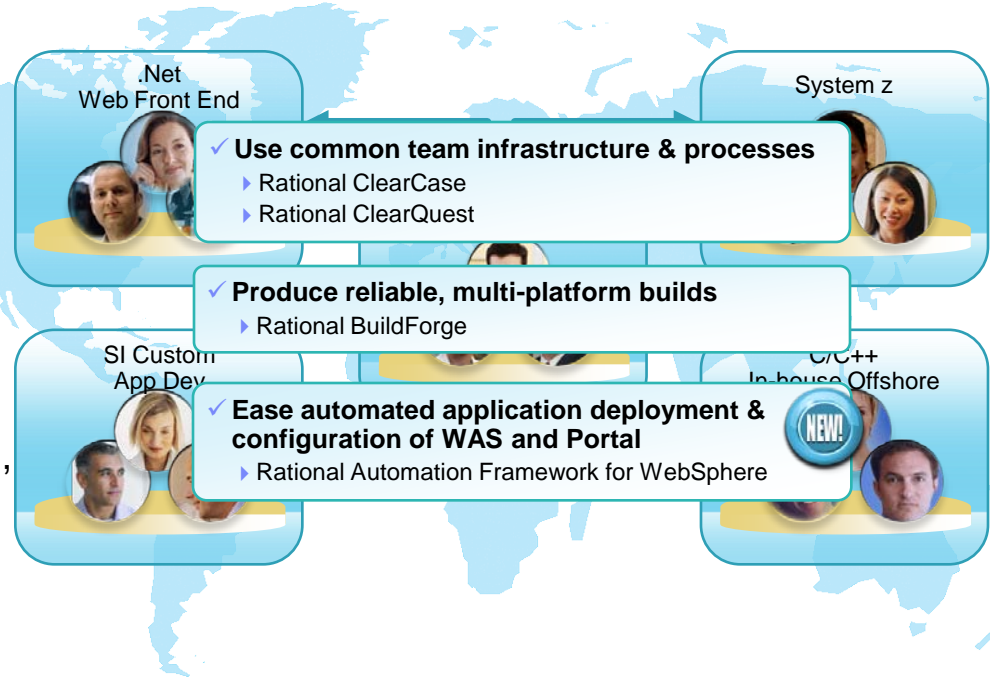
"Rational ClearCase in conjunction with Rational Developer for System z allowed us to completely centralize our software configuration and release management"
- Juergen Dimmler, Product Specialist, Kreditwerk

kreditwerk

Improve cross-team collaboration
Govern & collaborate end-to-end

- **Collaborate in context across all platforms and geographies**
  - ▸ Make software development more automated, transparent and predictable
  - ▸ Think and work in unison with integrated source control, work item and build management

- **Assess real-time project health**
  - ▸ Capture data automatically and unobtrusively
  - ▸ Measure & report progress against project and business objectives

- **Automate best practices**
  - ▸ Accelerate team workflow with dynamic processes
  - ▸ Leverage out-of-the-box or customized processes

✓ **Collaborate across the entire team**
  - ▸ Rational Team Concert for System z
  - ▸ Rational Team Concert for i
  - ▸ Rational Team Concert

✓ **Do it the best way**
  - ▸ Rational Method Composer
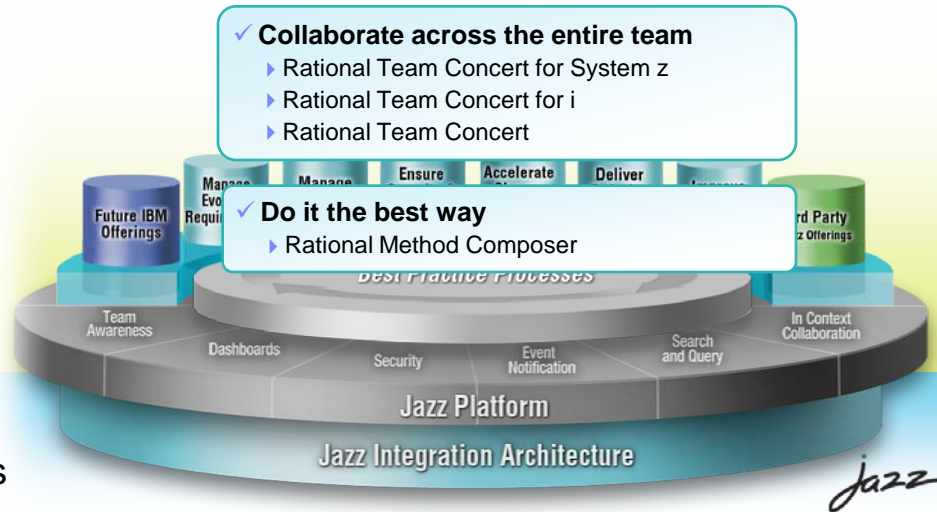
"Where we previously used separate systems, with Rational Team Concert we now have well integrated functionality. Our developers are more efficient because they are better able to focus on important issues. Our project managers greatly value the ability to customize these dashboards and instantly provide status on their milestones!" — Mika Koivuluoma - Production Manager, TietoEnator

Rational Enterprise Modernization Solutions
Lowering the cost of multi-platform application development and delivery
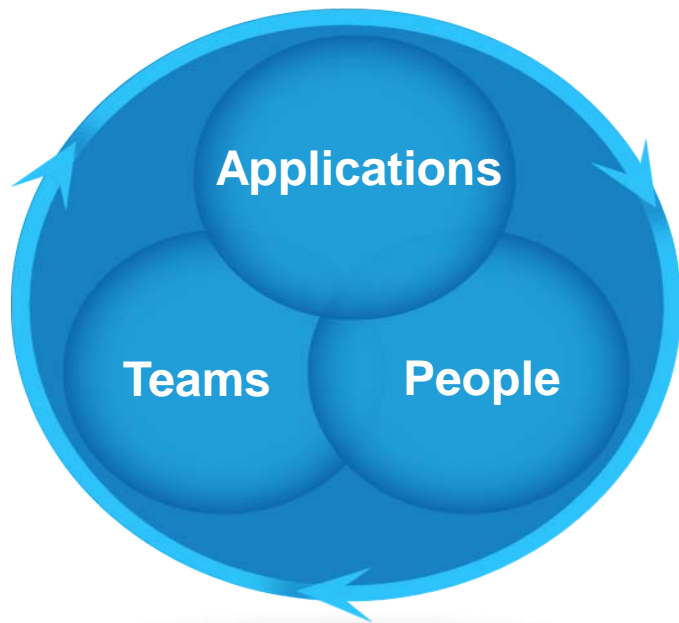
✓ Difficult times present opportunities to companies that can adapt quickly

✓ IT frequently inhibits flexibility due to fragile and poorly understood applications, limited staff productivity, poor collaboration and traceability across teams

✓ Rational Enterprise Modernization solutions deliver flexibility by:
  ▸ Improving how you build, maintain, and manage your Applications
  ▸ Helping your People be more productive
  ▸ Consolidating Teams across locations, roles, and platforms

Applications

Teams   **People**

Now, can we do this for less cost, better quality, and with more predictability?

This is a familiar problem …

Characteristics

- ✓ No automation
- ✓ Many skills to master
- ✓ Little standardization
- ✓ Local supply chain or custom built
- ✓ Manual monitoring, traceability

Results

- ✓ Very expensive
- ✓ Poor quality
- ✓ Unpredictable – time, cost, quality
- ✓ Flexible

Characteristics

- ✓ Process flow automation
- ✓ Specialists for each phase
- ✓ Some parts standardized
- ✓ Local or slow supply chain
- ✓ Manual monitoring, traceability

Results

- ✓ Less expensive
- ✓ Improved quality
- ✓ Unpredictable – quality
- ✓ Inflexible

Characteristics

- ✓ Process & task automation
- ✓ Optimized workforce with specialists
- ✓ Significant standardization
- ✓ Agile process for just-in-time production
- ✓ Automated oversight and intervention

Results

- ✓ Least expensive
- ✓ High quality
- ✓ Predictable
- ✓ Flexible

Software development today   Can we be more like this?

Examining the characteristics of a modern factory

Characteristics	Modern Factory	Software Factory
Process & task Automation	Well-established, automated process to transform inputs to finished products	Well-established software delivery process with automated tooling to transform business strategy to IT deployment
Specialized skills	Optimal blend of people with diverse skill set, and robots working on product assembly for optimal cost, and productivity	Use of role-based knowledge workers equipped with specialized tools for optimal cost and productivity
Standardized components	Product assembled with industry standard components sourced from global suppliers for cost and quality	Applications assembled from standardized software components/services built by a globally distributed workforce
Agile processes & integrated infrastructure	Flexible and agile process that optimizes production schedule with a just-in-time inventory/changes to lower cost and time-to-market	Flexible and agile process with real-time collaboration, integrated across disparate platforms, roles, and geographies
Automated control & oversight	Automated control system to monitor and intervene to ensure predictable outcomes	Governed software delivery process to continuously measure and improve, to ensure predictable outcomes

What components do we have today?

| *Characteristics*	*Software factory enabled by Rational*
Process & task automation	Rational automates the software development lifecycle and common development tasks
Specialized skills	Rational offers role-based tooling optimized for specific roles
Standardized components	Rational enables transformation of code/assets from disparate platforms and expose them as standards-based services
Agile processes & integrated infrastructure	*New* Rational's Jazz-based platform enables real-time collaboration of a global and diverse workforce, integrated across disparate platforms, roles and geographies
Automated control & oversight	*New* Rational's Managed Capability Improvement Framework enables controlling and steering of processes toward desired business outcomes

Rational Enterprise Modernization Solutions

Lowering the cost of multi-platform application development and delivery

Applications

Teams   **People**
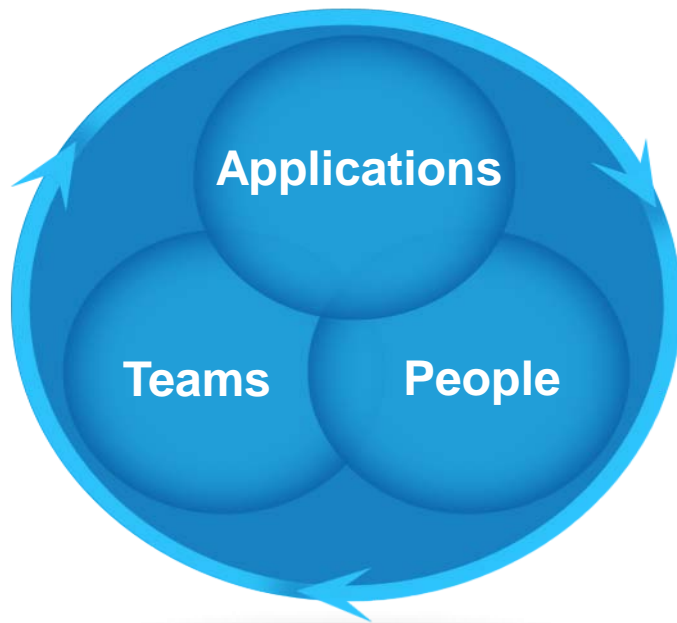
✓ Difficult times present opportunities to companies that can adapt quickly

✓ IT frequently inhibits flexibility

✓ Rational Enterprise Modernization solutions deliver flexibility

✓ A software factory puts it all together with
- Flexible & agile processes
- Automation across the software lifecycle
- Use of standardized components
- Optimized tooling that aligns with roles
- Continuous measurement & improvement
- Predictable outcomes

Get started today. We can help!

Leverage IBM Services to get started today

- **Executive Services**
  - ‣ Schedule an *Enterprise Modernization Executive Planning Session* to define modernization strategies

- **Application Modernization Services**
  - ‣ Application Assessments to:
    - ‣ Develop Modernization roadmaps to resolve specific business issues
    - ‣ Improve Application Quality & Performance
    - ‣ Identify opportunities for business software delivery improvements

- **People and Team Modernization Services**
  - ‣ Provide Implementation Services for Rational Enterprise Modernization tools
  - ‣ Provide SCM migration assistance
  - ‣ SDLC Assessments to:
    - ‣ Improve Software Delivery performance
    - ‣ Implement Software Delivery Metrics to more effectively manage the software development environment

Rational Professional Services

Articulate Business Objectives

Select Practices

PLAN
IMPLEMENT
MANAGE
ASSESS

IBM IT Governance Approach

Measure Practice Adoption and Business Outcome

Implement / Enact Practices

COMING SOON !
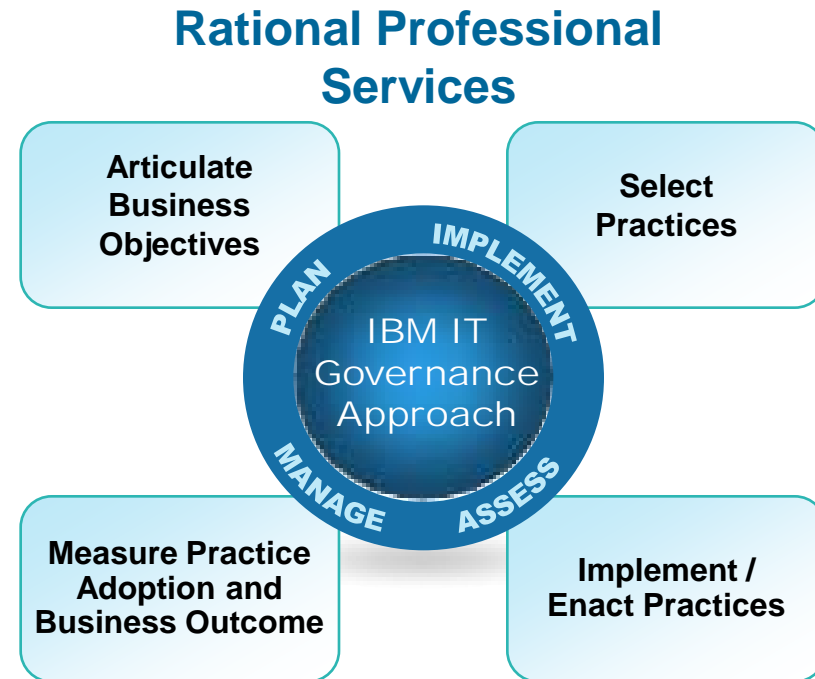
- **RDz V.Next**

  ▶ Support reuse of CICS v4.1 applications as services (tech preview)

    https://www14.software.ibm.com/iwm/web/cc/earlyprograms/ibm/cicsts41open/

  ▶ Integration with CA Endevor® SCM (tech preview)

    http://www-
    01.ibm.com/support/docview.wss?rs=3365&context=SSQ2R2&context=SS9KR6&context=SS2JX4&context=SS
    2QJ2&context=SSSTY3&context=SSDV2W&dc=D400&uid=swg24022860&loc=en_US&cs=utf-8&lang=en

  ▶ RTCz - extend the z/OS platform to support multiplatform software development and delivery on
    z/OS, Windows, and Linux, integration with RDz (tech preview)

    https://jazz.net/downloads/rational-team-concert/

- Tech preview for new **C/C++ and COBOL IDEs for POWER** on alphaWorks

  http://alphaworks.ibm.com/tech/cremoteide

- **RTCz open & closed betas** – try out the latest features for z/OS development

  https://www-304.ibm.com/software/earlyprograms/surveys/cust/nomination.wss?id=875

- Improve your skills - preview version of **online course to learn COBOL** with RDz, at the COBOL Café

  http://www-949.ibm.com/software/rational/cafe/docs/DOC-3129

- **Free version of EGL**, with Java & Web 2.0 support, available on the EGL Café in a few months

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