

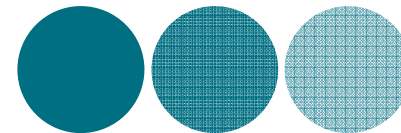
Managing the System z application development process

Michelle A. Cordes
Rational Ecosystem team
mcordes@us.ibm.com

Rational. software

Agenda

- **The realities and challenges of today's IT Shop**
- **Overview of Rational System z Enterprise Modernization solutions**
- **Summary**
- **Q&A**



IT Must be a Key Enabler of Change

“IT investments made 10 to 20 years ago are ... constraining the speed with which these businesses can change and respond to industry threats.” – Gartner’s Top Predictions for Industry Leaders, 2007 and Beyond

- **IT flexibility is a key enabler for today’s businesses to effectively and efficiently respond to change**
- **To be successful, you must mature and modernize your IT infrastructure**
- **However, doing so can be rather challenging...**

“Aligning IT with the business relates directly with an IT group attaining real flexibility.” – Butler Group

To Enable Change, IT Must be Flexible

But it's easier said than done...

To enable flexibility, IT must overcome challenges such as:



- Poor understanding of current enterprise application assets
- Complex application architectures
- Skills lock-in
- Islands of development
- Limited funding for new investments

Enterprise modernization challenges

“Legacy modernization is morphing into a strategic function. IT can't afford to toss away reliable application transactions indiscriminately.”

-- Phil Murphy, Forrester Research, April 2007

Assets

Layer of disjointed, poorly understood enterprise assets, preventing reuse

Architectures

Tightly-coupled architectures hindering IT flexibility

Skills

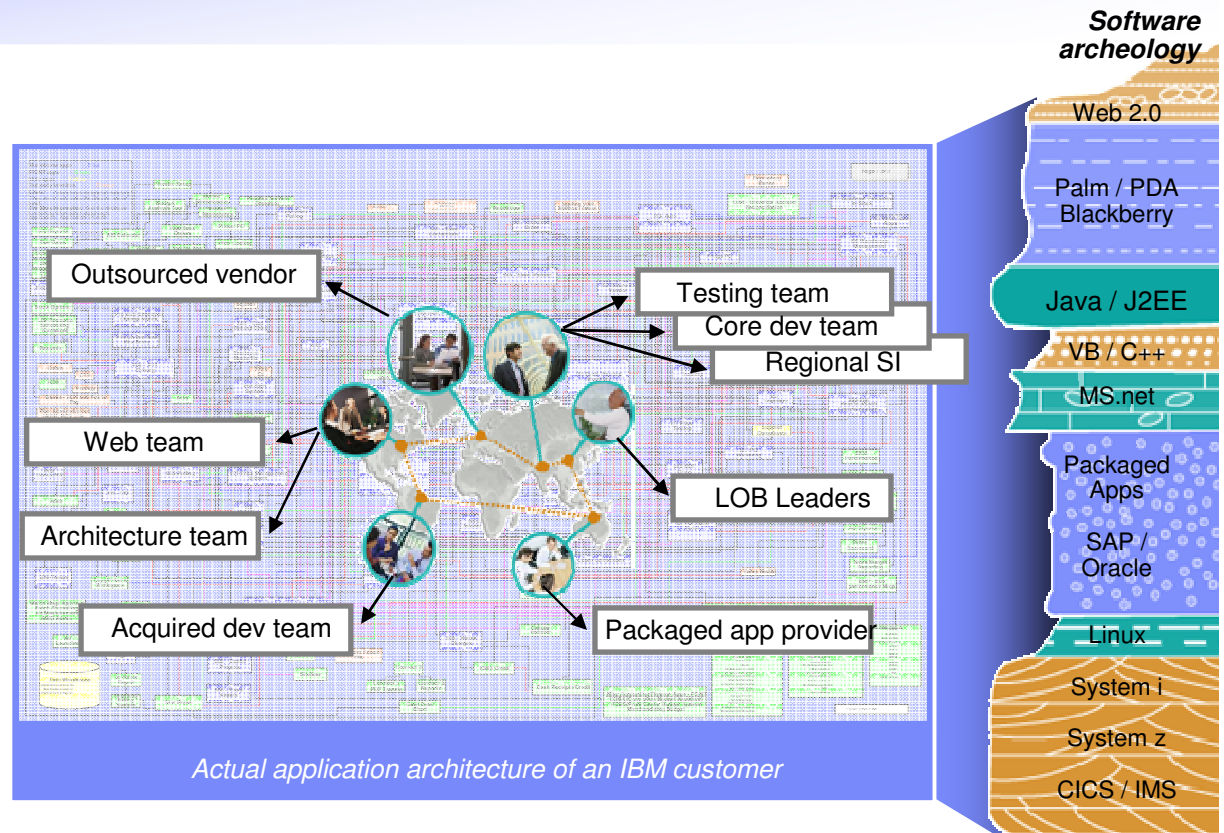
IT skills shortage and silos limiting staff productivity and mobility

Processes and tools

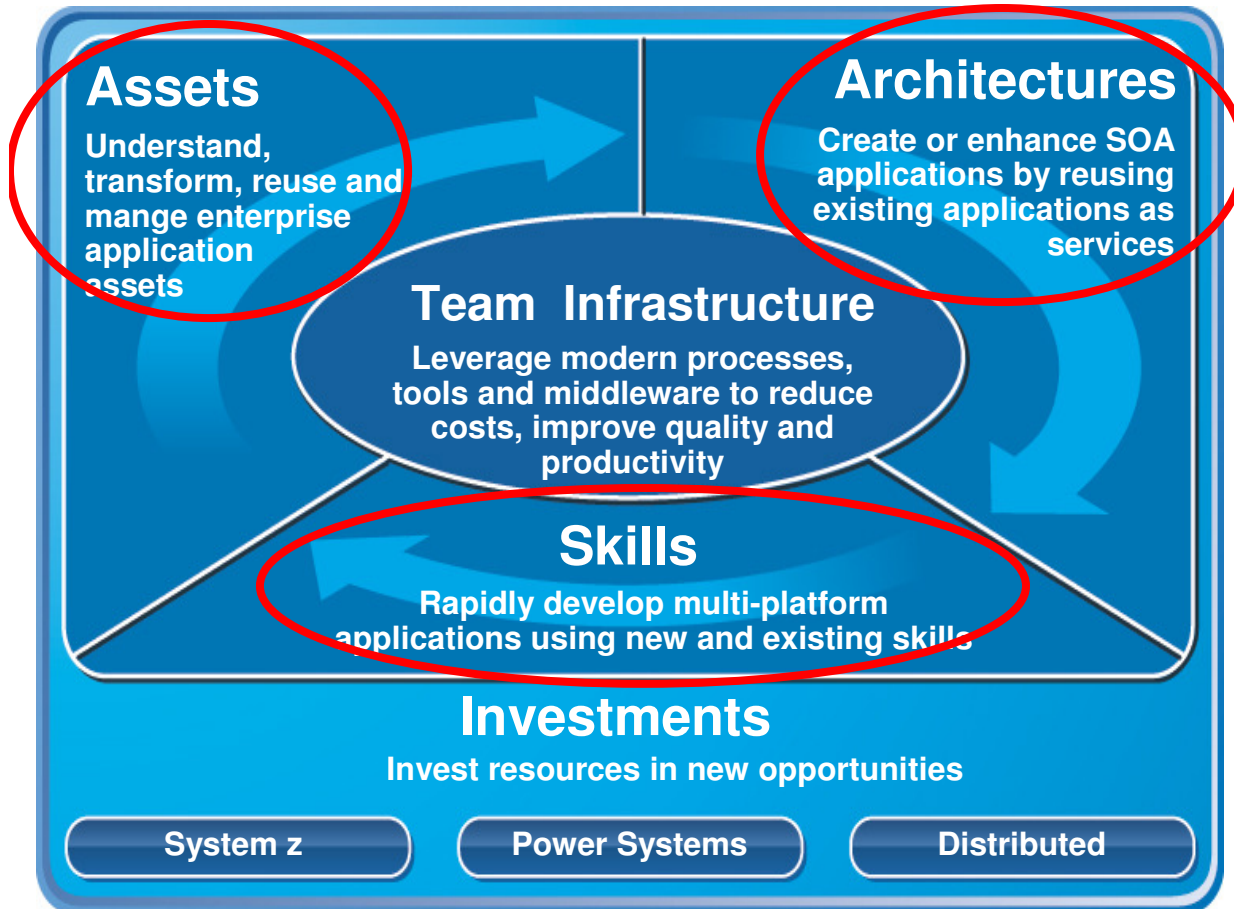
Duplicate processes, tools and infrastructures limiting collaboration

Investments

Increasing maintenance costs limiting flexibility for new investments



Enterprise Modernization – Improving IT Flexibility



- ✓ *Leverage value in existing assets*
- ✓ *Drive innovation with SOA and web technology advancements*
- ✓ *Leverage existing and new staff on multi-platform projects*
- ✓ *Improve quality and flexibility with a consolidated team infrastructure*
- ✓ *Reduce maintenance costs*

<http://www-306.ibm.com/software/info/developer/solutions/em/>

Modernize your Asset Management

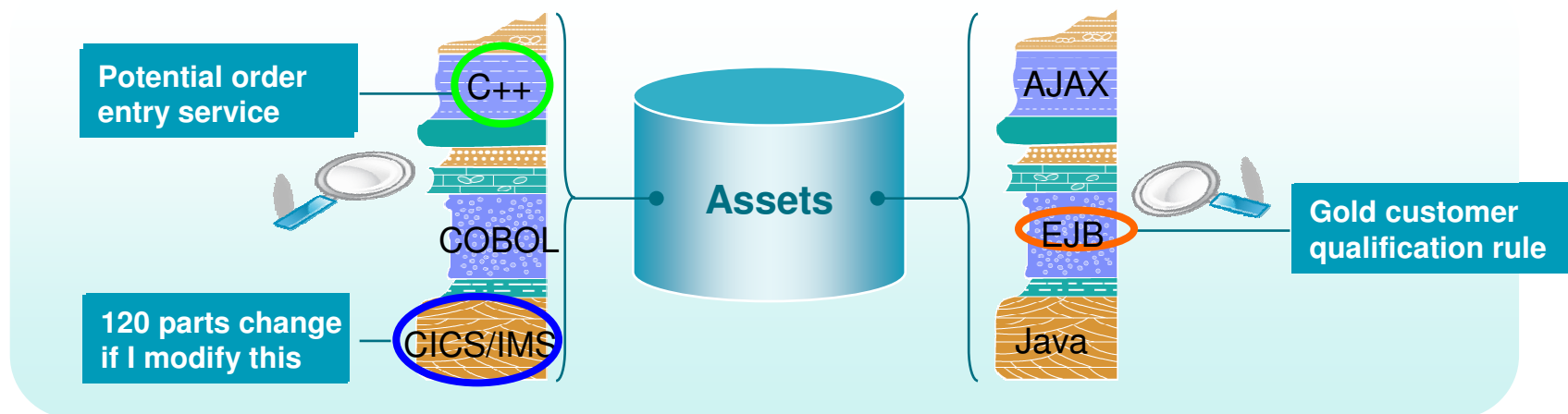
Business Challenge Difficulty understanding or leveraging existing systems

How can we...

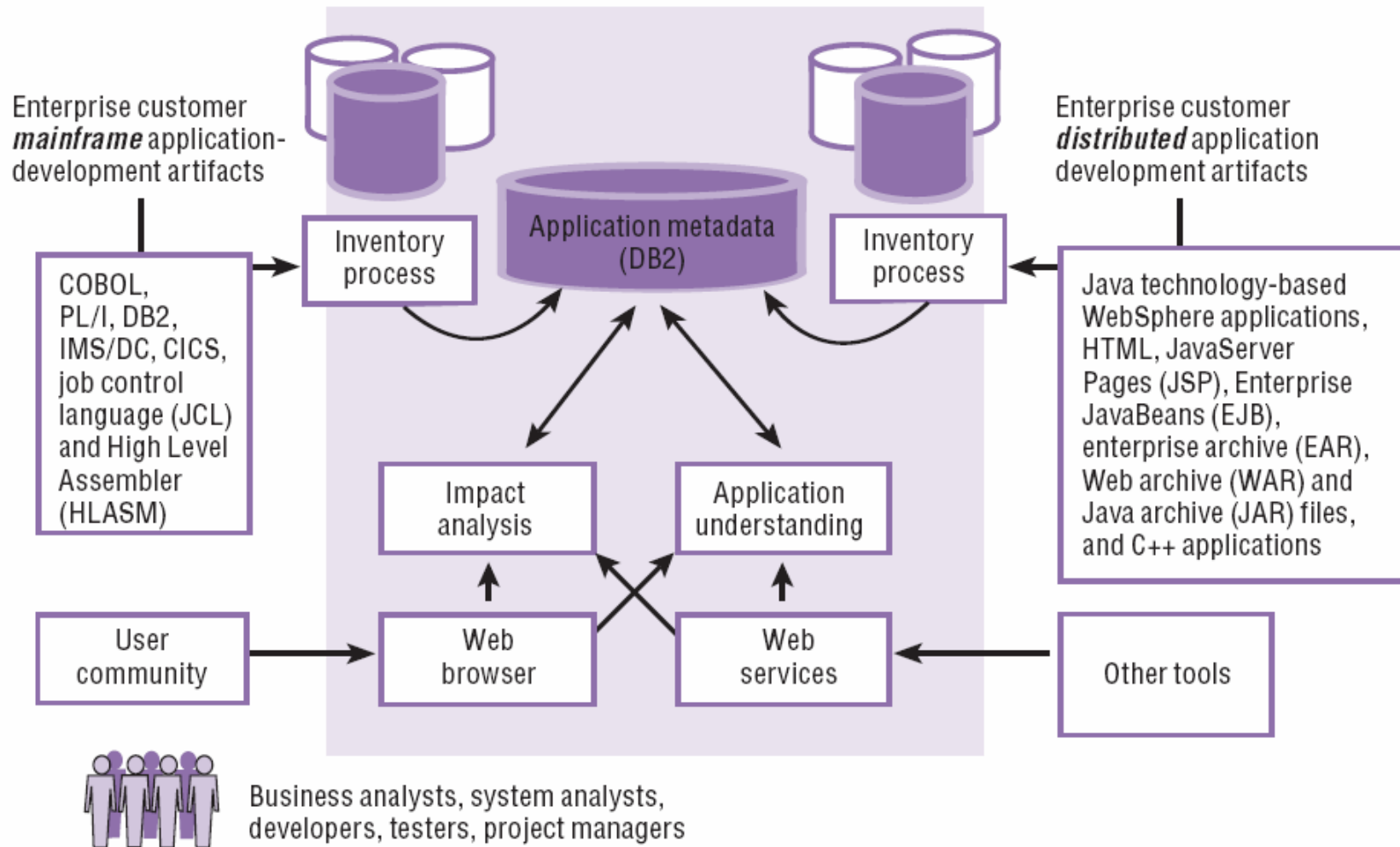
- ▶ Avoid application downtime due to unforeseen code dependencies?
- ▶ Teach new staff about existing systems quickly?
- ▶ Maintain control over code provided by outsourcers, business partners, or acquired through a merger?
- ▶ Accelerate SOA efforts?
- ▶ Improve portfolio evolution decisions?

Solutions Comprehensive inventory of assets for impact analysis & reuse

- ✓ Understand existing assets and relationships
 - *WebSphere Studio Asset Analyzer*
 - *Rational Asset Analyzer*
 - *Rational Transformation Workbench*
- ✓ Manage assets during development
 - *Rational Asset Manager*
- ✓ Manage deployed services
 - *WebSphere Service Registry & Repository*



WebSphere Studio Asset Analyzer V5.1



WSAA program insight

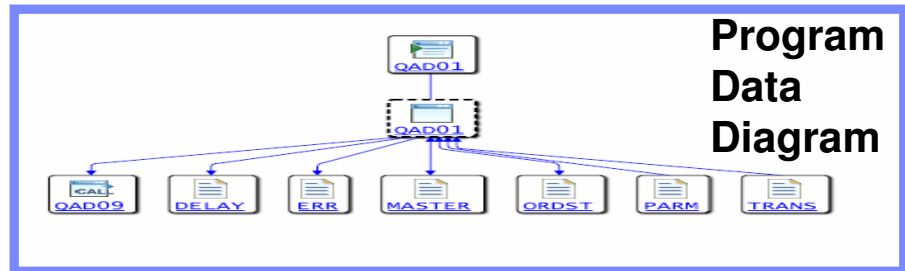
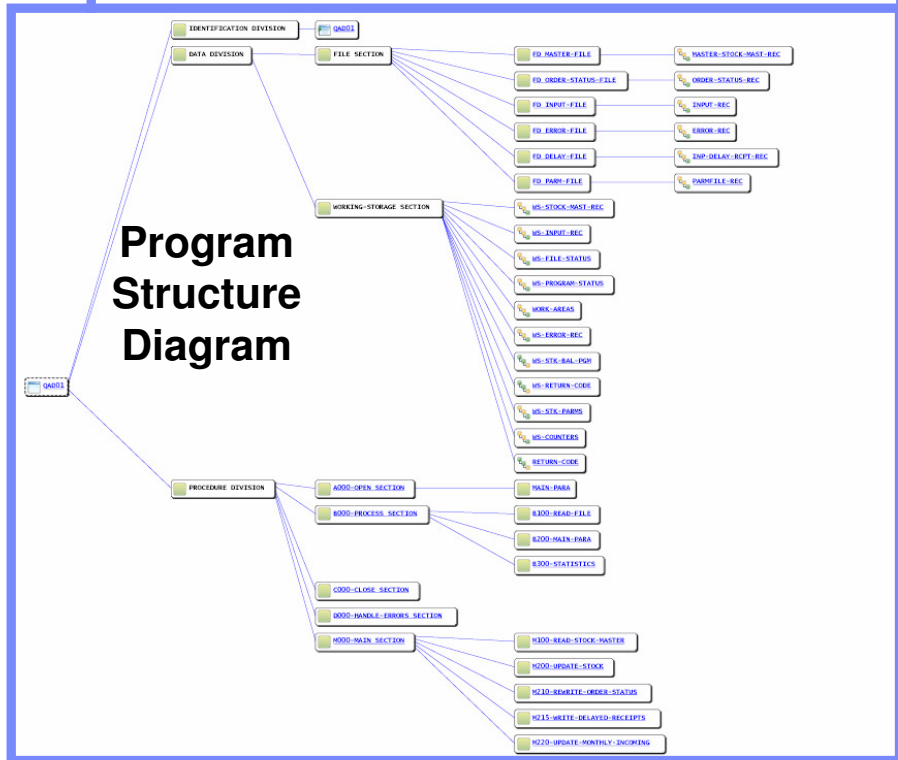
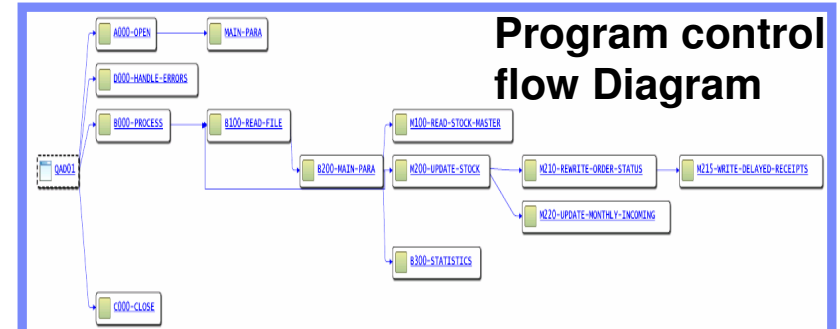
Program Details

File: DMHSRC13
 Program: QAD01
 Language/Type: COB / Program source
 Scanning options - actual: Proprietary scanner. Support any COBOL level. This is the most restrictive setting.
 Analysis status: Completed
 Metrics: Blank lines: 29, Comment lines: 47, Noncomment lines: 324, Number of lines in file: 400, Number of lines in program: 522, Splitting nodes: 47
 Site: WSAA
 Container: NTPS C:\DMH\SAMPLE\SOURCE\DMHSRC13
 Data base updated: 2007/07/10 07:29:00 PM by WSAA2
 Concatenation set assigned: COB - Data

File (3)	Language	Type	Analysis status	Action	Number of lines in file	Source location
DMHSRC06	COB	Included source	Completed	annotate	37	C:\DMH\SAMPLE\SOURCE\DMHSRC06
DMHSRC07	COB	Included source	Completed	annotate	19	C:\DMH\SAMPLE\SOURCE\DMHSRC07
DMHSRC14	COB	Included source	Completed	annotate	29	C:\DMH\SAMPLE\SOURCE\DMHSRC14

Control transfer to (1)	Type	Sequence	Parameters
Static (Literal): QAD09	CALL	1	WS-STX-PADMS

Data store (6)	Type	Program	Source location
DELAY	FILE	QAD01	C:\DMH\SAMPLE\SOURCE\DMHSRC13
ERS	FILE	QAD01	C:\DMH\SAMPLE\SOURCE\DMHSRC13
MASTER	FILE	QAD01	C:\DMH\SAMPLE\SOURCE\DMHSRC13
ORDST	FILE	QAD01	C:\DMH\SAMPLE\SOURCE\DMHSRC13
PARM	FILE	QAD01	C:\DMH\SAMPLE\SOURCE\DMHSRC13
TRANS	FILE	QAD01	C:\DMH\SAMPLE\SOURCE\DMHSRC13



WSAA - impact analysis

WebSphere Studio Asset Analyzer for Multiplatforms
Version 5.1

Home
Explore
Impact analysis
Database

Context : Home
Impact analysis summary
Impact analysis details: Im

Impact analysis details: Impact analysis results

Details

Impact analysis: QAD01:MASTER-STK-PART-NO - MC 8 17 2007
 Description: GENERATED for Program QAD01, Data element MASTER-STK
 Starting points for the impact analysis: Program/Element:
[QAD01/MASTER-STK-PART-NO](#)
 Scope of analysis: <unlimited>
 Levels of impact analyzed: <unlimited>
 Created/last updated: 2007/08/16 11:14:00 AM by WSA1 / 2007/08/16 11:14:06 A

Overview
Summary
Details
Metrics - overview
Metrics - detailed
User-related assets

The following impact analysis overview diagram shows a subset of assets that this proposed code change directly and indirectly affects.

The diagram illustrates the impact of a code change. It starts with 'Direct Impacts' (0 CICS transactions, 0 IMS transactions, 1 Batch jobs) and 'Indirect Impacts' (2 CICS transactions, 0 IMS transactions, 4 Batch jobs). Both lead to a central state: 'Starting with 1 data elements in 1 programs' (9 Data elements, 0 Entry points, 0 Other impacted programs) and '2 Data elements 2 Programs' (2 Data sets, 5 Data stores, 0 IMS segments, 0 DB2 tables).

Impact analysis: [QAD01:MASTER-STK-PART-NO - MC 8 17 2007](#)

Graph actions
[Zoom in](#) [Zoom out](#) [Zoom all](#)

The graph shows a hierarchical structure of assets. At the top is 'MASTER-STK-PART-NO'. Below it are assets like 'DMHSRC06', 'MASTER', 'STKMST', 'ERR', and 'TRANS'. Further down, there are more specific assets like 'QAD01', 'LSTAU.S.QA.VSAM.STOCK.MASTER', 'IDCAMS', 'QAD02', 'QAD03', 'QAD04', 'QAD05', 'QAJB0001', 'QAJB0002', 'Y2KMYSP', 'Y2KMYSR', 'QAMV', and 'LSTAU.S.QA.INCOMING.STOCK(+0)'. Arrows indicate dependencies between these assets.

- Find the needles in the haystack affected by a proposed change

Rational Asset Analyzer

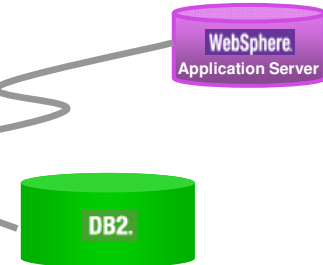
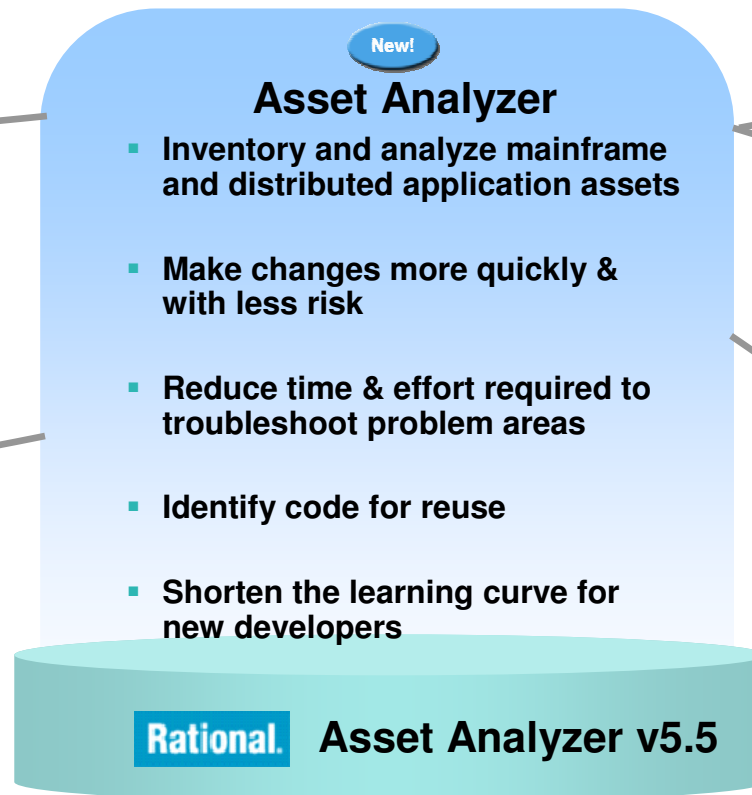
Faster application change and reuse

Improved requirements definition processes and business-IT team collaboration

Available July 2008



Better insight into which artifacts need to rebuilt based on changes *



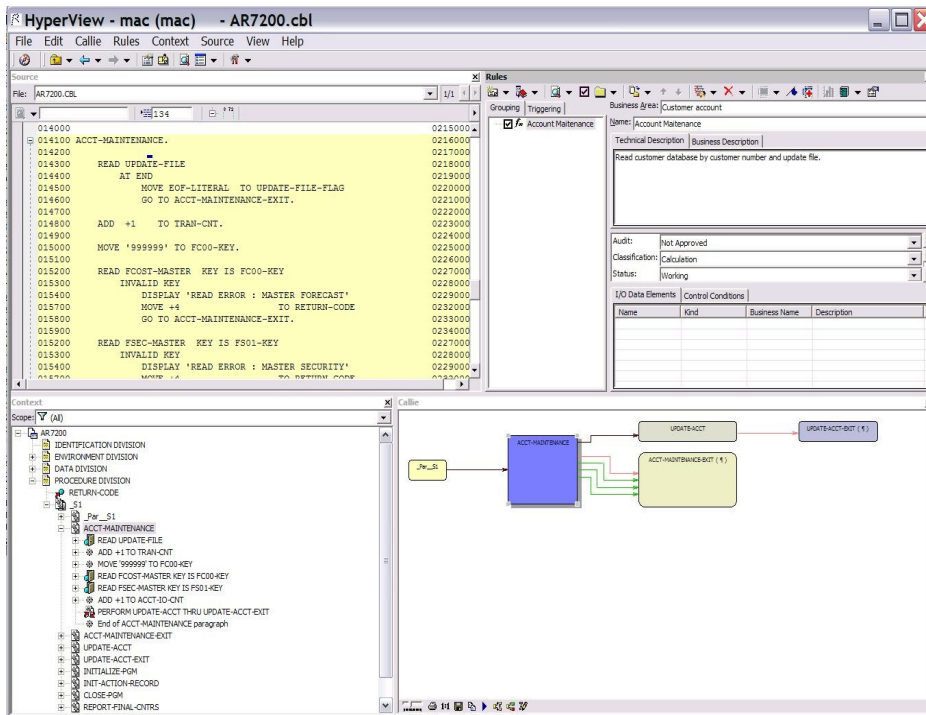
Build tools to leverage the rich data gathered by Asset Analyzer

- Use the web services interface to pull information from Asset Analyzer into other tools

* Future Integration

IBM Rational Transformation Workbench V3.1

Accelerate your path to reuse and SOA-readiness

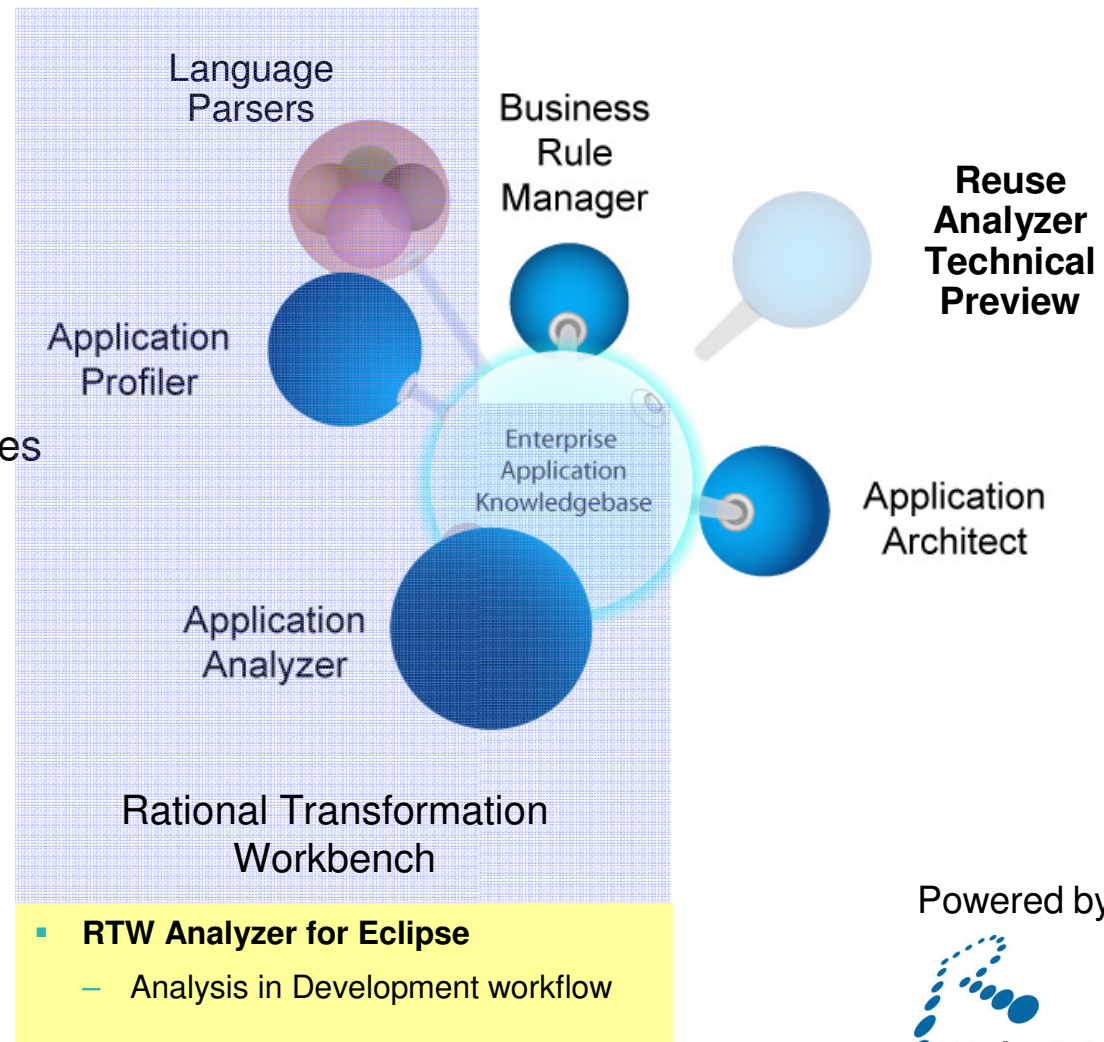


The new business rules extension can help speed the identification of your company valuable business rules

- **Helps collect and abstract business and technical knowledge from highly complex systems for better understanding**
- **Demystify enterprise applications and their inter- and intra-relationships**
- **Gain intellectual control; make fact-based decisions; develop transformation roadmap.**
- **Identify key assets and restructure for reuse in SOA; reduce cost and time of modernization projects**
- **Reduce cost and time of on-going application maintenance**

RTW – Pieces and functions

- **Application Analyzer**
 - Deep interactive analysis
- **Application Profiler**
 - Team access via the web
- **Business Rule Manager**
 - Find and manage business rules
- **Application Architect**
 - Create new, reusable components
- **Reuse Analyzer Technical Preview**
 - Analyze code for SOA
- **RTW Analyzer for Eclipse**



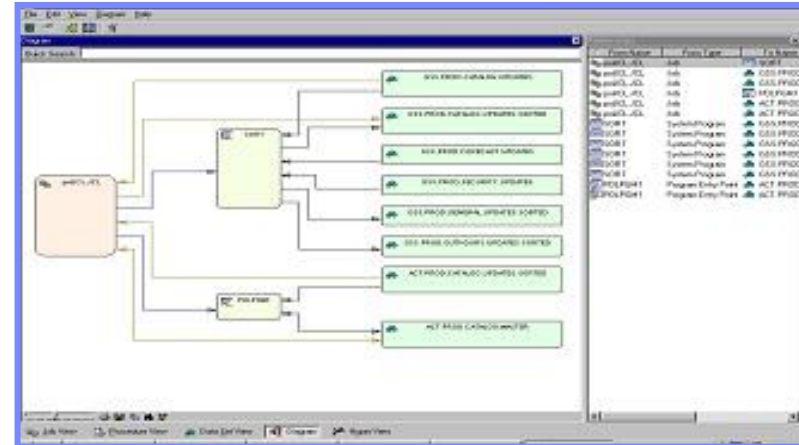
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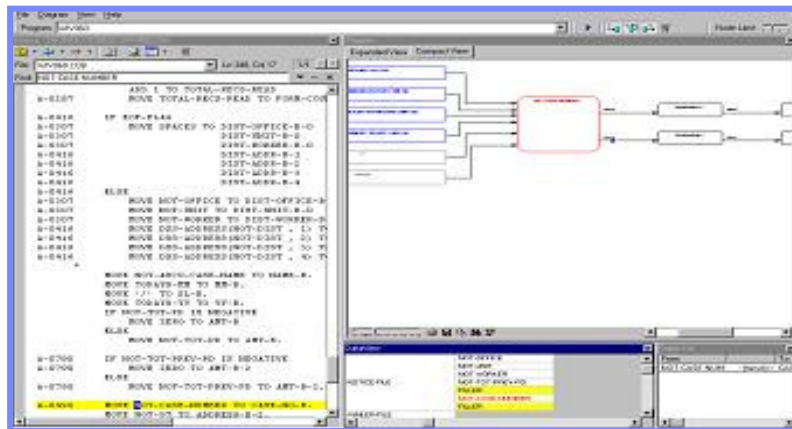
RTW Application Analyzer: Screen Shots

Name	Type	Executable Size	Operators	Operands	Vocabulary	Program Vols.	Complex.	Devel.
CE4211	Program	3747	6229	14343	8728	267177.30	0.06	243280.04
CE4001	Program	4599	5774	15462	8006	288338.30	0.05	254529.00
CE4202	Program	3227	5147	12058	7188	226317.20	0.06	196446.50
CE4214	Program	2920	4642	9474	5049	173652.00	0.07	145279.30
WBFWB	Program	1925	3671	8970	4149	152407.20	0.09	90712.17
BL0412	Program	1620	4089	17916	11964	297682.40	0.10	173560.96
WBFWB	Program	1637	3489	8150	3997	137877.90	0.10	80303.38
CE4208	Program	1877	3255	8083	5913	157082.80	0.07	119083.10
CE4203	Program	1710	2879	6375	3462	108802.90	0.07	83843.24
WBG1BL	Program	4261	5176	13808	6600	248966.90	0.06	248547.70
WBG1BL	Program	1504	2744	5778	2726	57257.92	0.07	74798.62
CE4201	Program	2127	3323	6090	3664	111442.40	0.07	82695.72
CE4300	Program	2289	3316	7118	3803	124090.80	0.07	109682.00
BL0091	Program	995	1932	9078	6438	136302.90	0.12	87597.68
CE4205	Program	1223	2087	4685	2548	74689.47	0.07	60830.32
BL0409	Program	598	1840	7712	5526	118755.60	0.10	64592.29
CE4204	Program	1102	1987	3749	2122	62494.50	0.06	95662.96
CE9802	Program	1920	2640	5446	2728	52290.69	0.07	77792.31
WV930	Program	3195	4101	9039	4956	199727.10	0.06	141072.30
CE4223	Program	1290	2182	4629	2851	77263.98	0.07	99586.96

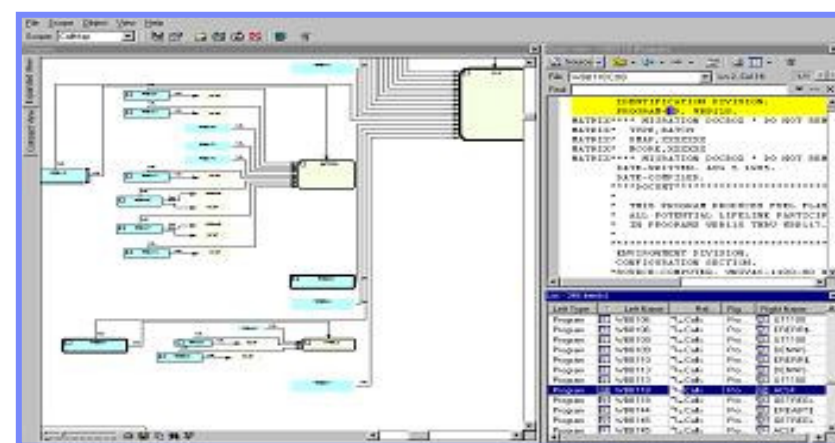
Complexity Report



Batch Application Viewer

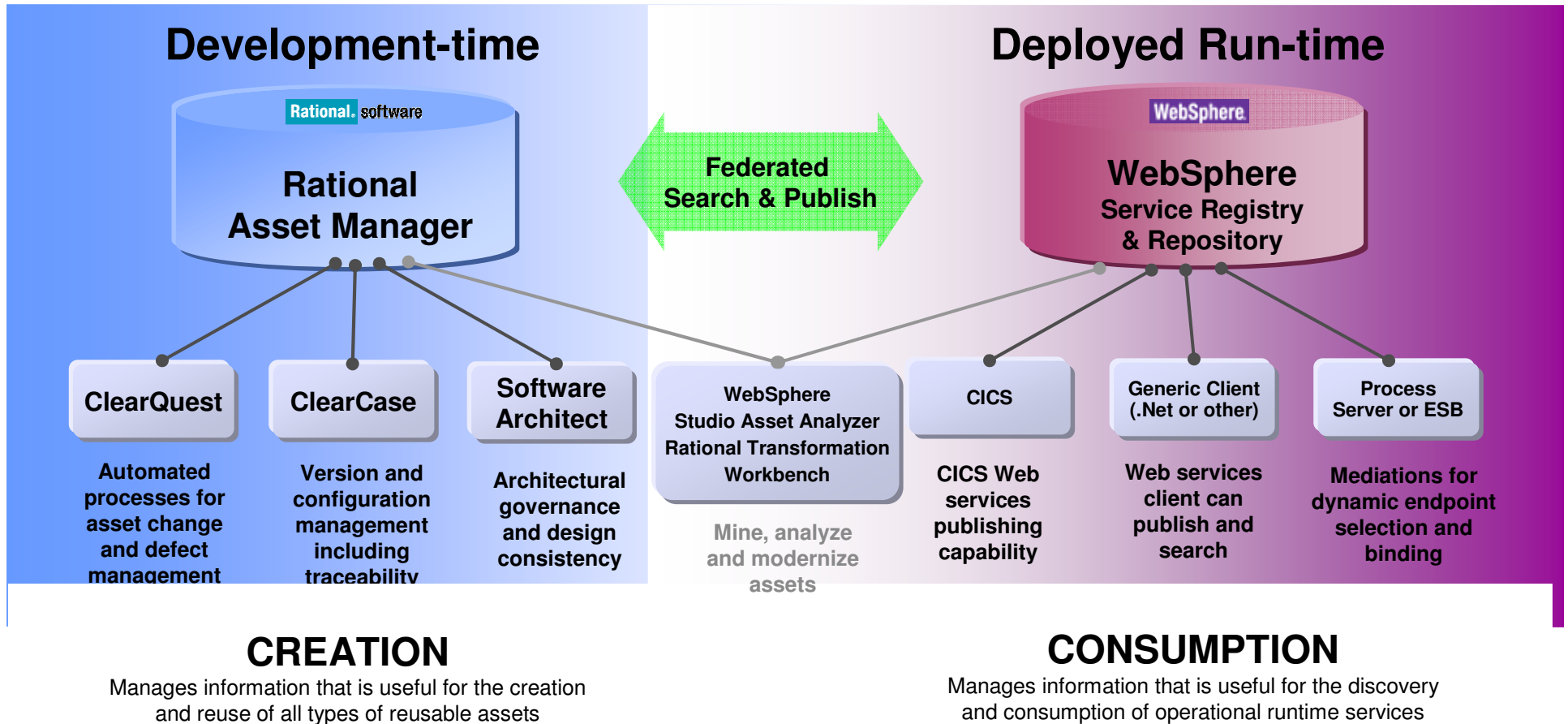


Global Data Flow Analysis



Call Map Diagrammer

Asset discovery, transformation and management



Modernizing existing systems to offer more higher-margin accessories

Multinational auto manufacturer

Challenge

- Expand existing systems to offer more higher-margin accessories; requires change to field used by >1300 programs
- Identify obsolete code within their automotive systems and begin a “decommissioning” process

Solution

- Performed impact analysis with WSAA, coupled with GBS Test Environment Builder to accelerate system verification
- Now employing RTW to start decommissioning” process

Products include:

- WebSphere Studio Asset Analyzer
- IBM Rational Transformation Workbench



“We are very pleased with WSAA. It is doing just what we want and need it to do.” - AD manager

Modernize your Architectures

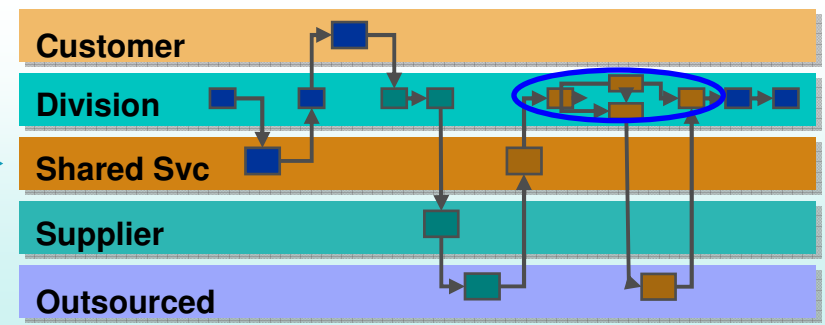
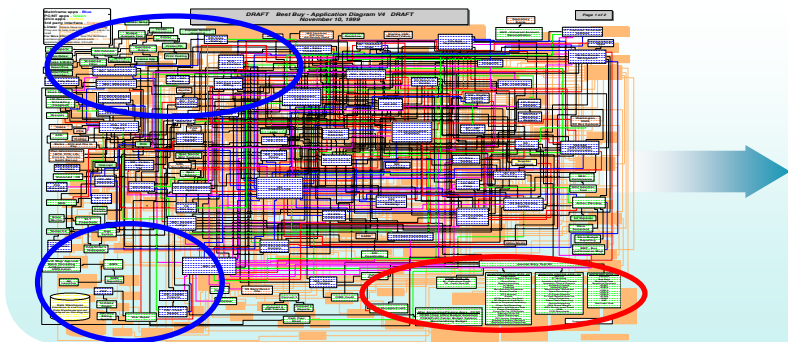
Business Challenge Inflexibility in adapting applications in support of business needs

How can we...

- ▶ Progress our SOA maturity given all our existing code assets, including CICS, IMS, IBM i and green screen applications?
- ▶ Build services once and deploy them across my heterogeneous production environment?
- ▶ Ensure our new SOA system will be more easy to extend and maintain than my current ones?

Solutions Flexible architectures to enable business agility

- ✓ Expose 3270 and 5250 applications as web services
 - *Host Access Transformation Services*
- ✓ Quickly create web services from existing COBOL, RPG, PL/I, Java, or EGL applications
 - *Rational Developer for System z (SFM)*
 - *Rational Business Developer*
- ✓ Create new platform-independent services
 - *Rational Business Developer (EGL Service keyword)*
- ✓ Leverage MDD - xform UML to EGL, COBOL, WSDL, etc
 - *Rational Software Architect*



Modernize your Skills - Languages

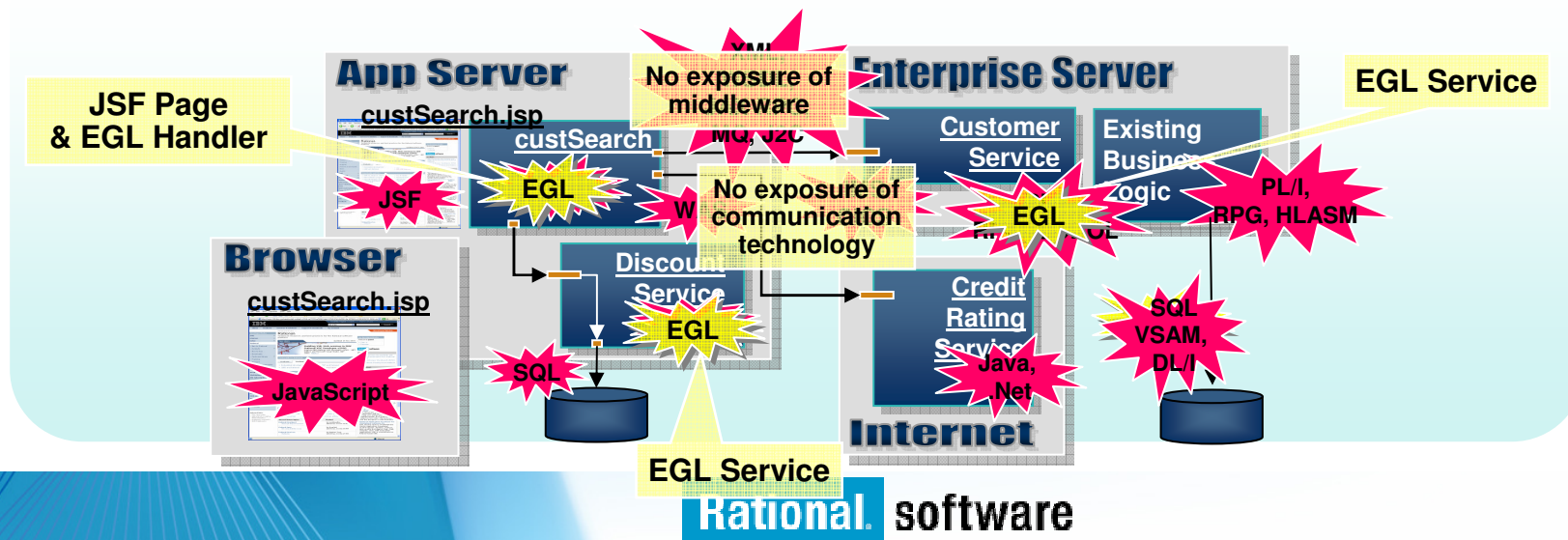
Business Challenge Staff inflexibility due to “skills silos”

How can we...

- ▶ Exploit new technologies and innovation without retraining existing staff that knows the business?
- ▶ Use new employees on any project, independent of the target platform?
- ▶ Provide modern web UIs leveraging existing skills and systems?

Solutions Powerful tools & abstractions for multi-platform development

- ✓ Apply existing business-knowledgeable staff to build all elements of multi-platform applications ... end-to-end from Web 2.0 to services to business transactions
- ✓ Attract new staff with “*IBM’s newest business language*”
 - *Rational Business Developer (EGL)*



Modernize your Skills - IDEs

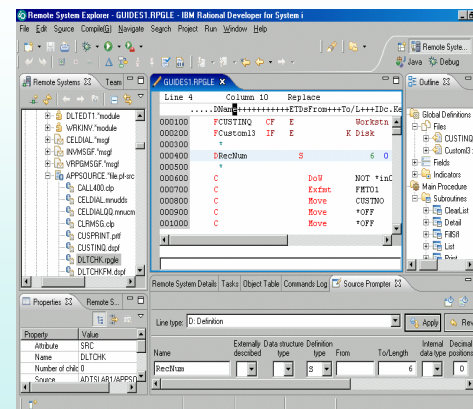
Business Challenge
 Low productivity, non-competitive tools for new developers

How can we...

- ▶ Achieve higher productivity for our enterprise developers?
- ▶ Attract new and younger developers to backfill retiring System z and IBM i developers?
- ▶ Simplify license management by standardizing on a single, multi-platform development IDE?
- ▶ Free up System z MIPS for production use?

Solutions
 Achieve high productivity, attract new talent with modern IDEs

- ✓ Use modern IDEs to develop and maintain code
- ✓ Debug and test from workstation
 - Rational Developer for System z
 - Rational Business Developer

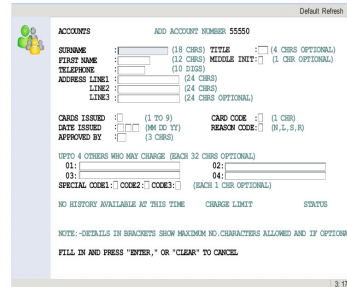


Rational Host Access Transformation Services

Modernize user interfaces and create Web Services

- Modernize and streamline “green screen” applications
- Combine data from multiple screens, applications and databases
- Non-invasive

Rich Client

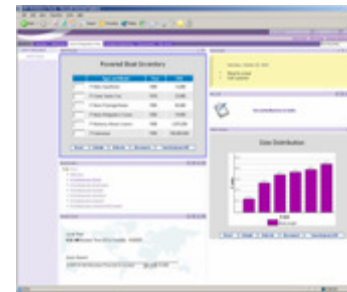


- Integration at the desktop with other Eclipse applications
- Client side processing
- Rich set of user interface widgets
- Built on the standard, open Eclipse foundation
- 3270e print directly to end user's printer

Example: CICS App

3270 or 5250
Data stream

Portal



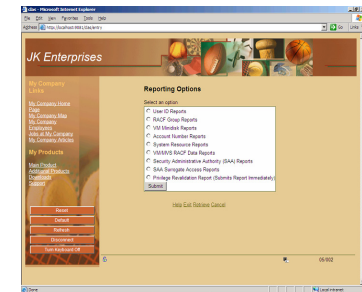
Web Service



- Build self-service transactions

- Integration at the glass
- Click-to-Action support

Web



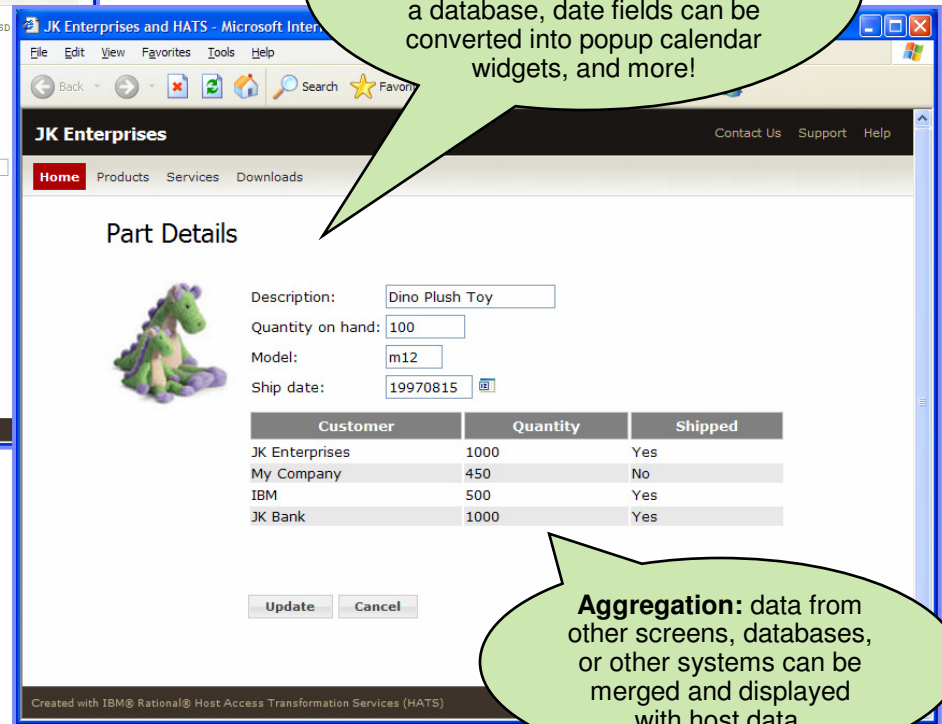
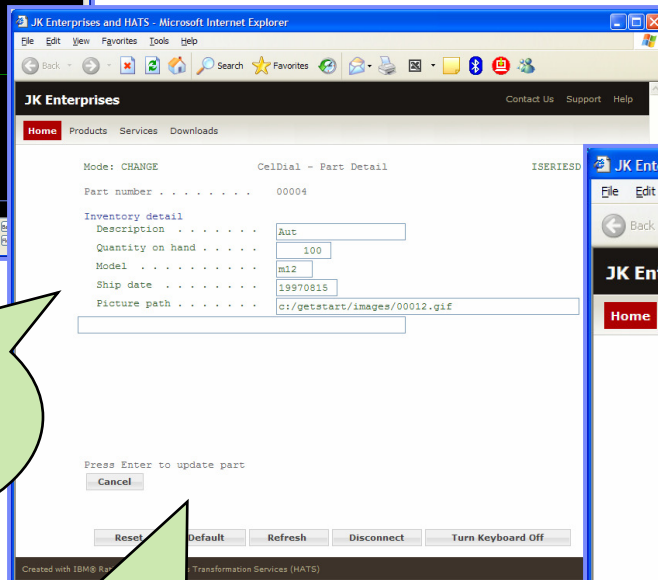
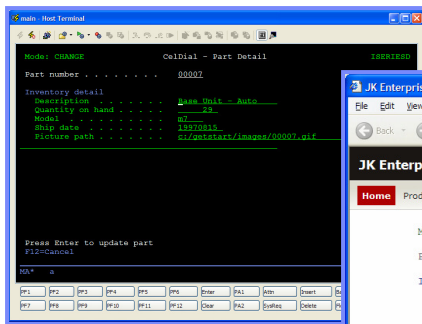
- Zero footprint
- View through your favorite browser

HATS - Modernization At Your Own Pace

Today

Day 1

Tomorrow



Modern UI: All pages share the same theme and style, which can be based on an existing Web site.

Instant Value: HATS default rendering automatically transforms actions into clickable links and buttons. No changes required to the host application.

Integration: Text can be replaced with images, input fields can be populated from data on other screens or from a database, date fields can be converted into popup calendar widgets, and more!

Aggregation: data from other screens, databases, or other systems can be merged and displayed with host data.



Host Access Transformation Services Values

Rich Client



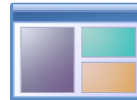
- Integration at the desktop with other Eclipse-based applications
- Client side processing
- Rich set of user interface widgets
- Supports Lotus Expeditor deployment

Browser



- Zero footprint
- Pure HTML
- Access through your favorite browser, including Internet Explorer and Firefox.

Portal



- Integration at the glass
- Cooperative portlet support
- JSR 168 compliant

Mobile



- Access host applications from mobile devices

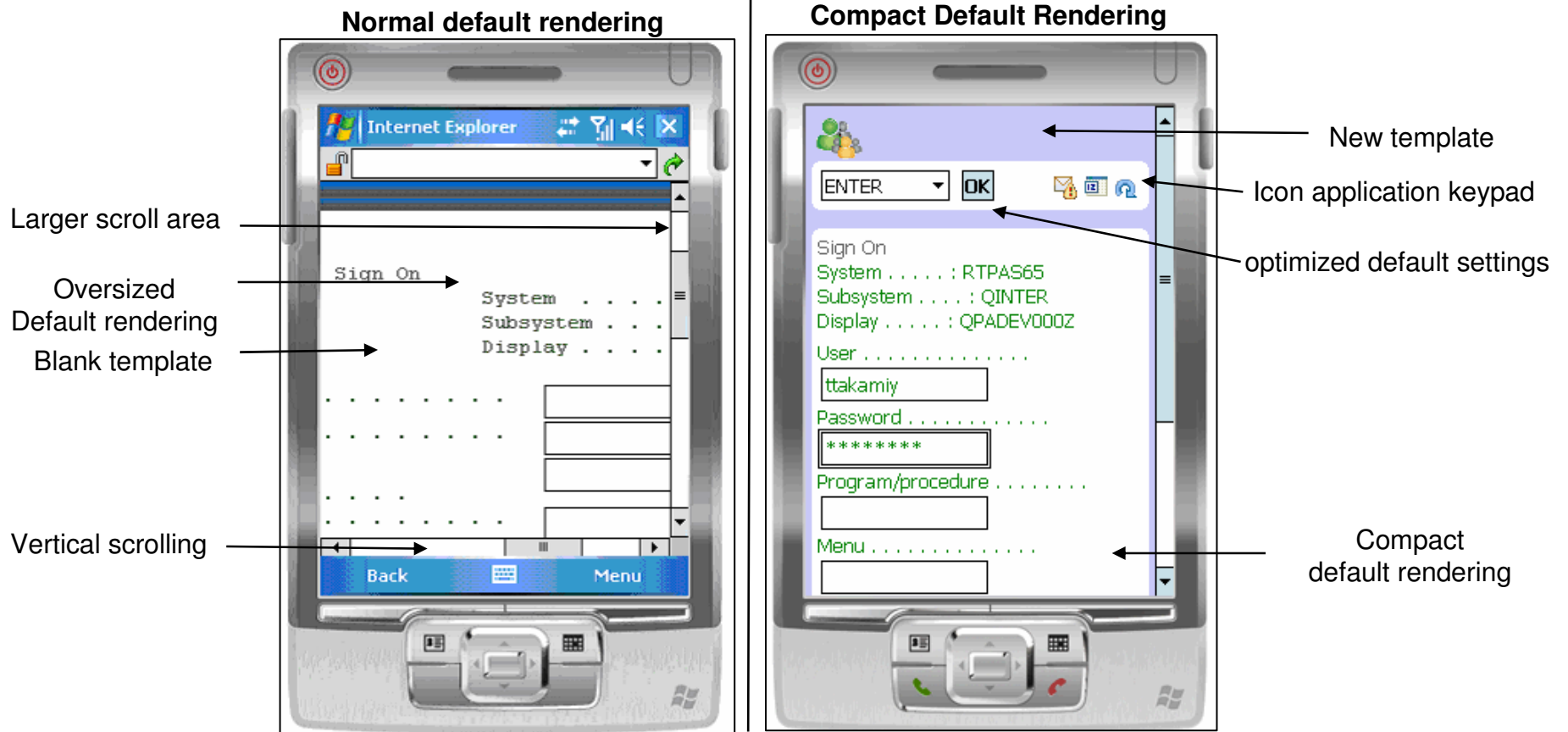
Web Services



- Build self-service transactions
- Expose host business processes as Web Services
- Provide controlled access to vital host applications and host data.

- **Quick ROI** : Host applications can be quickly deployed with a new user interface
- **Low cost** : No need to rewrite application
- **Low risk** : Leverage open, proven platforms and technologies
- **Increase productivity and reduce training costs**
- **Improving work flow from multiple applications**
- **Provides integration of host business processes and data with other Web, portal, and rich client applications**

HATS Compact Default Rendering Example



Improving customer satisfaction and reducing costs

Mercantil do Brasil

Challenge

- Help developers integrate the bank's .NET applications with its OS/390 environment.

Solution

- Use IBM modernization tools to effectively bridge the gap between Mercantil do Brasil's .NET applications and its OS/390 operating environment.

Products include:

- Host Access Transformation Services (HATS)
- WebSphere Application Server for z/OS



"Beyond the financial benefits, this new solution gave us speed and quality in the execution of our services."

-- Jaime Herrera,
technical support
manager, Mercantil do
Brasil

IBM Rational Developer for System z V7.1

Preserve System z investment – and leverage existing assets

JES and PD Tools

- Debug z/OS applications from the workstation as they execute live in the remote runtime
- Read/Write/Update VSAM datasets via integration with IBM File Manager
- Access IBM Fault analyzer reports for analyzing ABENDS and associating back to source code
- Interact with the Job Entry Subsystem (JES) to submit jobs, monitor jobs, and review job output

Integration with EGL using RBD

- Quick and easy development of modern enterprise applications for business programmers
- Simplify and speed up creation of Web applications and services without having to learn Java or J2EE

Traditional Development

Development Environment

- Connect to z/OS systems
- Work with z/OS resources like COBOL, PL/I, C, C++, JCL, assembler, etc.
- Perform dataset management actions like allocating datasets and migrating datasets
- Perform typical edit, compile, and debug tasks on remote z/OS resources from the workstation
- Create, build, and catalog DB2 stored procedures on z/OS
- Compile and test programs locally to ensure correctness

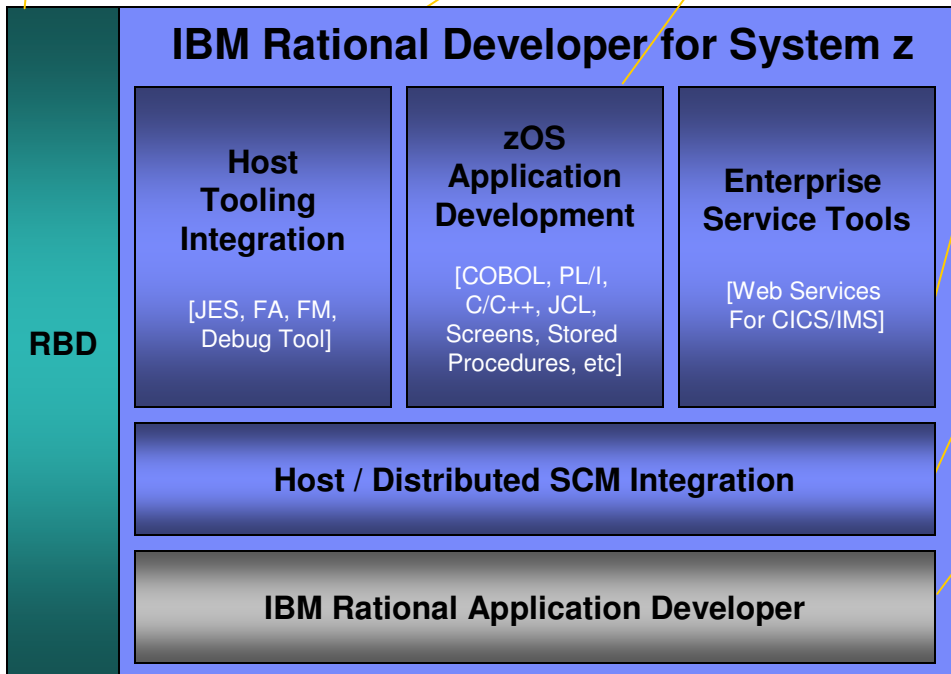
Screen design

- Visually create, modify, build, and deploy BMS maps sets or MFS/IMS maps remotely or on the local workstation

Code Generation

- Generate CRUD DB2 program code from UML, which can also be easily integrated into web service applications

IBM Rational Developer for System z



z/OS Web Service and Flow Creation

- Implements SOA and Web Services
- SOA access to CICS V3.2 and IMS V9 COBOL applications
- Bottom-up/Top-down or meet-in-the-middle COBOL to XML mapping support
- Integrated COBOL XML converters, XML schemas, and WSDL generation
- Service Flow Modeler to build/deploy service flows out of your existing Commarea, Channel, MQ, and Terminal CICS applications.

SCM Support

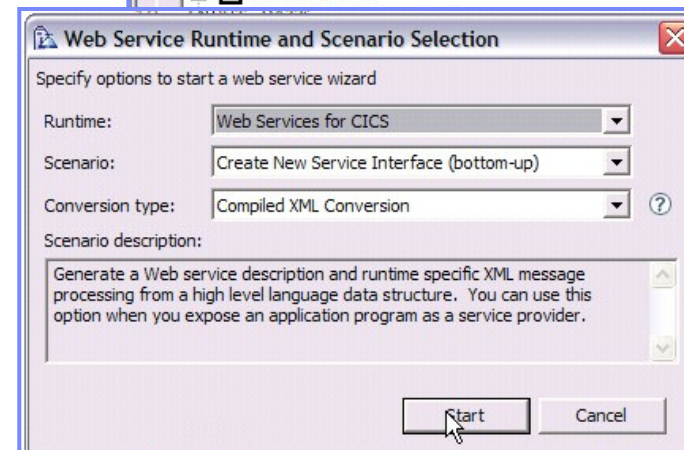
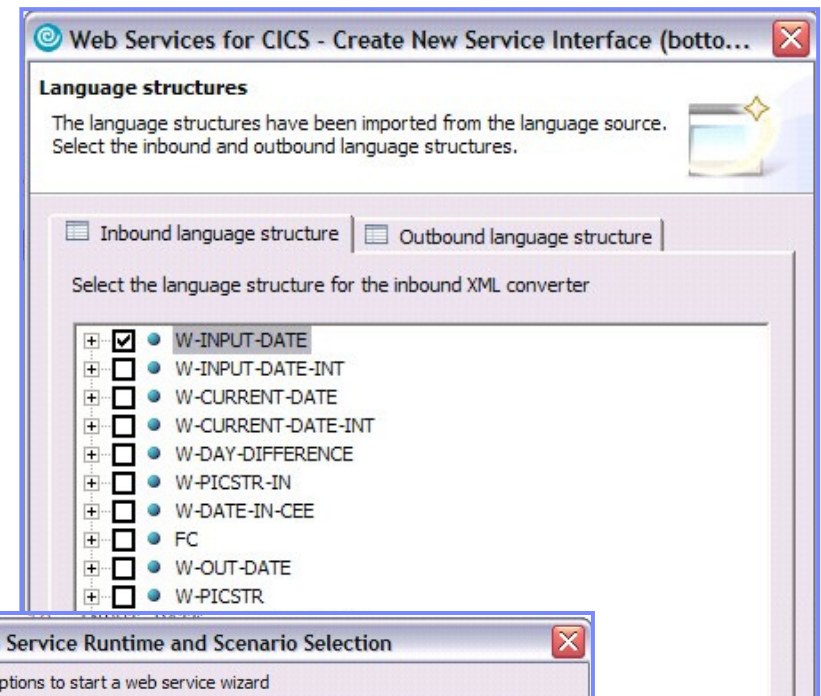
- Access to host SCMs such as SCLM
- Framework for writing/deploying custom SCM integration code
- Support for storing z/OS resources in distributed SCMs such as ClearCase

Web and JEE Development

- Create Web Pages / JSF / Struts
- JEE/Java Development
- JCA Connectors
- Distributed debugger
- Web Services and Test environment

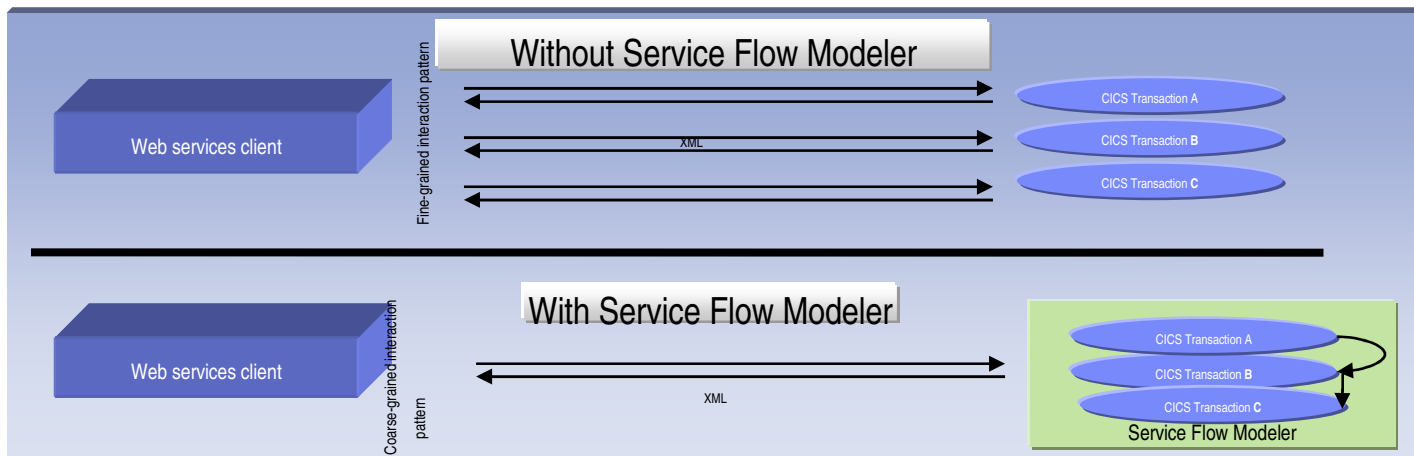
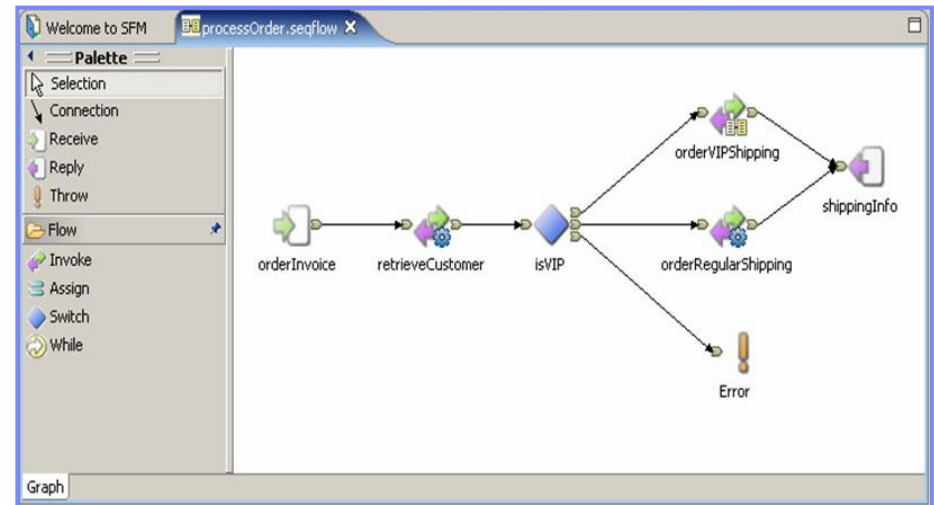
RDz - Create web services for zOS runtimes

- **Build, Deploy, and Test Web services from existing applications**
- **Create source code skeletons from web service definitions**
- **Map web service definitions to existing application modules**
- **Supports traditional languages**
 - COBOL
 - PL/I
- **Supports zOS specific runtimes**
 - CICS
 - IMS
 - Batch



RDz - Orchestrate CICS services and screens

- **Model, Deploy, and Test Service Flows using Service Flow Modeler**
 - Aggregates multiple CICS transactions into high-level business processes through visual modeling
 - Supports CICS BMS (terminal-based) applications & CICS commarea/container/channel applications
 - Highly optimized CICS runtime supporting Web services and XML interfaces



Extending COBOL applications for online banking

Commerzbank

Challenge

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

Solution

- Develop new application framework based on IBM COBOL
- Leverage single development that support both host and distributed platforms

Products include:

- IBM Rational Developer for System z

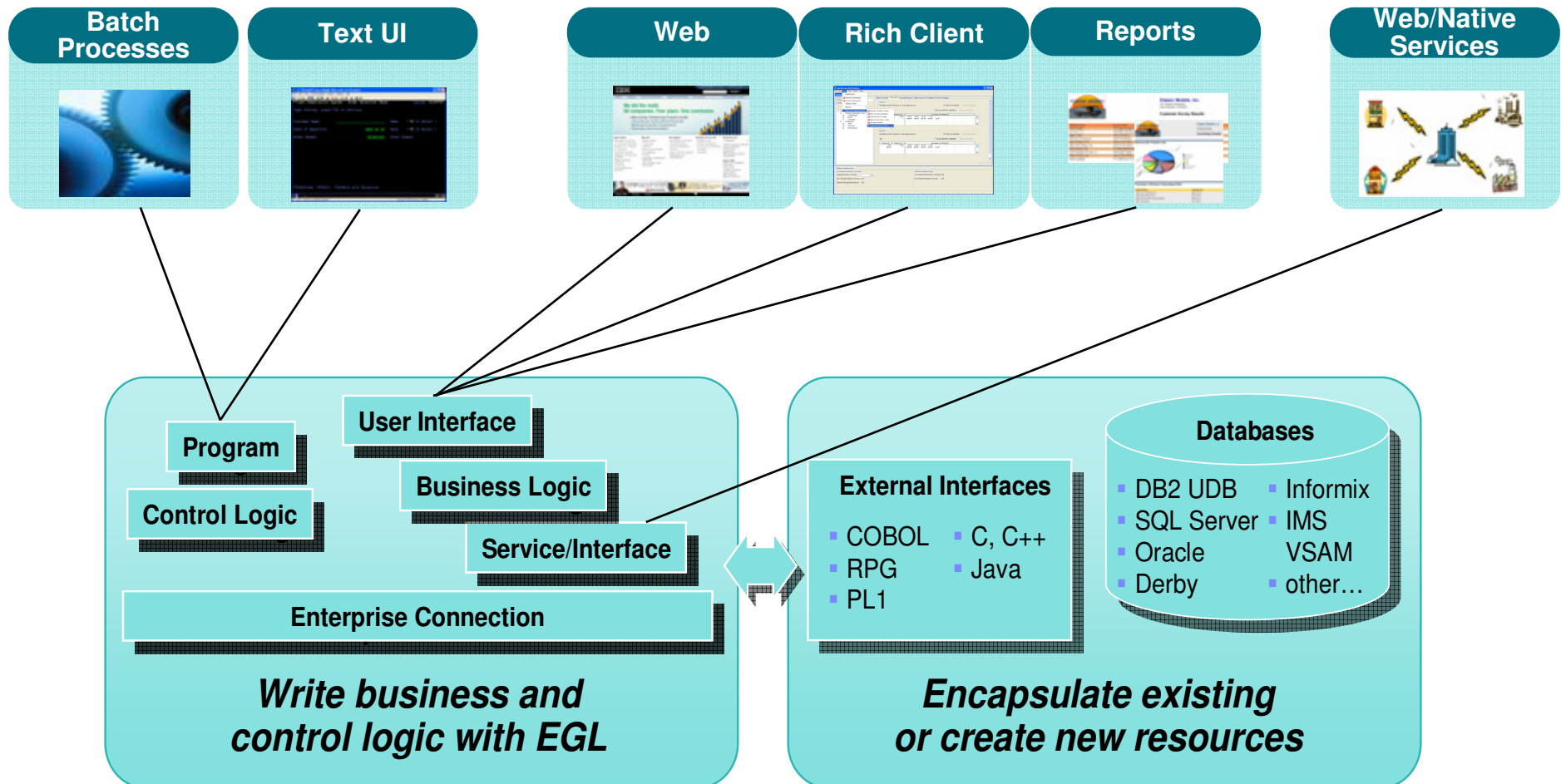


"In one tool, we have a single development environment for multiple environments. I don't have to jump between different tools to do different tasks. The tool is very complete."

Armin Schiller, transaction banking payments and cash transactions, Commerzbank AG

IBM Rational Business Developer V7.1

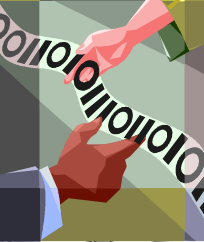
Unified approach to end-to-end construction that shields developers from intricacies of runtimes and middleware



RBD - The power of abstractions

■ Data access:

- “Records” provide access to:
 - SQL, Indexed, Relative, Serial, DL/I, Service data, Message Queues
- Common Verbs for data access (**Get, Add, Replace, Delete**).
- Allows complete access to SQL statement if needed.
- Common Error Handling.

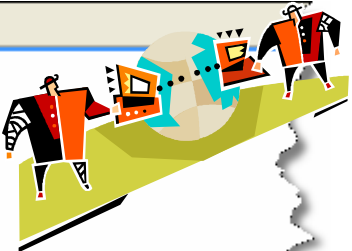


```

*sampleProgram.egl x
function allLoans()
  loans LoanRec[];
  get loans;
end
  
```

■ User Interface:

- EGL “handlers” hide complexities of
 - Web (JSF) UI
 - Reports (BIRT)
 - Portlets
 - * Rich Web (Ajax)



```

*sampleProgram.egl x
function callHelloWorldOniSeries()
  salutation char(30);
  call helloworld salutation;
end
  
```

■ Remote Invocation

- Call COBOL, RPG, C, Java.
- Linkage information separated from code.
- Data mapping, protocol invocation all resolved at runtime, NO code necessary!

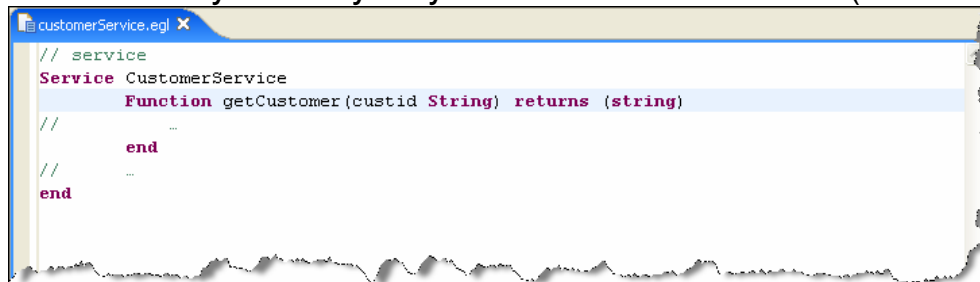
* Tech Preview

RBD - The power of Services

Built into the language

▪ Service part:

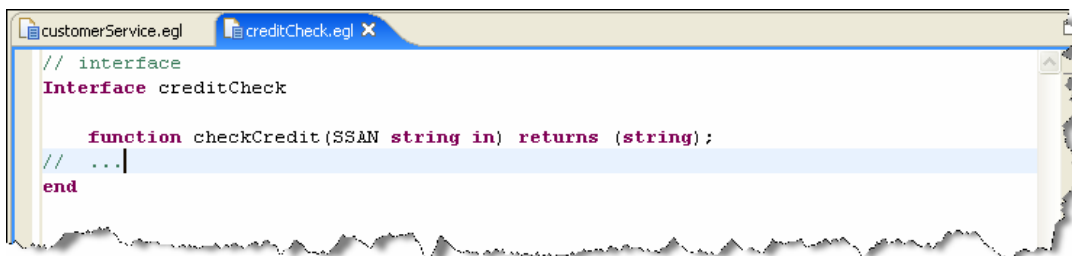
- a generatable part containing code that will be accessed:
 - from EGL code by way of a local or TCP/IP connection (*EGL Service*).
 - from any code by way of an HTTP connection (*EGL Web service*).



```
customerService.egl x
// service
Service CustomerService
  Function getCustomer(custid String) returns (string)
//
  end
//
end
```

▪ Interface part:

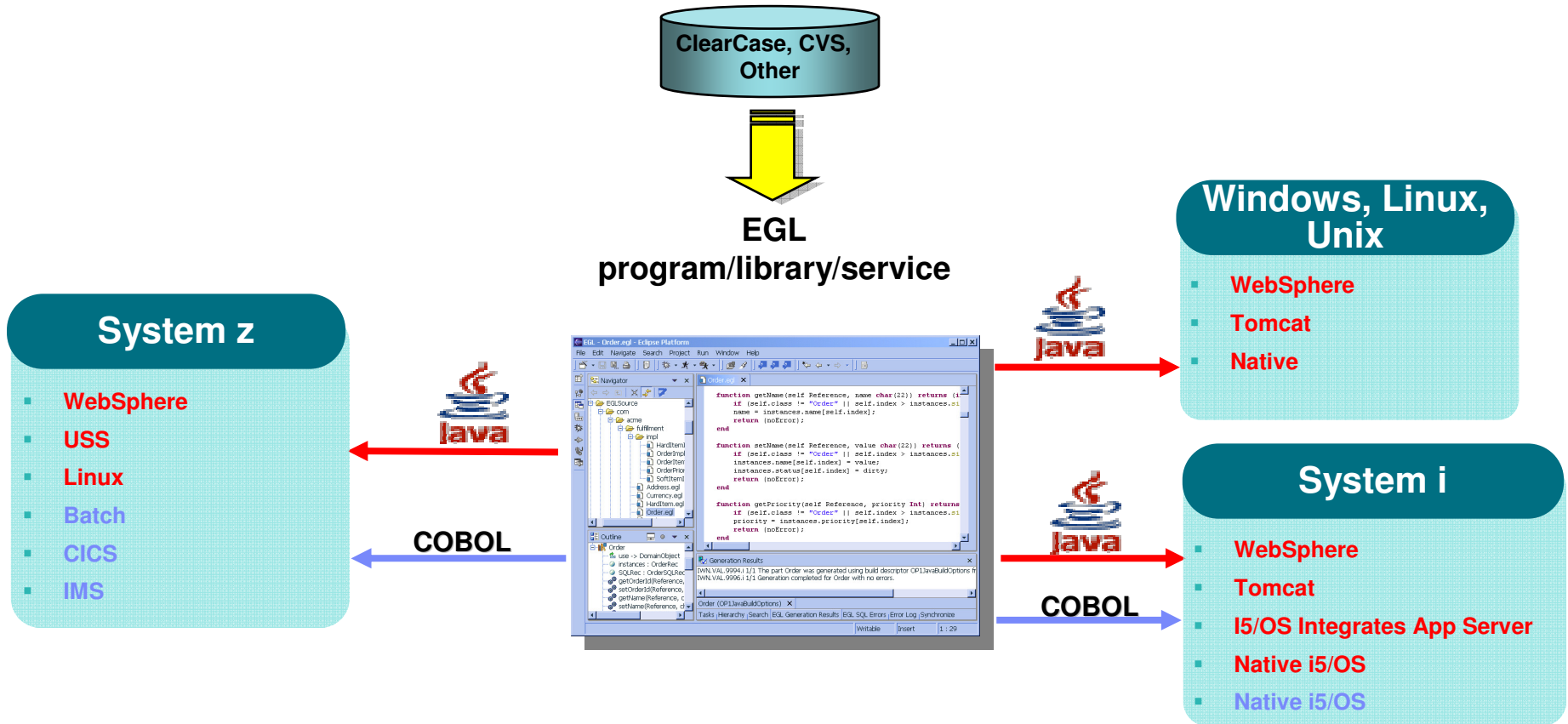
- Used to access external services as EGL services or simply to provide separation of concern.



```
customerService.egl creditCheck.egl x
// interface
Interface creditCheck
  function checkCredit(SSAN string in) returns (string);
// ...
end
```


RBD - The power of Generation

Platform Flexibility



Improving productivity by breaking skills silos

KBC

Challenge

- Leverage existing “business-knowledgeable” IT staff to create business services without dealing with platform and technology complexities

Solution

- Unify application development across all platforms and transaction managers (e.g. WAS, IMS)

Products include:

- IBM Rational Business Developer Extension
- IBM Rational Developer for System z



“We want to avoid the ‘skill silos’; what we really need is a large group of general developers who should not worry about target platforms and focus on developing business components, and only a small number of technology specialists, so that we can swiftly allocate general developers to upcoming business needs. . . . EGL is helping us achieve this goal.” -

*Lieven Gouwy, IT architect,
KBC*

Modernize Your Team Infrastructure

Business Challenge

Inefficiencies and quality problems in multi-platform development

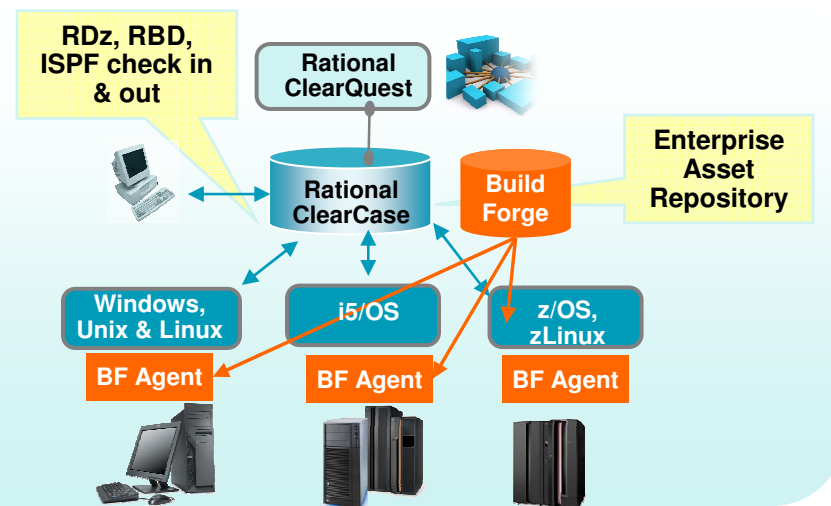
How can we...

- ▶ Increase quality and improve responsiveness for multi-platform development teams?
- ▶ Simplify management of team infrastructure for multiple development teams?
- ▶ Reduce team infrastructure costs across the enterprise?

Solutions

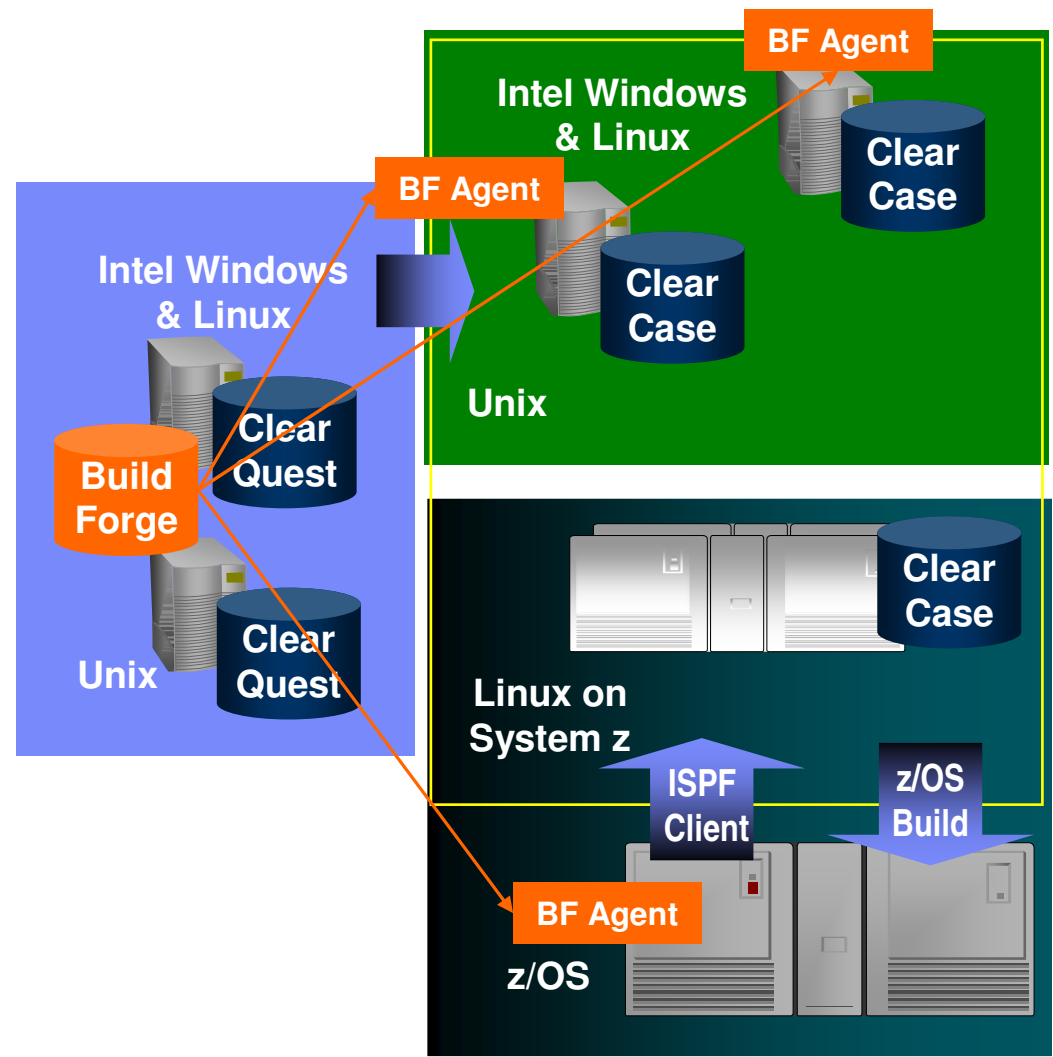
Provide coordination, traceability, consistency across platforms

- ✓ Consolidate enterprise and distributed source code management
 - *Rational ClearCase*
- ✓ Automate and orchestrate defect tracking and configuration management across the enterprise
 - *Rational ClearQuest*
- ✓ Produce coordinated, traceable, automated, and cross-platform builds
 - *Rational BuildForge*



ClearCase/ClearQuest/Build Forge for the Enterprise

- Extends ClearCase/ClearQuest/Build Forge to manage both distributed and z/OS assets
- Provides single point of control, single artifact repository, single set of user interfaces
- Provides consistent process paradigm across platforms
- Extends the power of the Software Delivery Platform and ClearQuest/ClearCase UCM to z/OS development



Unifying enterprise and distributed teams

Generali

Challenge

- Spiraling maintenance and resource costs constrained the development organization

Solution

- Move to a standardized solution to improve developer productivity and flexibility for delivering software solutions

Products include:

- IBM Rational ClearCase



Highly automated cross-platform solution using **Rational ClearCase** to manage and support the software lifecycle for COBOL and Java development, from start to finish

Modernize your Development Investments

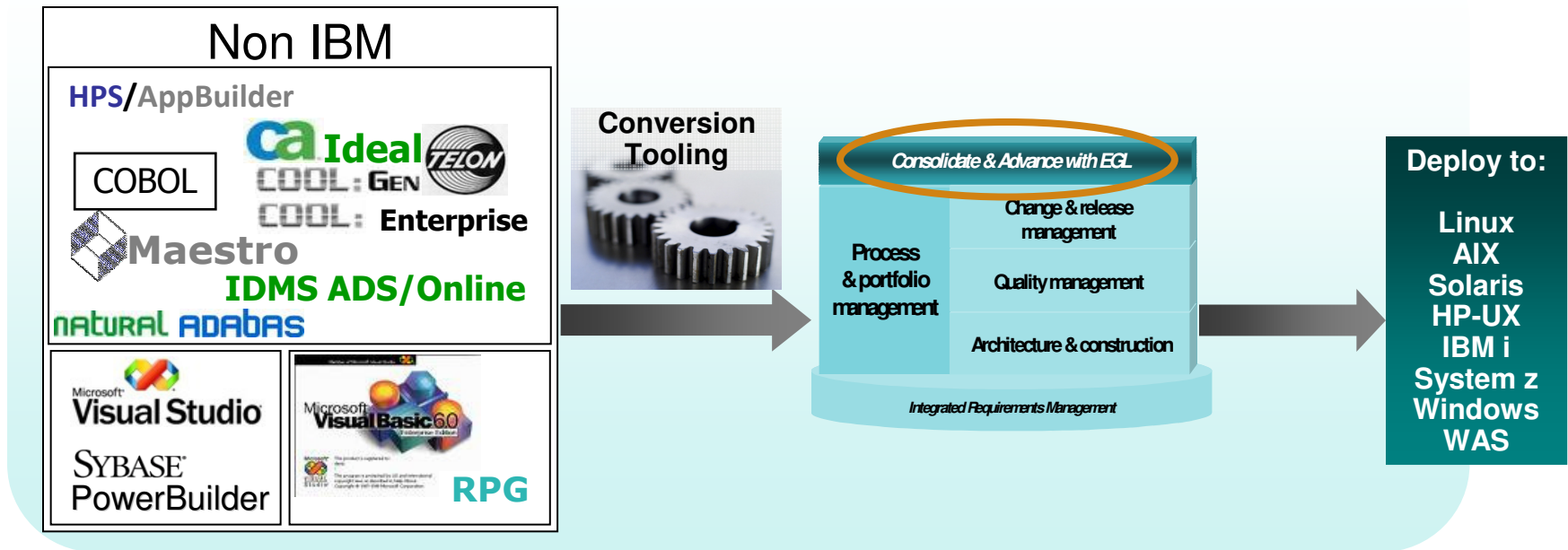
Business Challenge Unsupported legacy development platforms

How can we...

- ▶ Efficiently move to modern development platforms, languages, and tools?

Solutions Save money by moving off old platforms and languages

- ✓ Migrate from out-of-date and expensive legacy development platforms onto the IBM Rational Software Delivery Platform (SDP)
 - EGL, DB2
 - All SDP tools



Where can you get more information?

System z Sandboxes

Fully hosted online System z environments to experiment, try and buy

www.ibm.com/developerworks/downloads/emsandbox/

More details

Videos, product factsheets, whitepapers, demonstrations

www.ibm.com/software/info/developer/solutions/em/

Education Series

Modern Application Architecture for COBOL Developers

Learn how to design and integrate composite applications across CICS and WebSphere

EGL Distance Learning

10 days of FREE instructor-led virtual class!

EGL Cafe

Resources: Download, Learn, Presentations, Video/viewlet, Sample Code

Community: Clients, Partners, Influencers, Press, News & Events

Collaboration: Blogs, Forums, Tips & Techniques Comments, Ratings

Testimonials: Case Studies

www.ibm.com/rational/eglcafe

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- ✓ **IT flexibility is a key enabler of change**
- ✓ **Rational EM solutions provide this flexibility**
- ✓ **You can get started today**



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Questions