Modern application

Rational software

Agenda

- Enterprise Modernization and Rational Software Platform

- Rational Developer for System z

- Rational Asset Analyzer

- Agile Development Process

- Summary

What Is Enterprise Modernization

- 315,000 hits on Google

- Definition:

A holistic and ongoing evolution of business processes, applications, and technology, where business and IT are aligned to produce flexible, low-cost operating models that reduce risk, improve performance, and increase agility. - *Unisys*

Modernization is the process of leveraging existing technology assets and people skills, while optimizing team collaboration, in order to achieve maximum business value from the software managed by an organization. - *IBM Rational*

The Business Drivers for Modernization

- Opening Business Processes to Clients and Partners

- Improve customer experience with single view across channels

- Expose application logic and data across business processes

- Improve IT Responsiveness to busine   ge

- Reduce costs of redundant a   ations

- Take advantage of modern application packages and frameworks

IBM

64%

Unfortunately...

of enterprises list *application modernization* as top software priority for 2009

The State of Enterprise Software, June 8th 2009- Forrester Research

FORRESTER

Only 35%

Of software projects are delivered successfully

The Standish Report- 2006

No One Likes to Move But What's The Right Approach to Moving?

"More than One Trip?"

"There's got to be a better way?"

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 IDEs
- 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

The Rational Software Delivery Platform
Accelerating software innovation for the entire enterprise

Enterprise Modernization

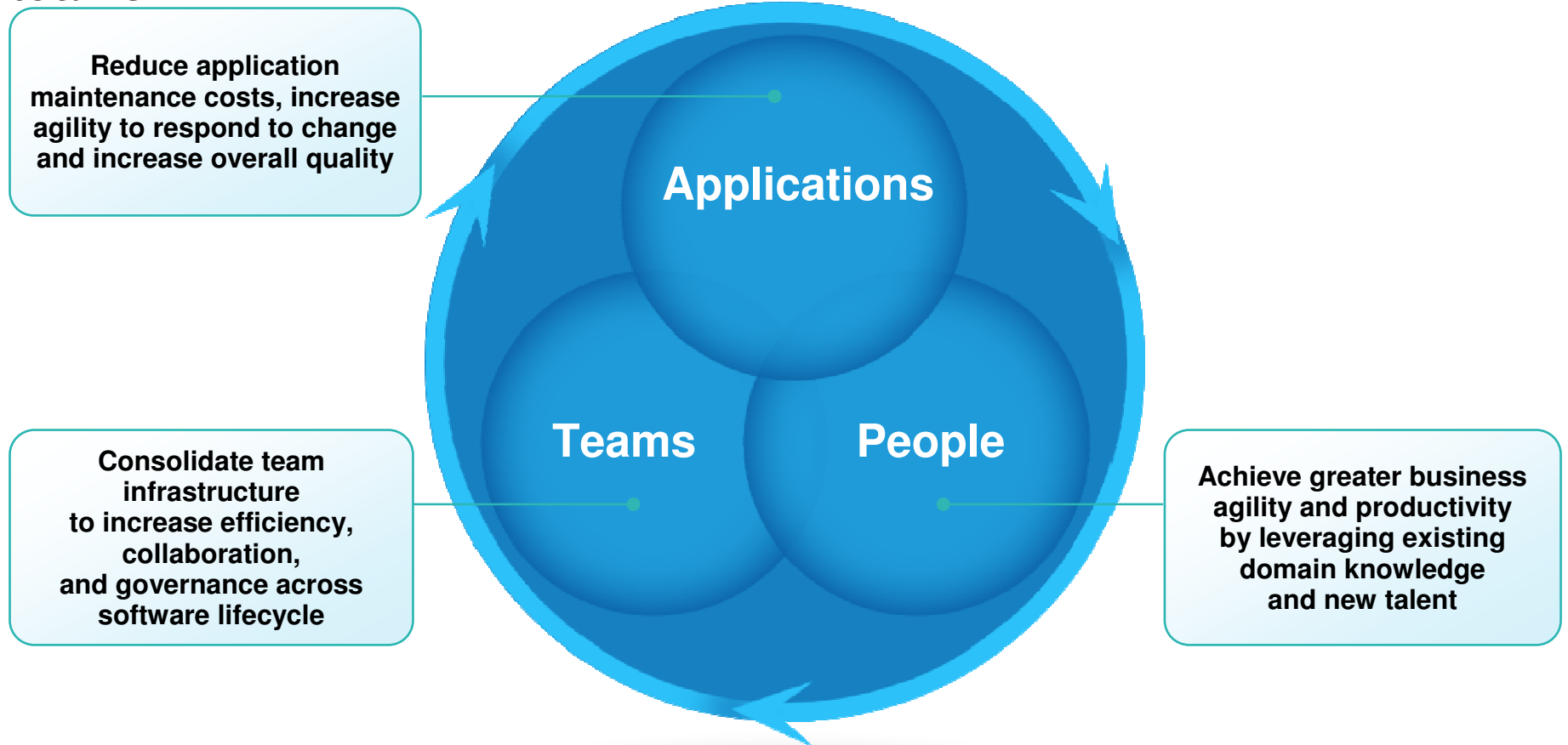**IT Business Transformation**

Complex / Embedded Systems

✓ 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

✓ Get started today. We can help!

Learn more at: www.ibm.com/rational/modernization

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**

IBM Software Delivery Platform Tooling for Enterprise Modernization

INVESTMENTS

Modernize Your Applications

- **Rational Asset Manager**
- **Ilog Rules for COBOL**
- **Rational Asset Analyzer/WebSphere Studio Asset Analyzer**
- **Host Access Transformation Services (HATS)**
- **Rational Developer for System z**
- **Rational Developer for System i**
- **IBM Data Studio Developer**
- **IBM Data Studio pureQuery**
- **Rational Software Analyzer**
- **Rational Functional Tester**
- **Rational Performance Tester**
- **Rational AppScan**
- **Rational Quality Manager**

Modernize your People Skills

- **Rational Business Developer**
- **Rational Developer for System z**
- **Rational Developer for System I**

Modernize Your Team Infrastructure

- **Rational ClearQuest**
- **Rational ClearCase**
- **Rational Build Forge**
- **Rational Team Concert**

Rational Developer for System z

Tools for developing Windows and System z composite applications and services

Why RDz - A simple Google search..

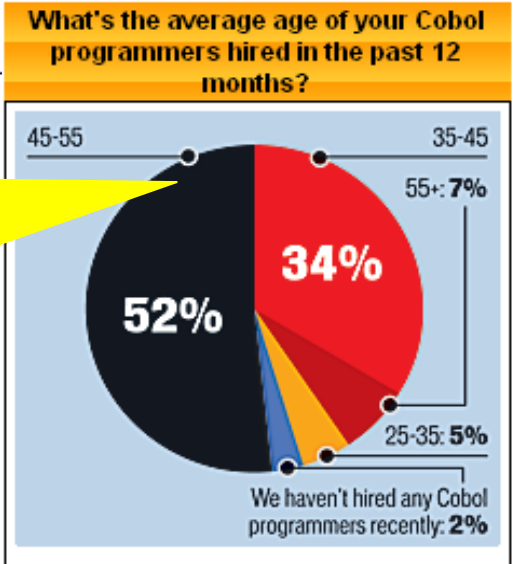http://cwflyris.computerworld.com/t/915781/281087/36897/2/

Many IT managers slowly migrating away from Cobol wonder whether they'll run out of Cobol programmers before they run out of Cobol c...

Gary Anthes Today's Top Stories ▸

October 09, 2006 (Computerworld...) that mainst... ...60s, '70s and '80s, is not going away ar... ...Con... ...gers at 352 companies, 62% of the respondents... it "a lot" and 58% said they're using it...

Are you noticing a short... programming...

Developers need a Modern development environment !

What's the average age of your Cobol programmers hired in the past 12 months?

45-55   35-45
                       55+: **7%**

34%

52%

                       25-35: **5%**

We haven't hired any Cobol programmers recently: **2%**

...ve years. - 27%

...org...nizations may want to think carefully before rewriting those applications in another language. Cobol is easier to read and manage than C# or Java, says Crego, who calls Visual Basic, C and C# "write-only code." And rewriting some Cobol programs can require four or five times as many program lines in Java or C#, says Vecchio. He describes such projects as "a maintenance nightmare waiting to happen."

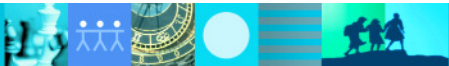# Rational Developer for System z (RDz) overview

▶ **What is RDz?**

- The Eclipse-based IDE speeding modern composite (SOA) application development – linking WAS and core system z processing

▶ **RDz supports Enterprise Modernization**

- Supports common IDE for COBOL, PL/I, C, C++, HLASM, Java, and web services development

- Transforms UML to COBOL source code

- Provides interactive access to z/OS for development, debug, job generation, submission, monitoring, command execution

- Support new and existing runtimes (CICS, IMS, Batch, USS, DB2 SP, WAS)

▶ **RDz supports SOA**

- Enables CICS and IMS applications for web services and SOA

- Supports for J2EE, JCA, XML, web services

IBM Rational Developer for System z version 7.5

XML Services for the Enterprise
- SOA support for COBOL or PL/I using CICS or IMS
• Bottom-up/Top-down or meet-in-the-middle COBOL/PLI to XML mapping support
• meet-in-the-middle development scenario tooling wizards. for CICS, IMS, and batch applications

DB2 Stored Procedure for COBOL and PL/I
• Create DB2 stored procedures on z/OS in either COBOL or PL/I
• Build and catalog support for the DB2 stored procedure
• Debug z/OS based stored procedures from workstation

z/OS Tooling Integration
• 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

VSAM App Generator wizard
Generate JCL , BATCH or CICS COBOL program skeletons to access VSAM/QSAM

IBM Rational Developer for System z

- z/OS Application Development
- XML Services for the Enterprise
- CICS Service Flow support
- CICS BMS/IMS MFS Map Support
- DB2 Stored Proc for COBOL - PL/I
- DB2 App Generator wizard
- z/OS Tooling Integration
- VSAM App Generator wizard
- UML to COBOL Transformation(*)
- Rational Application Developer or Rational Business Developer

Core functions
Other functions

z/OS Application Development
• Work with z/OS resources like COBOL, PL/I , C, C++, JCL, etc.
• Interact with the Job Entry Subsystem (JES) to submit jobs, monitor jobs, and review job output
• Perform dataset management actions
• Perform typical edit, compile, and debug tasks on remote z/OS resources from the workstation

CICS Service Flow support
• Supports CICS Service Flow Feature
• Wizards to build service flows out of your existing COMMAREA WSDL and Terminal based CICS applications.

CICS BMS/ IMS MFS Map Support
• Visually create and modify BMS Map sets or IMS/MFS
• Generates JCL
• Work with local or remote maps

DB2 App Generator wizard
• Generate WSDL, JCL and CICS COBOL program to access DB2
• Generate CRUD programs code from existing DB2 table, which can also be integrated into web service applications

UML to COBOL Transformation(*)
• Provide UML assets in order to represent COBOL in UML (Models, Profiles, Patterns)
• UML transformations generate models more specific to COBOL target
• Final transformation generates COBOL source
(*) Requires Rational Software Architect (RSA)

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Rational Asset Analyzer

Rational software

What is Rational Asset Analyzer?

- **Web Based browser tool used for Impact Analysis, Asset Discovery and Application Understanding**
- **Accelerate project delivery in response to business drivers**
  - Reduce risk
  - Increase productivity
  - Improve quality of application changes

- Gain **intellectual control** of applications

- Gain **transparency** into outsourced development
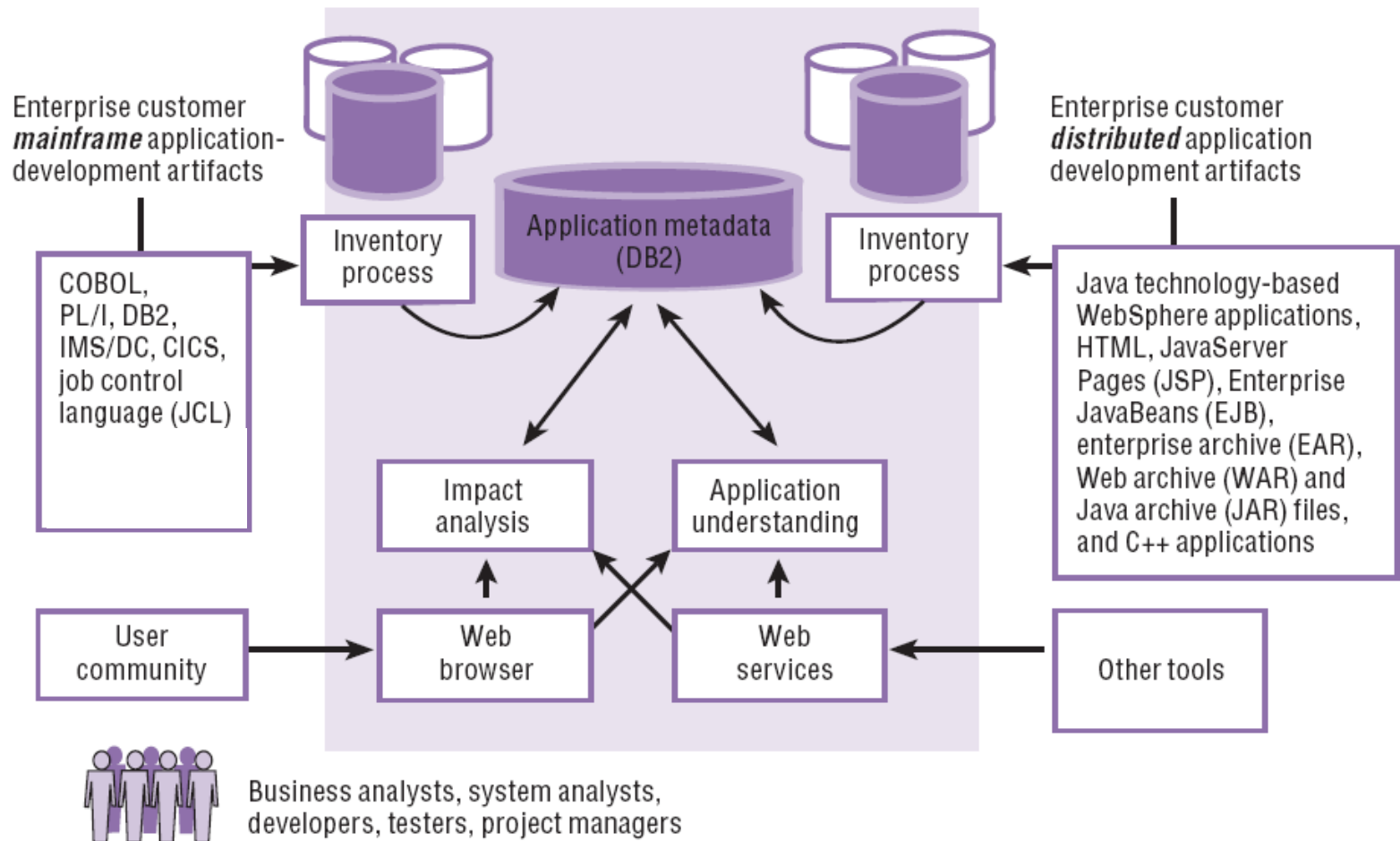
- **Customize** RAA to organizational processes and IT environments

Key functions

- Inventory Collection
  - ▶ zSeries assets
  - ▶ Distributed assets

- Explore
  - ▶ Search
    - By asset name and its attributes
  - ▶ Understand
    - Asset relationships and asset composition

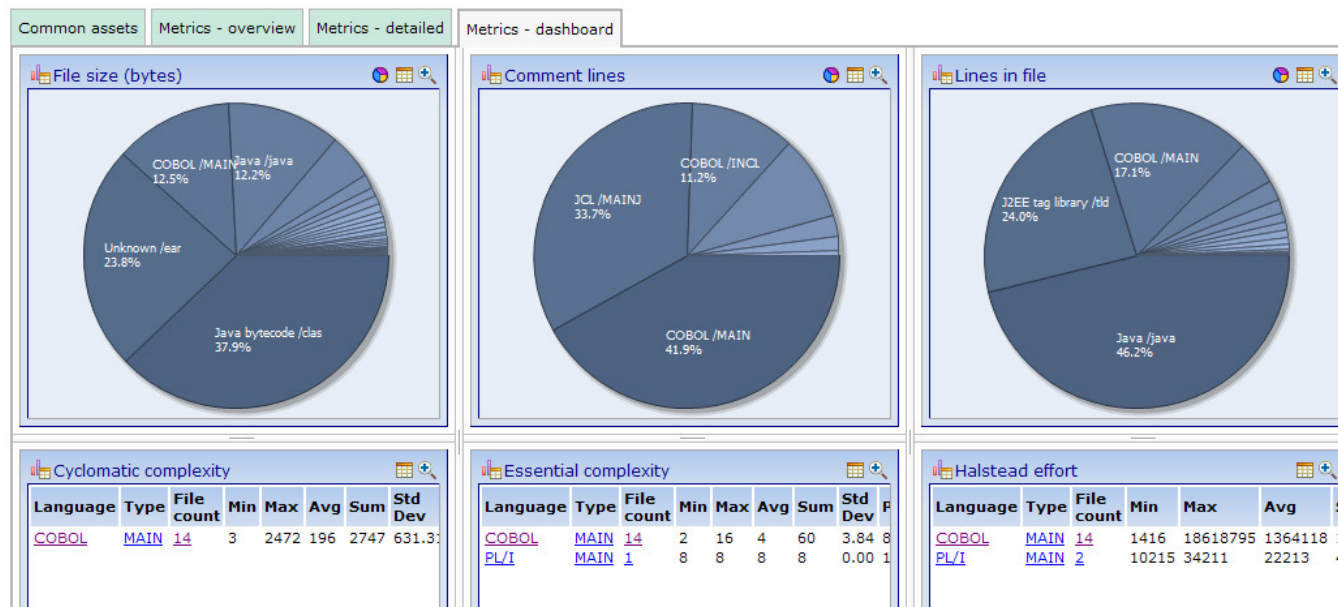- Impact Analysis
  - ▶ Analyze impact of proposed change

Rational Asset Analyzer Overview

Enterprise customer *mainframe* application-development artifacts

COBOL, PL/I, DB2, IMS/DC, CICS, job control language (JCL)

Inventory process

Application metadata (DB2)

Inventory process

Enterprise customer *distributed* application development artifacts

Java technology-based WebSphere applications, HTML, JavaServer Pages (JSP), Enterprise JavaBeans (EJB), enterprise archive (EAR), Web archive (WAR) and Java archive (JAR) files, and C++ applications

Impact analysis

Application understanding

User community

Web browser

Web services

Other tools

Business analysts, system analysts, developers, testers, project managers

Counts & Metrics
Gain control of your assets & know what you have

- Identify the **breadth of technologies** currently used in the enterprise – using a dashboard or report view

- Understand the **quality and complexity** of your assets

- Use the Errors view to **identify missing resources**

- Error rate is an indication of **validity of data**; also includes tools to help reduce the error rate

End to End Impact Analysis

Reduce time to market & risk of downtime by understanding change impact upfront

- Reduce time to determine **scope of change** whether for new enhancements, or even maintenance efforts

- View the metrics for impacted artifacts to determine the **risk of change** i.e. cyclomatic complexity, lines in file, etc.

- Traverse user-defined relationships to determine **impacts across platforms** i.e. follow dependencies from mainframe to J2EE and back.

- Create a "**bill of materials**" of impacted artifacts by evaluating the details page

| 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.

0 CICS transactions
0 IMS transactions

1 Batch jobs

0 CICS transactions
0 IMS transactions

0 Batch jobs

Direct Impacts

Indirect Impacts

Starting with 2 DB2 columns

5 Data elements
0 Entry points
2 Other impacted programs

0 Data sets
0 Data stores
0 IMS segments
2 DB2 tables

0 Data elements
0 Programs

Application Understanding
Quickly understand code with little or no documentation, and relationships across the enterprise

- Group artifacts into **user-defined groups** called Applications to limit scope to area of interest

- Use **various types of diagrams** for understanding how the application "hangs together"

- Use **annotations** to capture knowledge from SMEs e.g. Business function, description, etc.

- Create **user-defined relationships** for situations where relationships cannot be determined through static analysis

- Perform **enterprise-level keyword searches**
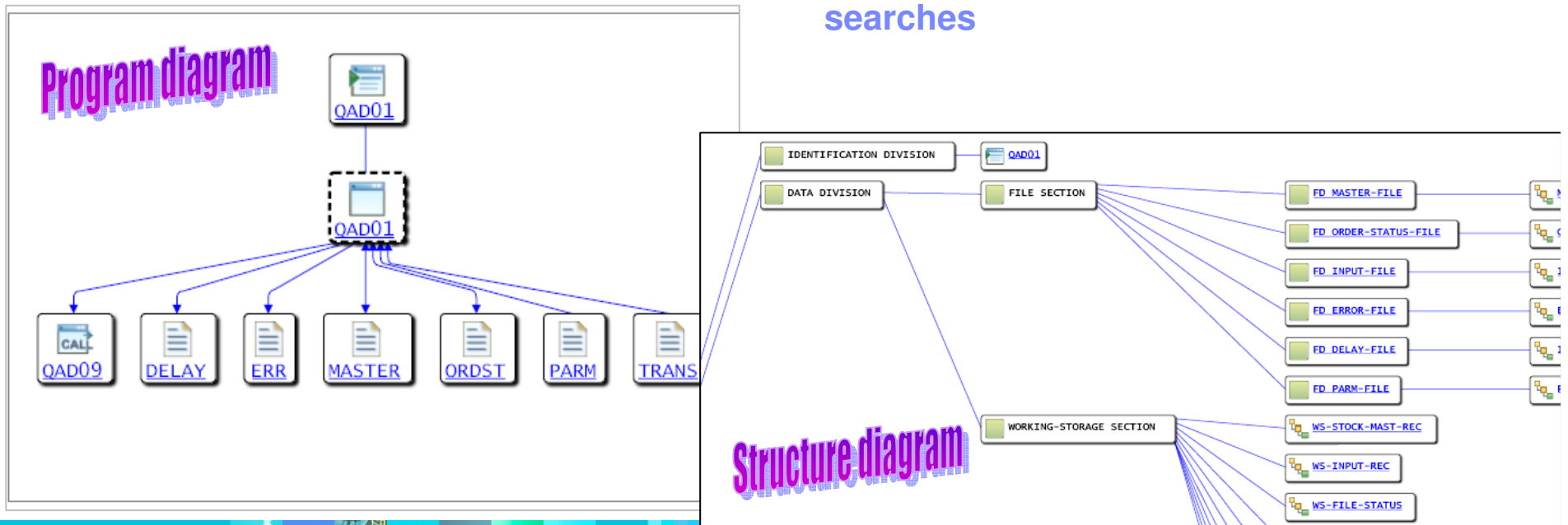
Extensible Framework
Tailor RAA to your organization's needs

- Access RAA's wealth of information using standard **web services**

- Easily add the support for languages not currently supported using RAA's documented **import file** format

- Extend RAA with **user-defined metrics & counts**

- Create **custom queries**, and optionally include them as actions on pages

- Combine RAA information to your pages using RAA's **REST interface** in support of Web 2.0

Database Tables, by name

The DB2 tables created by ▨▨▨▨▨▨▨ in alphabetical order. Not all of ▨▨▨▨▨▨▨▨▨▨▨▨ tables are for reference only and are subject to change. They do not constitute a programming interface.

Published Database Schema

Table name	Type	Model	Submodel
DMH_ACTIVITY_LOG	Table	System	Activity log
DMH_ACTUAL_PARM	Table	Logical assets (MVS)	Compile unit parameter
DMH_ANALYSIS_QUEUE	Table	System	Analysis queue
DMH_APPLICATION	Table	System	Application
DMH_APPL_CLOSURE	Table	System	Application
DMH_APPL_CMPNT	Table	System	Application
DMH_ARCHIVE	Table	Logical assets (Distributed)	Archive

Import file description

The input file, which must reside on the server machine, is a text file with fixed format records. Each record contains an identifying record type followed by one or more attribute fields (separated by at least one space).

For the import process to work correctly, the order of the text file records is important. The following lists outline the appropriate order for these records:

Record type: identifies

- FMT: the import file's format
- TOOL: the import file's origin
- SITE: the site (or server) name to associated with any subsequent import records
- APP: the Application owner for components that follow
- LIBR: a container
- MEMB: a file
  - ATTC: a character attribute
  - ATTN: a numeric attribute
  - incl (format 1): identifies an included source file
  - msg: identifies the text of a message

Published Import File Format

Agile Development With Rational Team Concert

Rational software

Agile Software Development

An iterative and incremental (evolutionary) approach performed in a highly collaborative and self-organizing manner with just the right amount of ceremony to frequently produce high quality software in a cost effective and timely manner which meets the changing needs of its stakeholders.

Core principles

- ▸ "Fits just right" process
- ▸ Continuous testing and validation
- ▸ Consistent team collaboration
- ▸ Rapid response to change
- ▸ Ongoing customer involvement
- ▸ Frequent delivery of working software

Adoption Rates:

- 69% of orgs have one or more agile projects
- 82% beyond pilot project phase
- 25% of "No" respondents hope to do Agile this year (2008)

Sources: Dr. Dobb's Journal (www.ddj.com)
2008 Agile Adoption Survey and 2007 Project Success Survey

Tooling for Agile IT Teams

- **Flagship Agile Products**
  - ▶ Rational Team Concert (RTC) – Distributed agile development, project monitoring

- **Primary Agile Products**
  - ▶ Rational Build Forge (RBF) – Continuous integration, deployment
  - ▶ Rational AppScan – Web site security testing
  - ▶ Rational Application Developer (RAD) – Development
  - ▶ Rational Insight – Governance
  - ▶ Rational Quality Manager (RQM) – Test management
  - ▶ Rational Requirements Composer (RRC) – Requirements modeling
  - ▶ Rational Software Analyzer (RSAR) – Static code analysis

- **Extended Agile Products**
  - ▶ Other products are potential candidates for scaling purposes

Software innovation through collaboration

- **Real time, in-context team collaboration**
  - Make software development more automated, transparent and predictive
- **"Think and work in unison"**
  - Integrated source control, work item and build management
- **Assess real-time project health**
  - Capture data automatically and unobtrusively
- **Automate best practices**
  - Dynamic processes accelerate team workflow
  - Out-of-the-box or custom processes
    - Scrum, The Eclipse Way, etc
- **Unify software teams**
  - Integrate a broad array of tools and clients
  - Extend the value of ClearQuest and ClearCase
  - Visual Studio Client
  - Support for System z and System i servers

Open and extensible on

jazz

- ✓ Collaborate in context
- ✓ Right-size governance
- ✓ Day one productivity

IBM Rational Team Concert

transparent *integrated presence*
wikis OPEN real-time reporting
chat automated hand-offs Web 2.0
custom dashboards automated data gathering
EXTENSIBILITY *Eclipse plug-ins* services
architecture **FREEDOM TO CREATE**

What Is Rational Team Concert

Iteration Planning

- Integrated iteration planning and execution
- Task estimation linked to key milestones
- Out of the box agile process templates

Project Transparency

- Customizable web based dashboards
- Real time metrics and reports
- Project milestone tracking and status

SCM

- Integrated stream management with flow relationships
- Component level baselines
- Server-based sandboxes
- Identifies component in streams and available baselines
- ClearCase connector

Work Items

- Defects, enhancements and conversations
- Query results view and share queries with team or member
- Support for approvals and discussions
- ClearQuest connector
- Query editor interface

Build

- Work item and change set traceability
- Local or remote build servers
- Supports ant and command line tools
- Integration with build forge
- Build definitions for team and private builds

Jazz Team Server

- Single structure for project related artifacts
- World-class team on-boarding / offboarding including team membership, sub-teams and project inheritance
- Role-based operational control for flexible definition of process and capabilities

- Team advisor for defining / refining "rules" and enabling continuous improvement
- Process enactment and enforcement
- In-context collaboration shows team members and status of their work

How IBM uses Rational Team Concert

Beaverton

Toronto

Zurich

- •Source Control
- •Reporting
- •Community Site

- •Build
- •Process

- •UI Foundation
- •Work Items
- •Agile Planning
- •Code Coverage

Jazz
Development
Server

Saint-Nazaire

- 2-way Xeon Server running application server (WAS) and another running DB2
- 70 developers, 20 testers, 8 doc selfhosting on Jazz.
- 18,000 change-sets
- 35,000 work items
- 250 repository workspaces
- 66K files
- 10GB file content uncompressed
- Integration stream has 30K files
- 40 builds a day
- Weekly integration build

Lexington

- •Static Analysis

Raleigh

- •Interop
- •Testing

- •Repository
- •Web UI
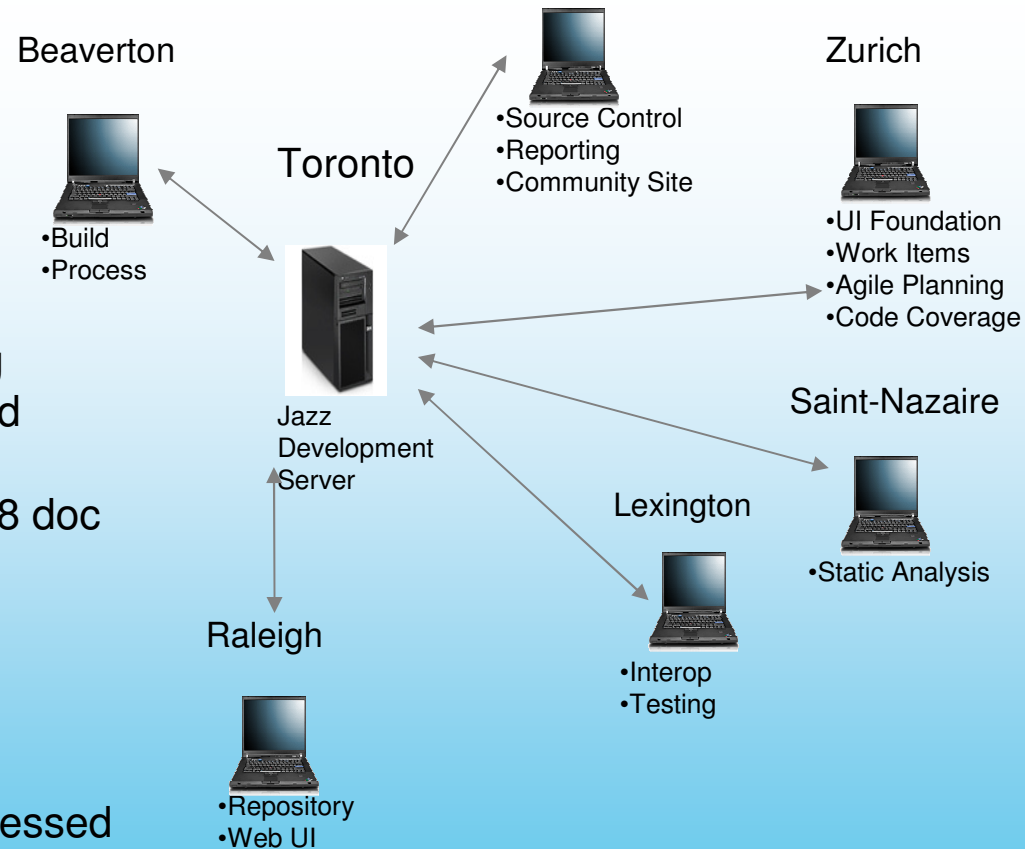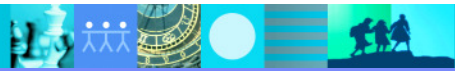
BACKUP

Rational solutions can help in 3 domains

Enterprise Modernization

IT Business Transformation
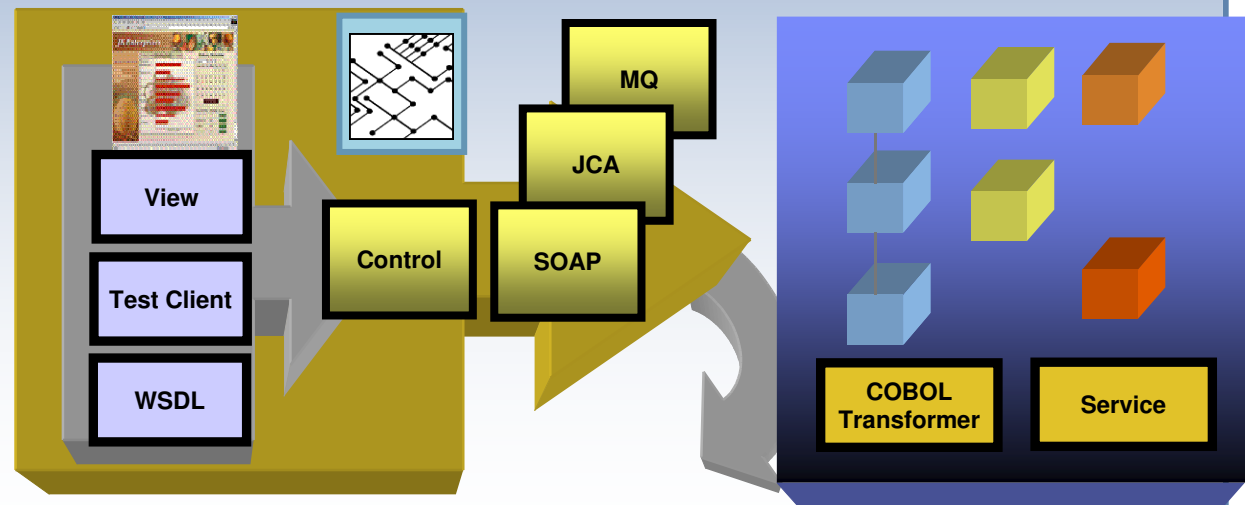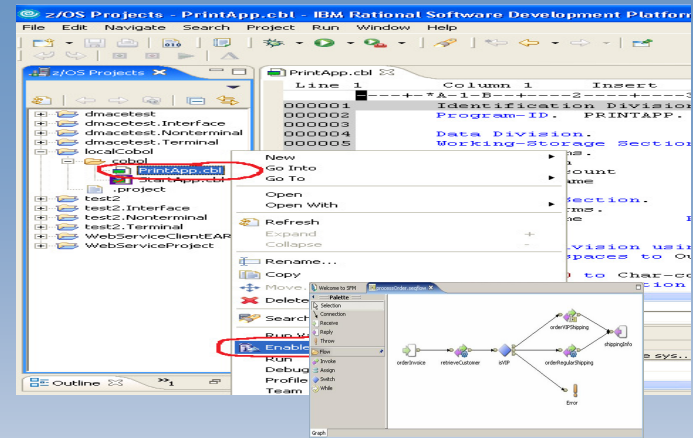
Complex / Embedded Systems

- **Enterprise Modernization** – 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
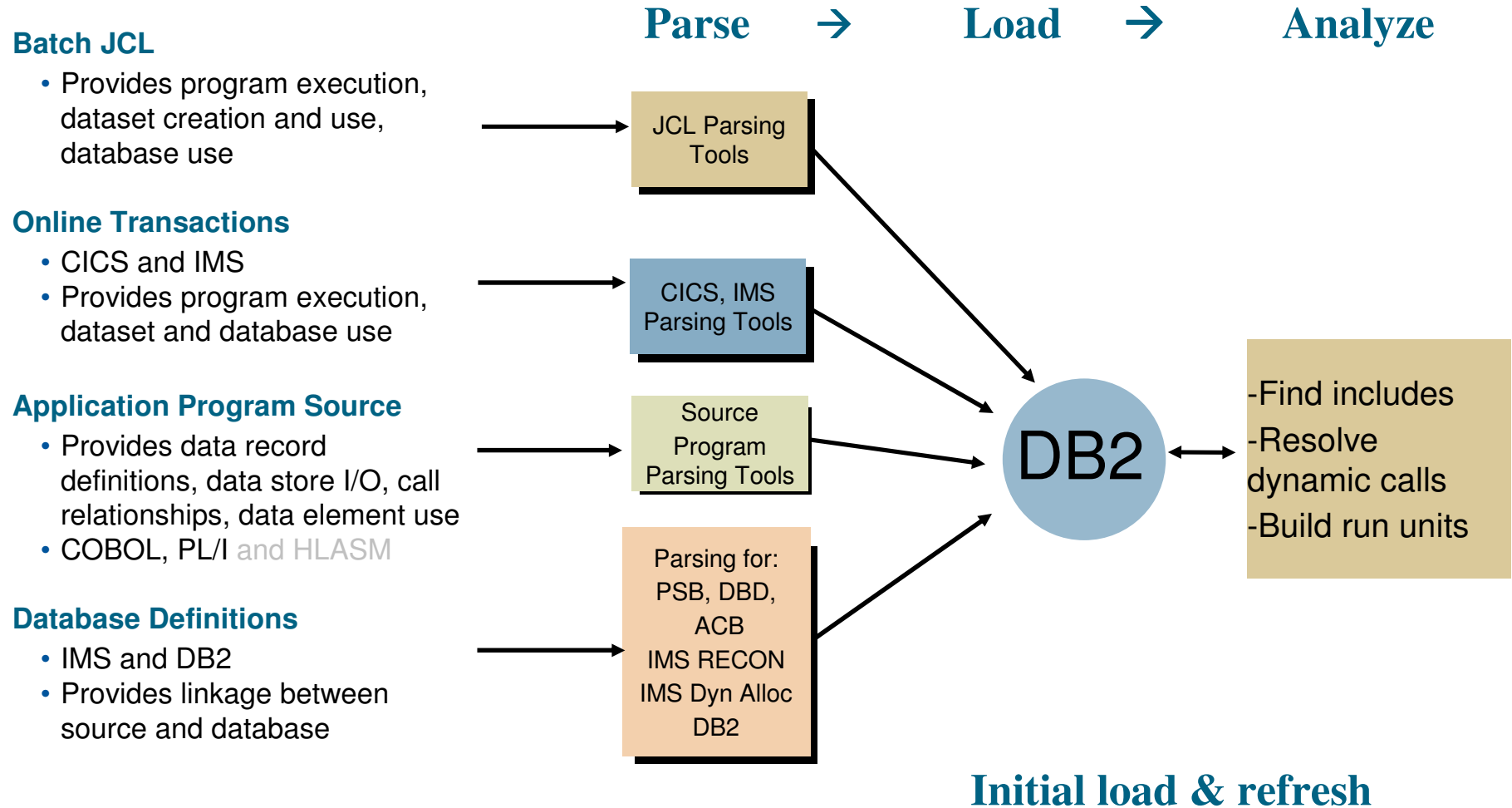
RDz IDE For IBM Development Tools

▸ Remote Development of COBOL, PL/I, C, Java, CICS, IMS, Batch, DB2 SP processing

▸ Tools for Web Services and XML including CICS Service Flow modeling and deployment

▸ Local Development COBOL, PL/I, and TXSeries(CICS)

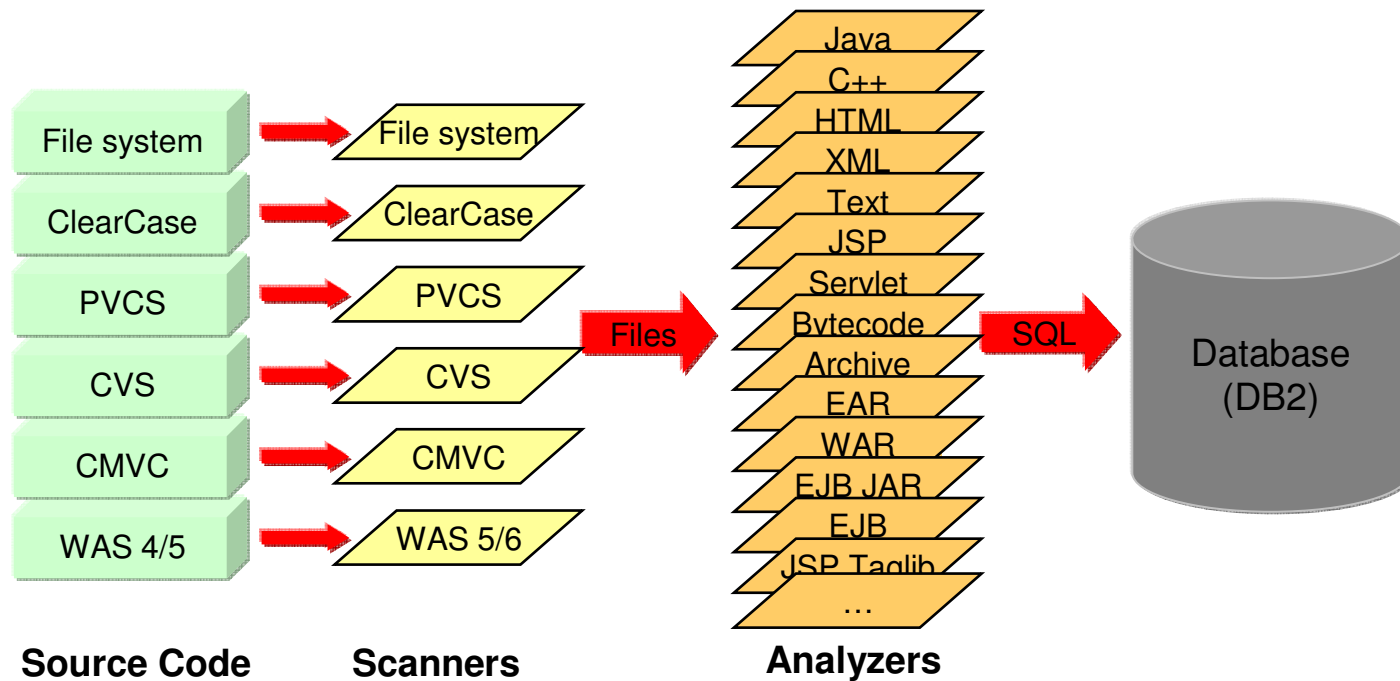▸ JCA Support including CTG

▸ HATS

▸ Integration with EGL using RBDe

MQ

JCA

View

Control

SOAP

Test Client

WSDL

COBOL Transformer

Service

IBM Rational Developer for System z

z/OS inventory collection overview

Parse → **Load** → **Analyze**

Batch JCL
- Provides program execution, dataset creation and use, database use

JCL Parsing Tools

Online Transactions
- CICS and IMS
- Provides program execution, dataset and database use

CICS, IMS Parsing Tools

Application Program Source
- Provides data record definitions, data store I/O, call relationships, data element use
- COBOL, PL/I and HLASM

Source Program Parsing Tools

Database Definitions
- IMS and DB2
- Provides linkage between source and database

Parsing for:
PSB, DBD, ACB
IMS RECON
IMS Dyn Alloc
DB2

DB2

-Find includes
-Resolve dynamic calls
-Build run units

Initial load & refresh

Distributed inventory scanning overview

Source Code	Scanners	Analyzers

File system → File system
ClearCase → ClearCase
PVCS → PVCS
CVS → CVS
CMVC → CMVC
WAS 4/5 → WAS 5/6

Files →

Java
C++
HTML
XML
Text
JSP
Servlet
Bytecode
Archive
EAR
WAR
EJB JAR
EJB
JSP Taglib
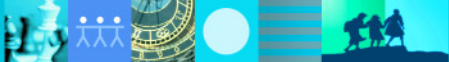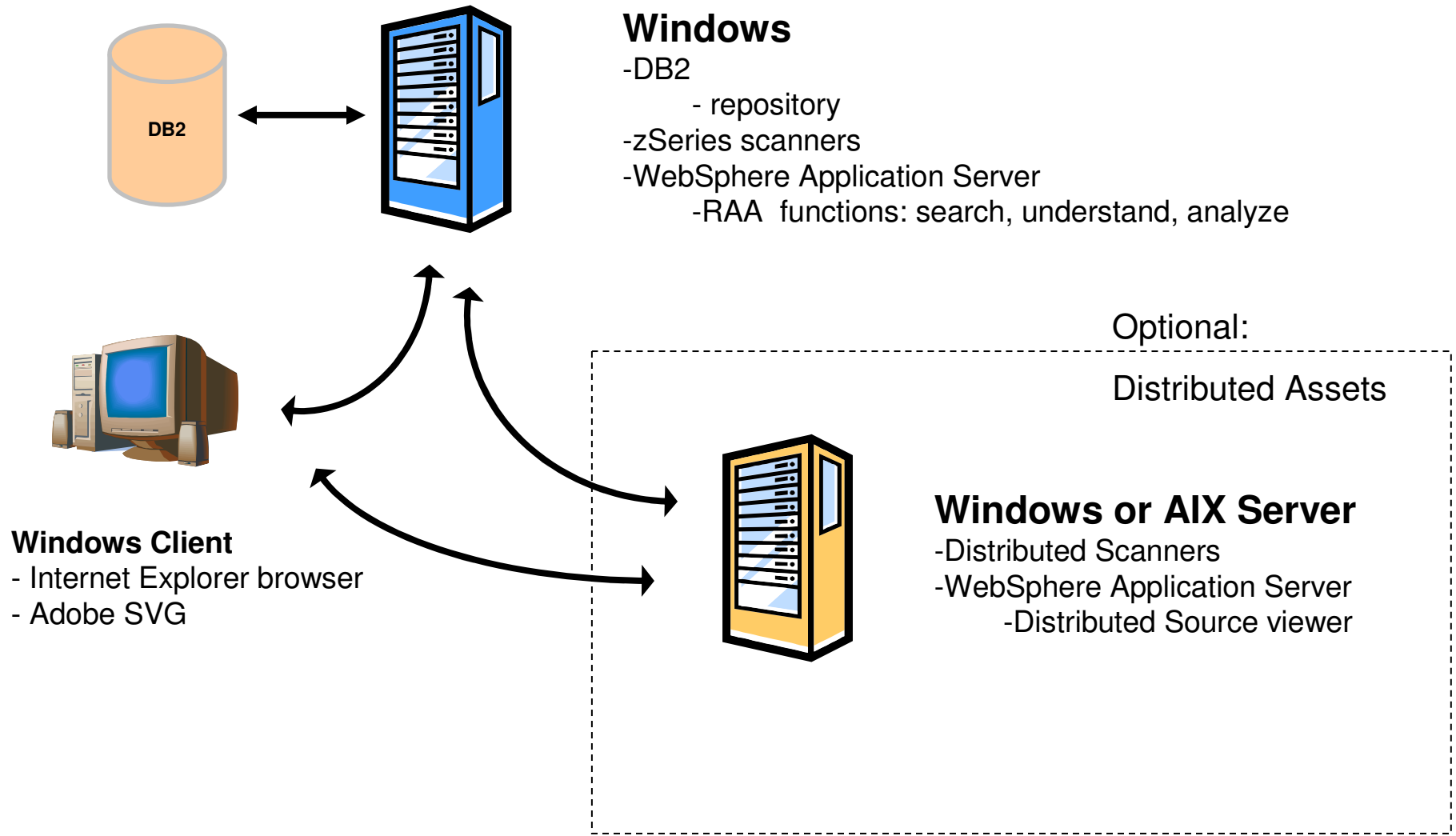…

SQL → Database (DB2)

Tools

- Bookmarks
  - ▶ Bookmark and name any page in the user interface for later access
  - ▶ View your own bookmarks or access those created by others if you are a WSAA administrator

- Custom Queries
  - ▶ Develop custom queries to access and report on any metadata gathered by Rational Asset Analyzer
  - ▶ Name and associate queries with specific users
  - ▶ View your own custom queries as well as those created by others if you are a WSAA administrator
  - ▶ Results of running custom queries are presented in a Details page

RAA Architecture

DB2

Windows
-DB2
    - repository
-zSeries scanners
-WebSphere Application Server
    -RAA functions: search, understand, analyze

Optional:

Distributed Assets

Windows Client
- Internet Explorer browser
- Adobe SVG

Windows or AIX Server
-Distributed Scanners
-WebSphere Application Server
    -Distributed Source viewer

Agility @ Scale Customer Profile – GVS (Brazil)

Challenge

Global Value Solutions (GVS) Brazil needed to guarantee the integrity of its developed artifacts, keep track of tasks and codes, and manage milestones in source codes. To achieve this, the IT team was looking for a collaborative environment which was easy to use and agile enough to support performance improvement. The solution would also need to show project managers ongoing status updates and allow them to influence ongoing projects.

The Solution

After a careful analysis followed by a pilot project, Global Value Solutions decided to implement IBM Rational Method Composer V7.2 software to create and configure development processes. To promote intuitive and efficient software configuration and change management, the company also installed IBM Rational Team Concert 1.0.1 software.

GVS Early Results

Thus far, Global Value Solutions reports that the results achieved from the IBM Rational solution have far exceeded expectations.
Configuration management efforts have been reduced by 50% as a result of the Rational Team Concert features and customization capabilities such as:

• Use of "Process Template" and Jazz API Extension to create new projects in a fast way (few minutes)

• Automatic traceability between Work Item and code providing input to Change Management Process

• High Performance and better usability of RTC reducing the need of training and support to the Development Team

• The baselines workflow (GVS Work Item customization) reducing the CM control and management

• The systems development team has also experienced an increase in productivity of 15% . This statistic was calculated considering the use of RTC for 5 months; Two projects were measured.