SOA Tools Landscape

SOA & End-2-End Business Driven Development

using J2EE, Portal, Web Services, Modeling, BPM, SDO, JSF, Legacy & more…

Go to http://JavaSOA.com for presentations, demos, tutorials and other resources

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SOA End-2-End Agenda

- SOA Overview
  - SOA Business Demo
    - Bridging the gap between business and I/T
  - SOA Solution Space
    - Lifecycle [Model > Assemble > Deploy > Manage > Governance]
    - Roles [Analyze > Architect > Develop > Integrate > Orchestrate]
- SOA Tools In Action
  - [Model]
    - Analyze > Business Process Modeling with WebSphere Business Modeler (WBM)
    - Architect > Application Architecture Modeling with Rational Software Architect (RSA)
  - [Assemble]
    - Develop > Service Implementation with Rational Application Developer (RAD)
    - Integrate > UI, Data, Service and Enterprise Integration with RAD
    - Orchestrate > Service Orchestration with WebSphere Integration Developer (WID)
- SOA Infrastructure
  - [Deploy]
    - SOA Services Runtime with WebSphere Process Server & ESB
    - SOA End User Experience with WebSphere Portal Server
  - [Manage]
    - WebSphere Business Monitor and Tivoli Composite Application Monitors
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    - IT View: SOA SW Development Process, Quality and Change Management with Rational Unified Process
    - Business View: SOA ROI Controls with Rational Portfolio Manager & Tivoli Dashboards

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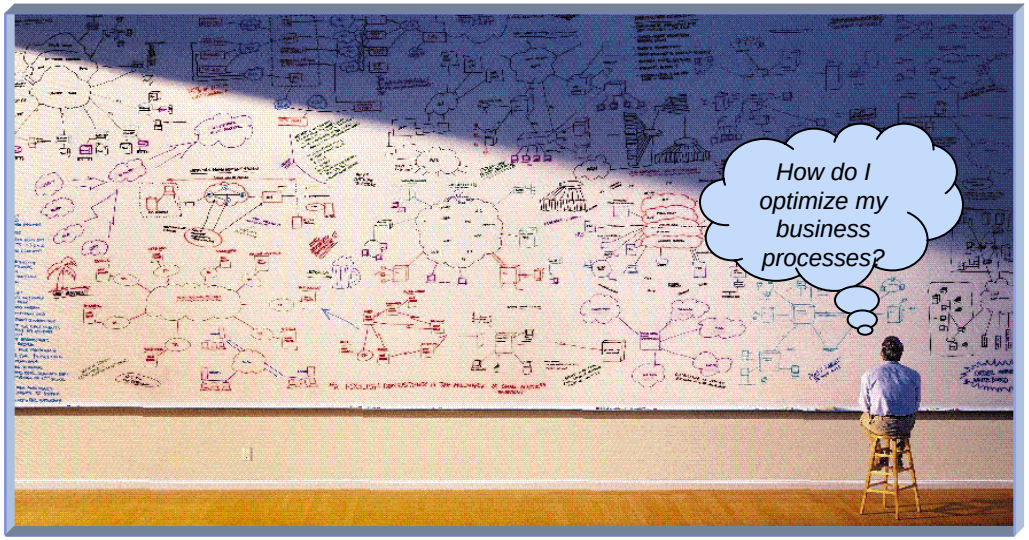
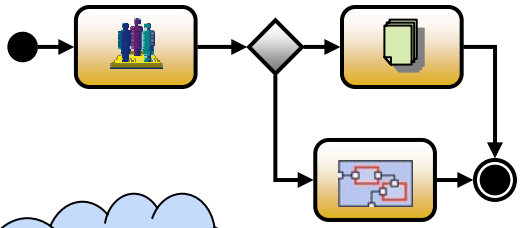
Bridging the Gap between Business and IT: How?

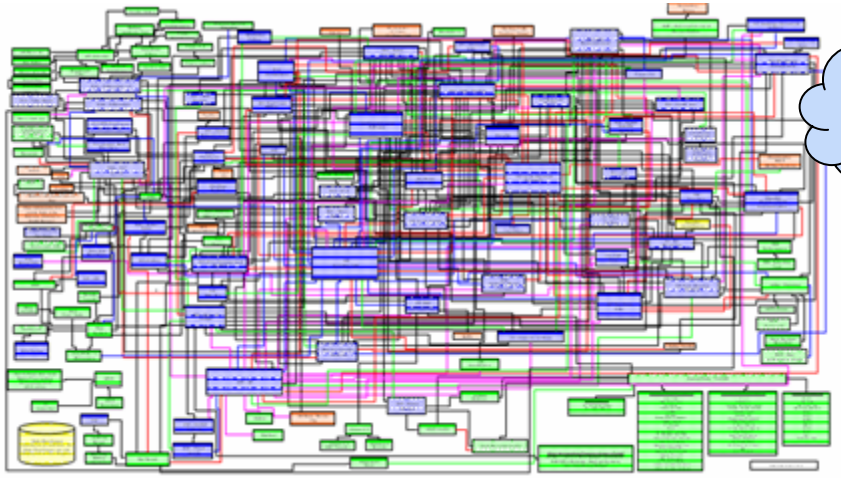


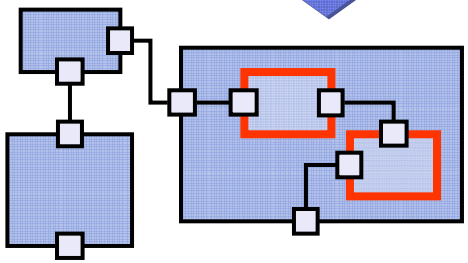
Business Models
Identify Process Activities



Business and I/T can use a common language a.k.a. "Process Integration"

Business Process Activities = I/T Services Granularity





I/T Components exposed as SOA Services

What is Service Oriented Architecture (SOA) ?

… a service?

A **repeatable business task** – e.g., check customer credit; open new account

… service orientation?

A way of integrating your **business as linked services** and the outcomes that they bring

… service oriented architecture (SOA)?

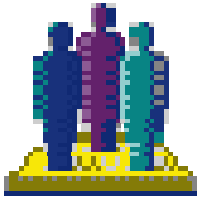
An IT **architectural style** that supports service orientation

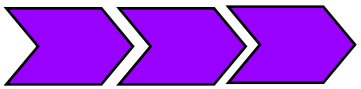
… a composite application?

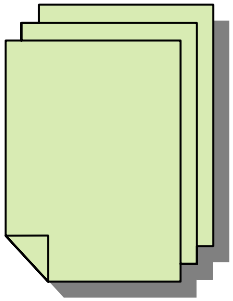
A set of **related & integrated** services that support a business process built on an SOA

Why should IT use Service Oriented Architecture?

Organizations are composed of





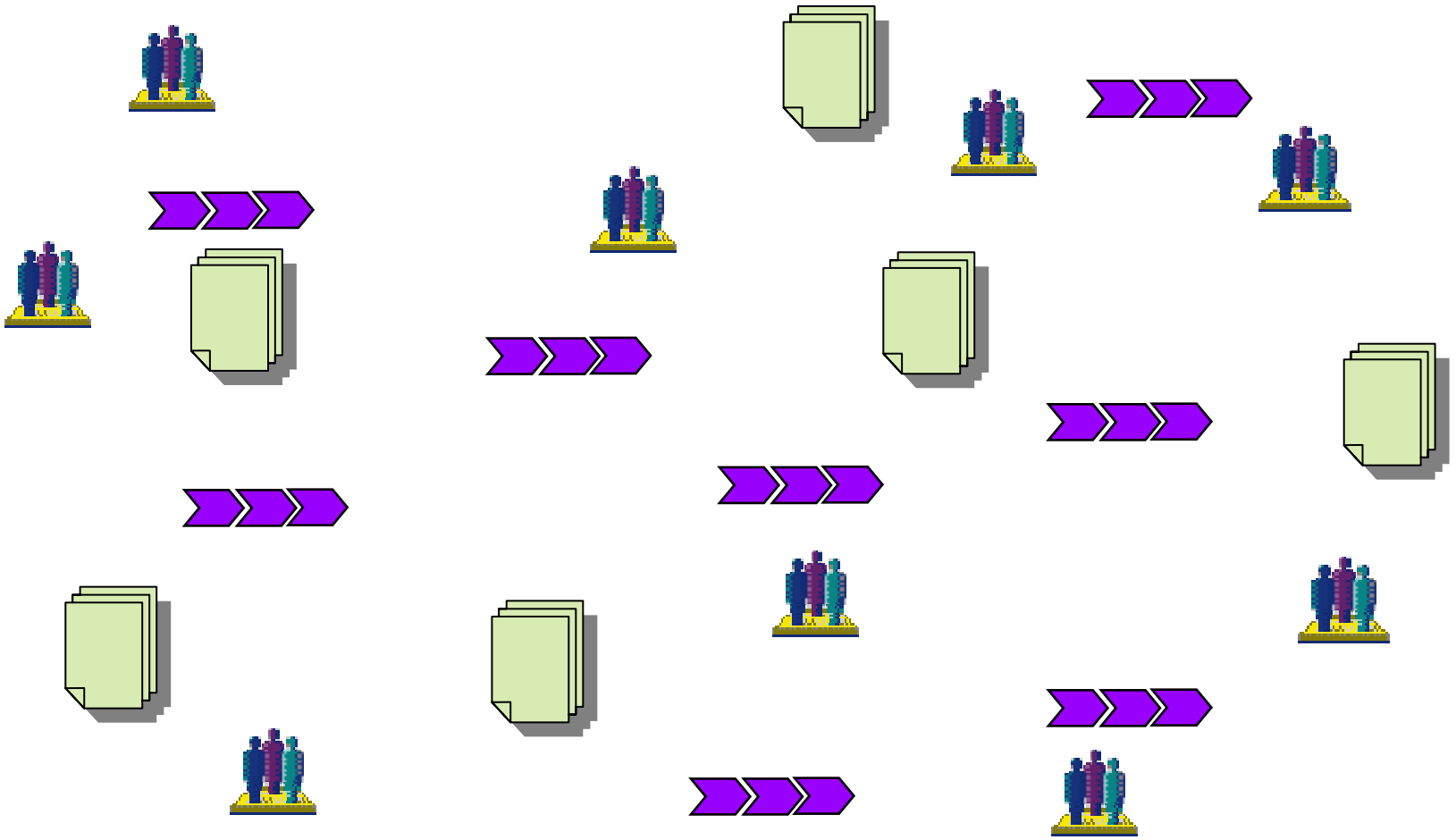


People

Processes they run

Information they use

Why should IT use Service Oriented Architecture?



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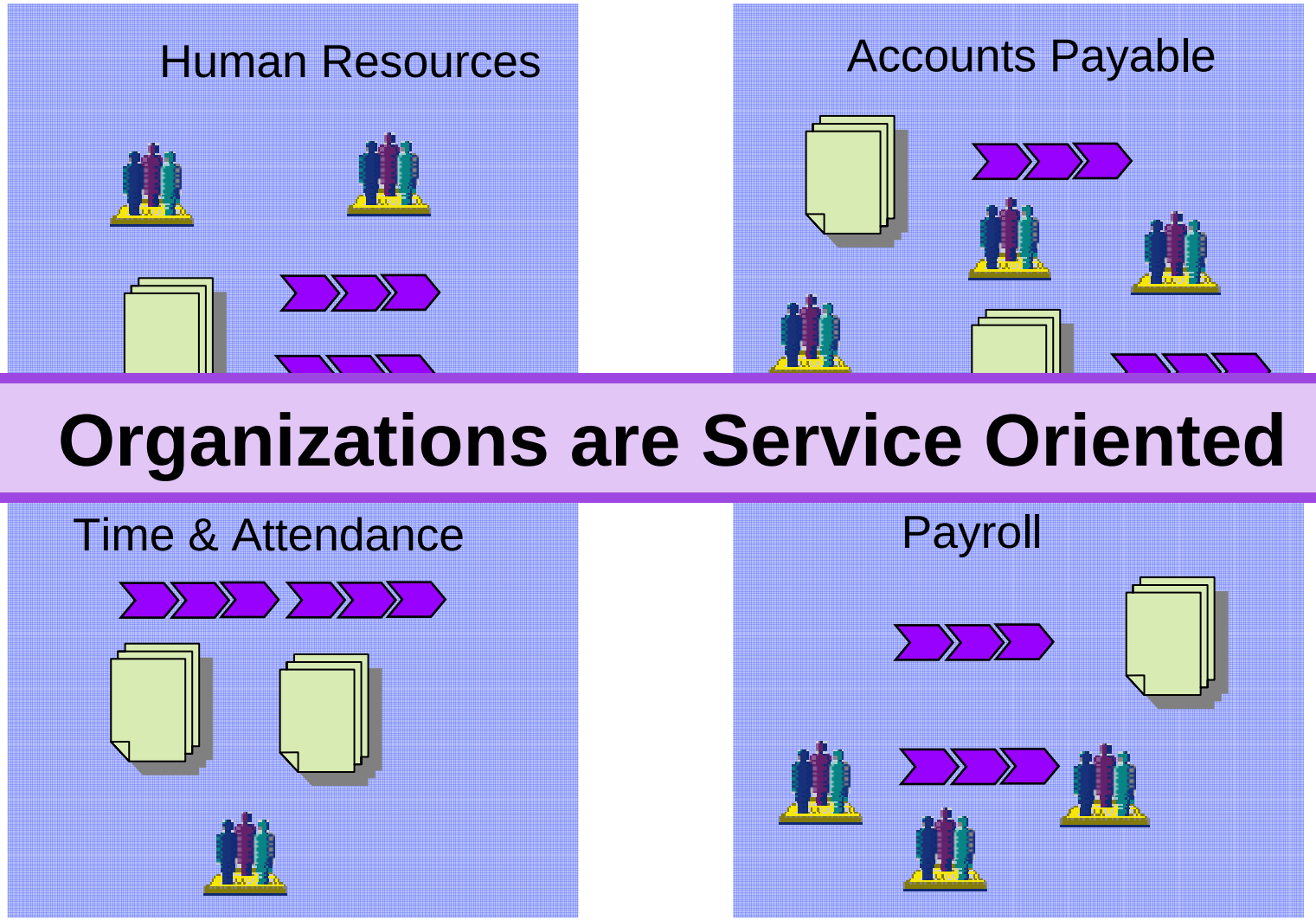
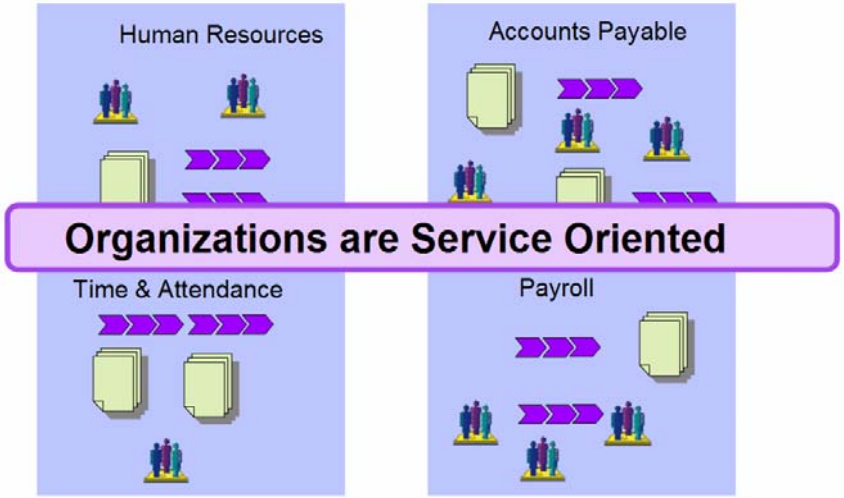


Why should IT use Service Oriented Architecture?

For the same reasons businesses are organized by services:

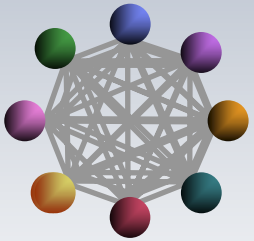
- Measurable and accountable
- Efficiency and optimization
  - Specialization and best practices
  - Well-defined interaction and processes
  - Independently scalable
  - Reduce duplication and reuse assets
- Isolation of changes



SOA builds flexibility on your current investments

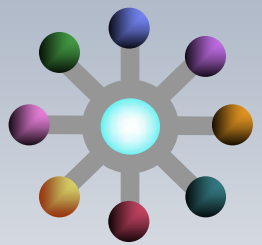
The next stage of integration

Messaging Backbone



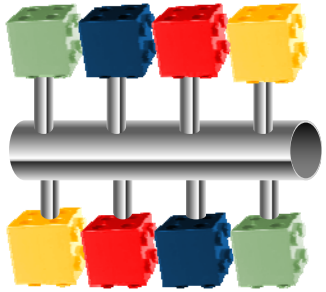
- Point-to-Point connection between applications
- Simple, basic connectivity

Enterprise Application Integration (EAI)



- EAI connects applications via a centralized hub
- Easier to manage larger number of connections

Service Orientated Integration

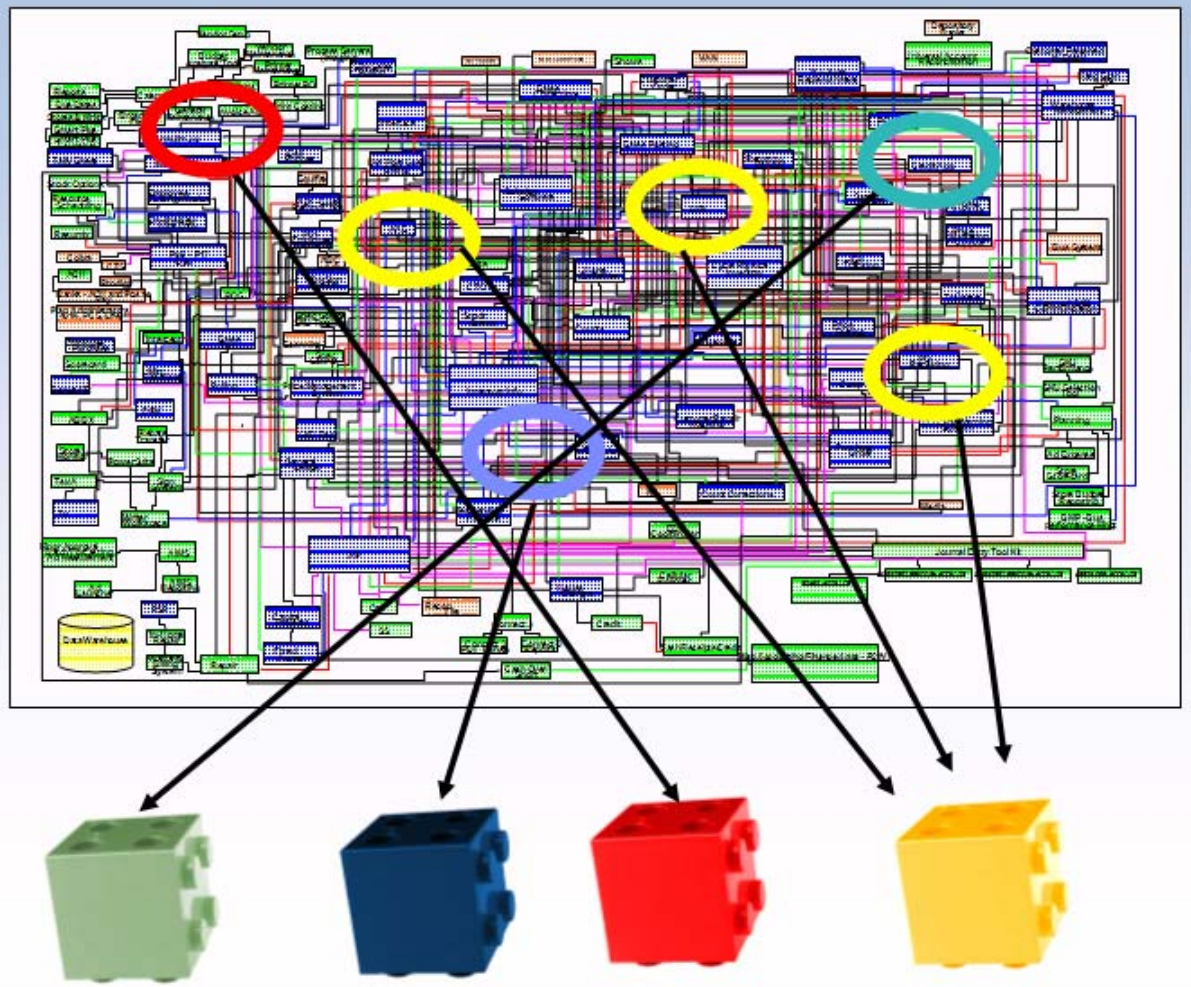


- Integration and choreography of services through an Enterprise Service Bus
- Flexible connections with well defined, standards-based interfaces

Flexibility

As Patterns Have Evolved, So Has IBM

Applications can be composed of or exposed as services



Step 1

Identify the Business Service – the basic SOA building block

Step 2

Locate the service components

Step 3

Construct the interface

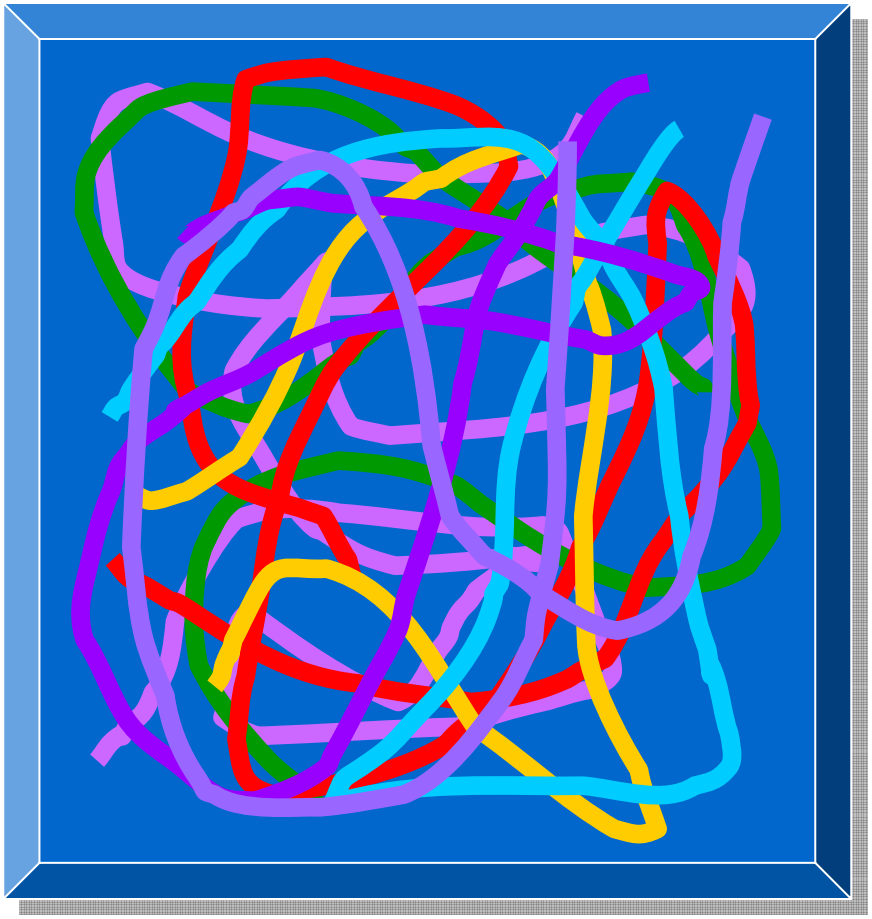
Step 4

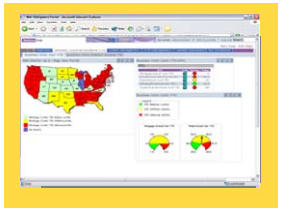
Repeat

Applications can implement business process workflows… by using services

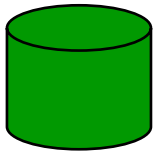
Business Process is implemented by integrating services

What is in an application?

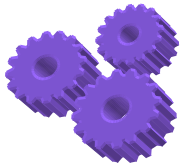




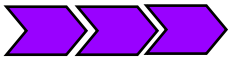
User Interaction Logic



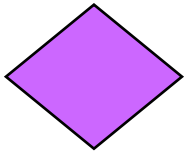
Data Logic



Integration Logic

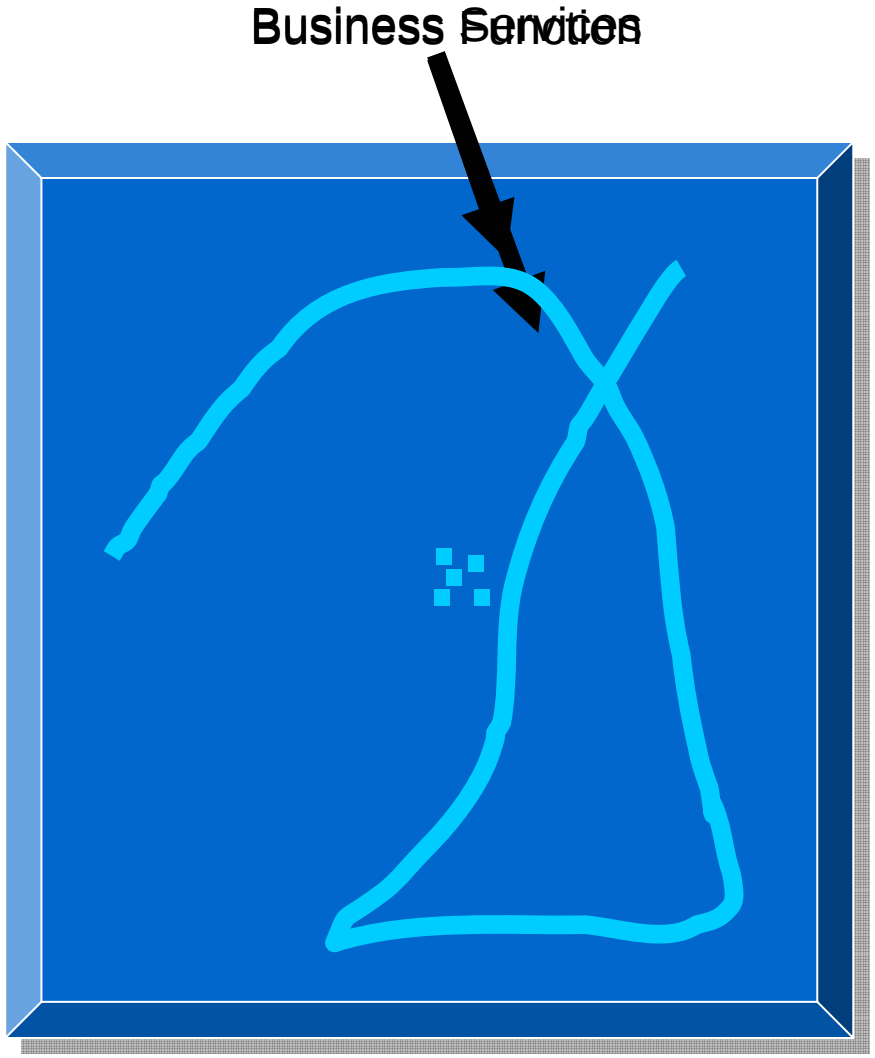


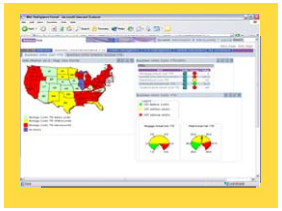
Process Logic



Business Rules

Monitoring & Management Logic





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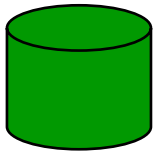

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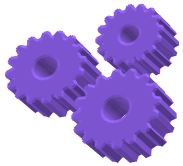

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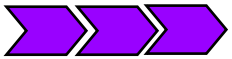

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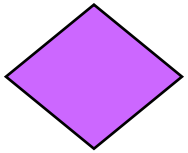

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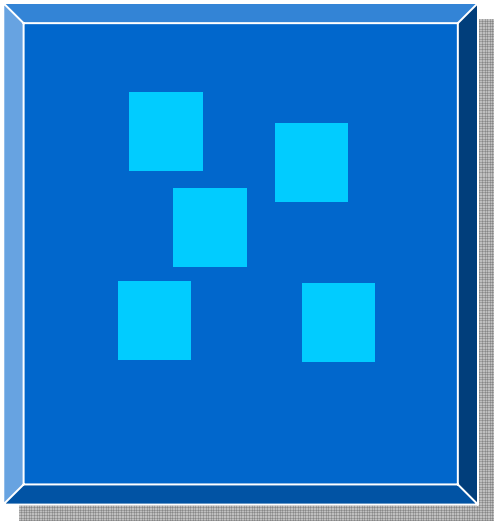
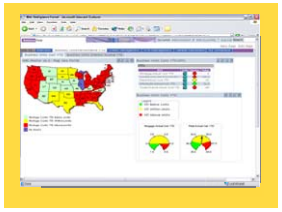
Monitoring & Management Logic

Integration through disintegration
Or "Service Orientation"

Business Services



- Closely model business functions
- Realized by
  - Transforming existing assets
  - Creating new assets
- Independently utilized & re-used
- Composed into processes (a.k.a. Services, applications, etc.)



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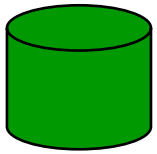

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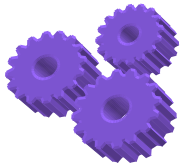

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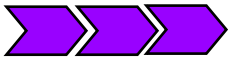

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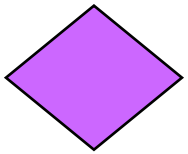

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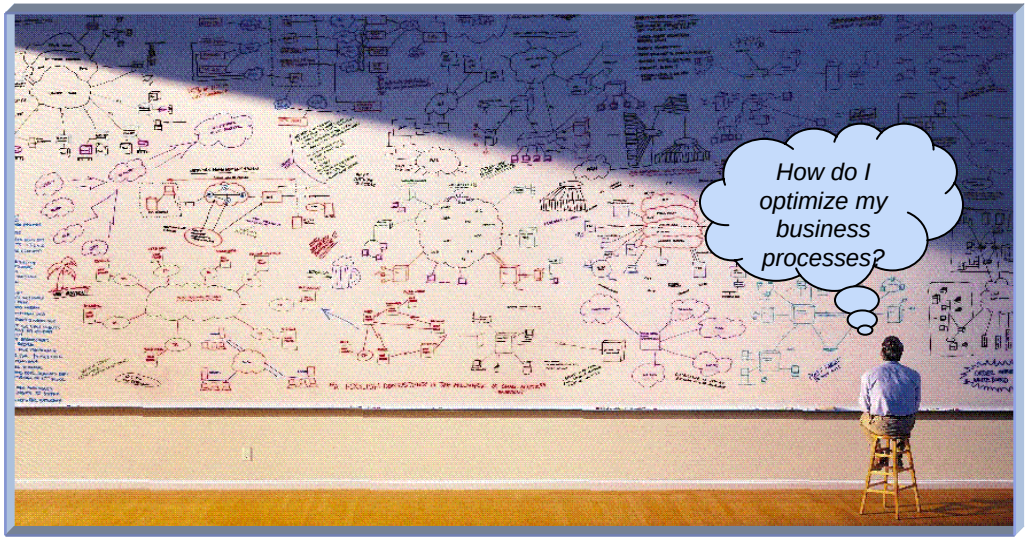
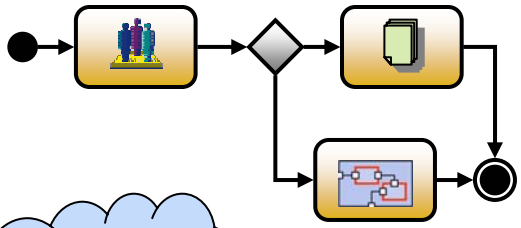
Bridging the Gap between Business and IT: How?



Business Models Identify Process Activities



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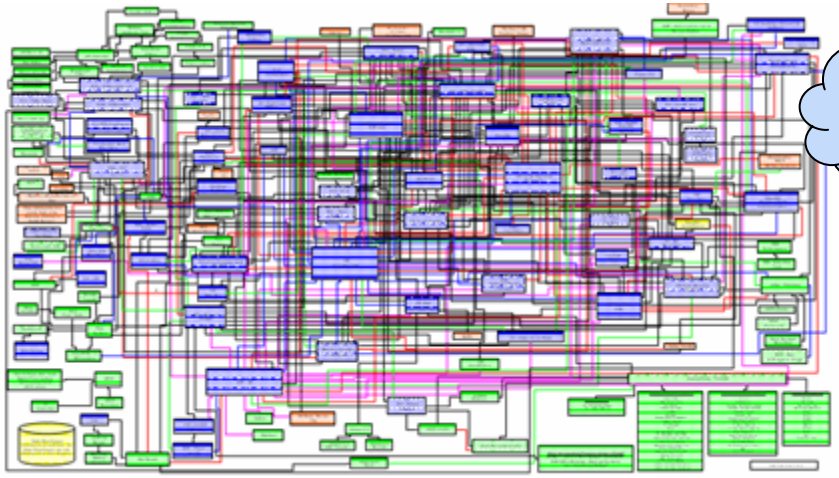

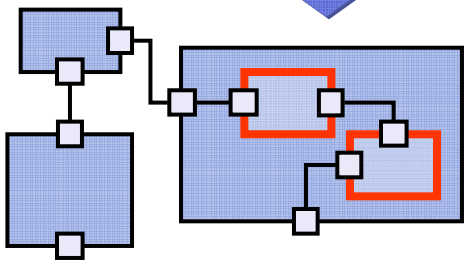

I/T Components exposed as SOA Services

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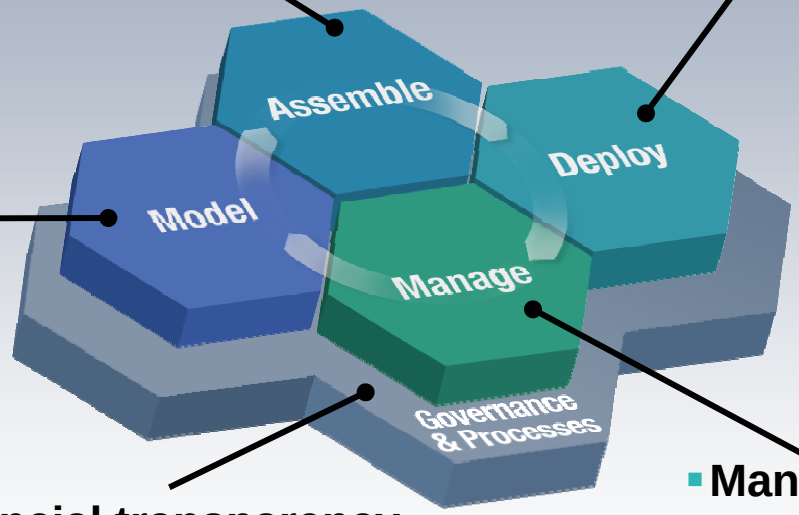
Using SOA to Bridge the Gap Between Business and I/T

The SOA Lifecycle

- Discover
- Construct & Test
- Compose

- Integrate people
- Integrate processes
- Manage and integrate information



- Gather requirements
- Model & Simulate
- Design

- Financial transparency
- Business/IT alignment
- Process control

- Manage applications & services
- Manage identity & compliance
- Monitor business metrics

SOA is a Team Sport

Roles Across Business and I/T

	Title	Role
	Business Analyst	Provide comprehensive and structured view of the business requirements
	Architect	Provide architecture for a software application or service
	Integration Developer	Creation of new business function by combining existing services
	Application Developer	Develop the business services according to the Architects' design, incorporating both functional as well as presentation aspects of the offering
	CIO / Project Manager	Gain visibility into the business benefits, costs and risks of the portfolio of SOA services from proposal to retirement

SOA Foundation – Development Roles

Role	Description	Benefits & Skill Requirements
Business Analyst	Modeling business processes for optimization or to reengineer existing business processes or define new business processes	▪ **No programming experience required** ▪ Can focus on business performance & process
Integration Developer / Specialist	Visual tools to configure integration logic with existing and new applications and humans in the network	▪ Some basic programming experience (loops, conditions, string manipulation) ▪ **No J2EE skill required** ▪ Expect tools to simplify and abstract advanced IT implementation details
Software Architect	Model-driven development environment that automates the translation from design to implementation. Includes requirements and business modeling integrations with RequisitePro and WBI Modeler	▪ **Focused specifically on UML modeling and J2EE implementation**
J2EE / Java Application Developer	Comprehensive integrated development environment, for Web, Java, Web services, Portal, and EJB development with visual tools that accelerate application development.	▪ **Focused specifically on J2EE implementation**

SOA Foundation – Development Tools

Role	Description	Development Tool
Business Analyst	Modeling business processes for optimization or to reengineer existing business processes or define new business processes	WebSphere Business Modeler
Integration Developer / Specialist	Visual tools to configure integration logic with existing and new applications and humans in the network	WebSphere Integration Developer
Software Architect	Model-driven development environment that automates the translation from design to implementation. Includes requirements and business modeling integrations with RequisitePro and WBI Modeler	Rational Software Architect
J2EE / Java Application Developer	Comprehensive integrated development environment, for Web, Java, Web services, Portal, and EJB development with visual tools that accelerate application development.	Rational Application Developer

SOA Business Driven Development – Roles and Primary Tools

Business Analyst

- Defines, models Processes
- Optimizes Processes through simulations

WebSphere BI Modeler

Solution Architect

- Defines business contract and system use cases
- Models Service Implementation

Rational Software Architect

Integration Developer

- Implements Processes and Composite Applications
- Defines/Connects Services & Interfaces

WebSphere Integration Developer

J2EE Developer

- Implements Services
- Constructs other J2EE artifacts

Rational Application Developer

Differentiating Integration Developer vs. J2EE Developer

Integration Developer

WebSphere Integration Developer V6.0

- Focus on SOA implementations and business process automation
- Had some basic programming experience (loops, conditions, string manipulation)
- Expects tools to simplify and abstract advanced IT & SOA implementation details

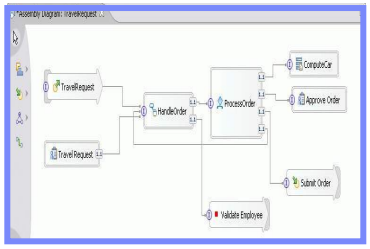
J2EE Developer

Rational Application Developer V6.0

- Creates J2EE artifacts used by Integration Developer to assemble solutions
- Has J2EE and Web Services skills
- Expects tools to automate the low level details of J2EE programming model

WebSphere Business Process Management for SOA

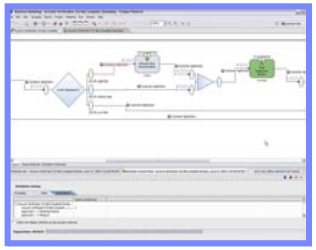
WebSphere Integration Developer

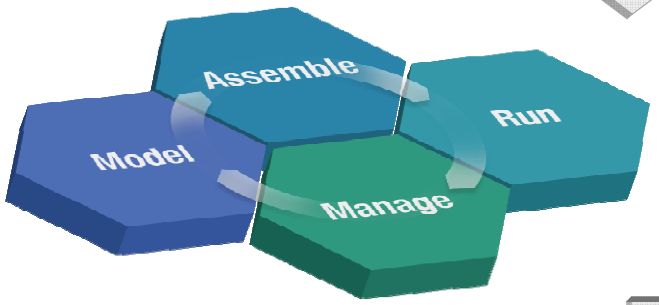


Clean hand-off to IT with Business Models, Metrics

Constructs for dynamic and adaptive business processes based on an integration platform

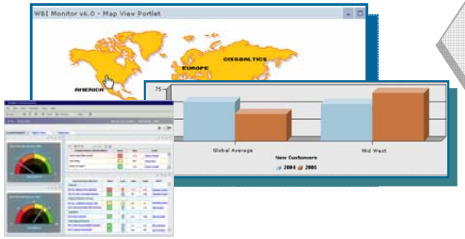
WebSphere Business Modeler





WebSphere Portal and Process Server

WebSphere Business Monitor



Feedback for continuous improvement

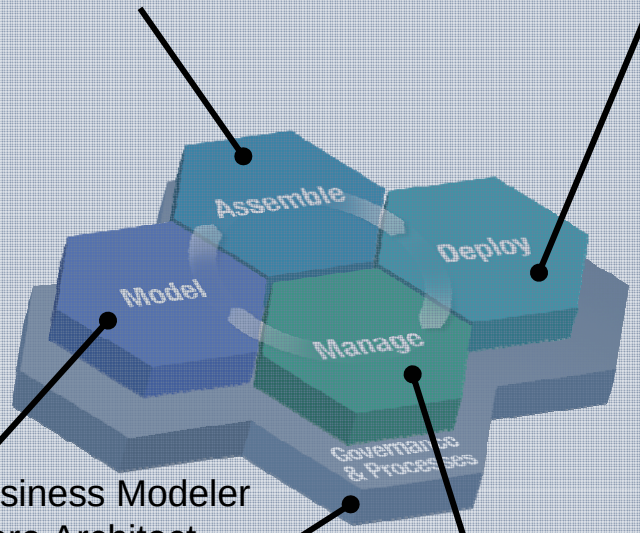
Real time management of business processes

Managing Your Business Processes with a Service Oriented Architecture

IBM SOA Foundation

Part of a broader portfolio to meet your SOA needs

WebSphere Integration Developer
Rational Application Developer



Process:
WebSphere Process Server
WebSphere ESB
People:
WebSphere Portal
Information:
WebSphere Information Integrator
Application Infrastructure:
WebSphere Application Server & XD

WebSphere Business Modeler
Rational Software Architect

Rational Unified Process
Rational Team Unified Platform
Rational Portfolio Manager

WebSphere Business Monitor
Tivoli Composite Application Manager
Tivoli Identity & Access Manager

SOA End-2-End Agenda

- SOA Overview
  - SOA Business Demo
    - Bridging the gap between business and I/T
  - SOA Solution Space
    - Lifecycle [Model > Assemble > Deploy > Manage > Governance]
    - Roles [Analyze > Architect > Develop > Integrate > Orchestrate]
- SOA Tools In Action
  - [Model]
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    - Architect > Application Architecture Modeling with Rational Software Architect (RSA)
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    - Develop > Service Implementation with Rational Application Developer (RAD)
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SOA Business Driven Development – Key Roles and Tools

Business Analyst

- Defines, models Processes
- Optimizes Processes through simulations

WebSphere BI Modeler

Solution Architect

- Defines business contract and system use cases
- Models Service Implementation

Rational Software Architect

Integration Developer

- Implements Processes and Composite Applications
- Defines Services

WebSphere Integration Developer

J2EE Developer

- Implements Services
- Constructs other J2EE artifacts

Rational Application Developer

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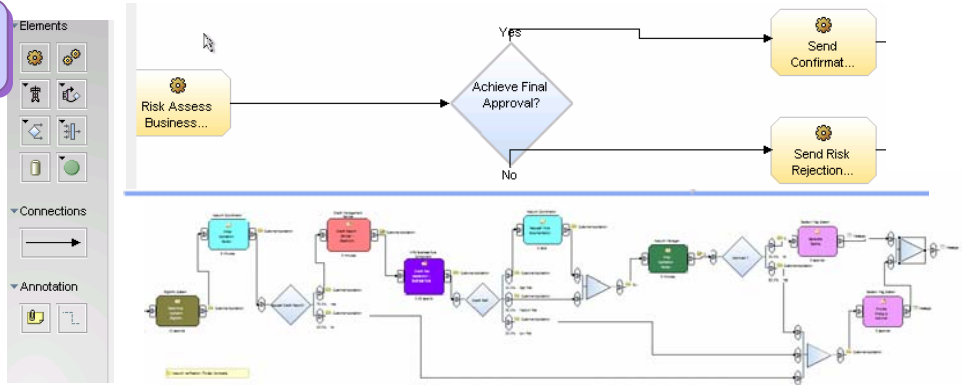
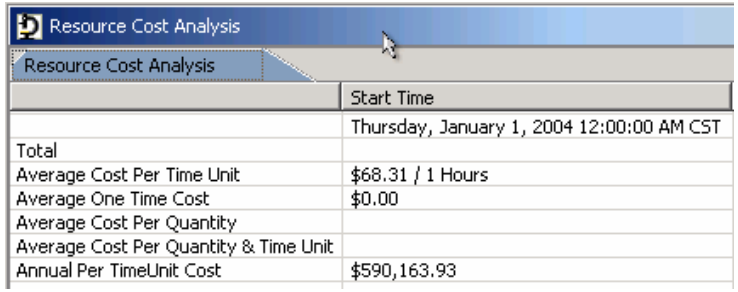
Business Models Driven into J2EE Workflows

- Business process model - Simulate cost/time savings and assign business measures (KPIs)

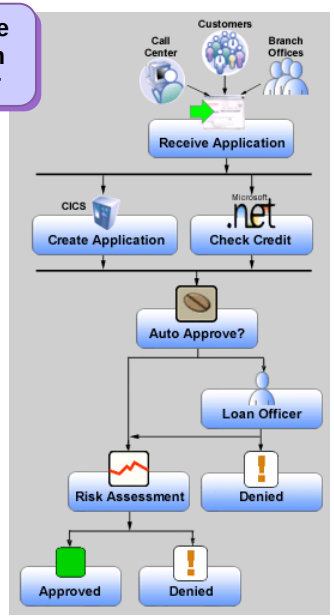
WebSphere Business Modeler

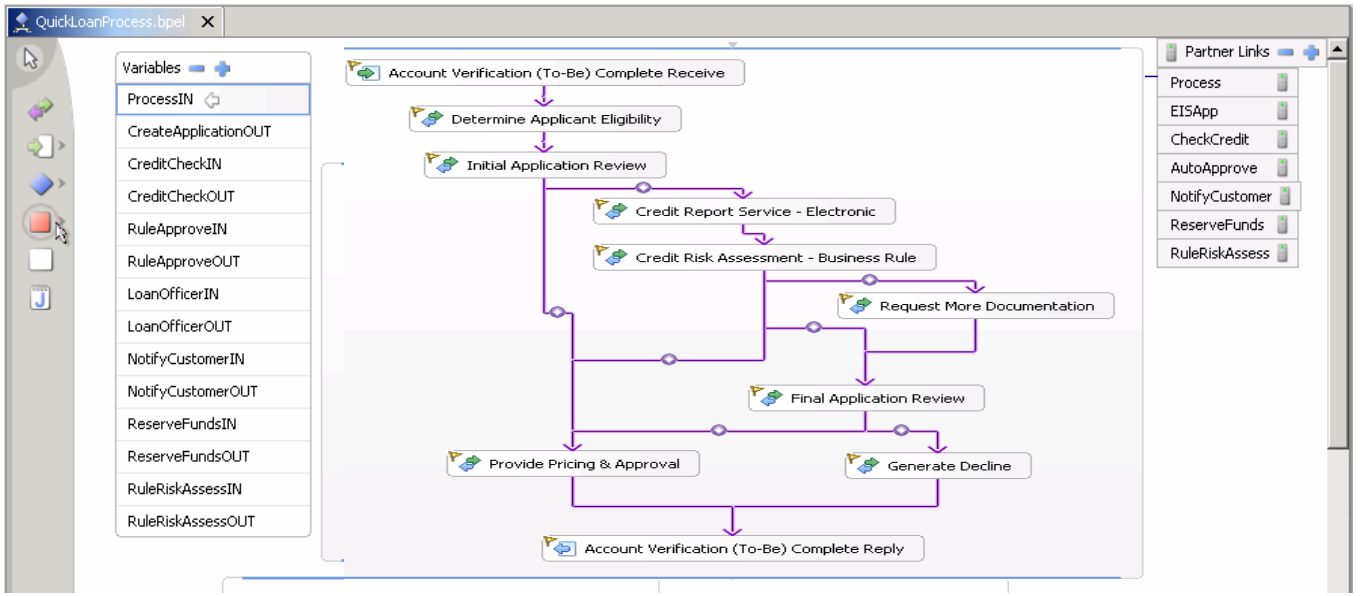




- Re-use business process model in visual workflow tools to build SOA J2EE web services

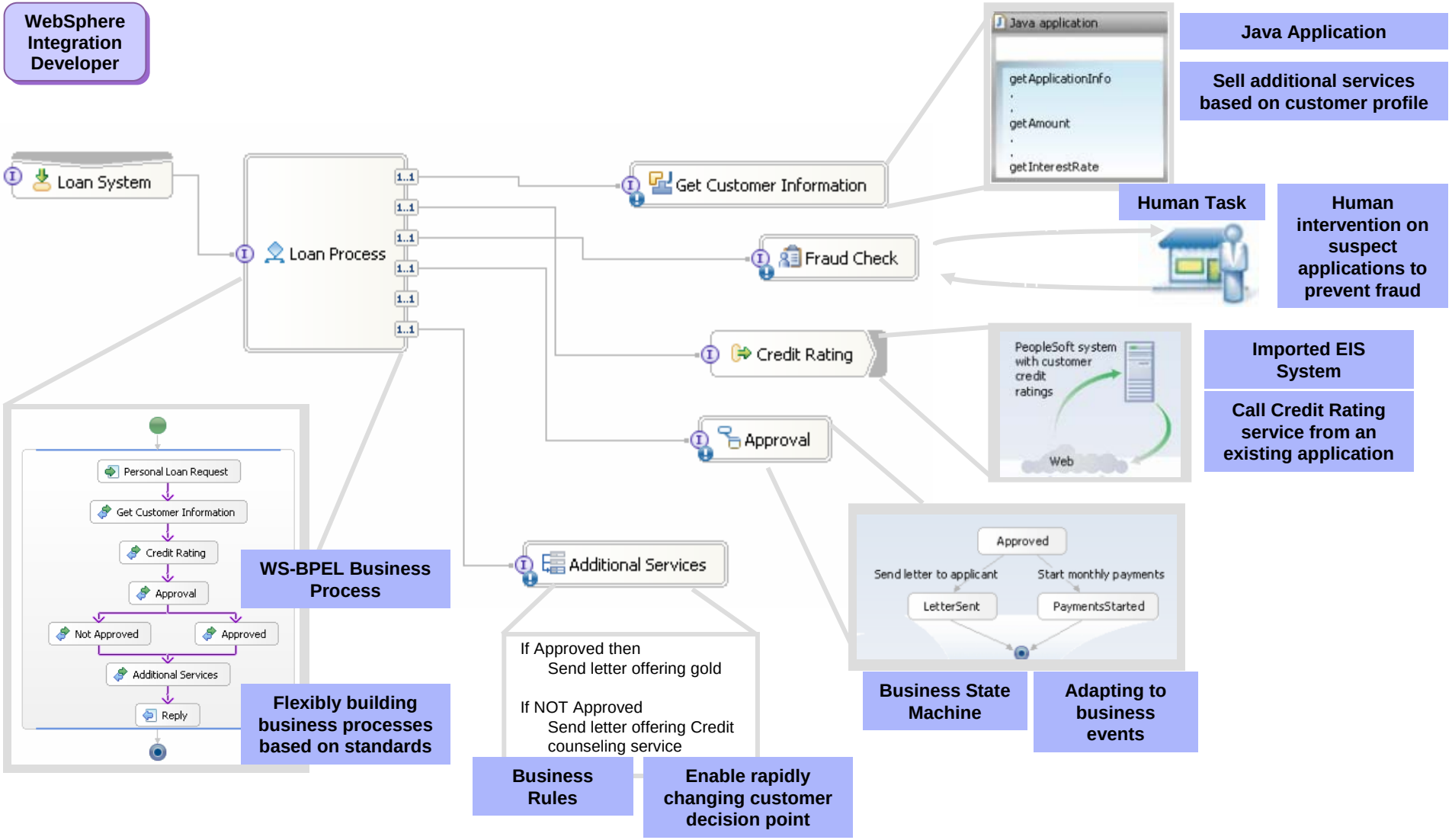
WebSphere Integration Developer





SOA Example - Composite Application

WebSphere Integration Developer



Java Application

Sell additional services based on customer profile

Human Task

Human intervention on suspect applications to prevent fraud

Imported EIS System

Call Credit Rating service from an existing application

WS-BPEL Business Process

Flexibly building business processes based on standards

Business State Machine

Adapting to business events

Business Rules

Enable rapidly changing customer decision point

Traditional Open Integration Programming Model

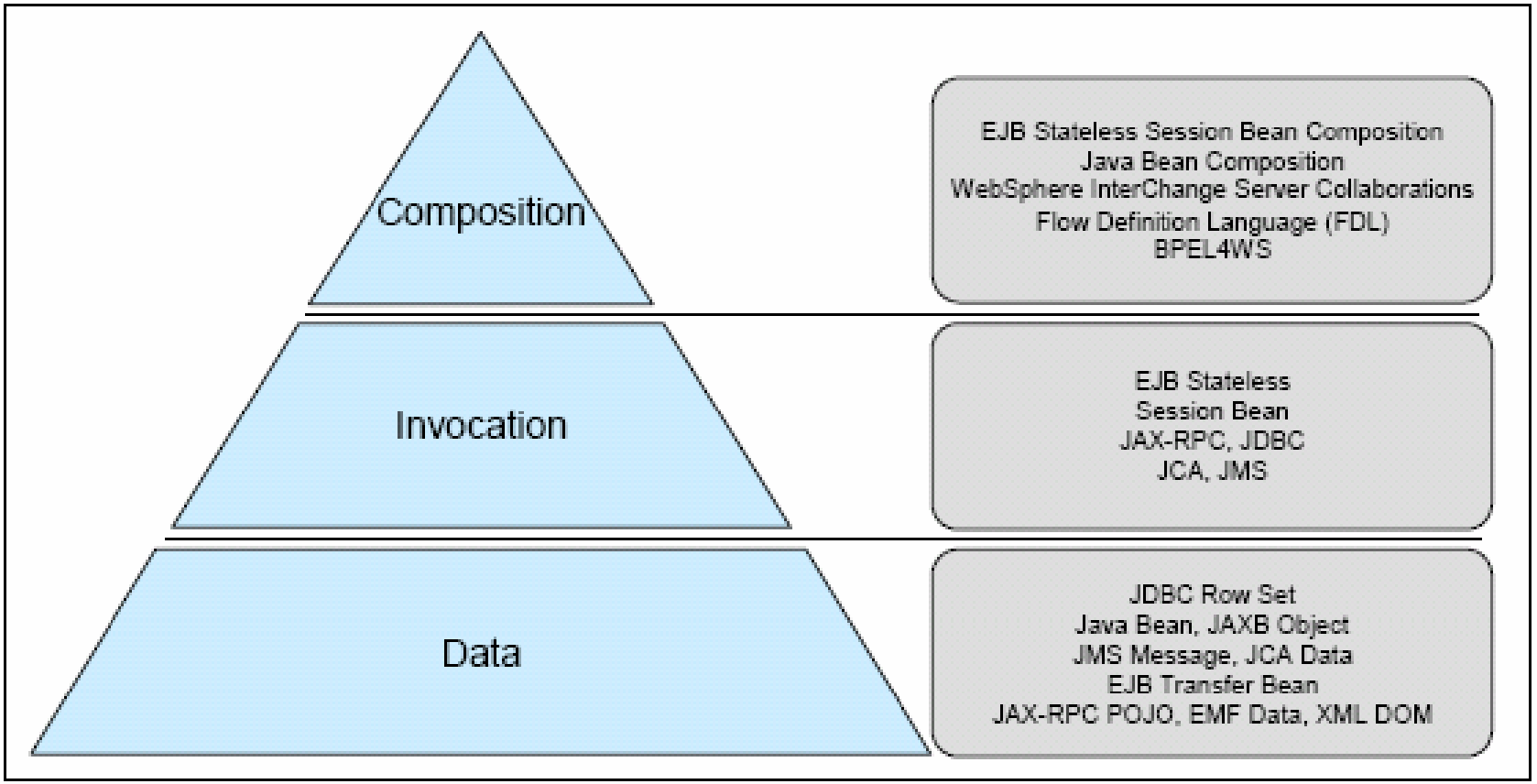


Figure 2-1 Traditional programming model

Today's Open SOA Programming Model

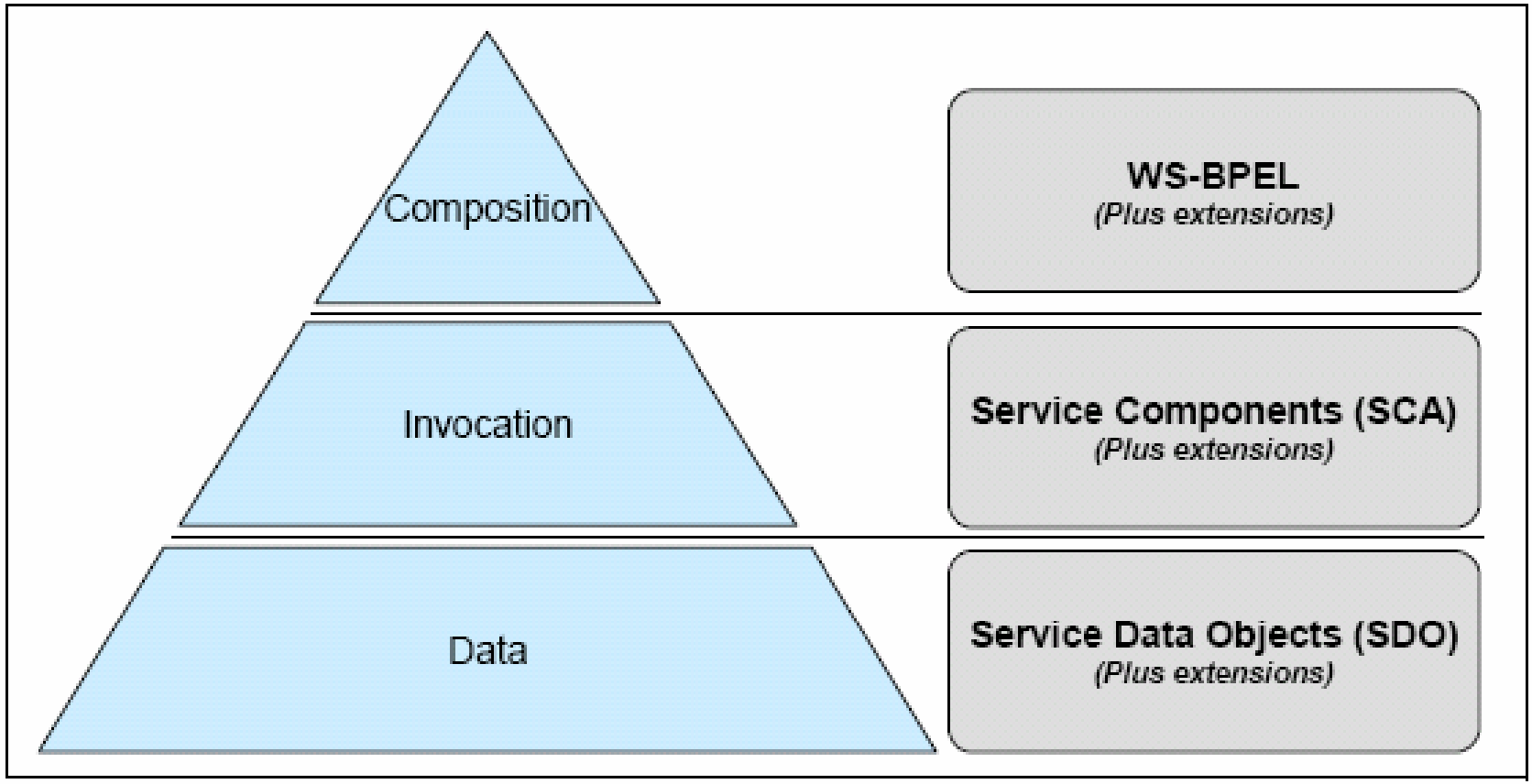


Figure 2-2 New programming model

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J2EE Developer

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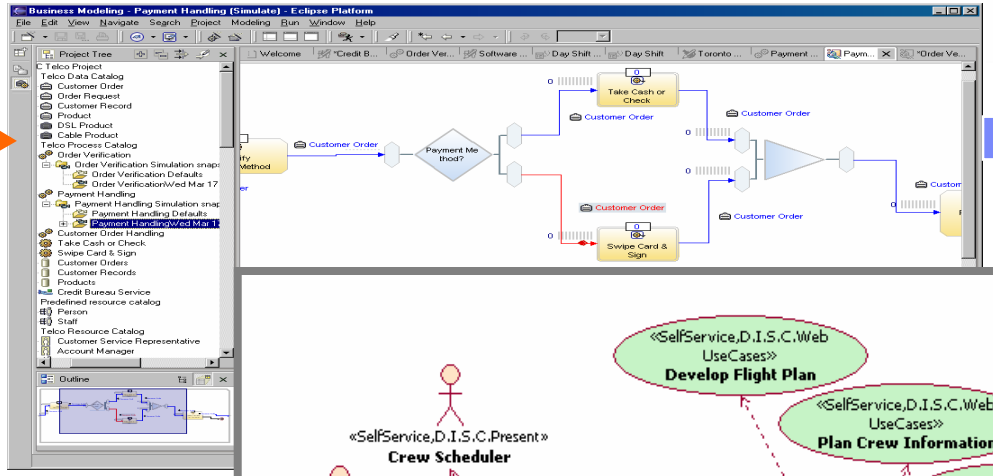
Rational Application Developer

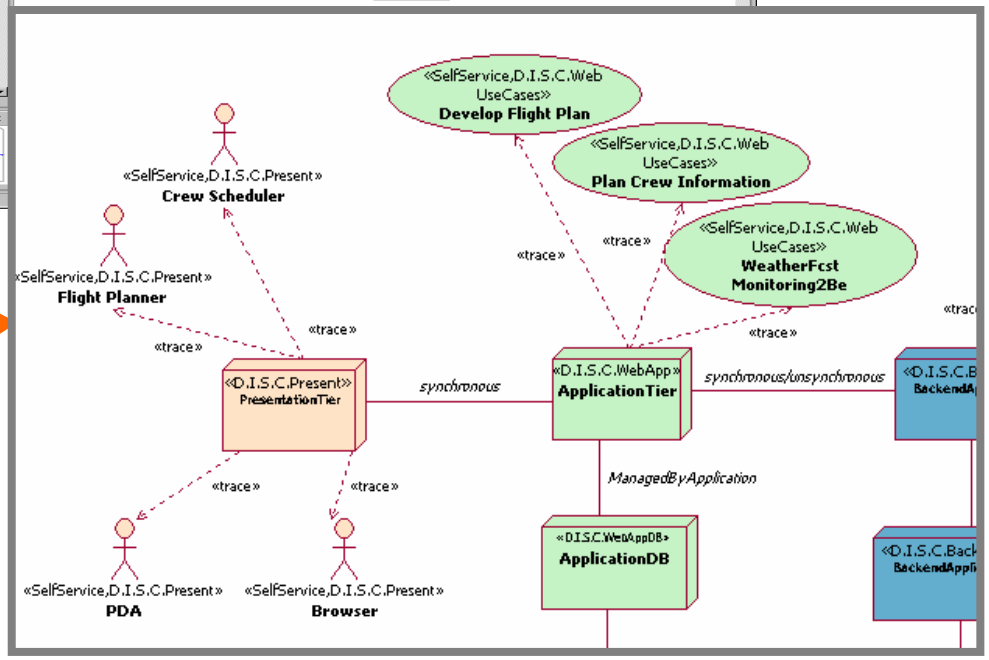
Model the Business

Document business processes and user interactions

Analyst models "as is" business process and explores alternative "to be" business processes



Analyst models "as is" and "to be" user interactions through use cases



IBM WebSphere Business Integration Modeler
IBM Rational Software Architect

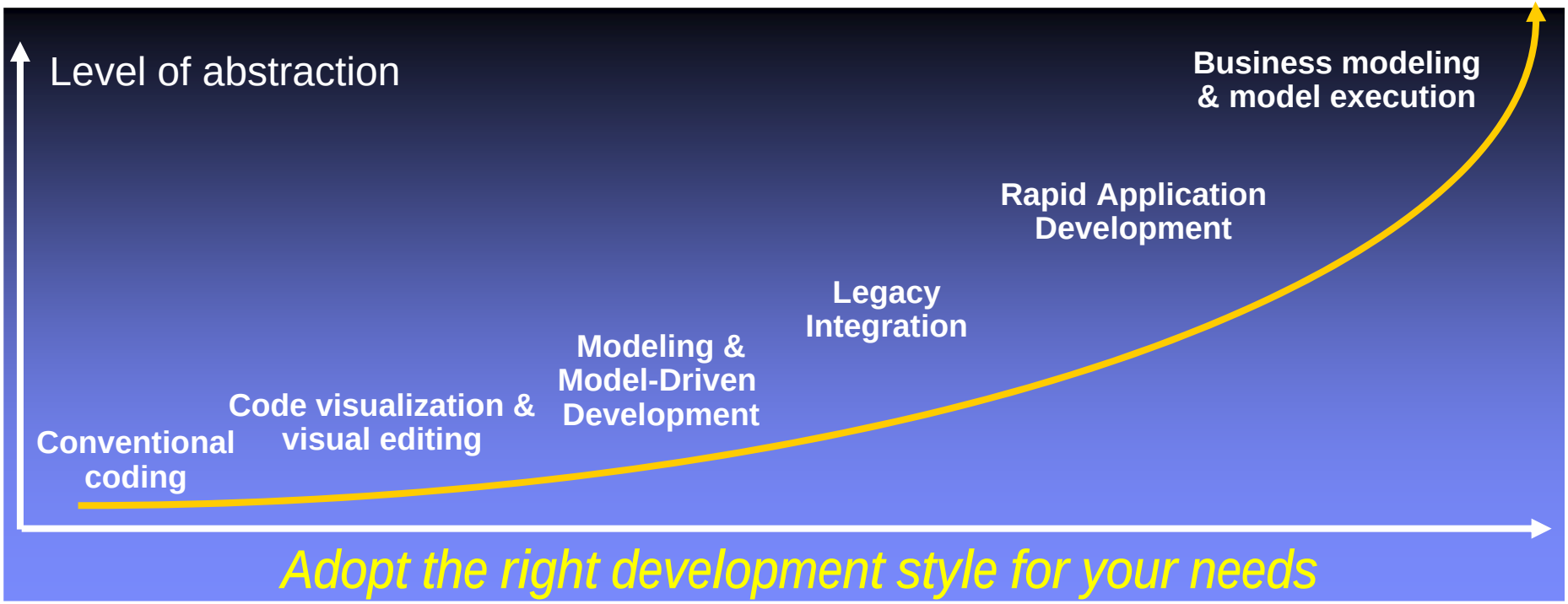
IBM Design & Construction Offerings

Benefits

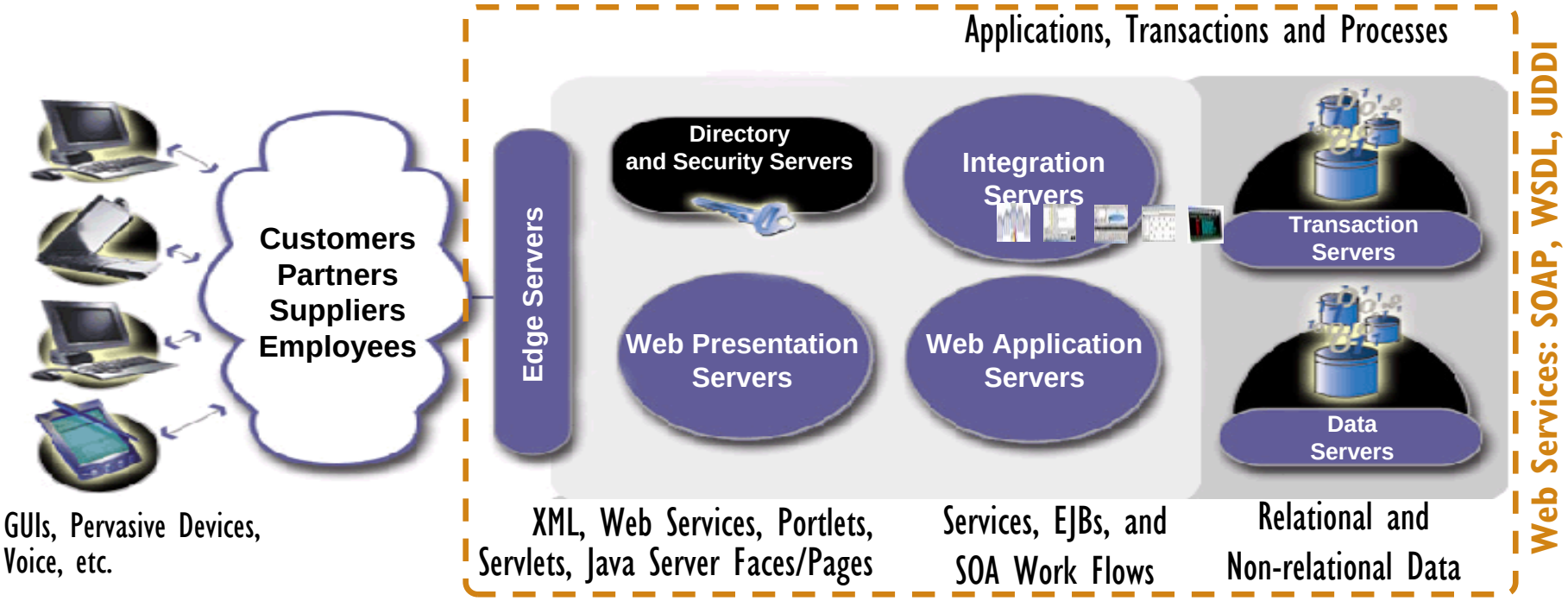
- Drive higher levels of productivity and time to value
- Maximize quality, robustness, reusability
- Maximize value from both code & models
- Choice of development styles

Capabilities

- Design > Build > Test > Deploy
- Code visualization & visual editing
- Modeling & round-trip engineering
- Legacy integration
- Rapid application development
- Model execution



Build Tools - End-2-End Design & Construction

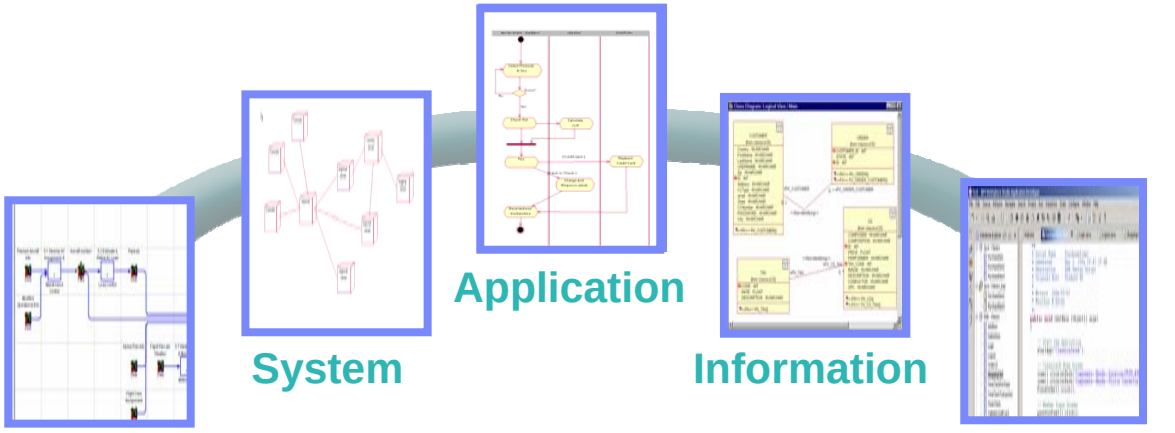


Development Roles

Application Modeling	Java/J2EE Development	Web/Portal Development	XML Web Services Development	Database App Development	Business Process SOA Integration	Cobol, CICS/IMS, 4GL Development

Model Driven Development With A Focus On Architecture

- ✓ Create models at various levels of abstraction
- ✓ Implement with component-oriented and service-oriented architectures
- ✓ Visualize as-built architecture
- ✓ Validate or refine & iterate



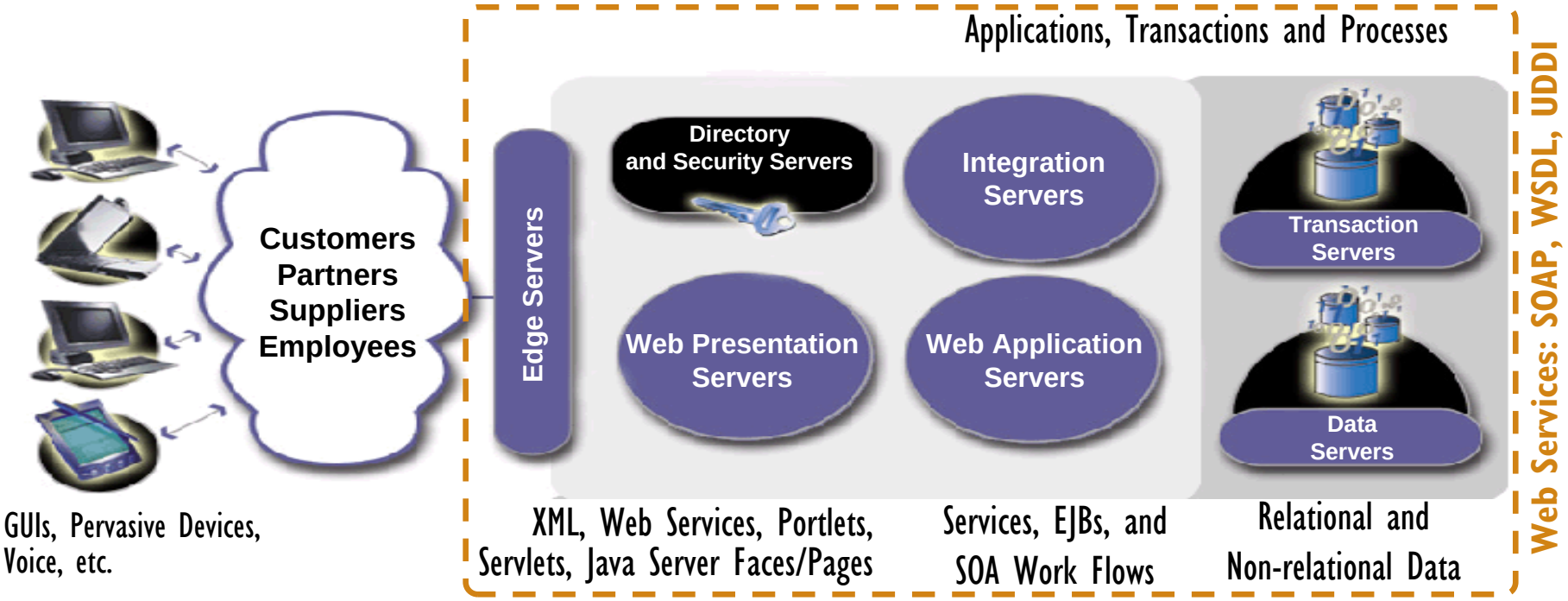
Business Benefits

- Better align projects with business needs
- Higher-level reuse for improved productivity
- Faster, more reliable changes

Technology Benefits

- Enables model-driven architecture and development
- Scales better than focusing only on code
- Facilitates traceability across the lifecycle

Build Tools - End-2-End Design & Construction



Development Roles

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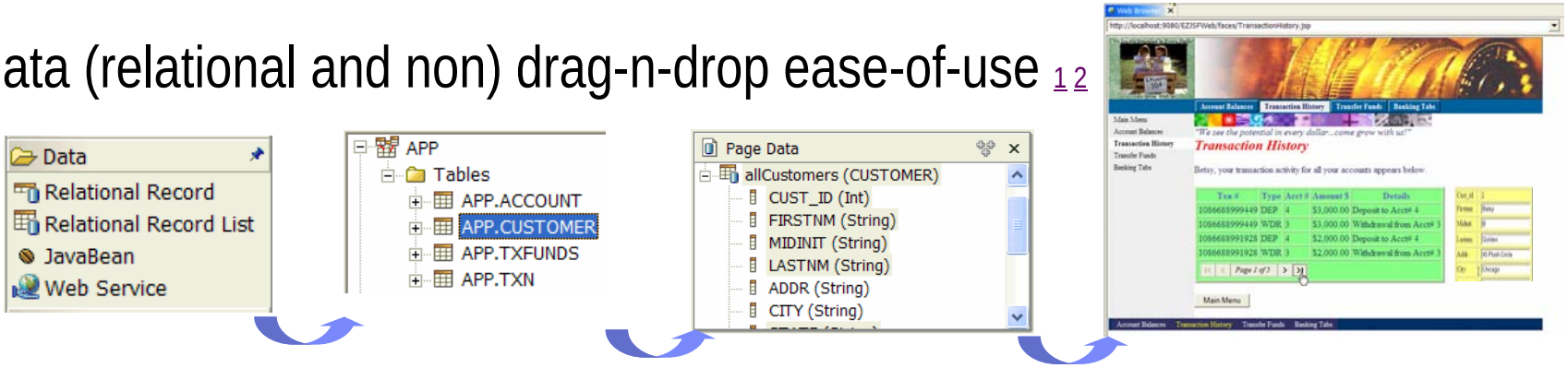
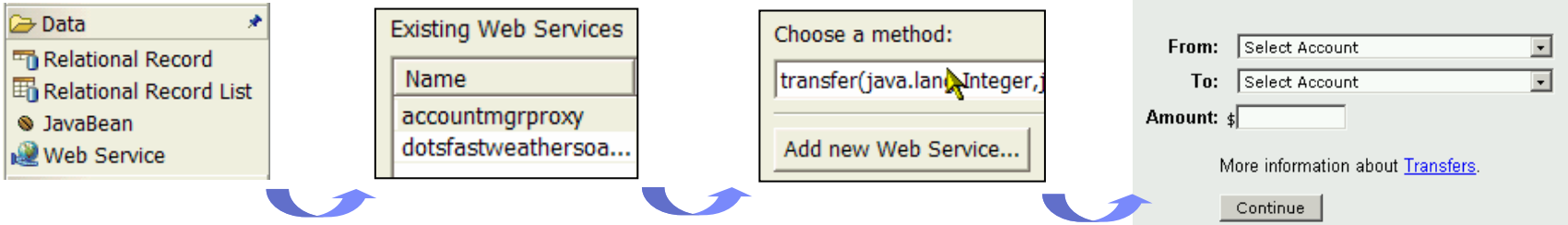
Simplifying J2EE, Web and Portal/Portlet Development

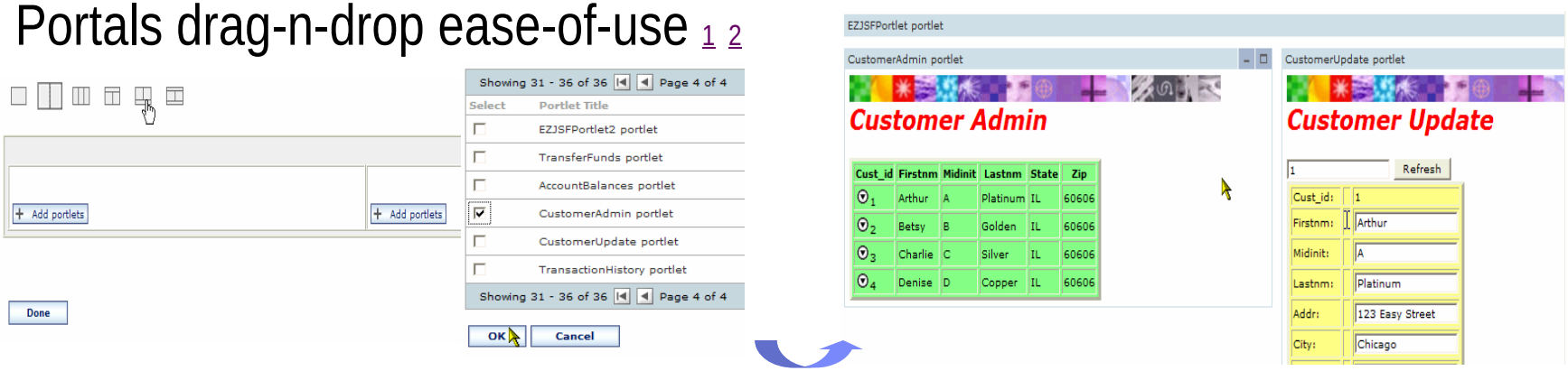
- Data (relational and non) drag-n-drop ease-of-use 1 2



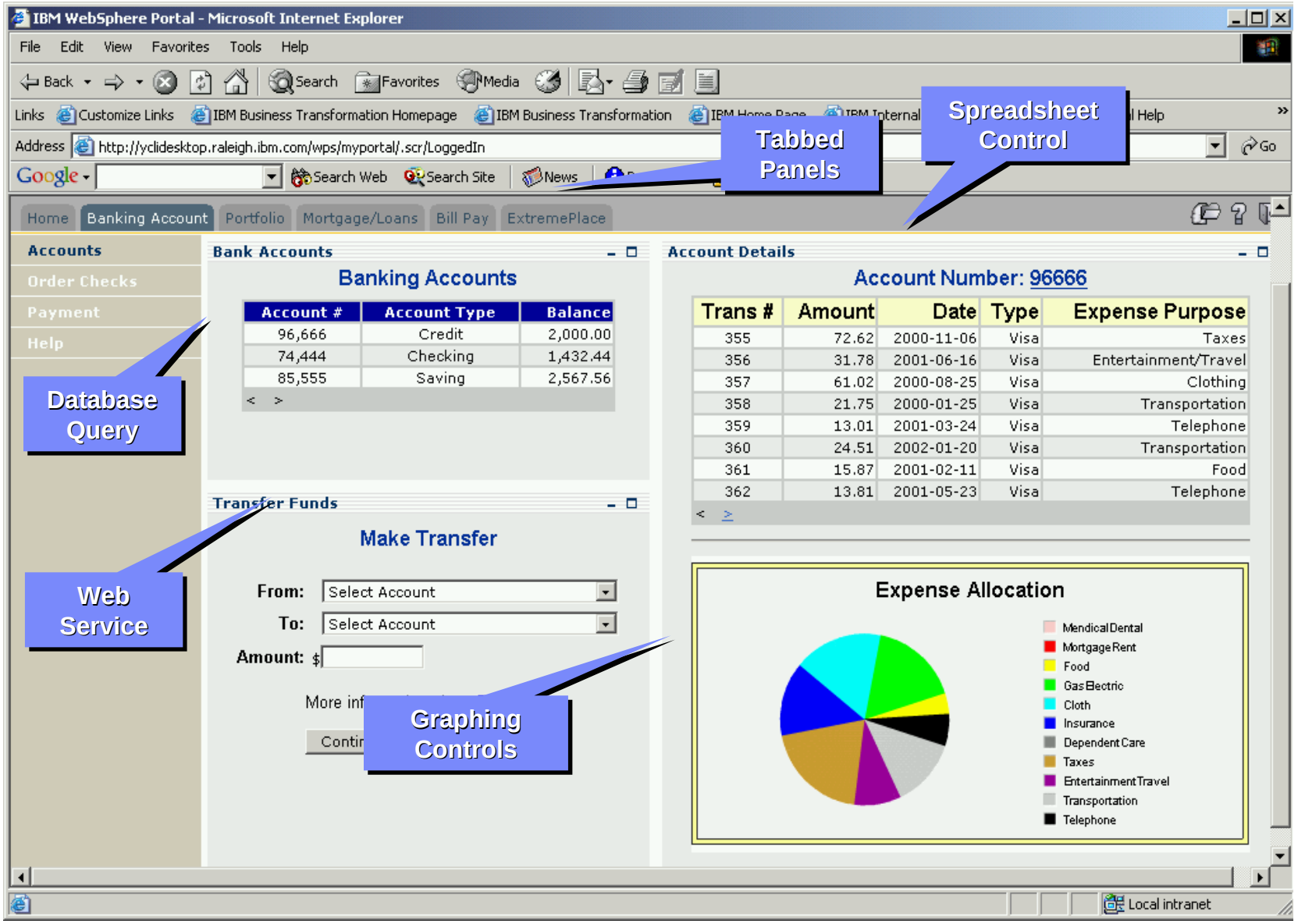
- Web Services development drag-n-drop ease-of-use 1 2



- Portals drag-n-drop ease-of-use 1 2

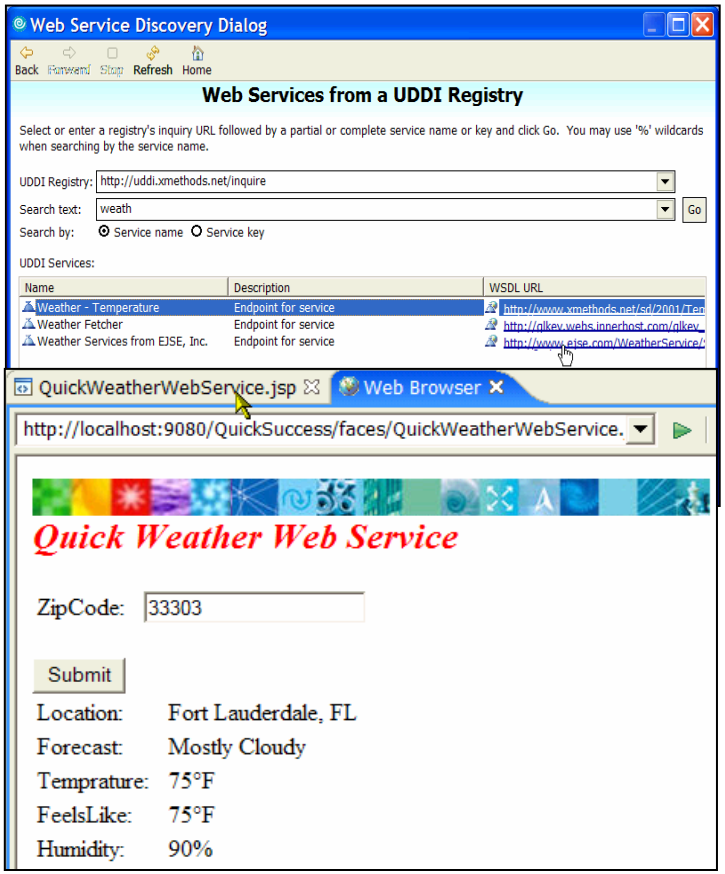


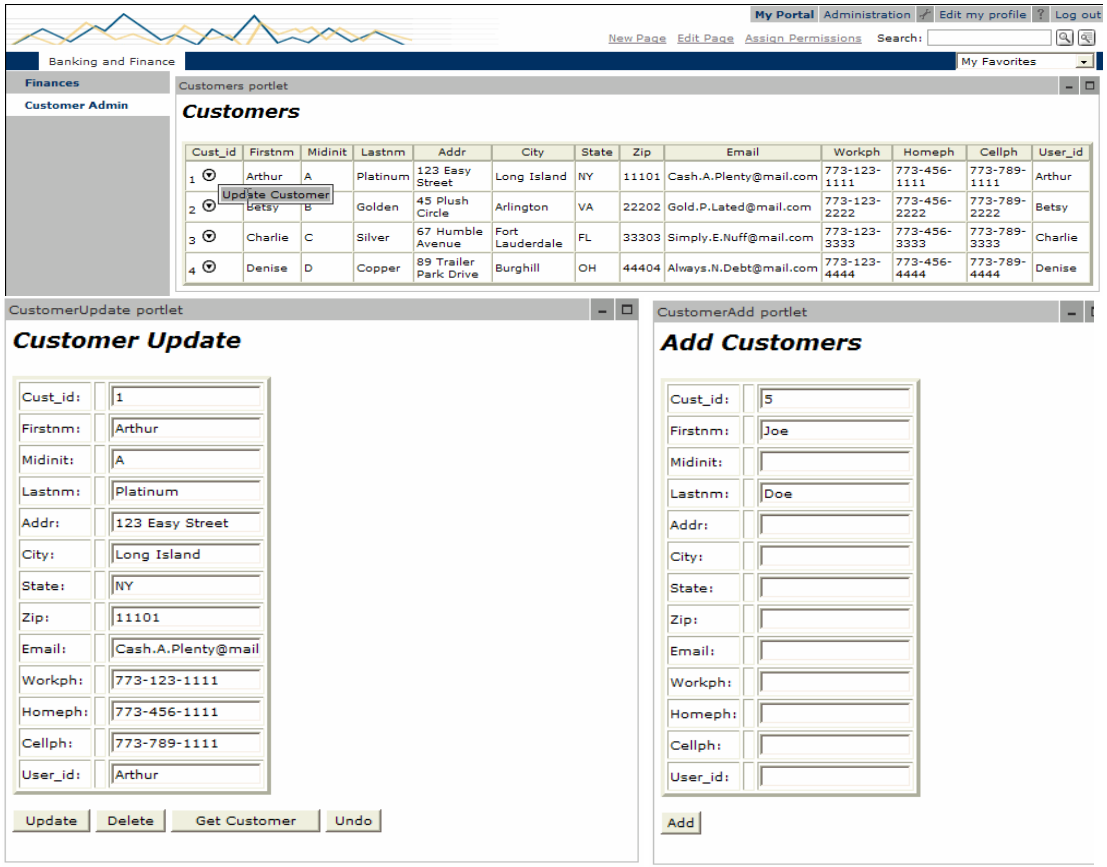
Richer Thin Clients (Portal, Portlets and Web Apps)



Build Scenarios – J2EE, Web Services and Data

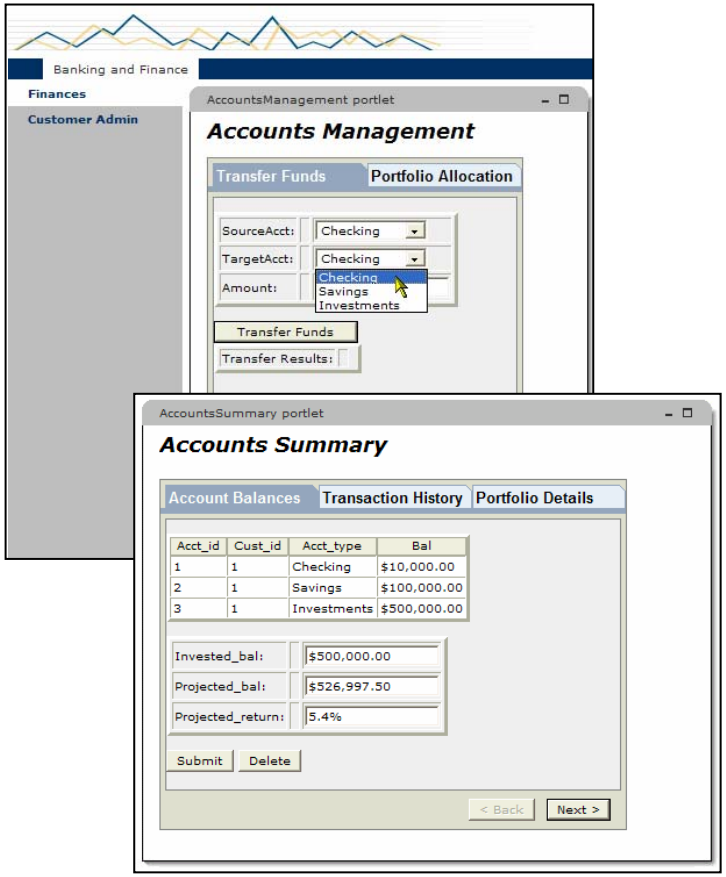
- Web Services – Creating, testing and consuming
- Data - Relational and non-relational data integration via Service Data Objects (SDO)
- JavaBeans and EJBs – Creating, testing and JavaServer Faces (JSF) MVC app design

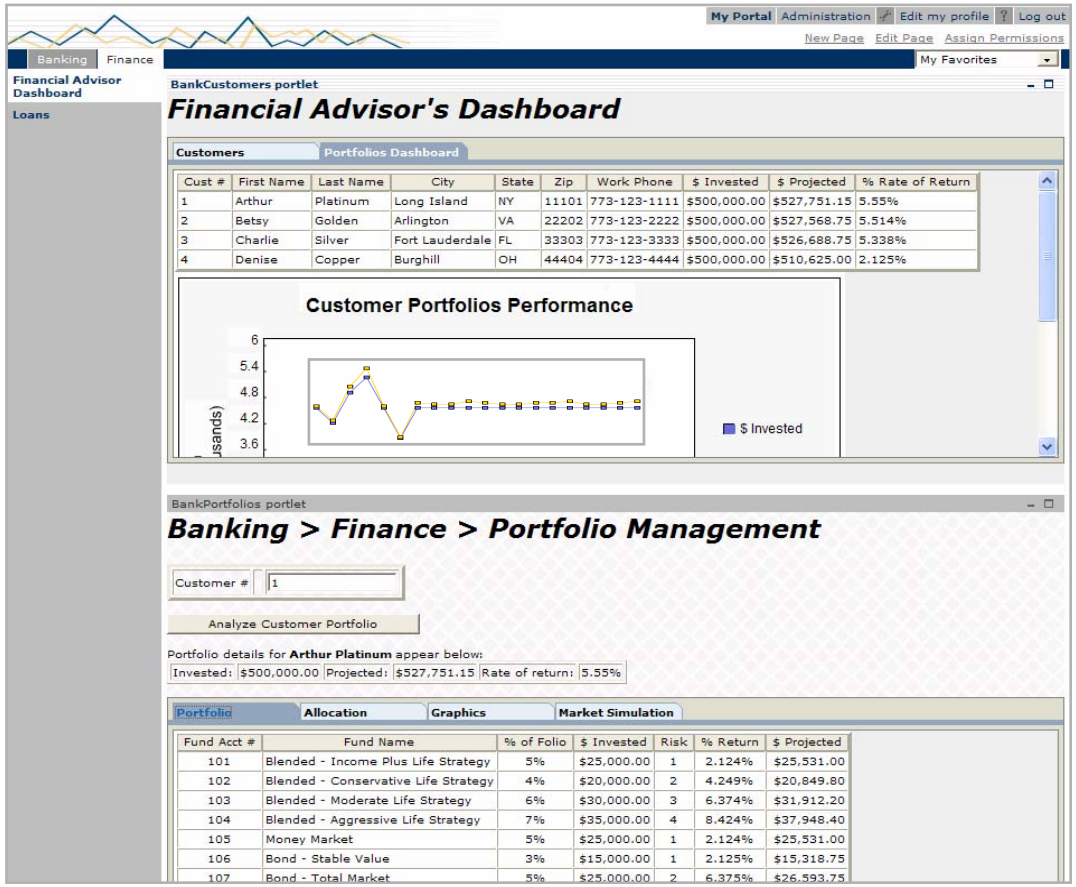




Build Scenarios – Banking & Finance (Applying End-2-End Development)

- Account Management - Transfer Funds, Web Services, Service Data Objects (SDO), JavaServer Faces (JSF))
- Accounts Summary - SDO custom queries, Portlet User session/state, personalization
- Portfolio Management & Financial Advisor Dashboard - Portlet wiring click-2-action, charts/graphs
- Portal Site Design - Themes, skins, navigation, look-n-feel





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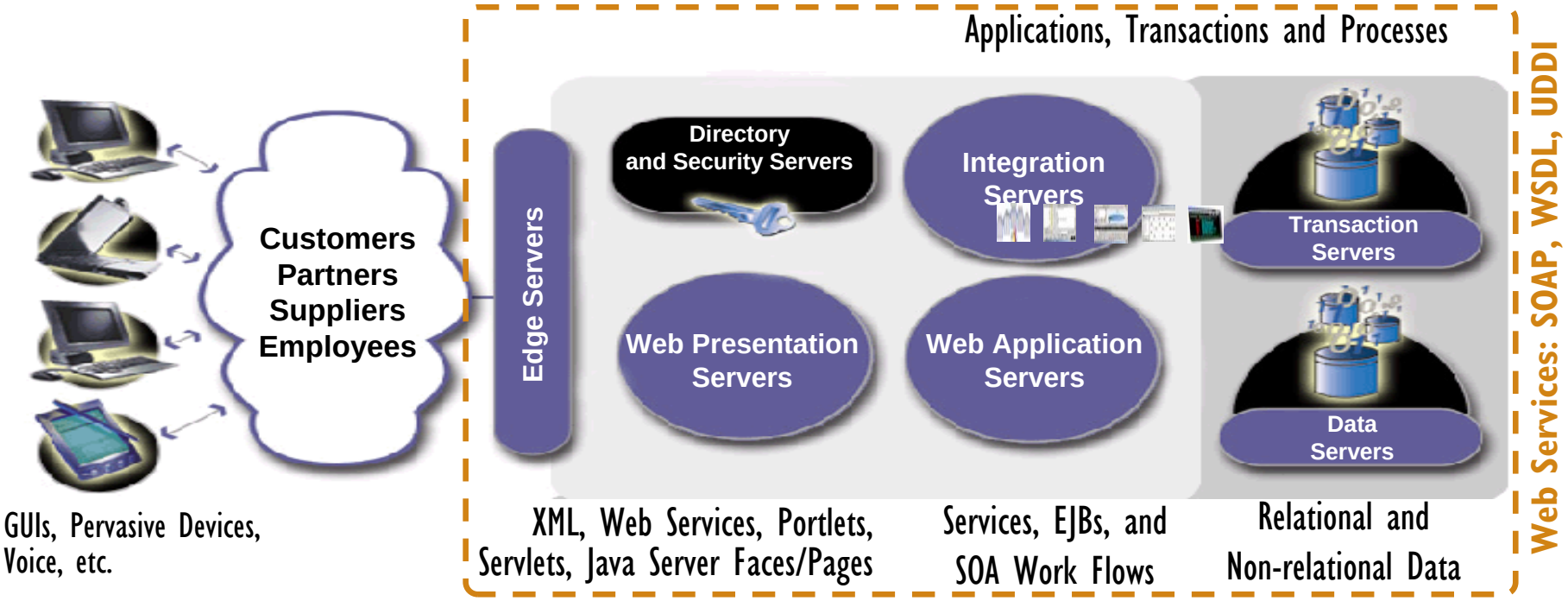

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The Business Driven Development Lifecycle

Business Process Integration – Full Circle

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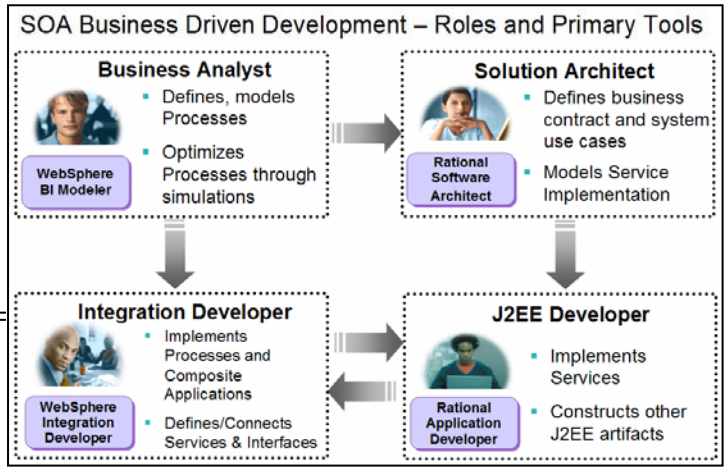
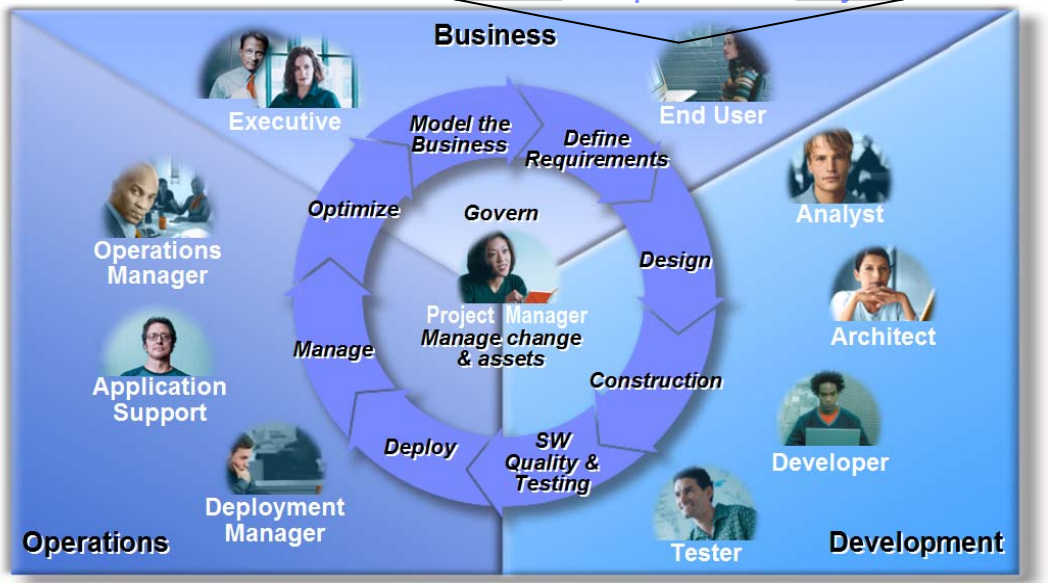


The Business Driven Development Lifecycle



SOA Business Driven Development – Roles and Primary Tools

Business Analyst

- Defines, models Processes
- Optimizes Processes through simulations

WebSphere BI Modeler

Solution Architect

- Defines business contract and system use cases
- Models Service Implementation

Rational Software Architect

Integration Developer

- Implements Processes and Composite Applications
- Defines/Connects Services & Interfaces

WebSphere Integration Developer

J2EE Developer

- Implements Services
- Constructs other J2EE artifacts

Rational Application Developer

SOA Business Driven Development – Roles and Supporting Tools

Analyst

- Defines and models processes and concepts
- Optimizes processes through simulations

Business Goals and Objectives

Business Design Model

Business Requirements

WebSphere software
Websphere Business Modeler
WebSphere Business Monitor

Rational. software
Rational Requisite Pro
Rational Software Architect

Solution Architect

- Defines services for business and system use cases
- Models service implementation

Service Design Model

Software Architecture

Enterprise Architecture

Rational. software
Rational Requisite Pro
Rational Software Architect

Integration Developer

- Implements processes and composite apps
- Defines services

Service Flow Model

Service Assembly Model

WebSphere software
Websphere Integration Developer

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Implementation Model

Deployment Model

Rational. software
Rational Application Developer

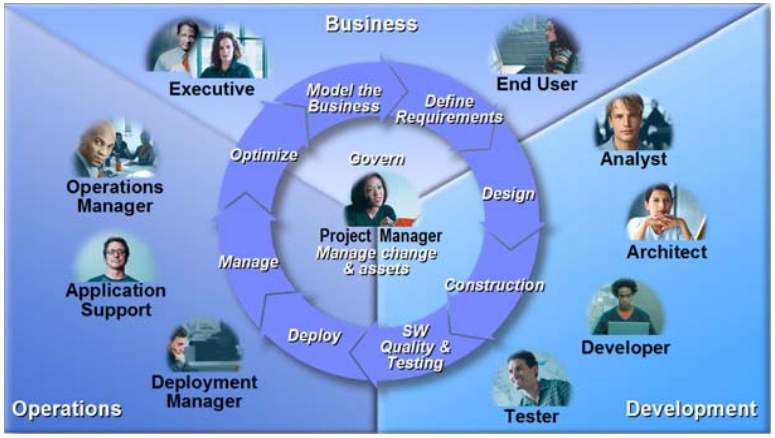
Portfolio Resource Model

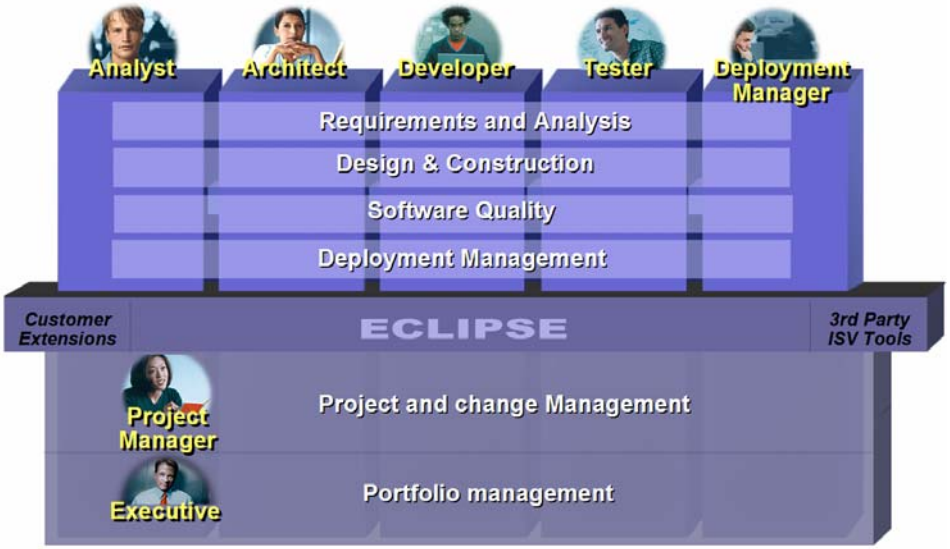
Shared Assets

Common Process

Rational. software
Rational Portfolio Manager
Rational Unified Process
Rational ClearCase
Rational ClearQuest

IBM Rational Software Development Platform





- V6 Lifecycle tools views are integrated into a single RAD… IDE
- Industry challenges addressed
  - Requirements: 70 – 80 % of project failures are tied to poor analysis of requirements
  - Development: 65% of development projects fail to meet expectations
  - SW Quality/Testing: Developers make up to 150 errors in every thousand lines of code
  - SW Quality/Testing: Only 14% of new web applications perform as planned in production
  - SW Quality/Testing: The average new web application is down nearly one day per week
  - Change Mgmt: Over 70% of build errors are because of poor SW Config management.
  - Portfolio Mgmt: Nearly 75% of problems are not identified by traditional project mgmt SW

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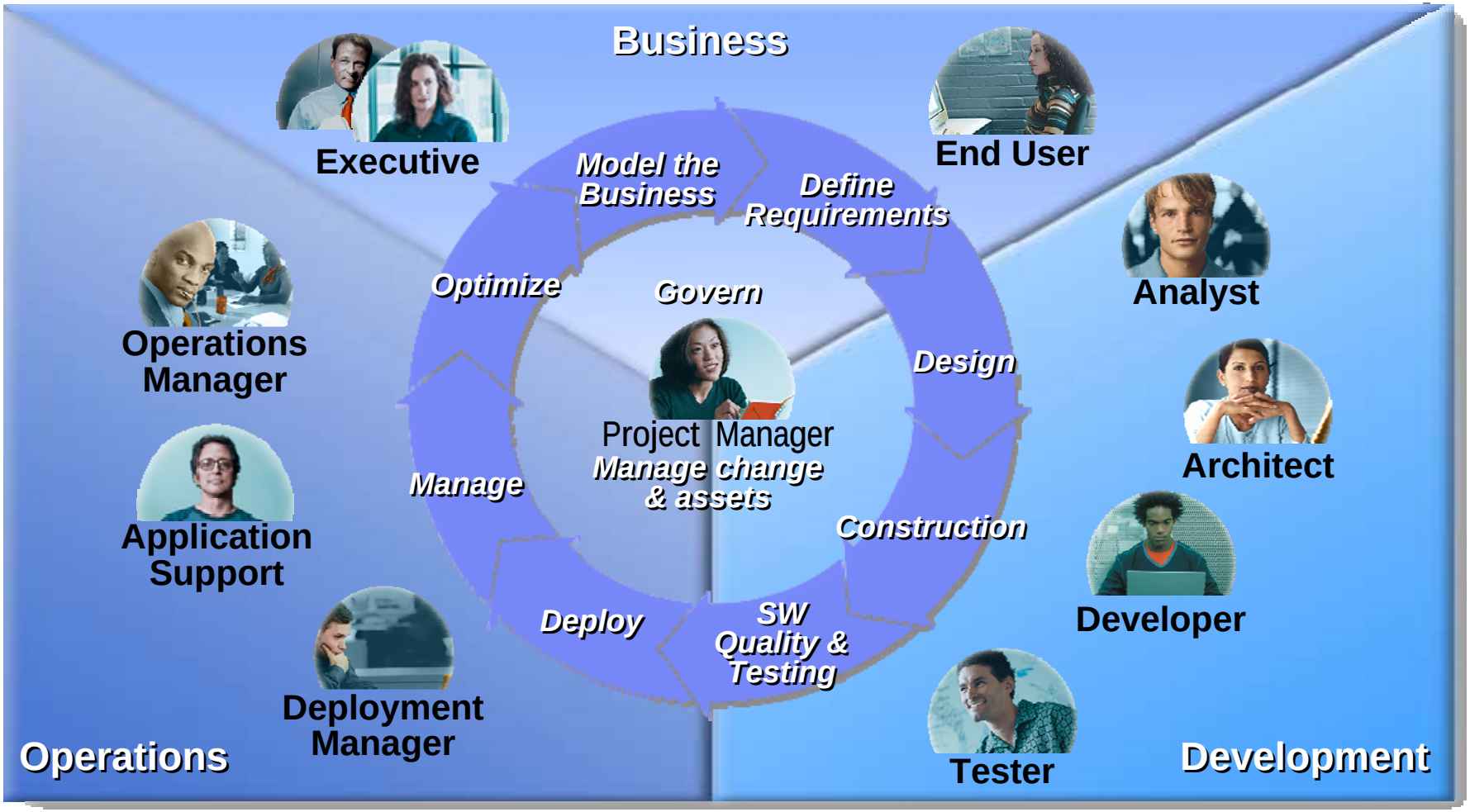
IBM Rational Software Development Platform

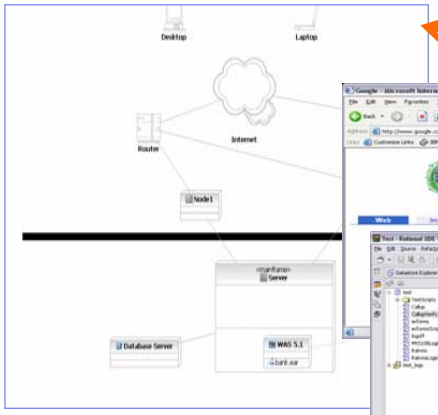
Prioritize Plan Manage Measure

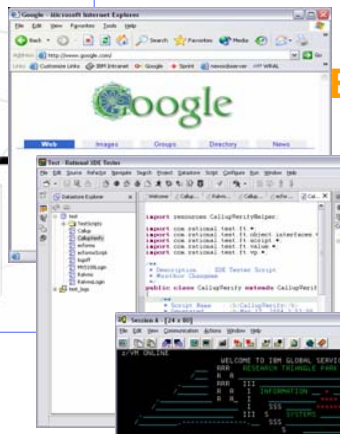


Optimize Iterate

Test application

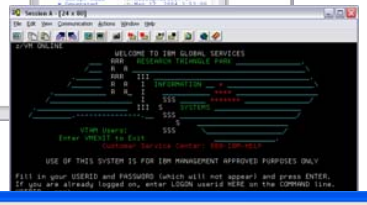
Validate functional requirements



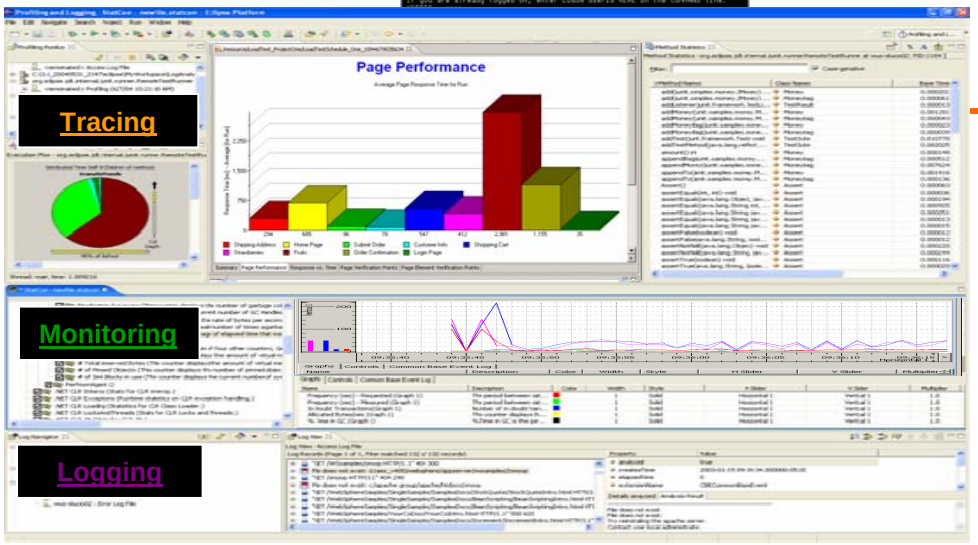


Browser UI

Java UI



Host UI



Deployment Manager leverages operational model to provision the test lab

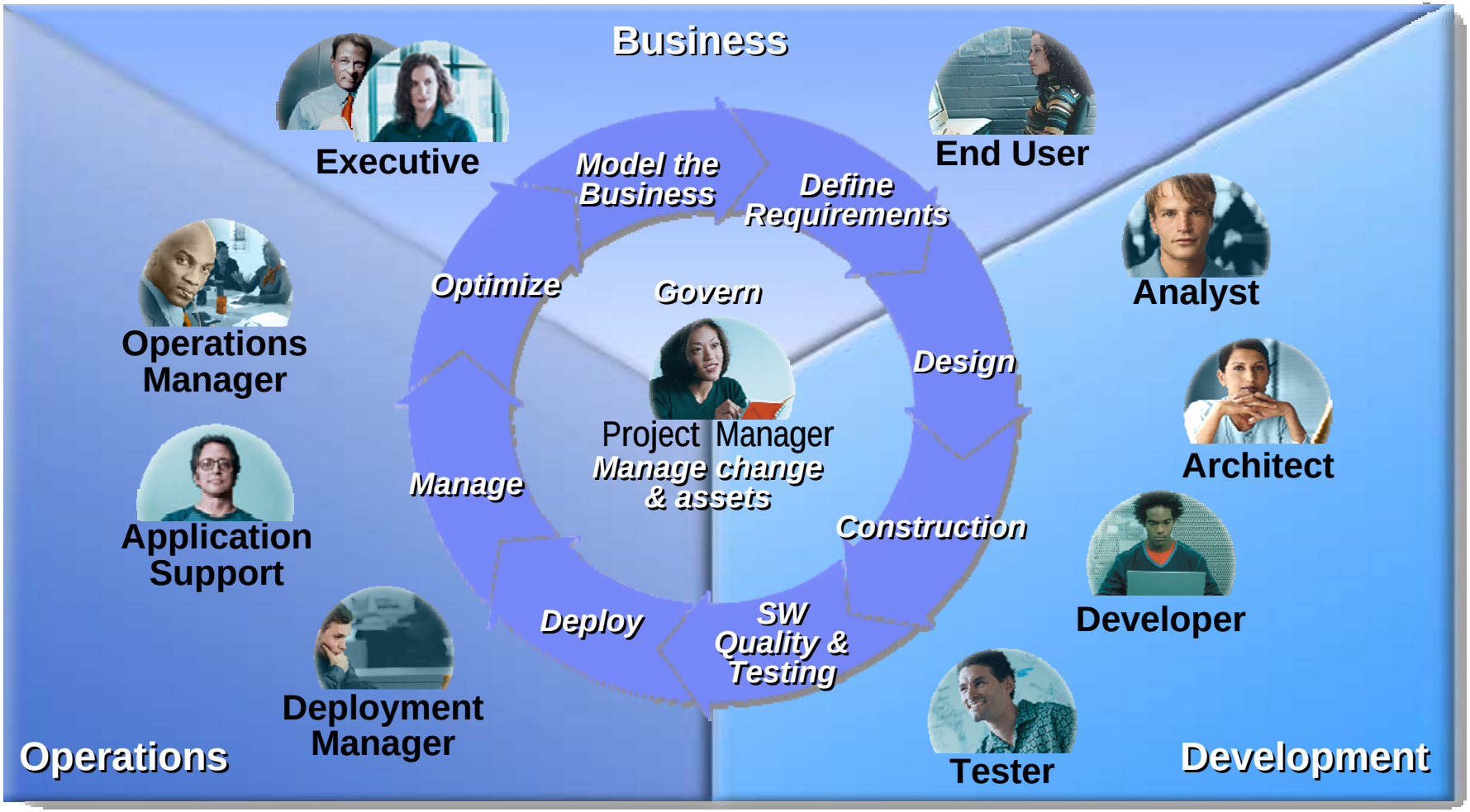
Tester performs automated and manual functional testing based on use cases derived from business requirements

IBM Rational Manual Tester
IBM Rational Functional Tester
IBM Rational Performance Tester

The Business Driven Development Lifecycle

IBM Rational Software Development Platform

Prioritize Plan Manage Measure



Optimize Iterate

Managing Change: The Challenge

Did requirement 462 make it into this release ?

Analyst

Add promotio
calculation
Bug 849
New customer transaction
New GUI button
98
Bug 348
179

How many severity 1 bugs are left?

Project Manager

Of course I didn't forget a file...

Developers

Why did the build break?

Integrator

Is bug 873 fixed in this build?

Build 3
Build 2
Build 1

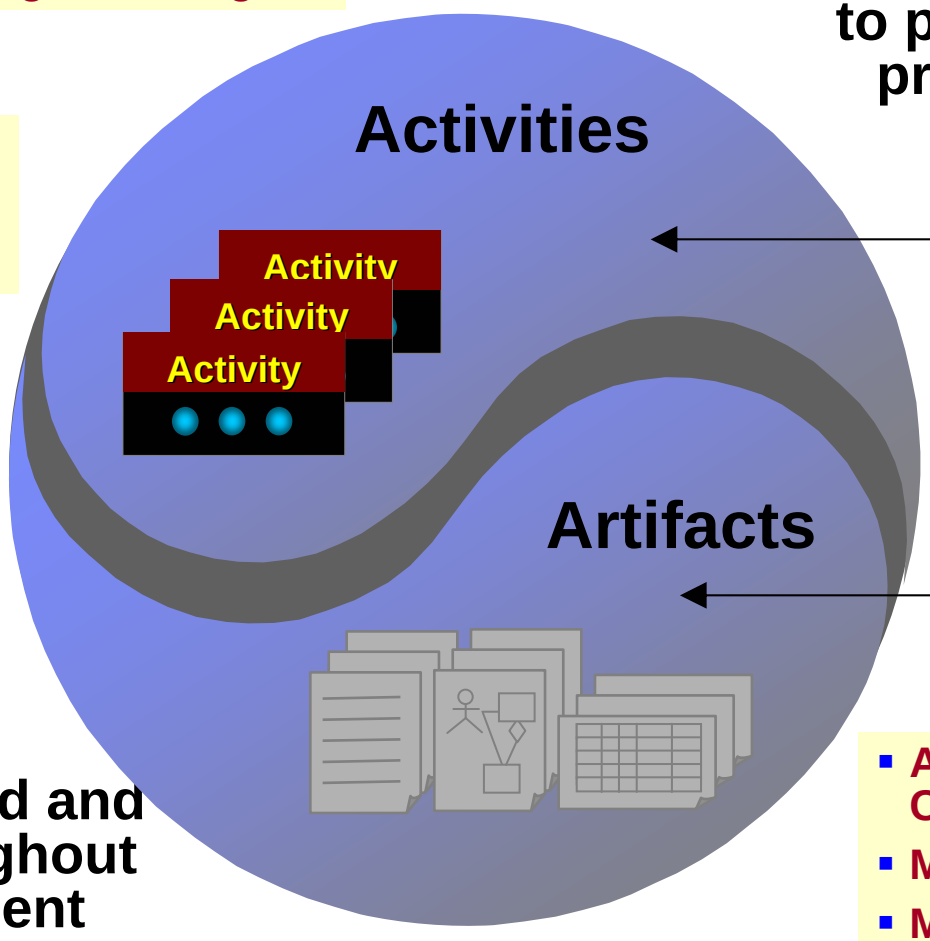
Testers

Unified Change Management: The Solution

- Never forget a file again

Activities carried out to plan and track project status

- Organize Projects
- Track Project Status
- Easy to Adopt



ClearQuest

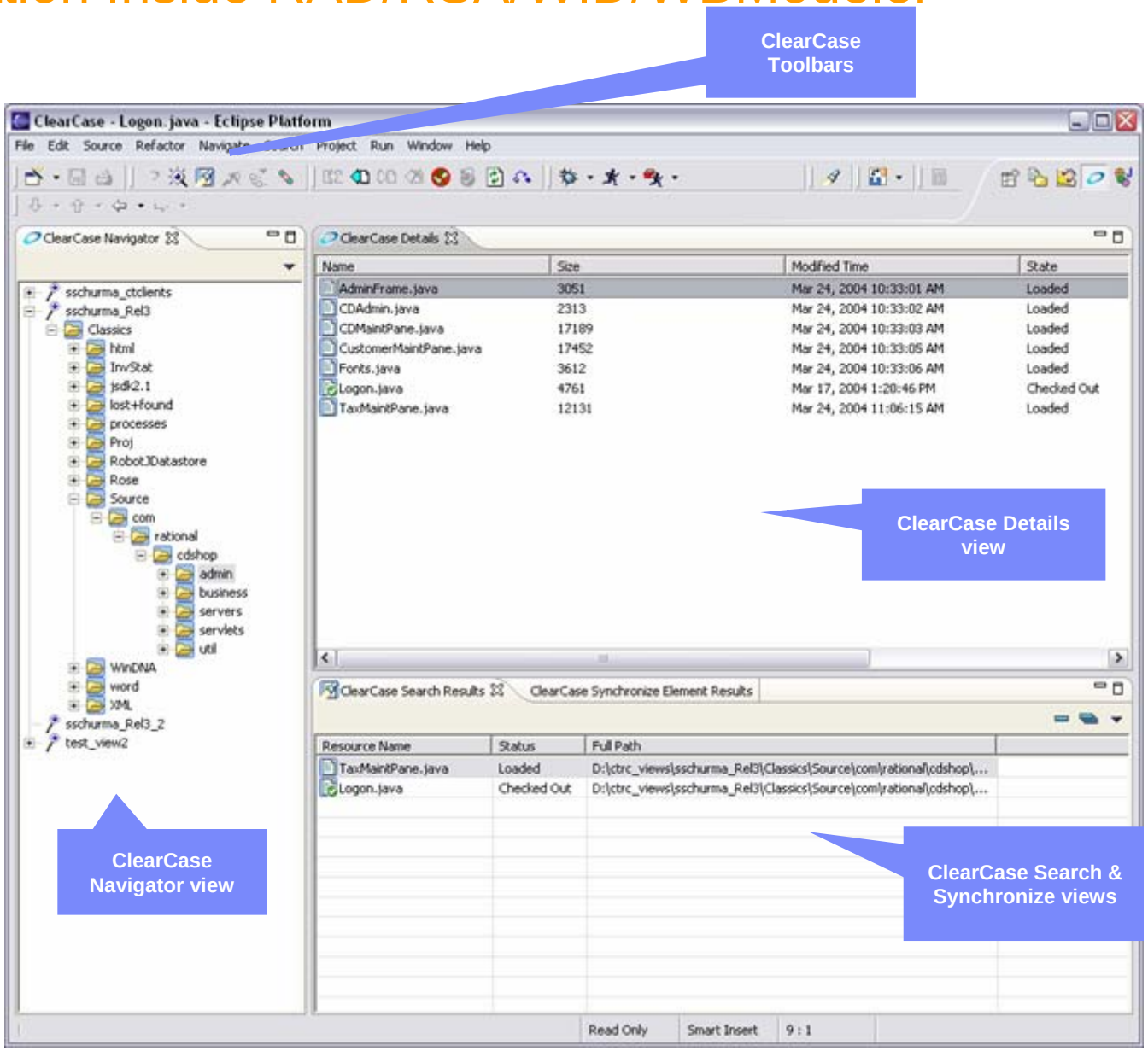
ClearCase

Assets generated and modified throughout the development lifecycle

- Assemble Systems Consistently
- Manage Baselines
- Maintain Build Audit Trail

ClearCase Integration Inside RAD/RSA/WID/WBModeler

- Provides ClearCase perspective with multiple Eclipse views
- Improved performance in a WAN environment
- Leverages existing CC Web infrastructure
- Better support for disconnected mode and remote users
- Supports ClearCase ← →ClearQuest interaction (UCM) in a WAN environment

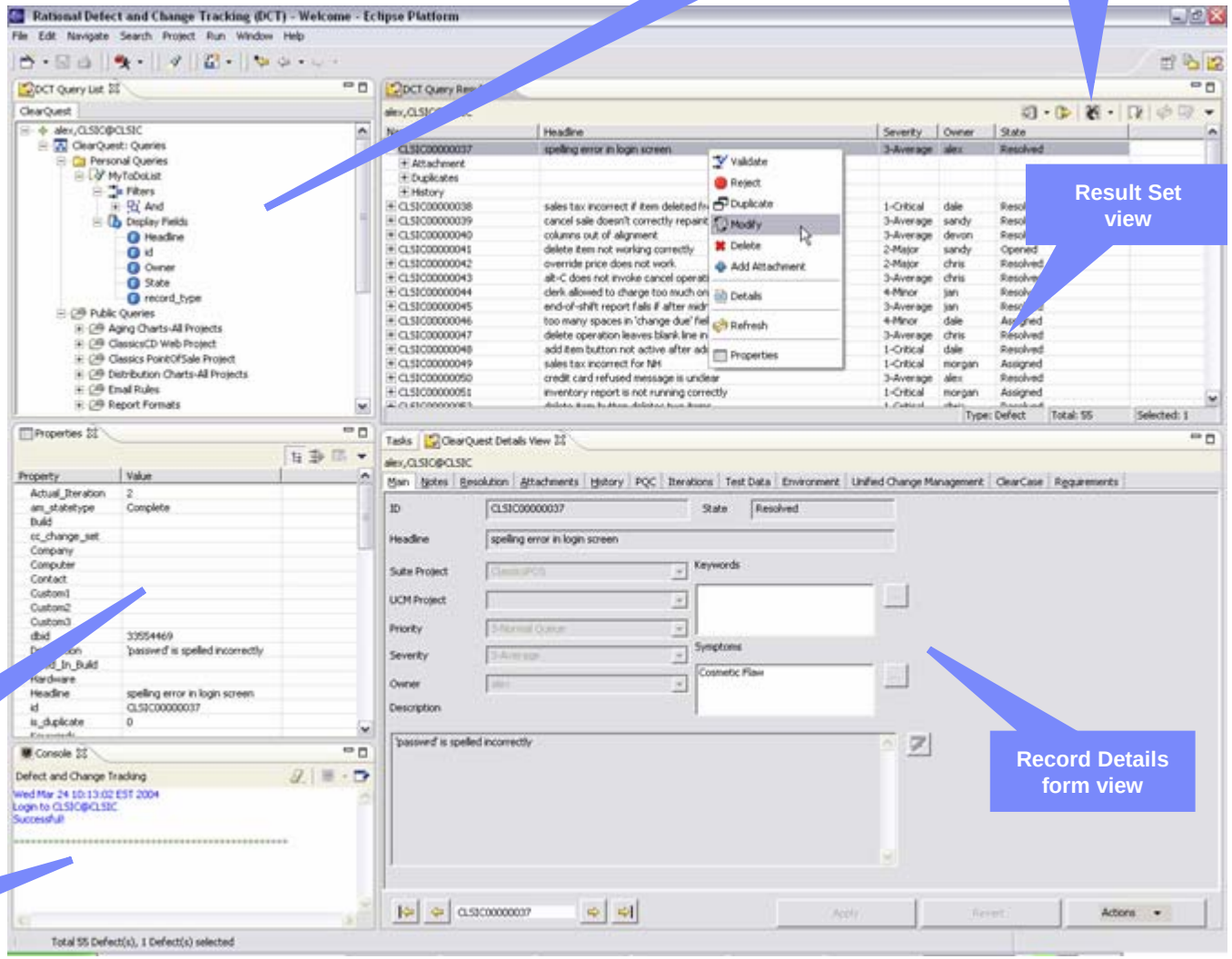


ClearQuest Integration Inside RAD/RSA/WID/WBModeler

- A new client interface for ClearQuest based on Eclipse 3.0

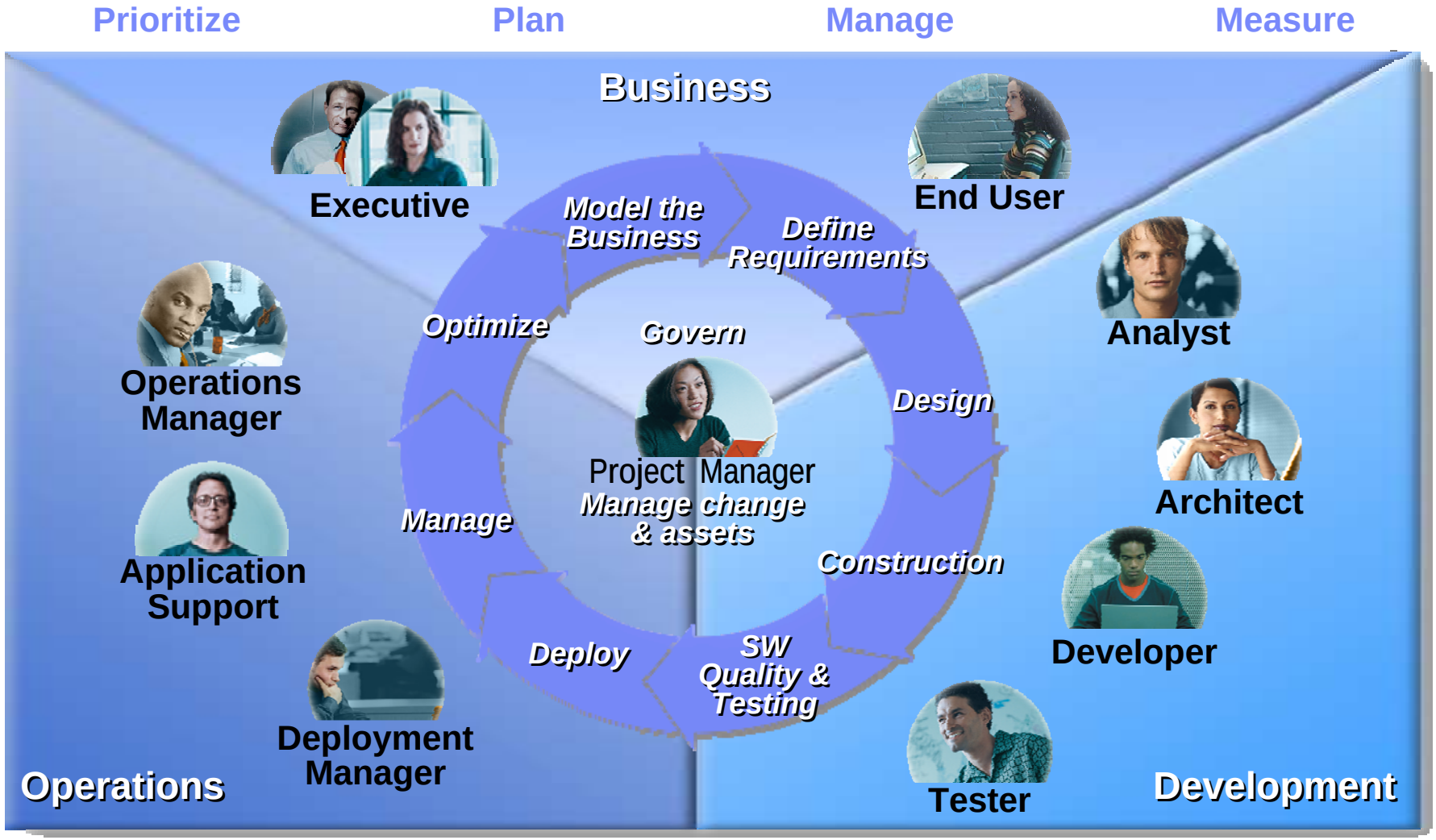
- Provides complete CQ capabilities for developers and testers in the Eclipse IDE

- Replaces existing ClearQuest Result Set plugin,



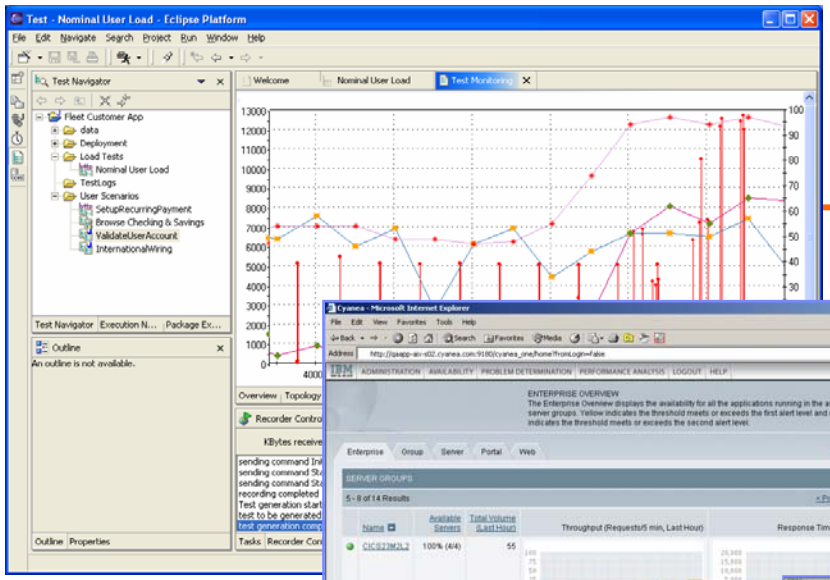
The Business Driven Development Lifecycle

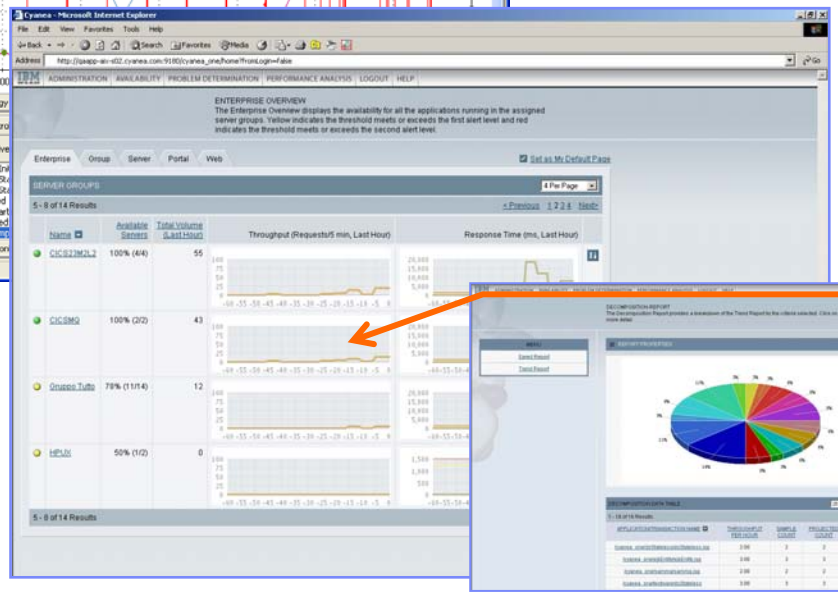
IBM Rational Software Development Platform

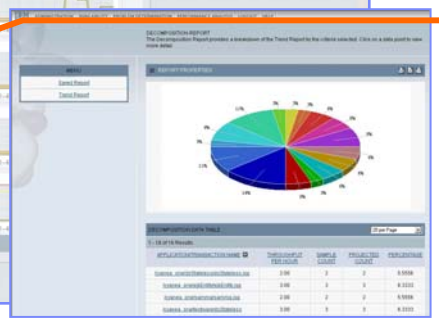


Deploy

Plan capacity and ensure compliance with Service Level Agreements







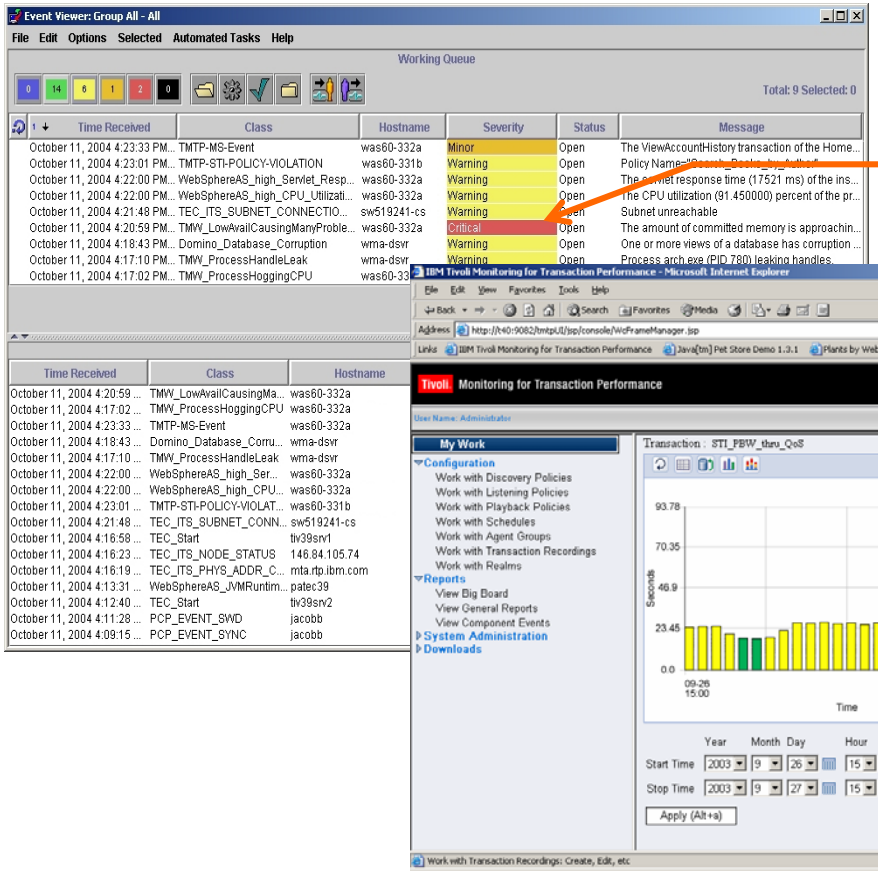
Tester evaluates the scalability of the new application based on Service Level Agreements captured in business model

Deployment team builds capacity plans based on performance tests

IBM Tivoli Composite Application Monitor
IBM Rational Performance Tester

Manage and Monitor

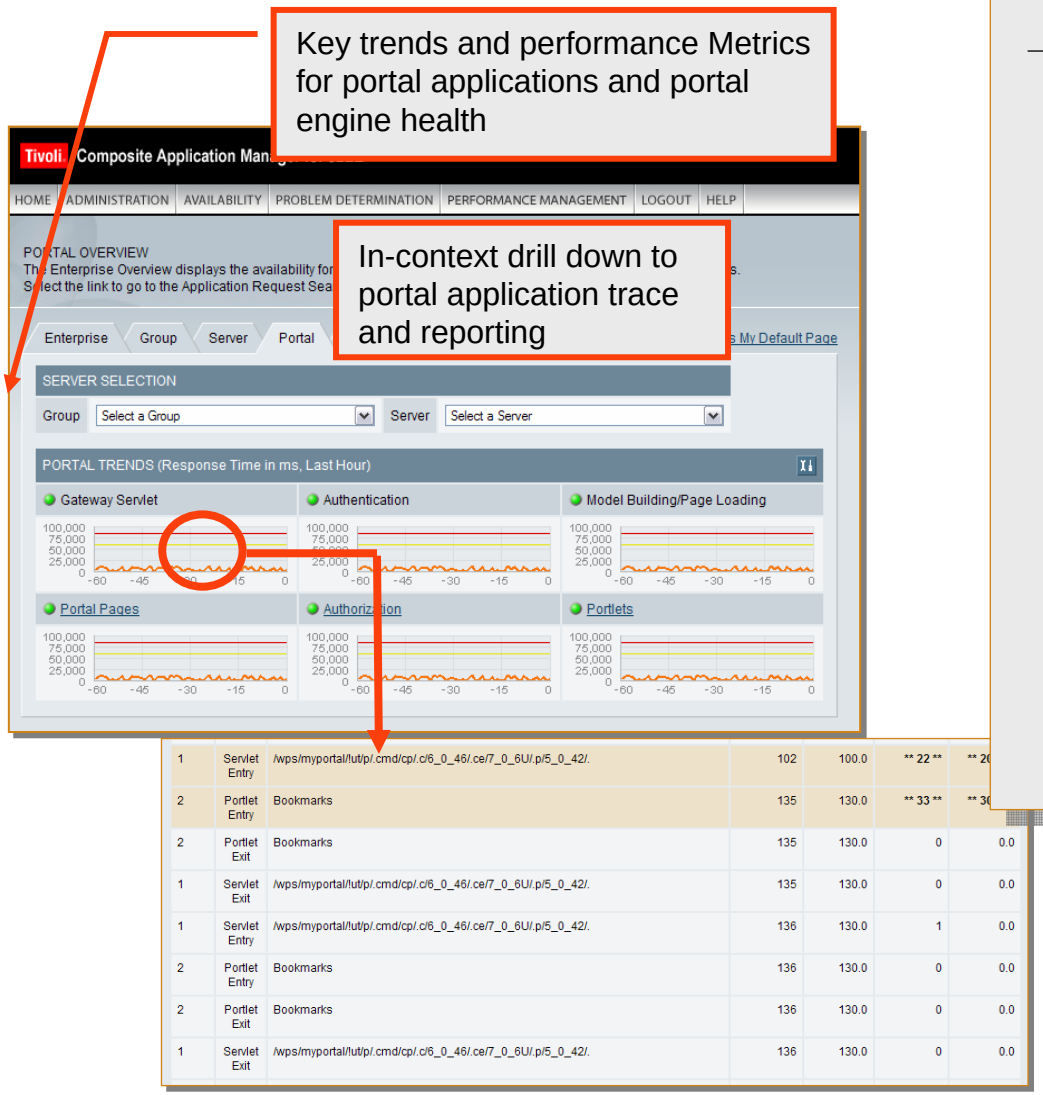
Monitor service levels with a centralized view into your network, systems, middleware, and application performance



Operations Manager monitors application performance and is automatically notified of problems, enabling fast triage to the right stakeholders (application, DB, network, etc.)

IBM Tivoli Enterprise Console
IBM Tivoli Monitoring for Transaction Performance

Advanced WebSphere Portal Monitoring



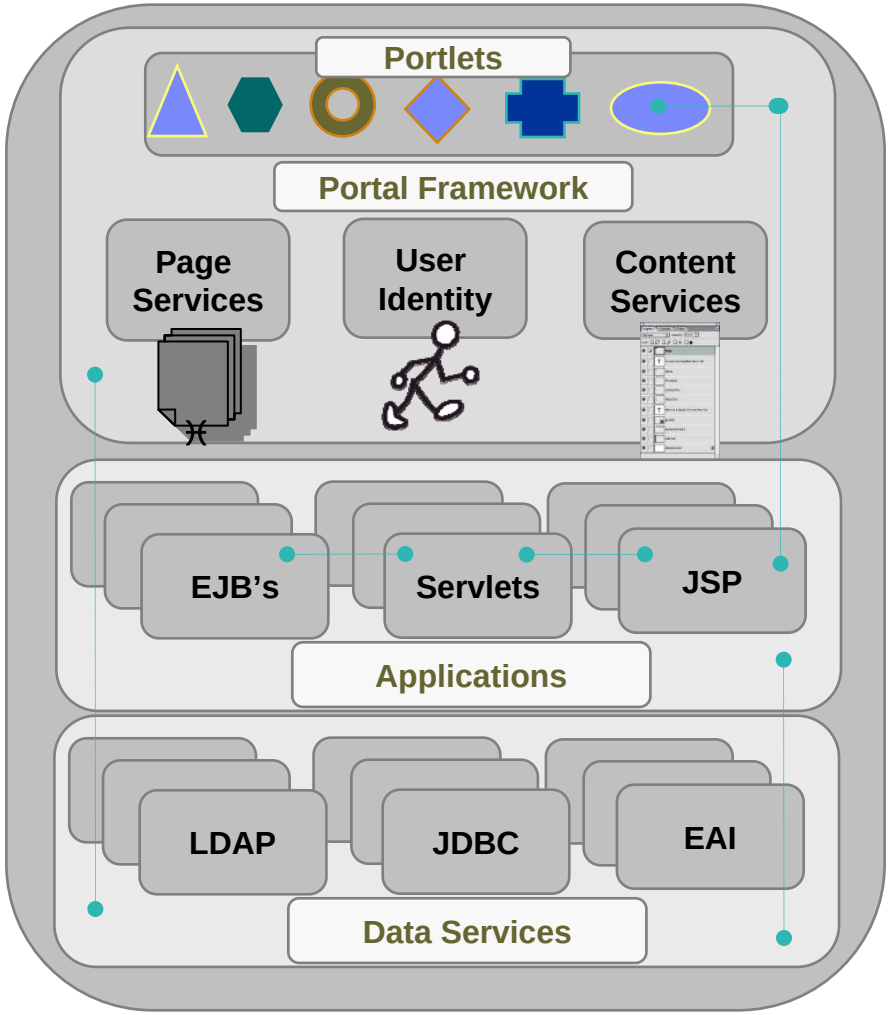
ITCAM for J2EE Portal Monitoring Highlights

- Portal Overview page/tab
  - Trend views of recent performance of critical metrics
- Links to new trend PAR reports:
  - Gateway Servlet, Building Models, Page Loading, Authentication, Authorization
- Powerful Drill-down for deep portal diagnostics
  - Nested Request support for instance-level tracing on Pages and Portlets

Advanced Transaction Monitoring

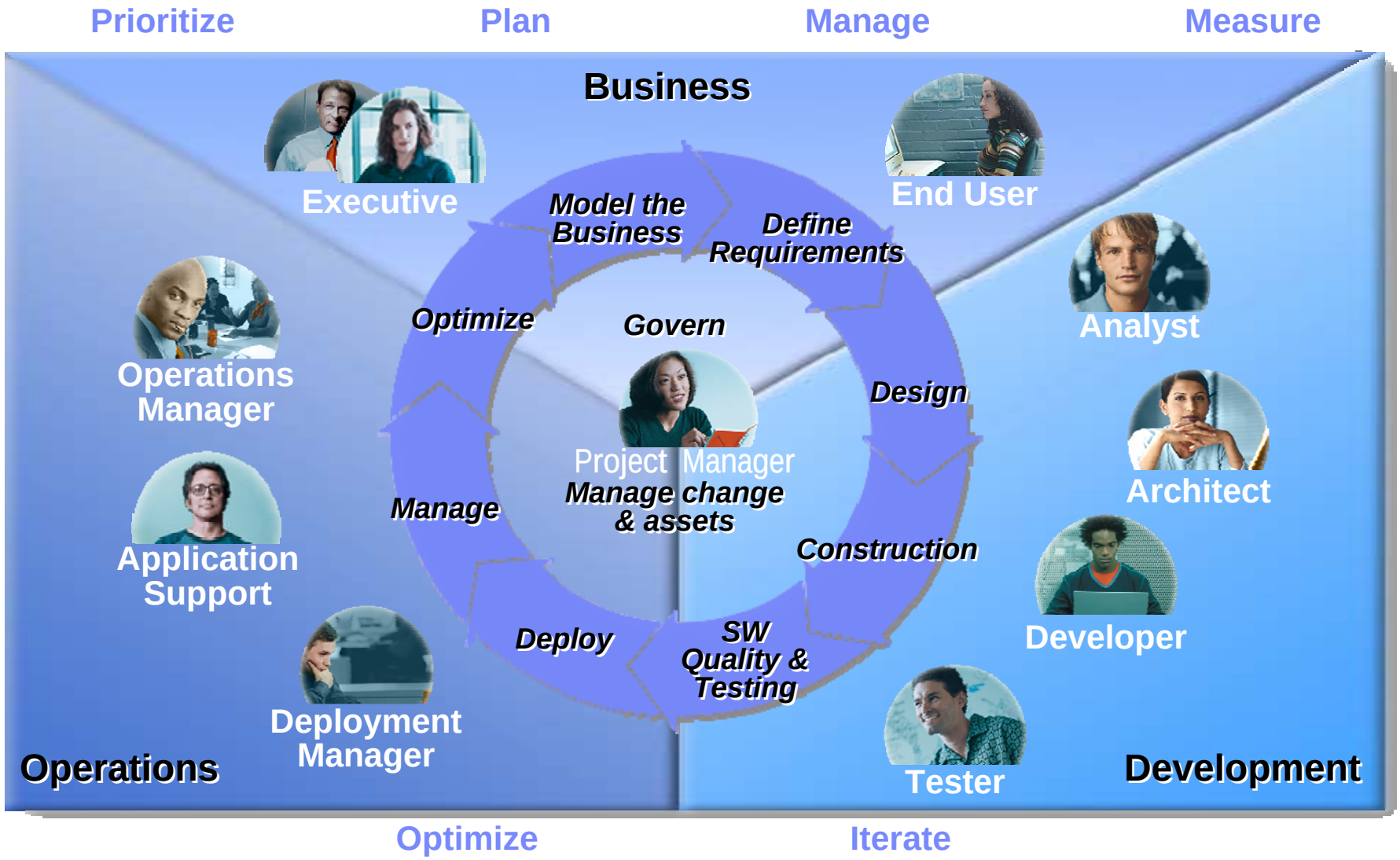
- **Performance Analysis**
  - Rich historical data
  - Interactive graphical presentation
  - Application demand characterization for accurate infrastructure sizing
- **Problem Determination**
  - Quickly isolate problematic application components
  - Drill-down from portlets to components to methods with few clicks
- **Transaction Tracing**
  - Track and correlate portlet-initiated transactions throughout computing infrastructure

<< Managed Transaction Pathways



The Business Driven Development Lifecycle

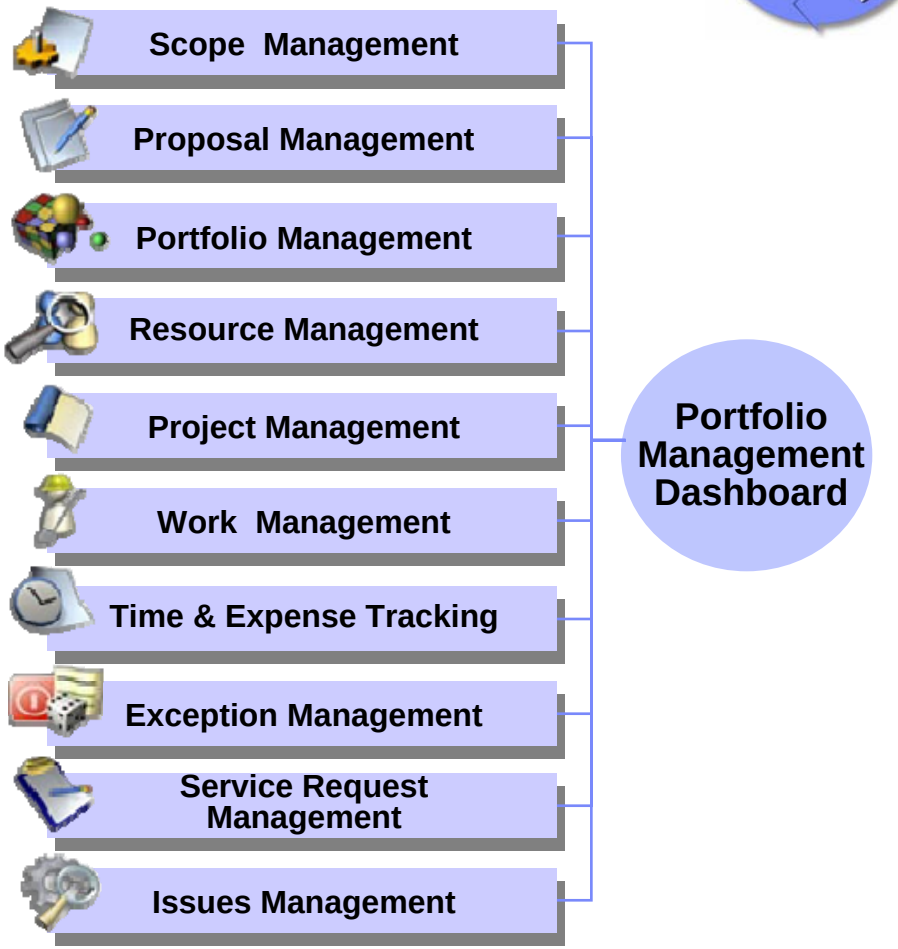
IBM Rational Software Development Platform



Prioritize, Plan, Manage and Measure

Align priorities, projects and people

- For executives
  - Visualize and balance portfolios
  - Make objective “save/kill” decisions
  - Move smoothly from initiatives to measurable programs and projects
- For project and program managers
  - Quickly ramp projects with reusable processes based on best practices
  - Balance workload and manage demand
  - Manage skills inventory and usage
  - Actively manage risks and issues
- For team members
  - Communicate, coordinate and collaborate globally

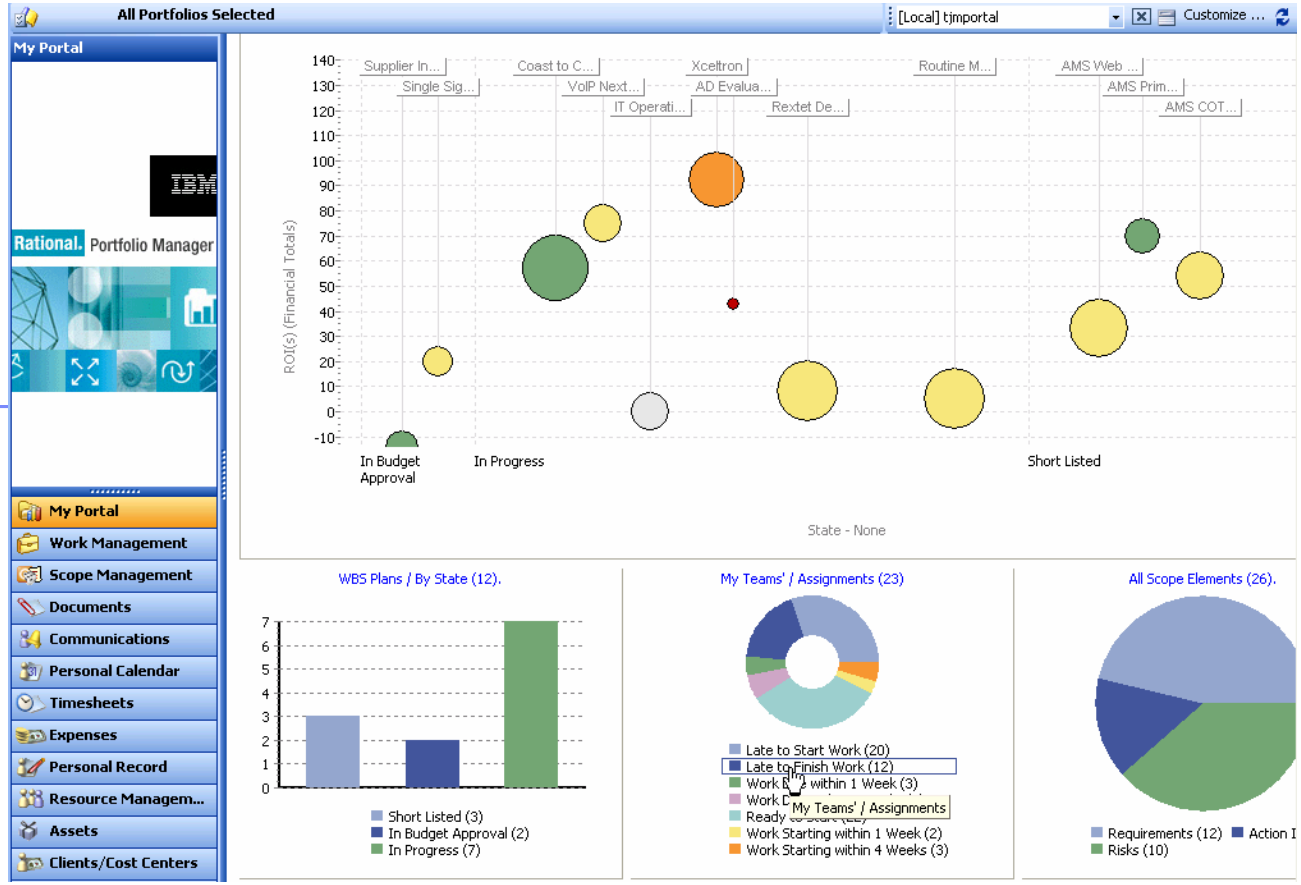


IBM Rational Portfolio Manager

Rational Portfolio Manager

Align priorities, projects and people

- Scope Management
- Proposal Management
- Portfolio Management
- Resource Management
- Project Management
- Work Management
- Time & Expense Tracking
- Exception Management
- Service Request Management
- Issues Management

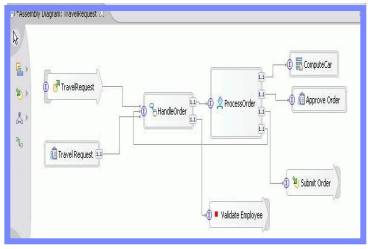


IBM Rational Portfolio Manager

Summary Highlights of the SOA Tools Landscape

Build ➔ RUN ➔ Manage your SOA

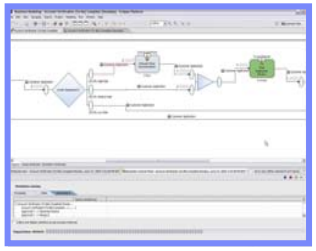
WebSphere Integration Developer (WID)

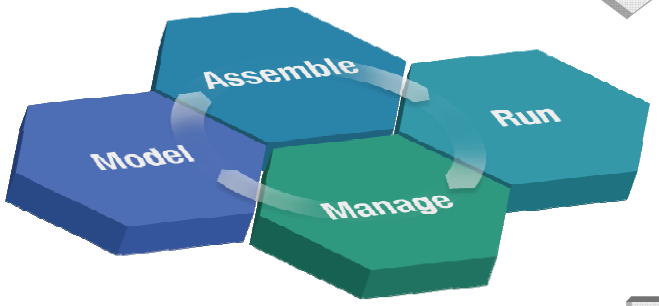


Clean hand-off to IT with Business Models, Metrics

WID + RAD + RSA Construct SOA Apps for dynamic and adaptive business processes based on a process integration platform

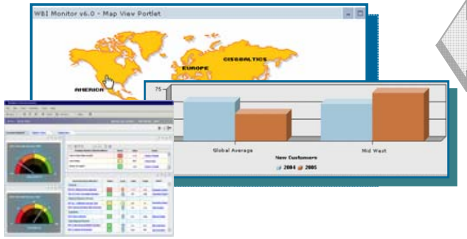
WebSphere Business Modeler





WebSphere Process Server and Portal Server

WebSphere Business Monitor

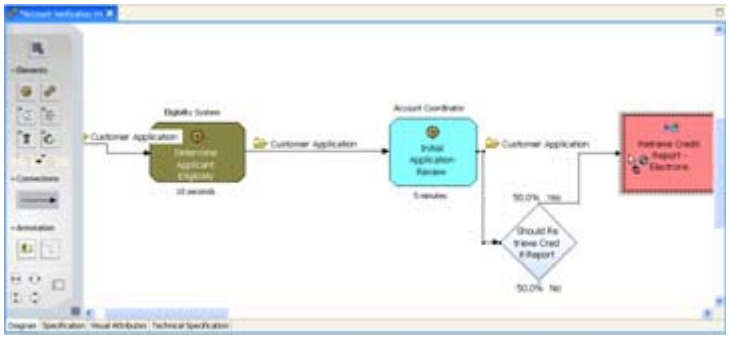


Feedback for continuous improvement

Real time management of business processes

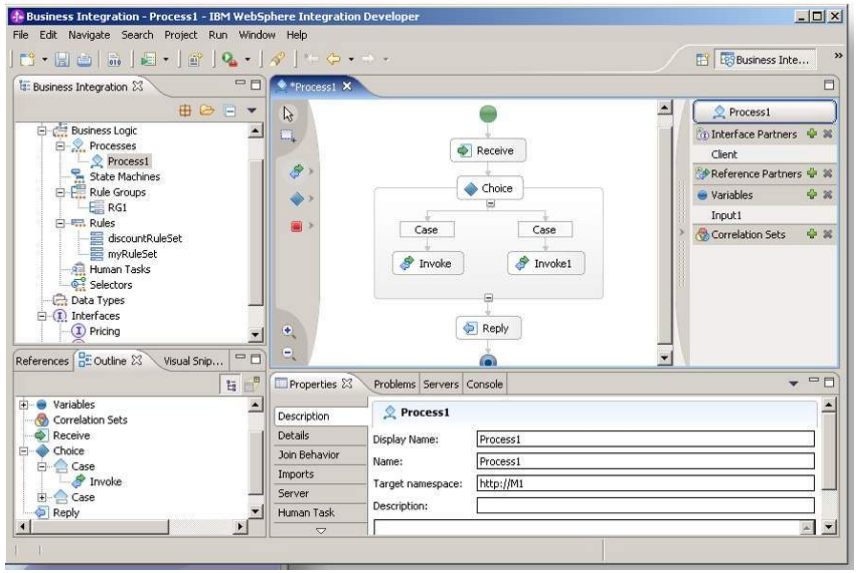
Managing Your Business Processes with a Service Oriented Architecture

WebSphere Business Modeler



- **Easy-to-use (multiple modes, business friendly, multi-user support)**
- **Robust Analysis with a Powerful Simulation Engine**
- **Collaboration Support-Web Publishing**
- **Business Measures (Metrics, KPIs, Aggregations)**
  - **Export model to WebSphere Business Monitor**
  - **Import WebSphere Business Monitor Run-Time Metrics**
- **Integration…**
  - **WebSphere Integration Developer – BPEL**
  - **Tivoli IT Process Management-CEI Event Catalog**
  - **WebSphere Studio Application Developer Integration Edition – BPEL**
  - **Rational Software Architect – UML**
  - **WebSphere MQ Workflow-FDL**

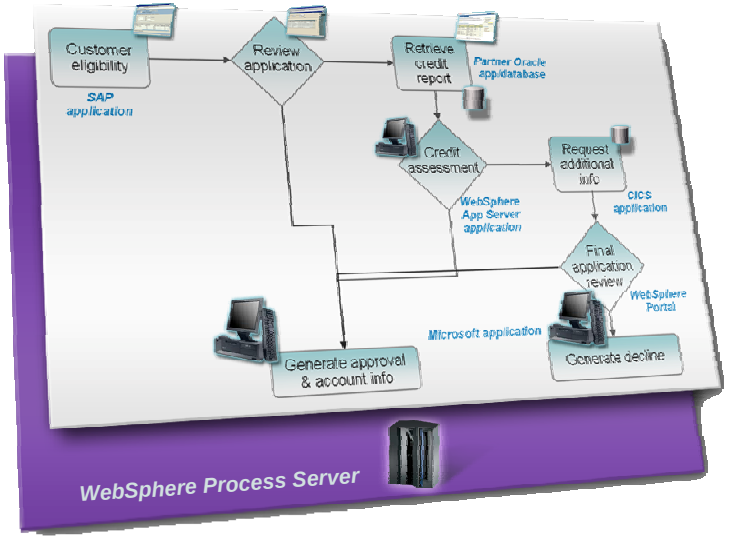
WebSphere Integration Developer



- **Rapid assembly of composite applications**
- **Streamline process design hand-off between business and IT (BPEL support)**
- **Simplify and speed development (J2EE programming skills not needed)**
- **Maximize re-use**

WebSphere®

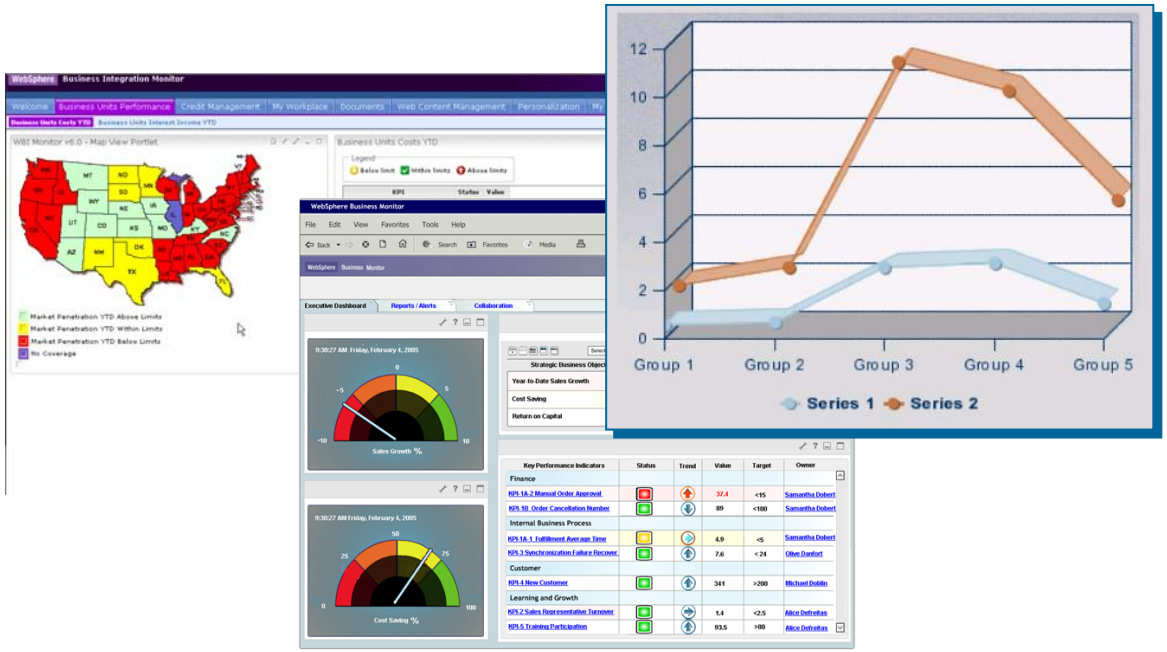
WebSphere Process Server



- **Built on WebSphere Application Server**
- **Powered by the Enterprise Service Bus (ESB)**
- **Flexible deployment of processes**
- **Dynamically modify deployed services**

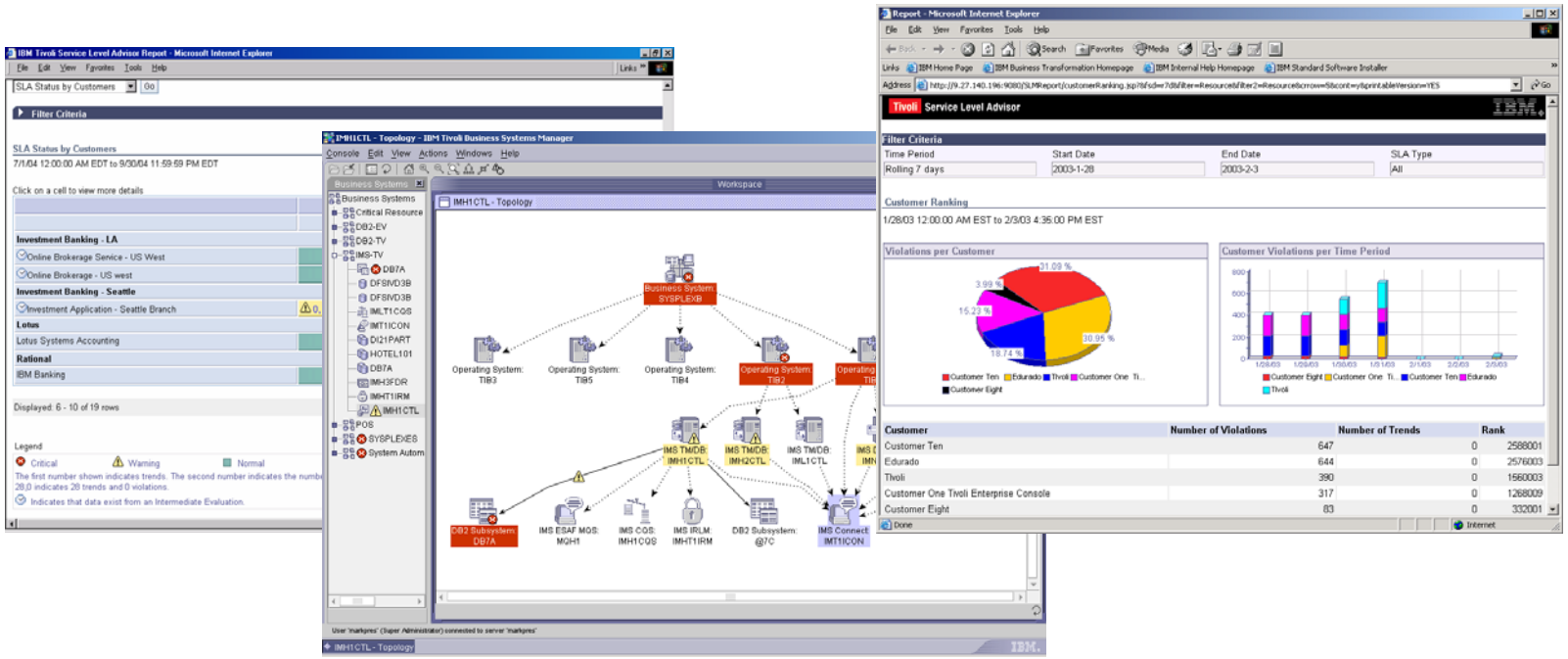
WebSphere.

WebSphere Business Monitor



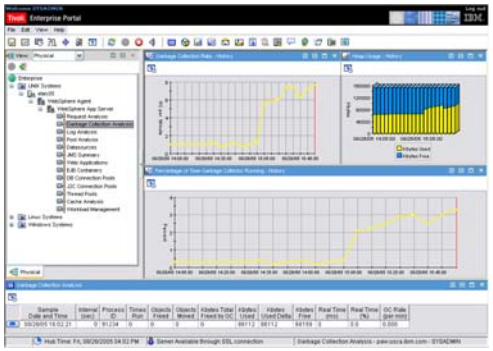
- **Real-time visibility into process execution**
- **Management dashboards, reporting, and trending**
- **Active intervention in process execution**
- **Exports results to WebSphere Business Modeler**

Business Systems Management



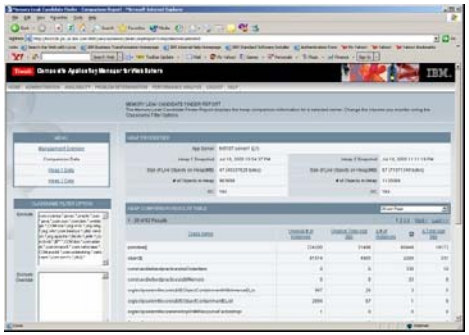
- **Business focused versus technology centric**
- **Prioritization of IT activities**
- **Planning investments and changes**
- **Consolidate status consoles into business views**
- **Understand the impact of outages to business**

IT Management of Business Process Management



IT Operations

Application Subject Matter Expert



ITCAM for SOA

- **Web Services automated mediation & problem identificatio**

ITCAM for Response Time Tracking

- **End-to-end transaction tracking isolates problems**

ITCAM for WebSphere

- **WebSphere application performance problems**

IBM Tivoli OMEGAMON XE for WebSphere Business Integration

- **Resource analysis for WebSphere MQ environments**

IBM Tivoli Business Systems Manager

- **Manage resources with Business views**

Tivoli®

SOA End-2-End Agenda

- SOA Overview
  - SOA Business Demo
    - Bridging the gap between business and I/T
  - SOA Solution Space
    - Lifecycle [Model > Assemble > Deploy > Manage > Governance]
    - Roles [Analyze > Architect > Develop > Integrate > Orchestrate]
- SOA Tools In Action
  - [Model]
    - Analyze > Business Process Modeling with WebSphere Business Modeler (WBM)
    - Architect > Application Architecture Modeling with Rational Software Architect (RSA)
  - [Assemble]
    - Develop > Service Implementation with Rational Application Developer (RAD)
    - Integrate > UI, Data, Service and Enterprise Integration with RAD
    - Orchestrate > Service Orchestration with WebSphere Integration Developer (WID)
- SOA Infrastructure
  - [Deploy]
    - SOA Services Runtime with WebSphere Process Server & ESB
    - SOA End User Experience with WebSphere Portal Server
  - [Manage]
    - WebSphere Business Monitor and Tivoli Composite Application Monitors
  - [Governance]
    - IT View: SOA SW Development Process, Quality and Change Management with Rational Unified Process
    - Business View: SOA ROI Controls with Rational Portfolio Manager & Tivoli Dashboards

Resources

- http://ibm.com/developer
  (IBM developerWorks for technologies and/or products)
  - Java, J2EE, Web Services and other technology zones are on the left hand side
  - WebSphere Zone: http://ibm.com/developer/websphere
  - Rational Zone: http://ibm.com/developer/rational
  - Free Education Portal: http://ibm.com/developer/training

- http://www.redbooks.ibm.com
  (How-To Step-by-step Practical Implementation Books)

- Sun Java/J2SE/J2EE Tutorials: Java Tutorial Online , J2EE Tutorial Online , J2EE Tutorial BOOK

- http://JavaSOA.com (a.k.a. JavaDevTools.com, RationalCentral.com, WebSphereCentral.com)
  (Tutorials, Links, Presentations, White Papers, Articles, etc.)