



Enterprise IT Architectures

Enterprise IT Architectures SOA Part 2

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November 19, 2007

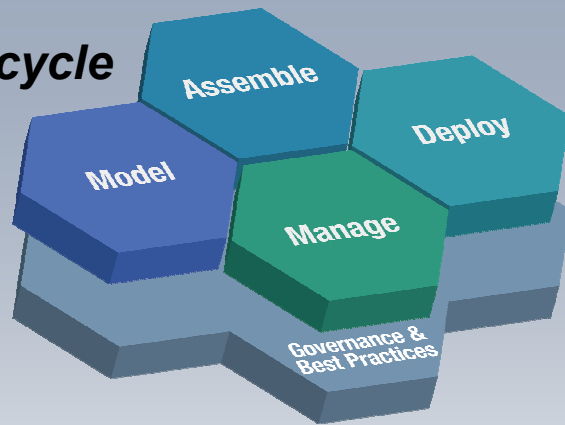
Agenda

- I. Recap SOA Architecture and JKE's "Open Account" Process
- II. Business Process Modeling
- III. Programming Models for Business Process Realization (Assembly)
- IV. Business Driven Development (BDD)
- V. Business Process Management – from end-to-end

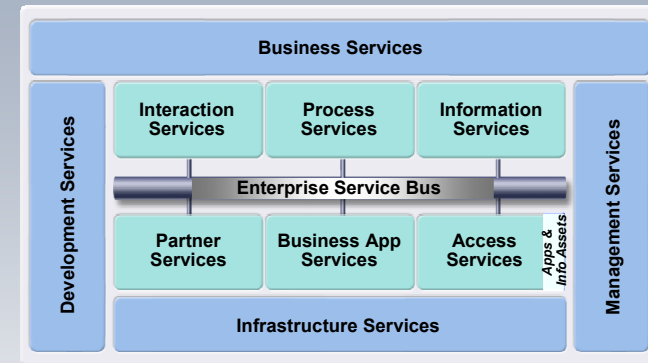
I. Recap SOA Architecture and JKE's Account Opening Process

Key Models for SOA – Enabling Greater Flexibility in Enterprise IT Architectures

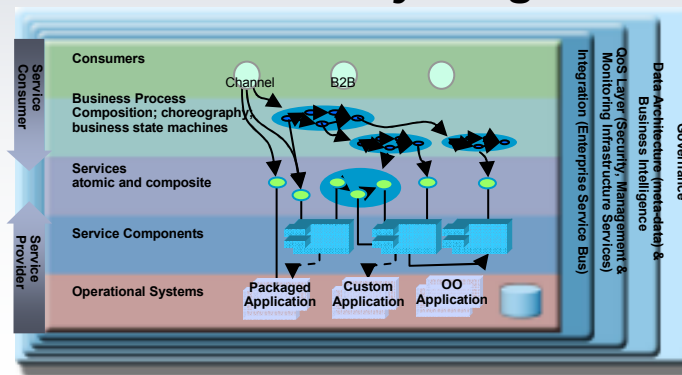
SOA Lifecycle



SOA Reference Architecture



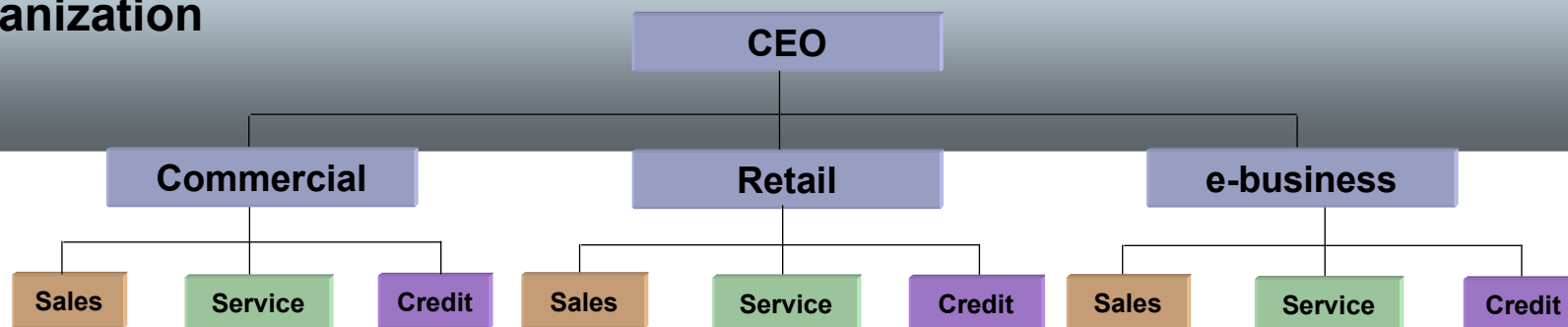
SOA Solution Layering



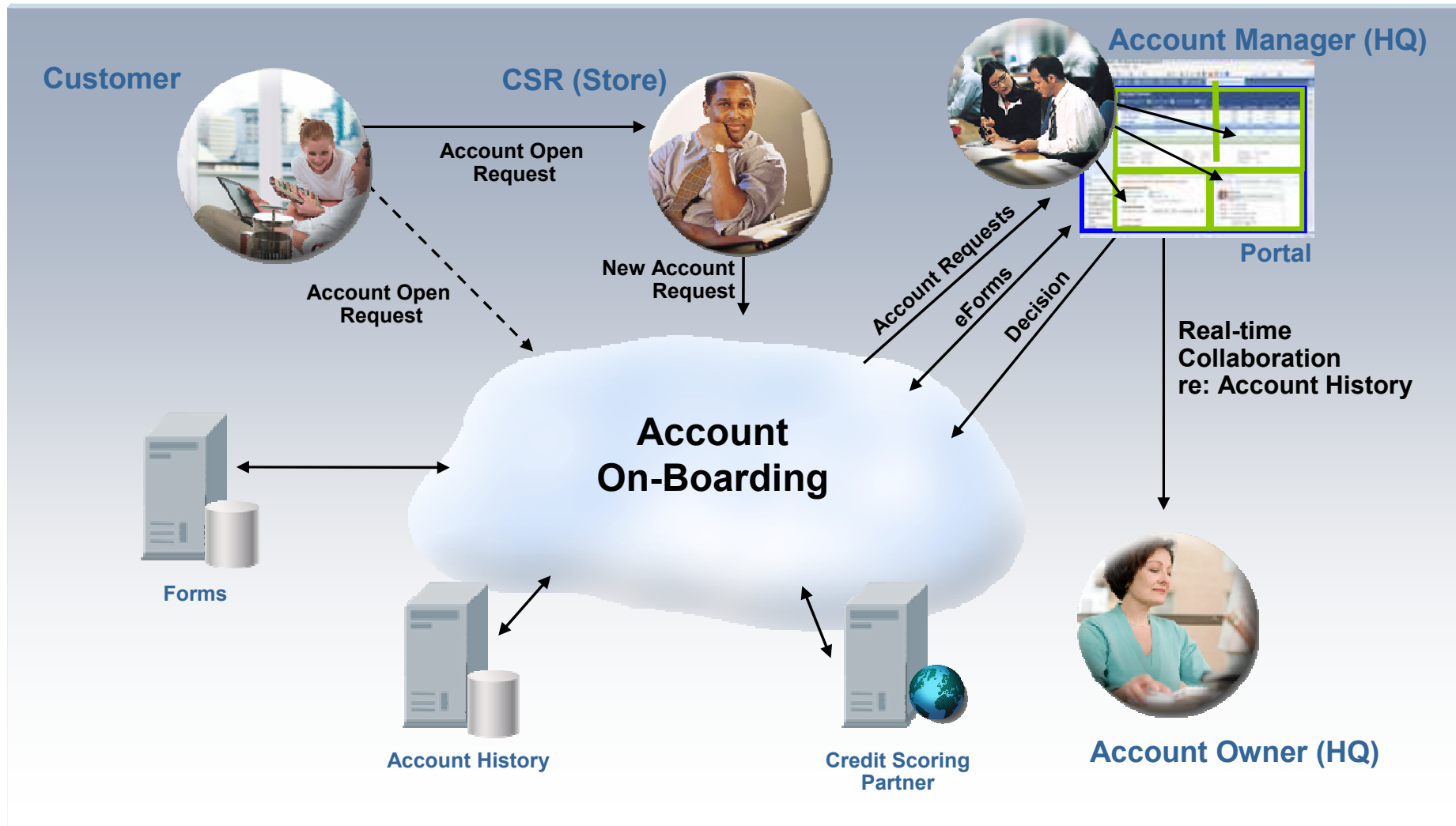
Example for Business Process – „Open Account“ at JK Enterprises

- Virtual Company – a premier supplier to retail channel, small business channel, and corporate customers
- High-touch approach to our customers - now with customer centers around the world
- Customers of all types can interact with us in a way that suits their individual needs – corporate customers are true business partners

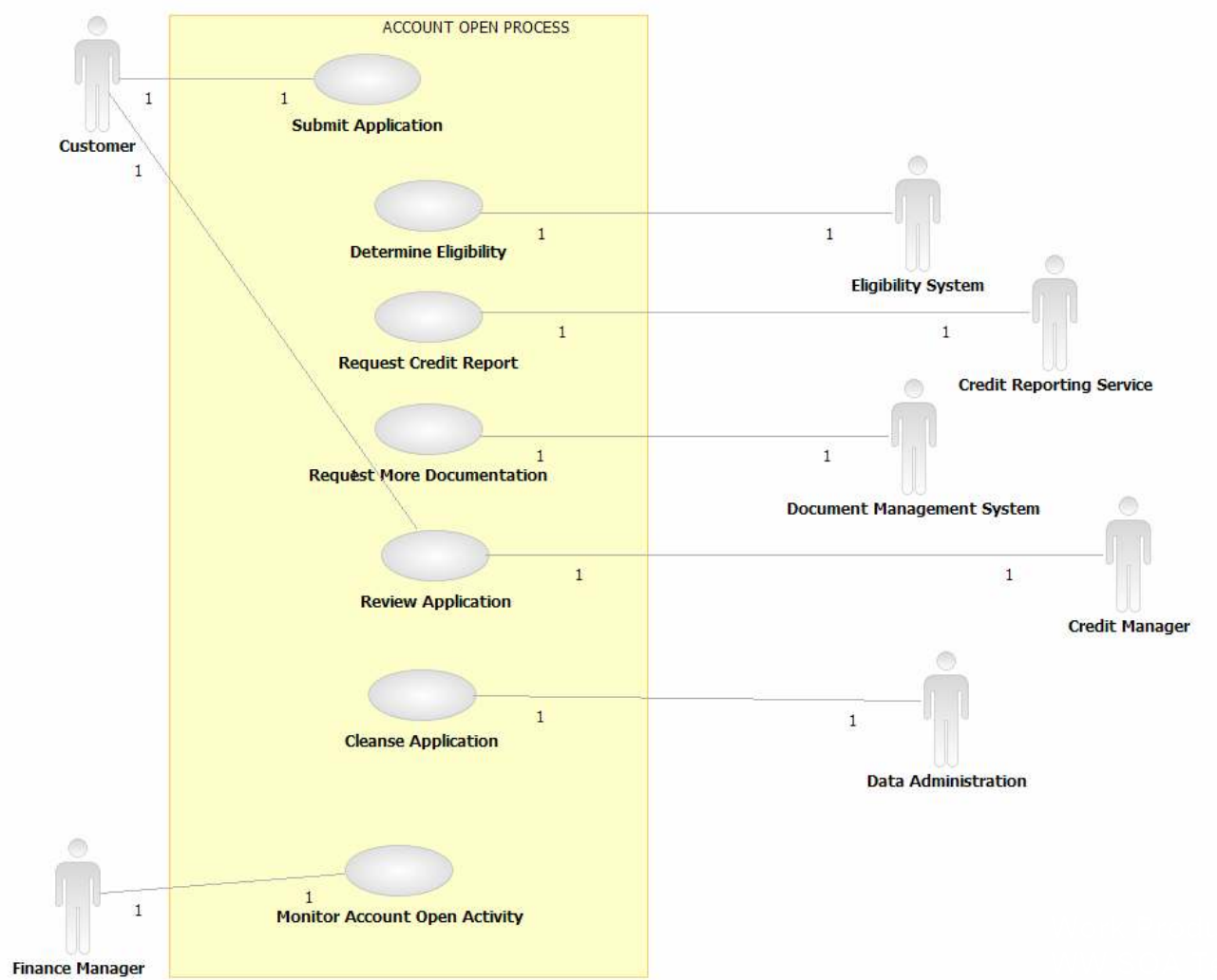
Line of Business Organization



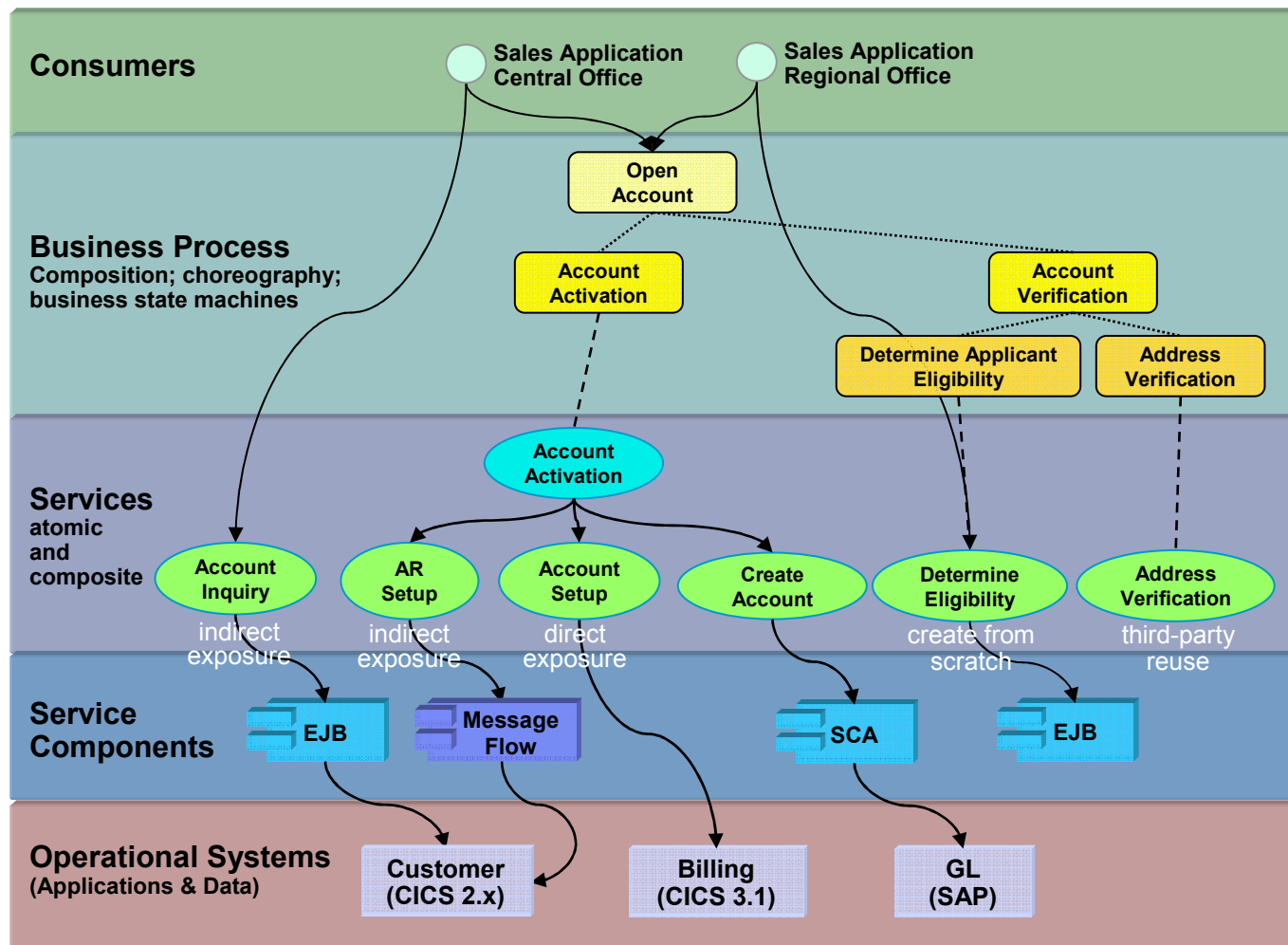
Defining Solution Scope – Business Context Diagram



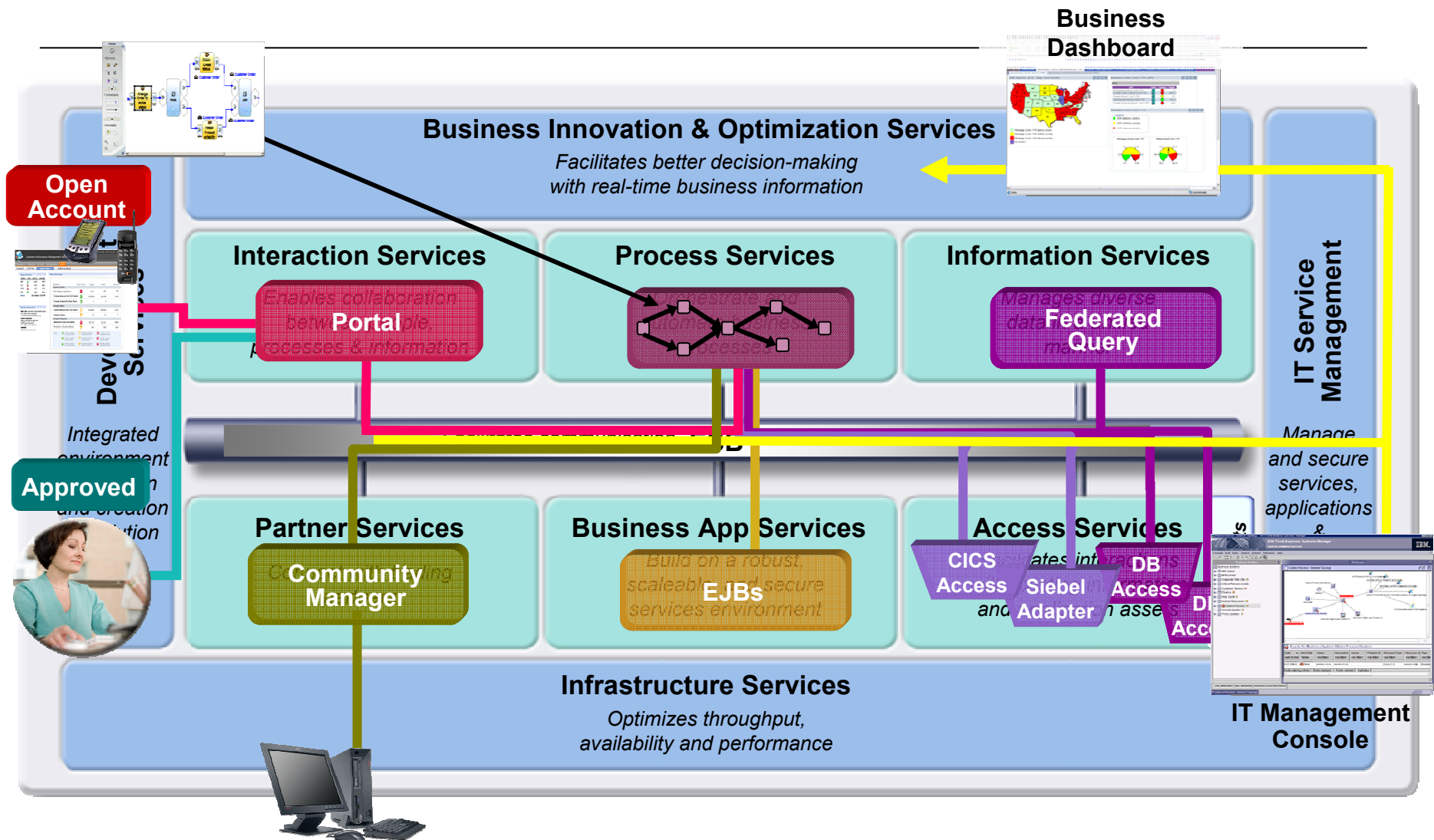
Use Case for “Open Account” Process



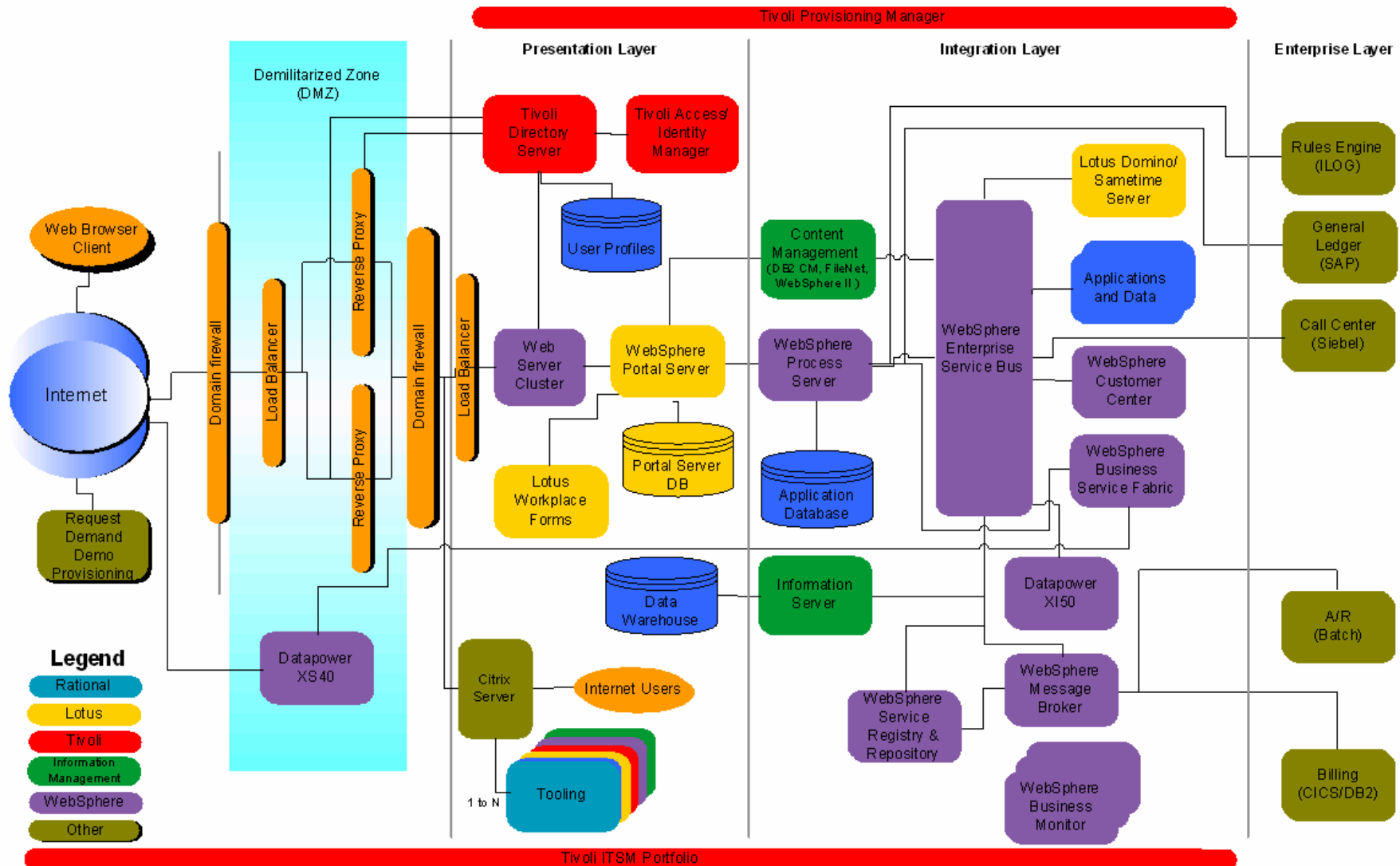
SOA Stack for "Open Account" Process



Reference Architecture and “Open Account” Process



Overview of JKE's IT Environment

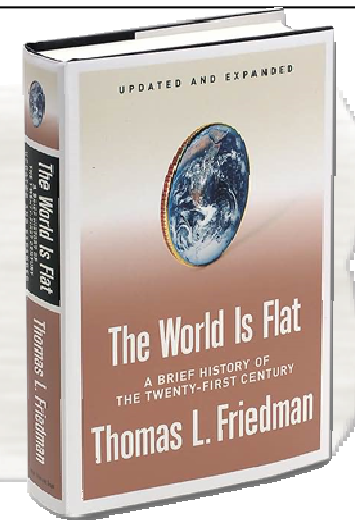


II. Business Process Modelling

Business Models are Changing...

“On such a flat earth, the most important attribute you can have is creative imagination – the ability to be the first on your block to figure out how all these enabling tools can be put together in new and exciting ways to create products, communities, opportunities, and profits.

Thomas Friedman, The World is Flat

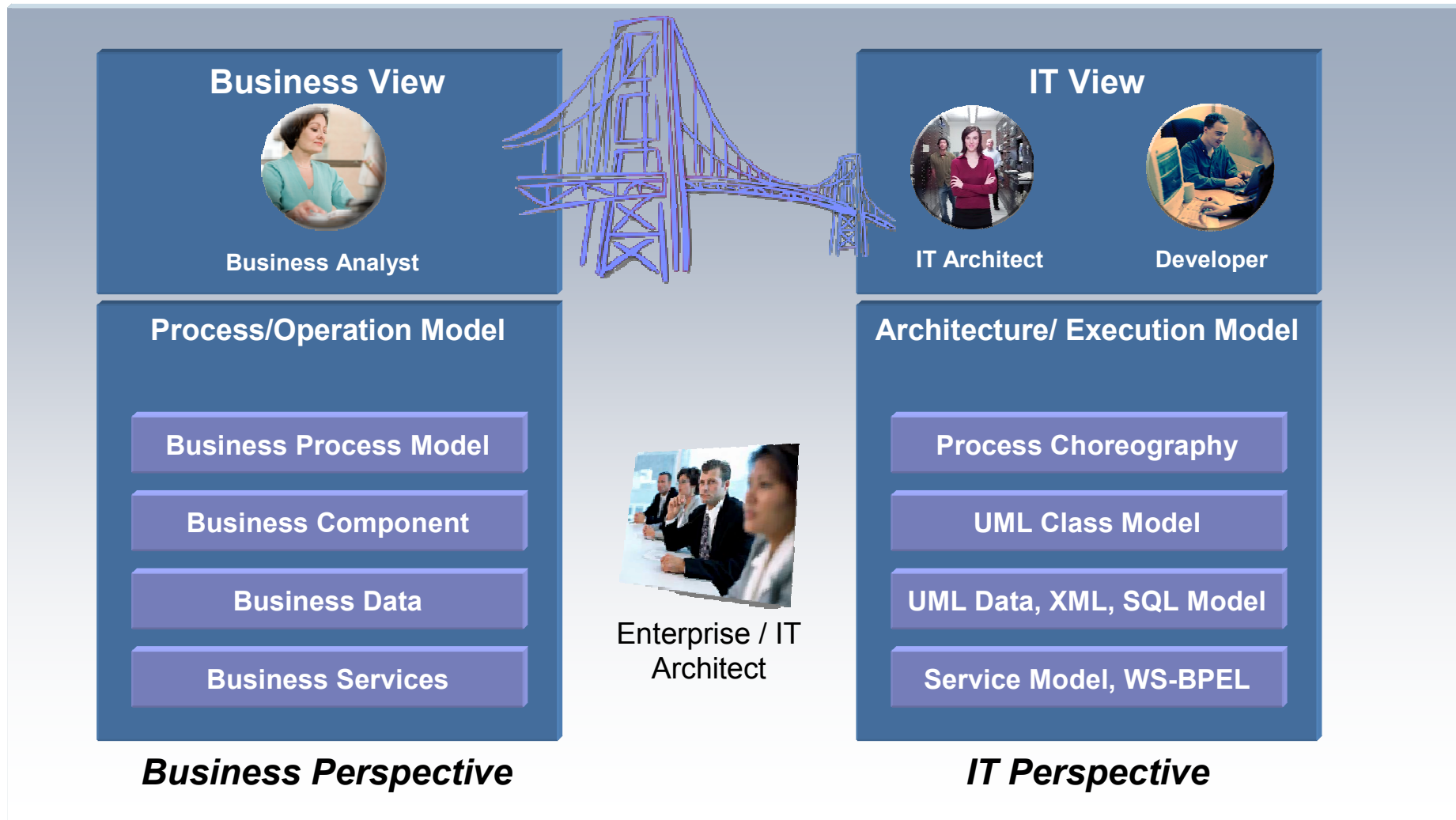


“ Service orientation does not begin with technology; it begins with the mind-set of thinking about your business and the world around you in terms of functional components. Becoming more functionally service oriented allows organizations to quickly and economically rearrange the components that make up a business.”

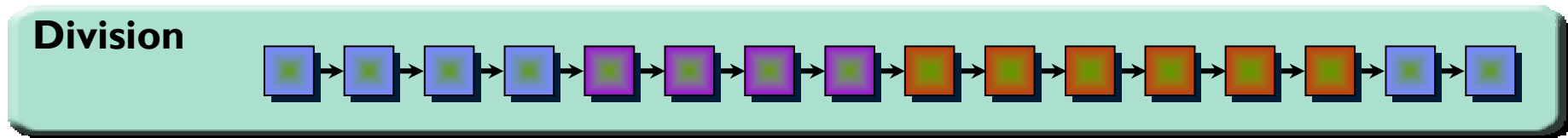
The Future of Business June 2007

*Steve Mills, Senior Vice President and Group Executive
IBM Software Group*

Providing Linkage Between Operational and IT Views Reconciling Business Perspectives and IT Perspectives

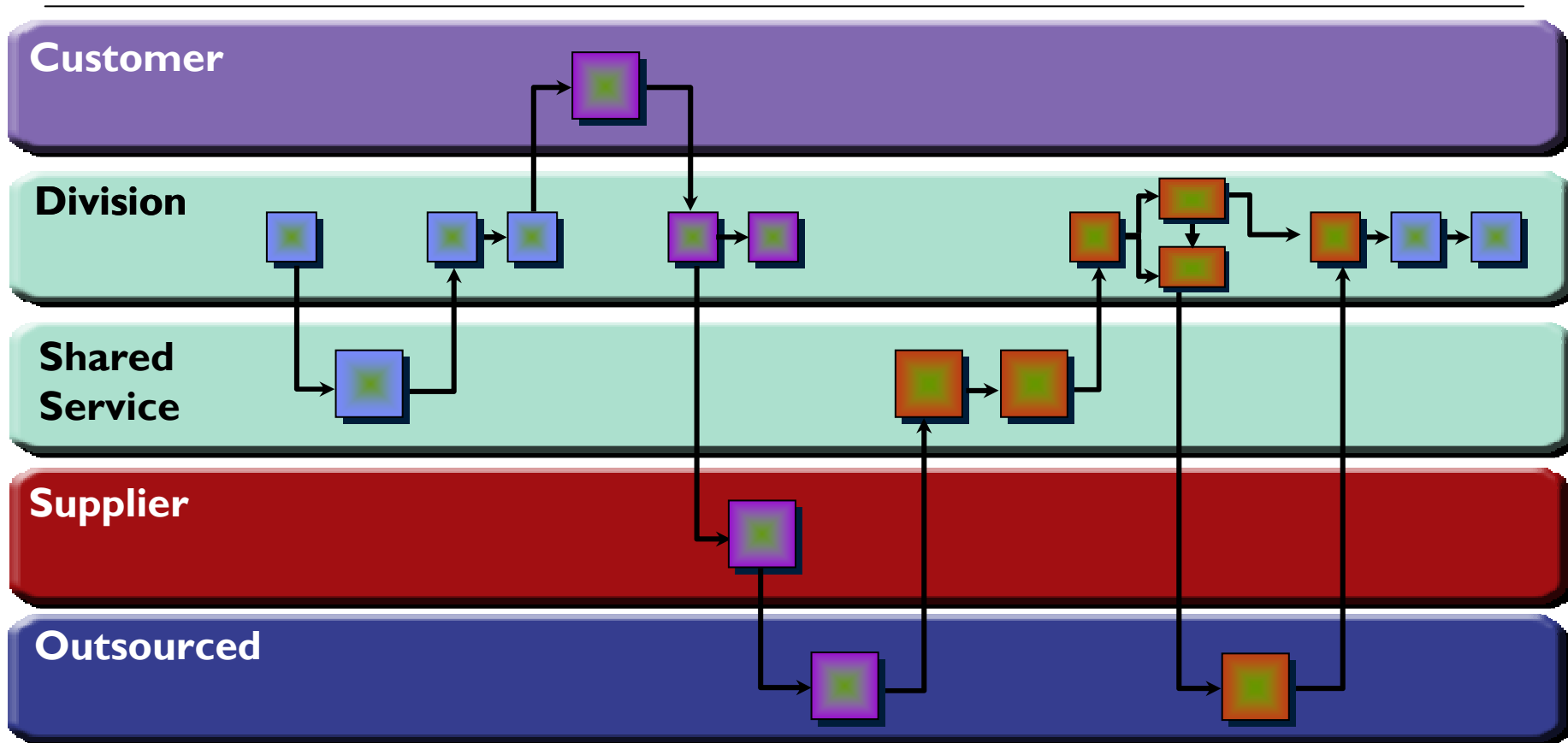


Where We Are Heading – Start



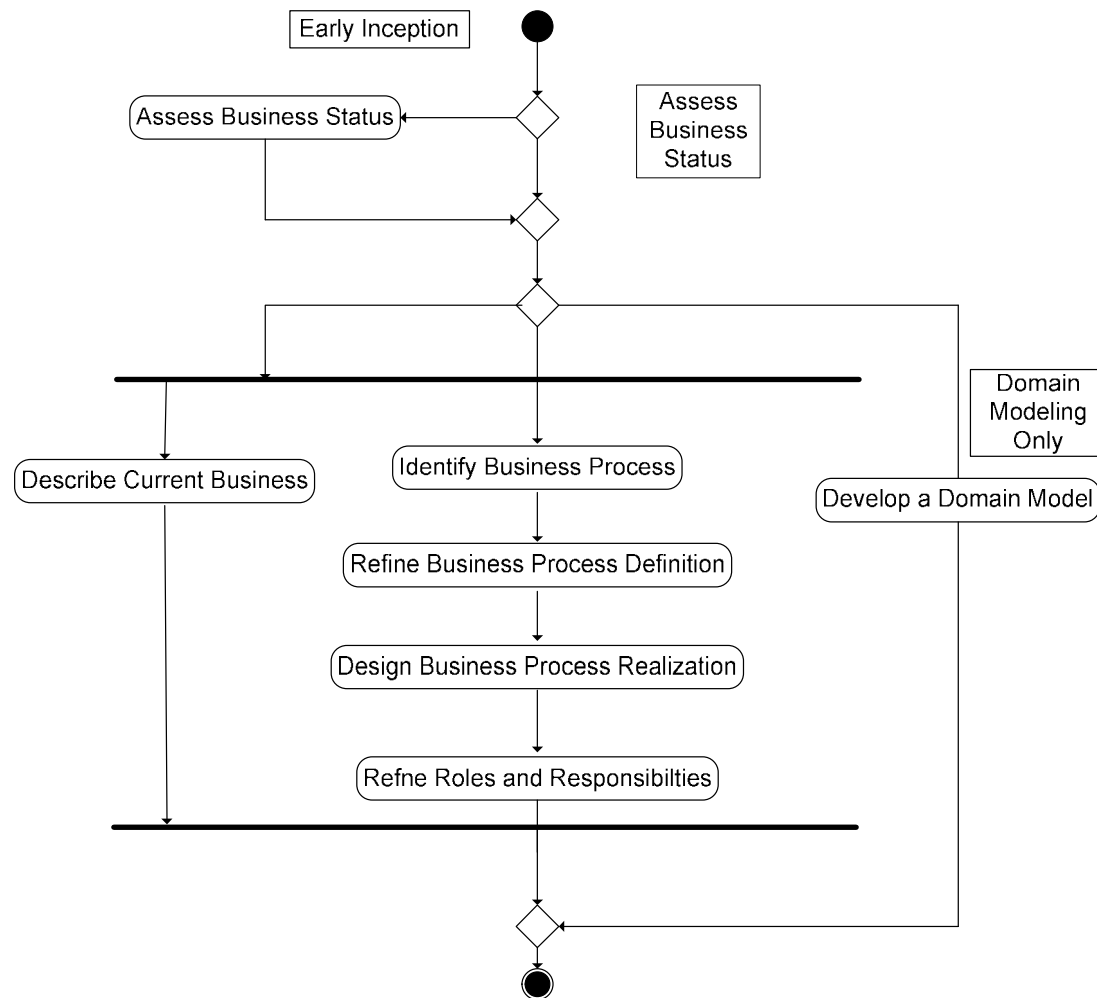
Case Study: Procure to Pay Process

Where We Are Heading – Goal

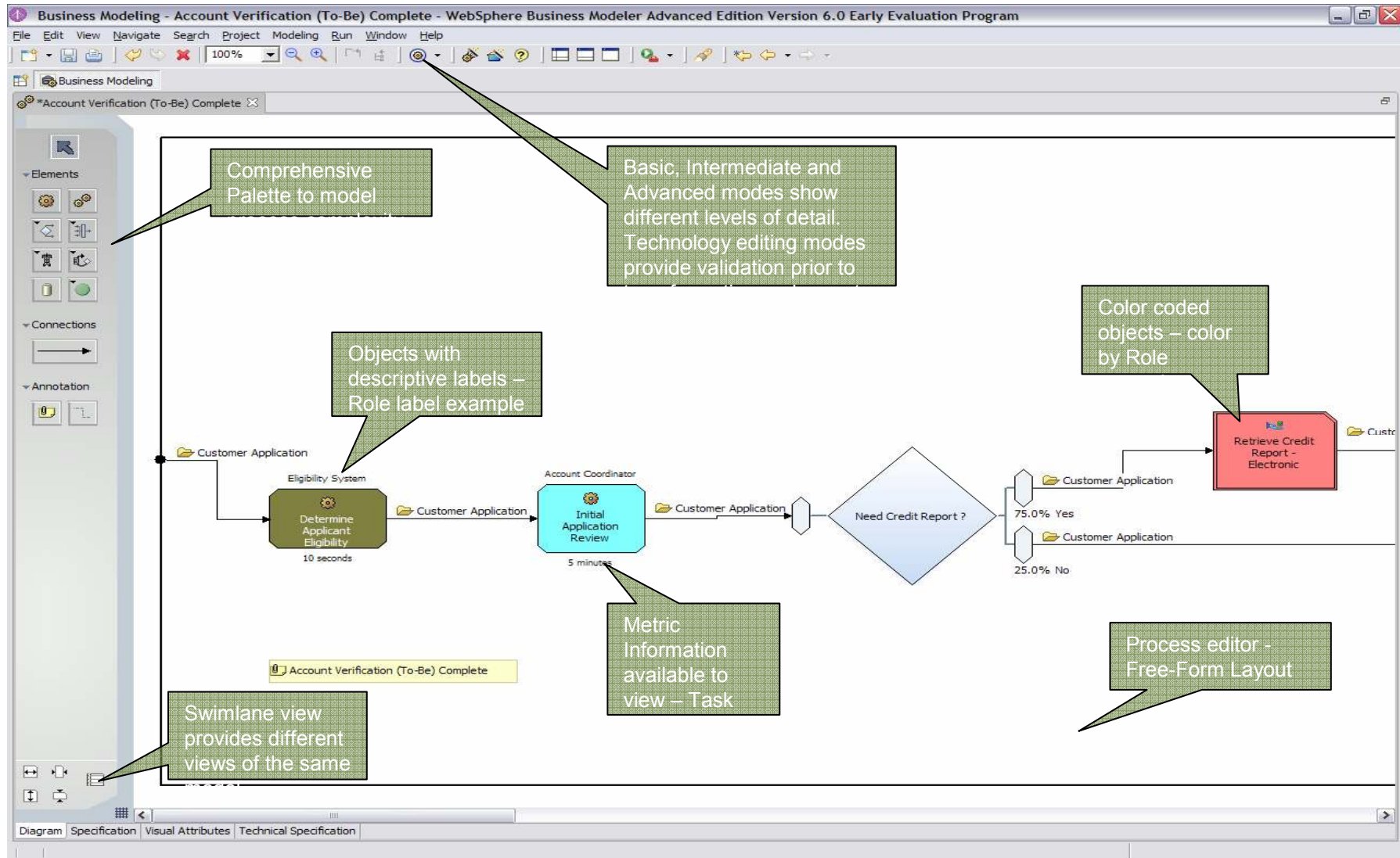


Case Study: Procure to Pay Process

Business Modeling – Methodology and RUP (Rational Unified Process)



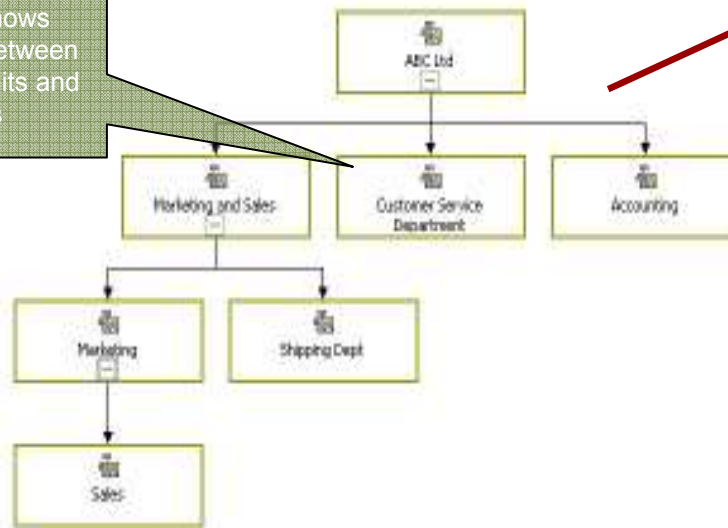
The Process Model



The Organization Model

- Defines the structure of organization units and locations
- Graphical organization trees allow for visibility into what the relationship between the organizations and the resources are in order to view hand-offs

Organization structures shows relationships between organization units and locations



ABC Ltd

Instance of

Organization attributes

Attributes of the organization definition. If the organization definition is updated, refresh the table to synchronize the instance with the new values.

Name	Type	Minimum	Maximum	First value
organizationID	String	1	1	✓ DAL
type	String	0	1	✓
industryType	String	0	1	✓
businessType	String	0	1	✓
geographicLocation	String	0	1	✓
affiliates	String	0	1	✓
displayName	String	0	1	✓
businessCategory	String	0	1	✓
secretary	Staff template	0	1	
assistant	Staff template	0	1	
manager	Staff template	0	1	
Organization members				
members	Staff template	1	n	
parentOrganization	Organization template	0	1	

Attributes of the organization units can be either user defined or adhere to the definitions of a specific runtime

The Business Measures (Observation) Model

The screenshot displays the IBM Business Modeler interface. The main workspace shows a process flow diagram for 'Account Verification (To-Be)'. The flow starts with 'Customer Application', leading to 'Determine Applicant Eligibility', then 'Initial Application Review', and finally a decision diamond 'Need Credit Report?'. The 'Yes' path (75%) leads to 'Customer Application', and the 'No' path (25%) leads to 'Customer Application'.

Three callout boxes provide additional information:

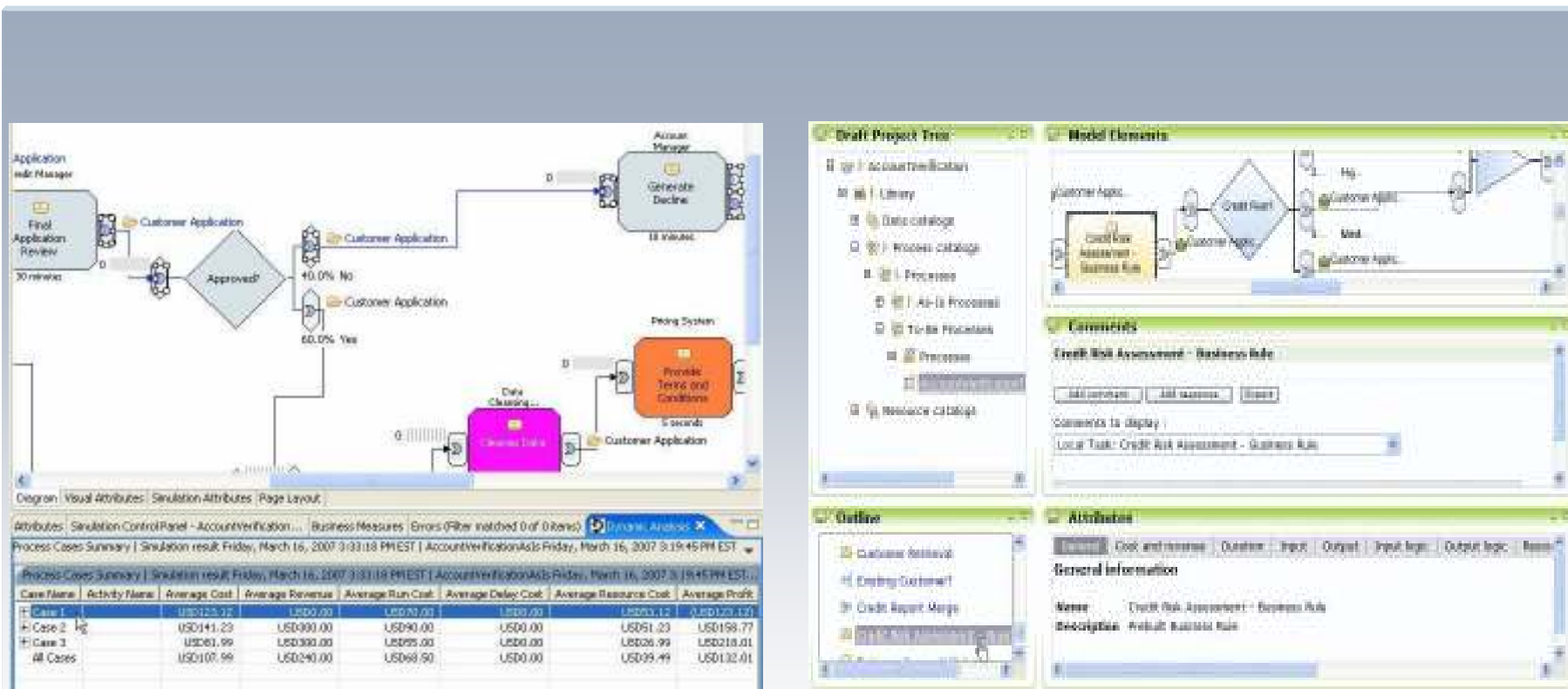
- Icons are added automatically showing Triggers, Metrics, Timers, Counters and KPIs, etc. as they are added to the model.** (Points to a toolbar with various icons)
- Observation Model** (Points to the process flow diagram)
- Business Measures, KPIs and their Attributes** (Points to the 'Attributes View' table)

The 'Attributes View' table is as follows:

Name	Type	Default Value	Target	Upper Bound	Lower Bound	Upper Margin
Accounts Opened Per Day Indicator	Integer	50	65	110	40	40
Account Opening Cost Indicator	Integer	375	350	400	200	200

Developing the Process Model

Completing the “Account Open” Process Model



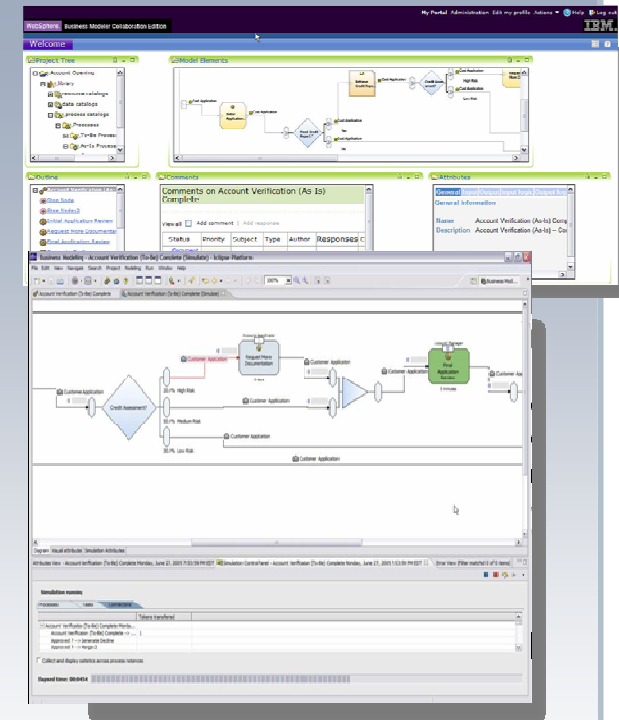
Design and Simulation of the “Account Open” Business Process Model

Collaborative Development of the “Account Open” Business Process Model

Business Process Modeling

Capture, Simulate, Analyze & Hand-off to Implementation

- Graphically Model Processes
 - Define: Goal, Scope, Perspective, Audience, Level-of-detail, Content
 - Introduce naming conventions for all process objects (costs, time, resources, decision points, actions, etc)
 - Agree on a maximum number of process levels (3-4) and number of activities per process diagram (15-20)
- Simulate and Analyze
 - Simulate execution with statistical analysis tools
 - Run "what if" scenarios to predict outcomes
 - Identify bottlenecks and workload imbalances
 - Isolate projects that will generate the greatest returns
- Hand off to Implementation
 - Export business and data models for use in IT deployment
 - Direct export of models to IT such as WS-BPEL for execution, XSD for data definitions, WSDL for services interfacing, UML for IT architect refinement

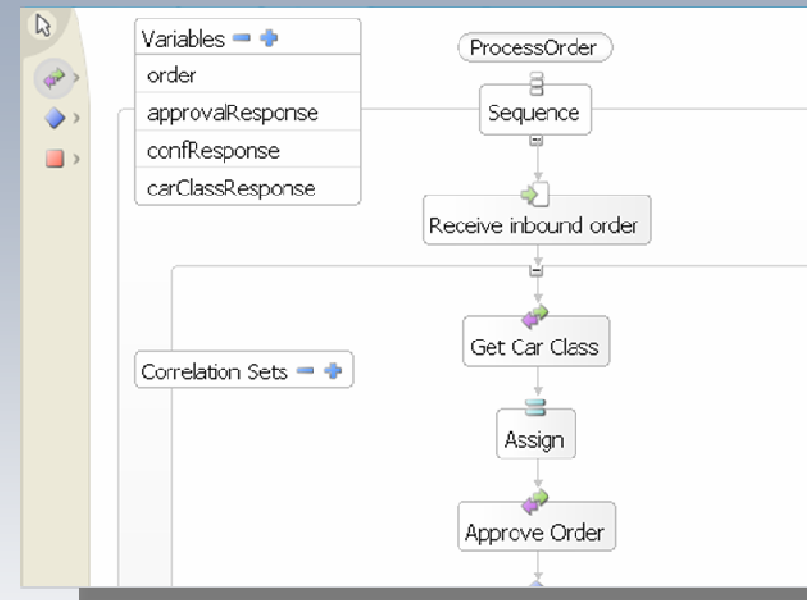


Architectural Benefit:

- Business analysts provide top-down approach to service and process design
- Enable coordination of process development across business stakeholders
- Creation of artifacts to support down-stream implementation

SOA-Based Business Assembly and Execution

- Business Process Choreography orchestrates services to form *deployable* processes:
 - *Process model based on WS-BPEL*
 - *Choreography includes automated and human based services, business rules, service invocations and control of flow aspects*
 - *Processes support transactions and compensation*
- Service consumers can initiate as well as create SOA-based process solutions
- Mediation creation to transform/route service requests and responses
- Enables inter and intra-enterprise (B2B) service integration over the ESB framework



Architectural Benefit:

- Simplified, standards-based business process development
- Support for industry process and data models
- Directly invoke mediations for routing/transforming requests between services

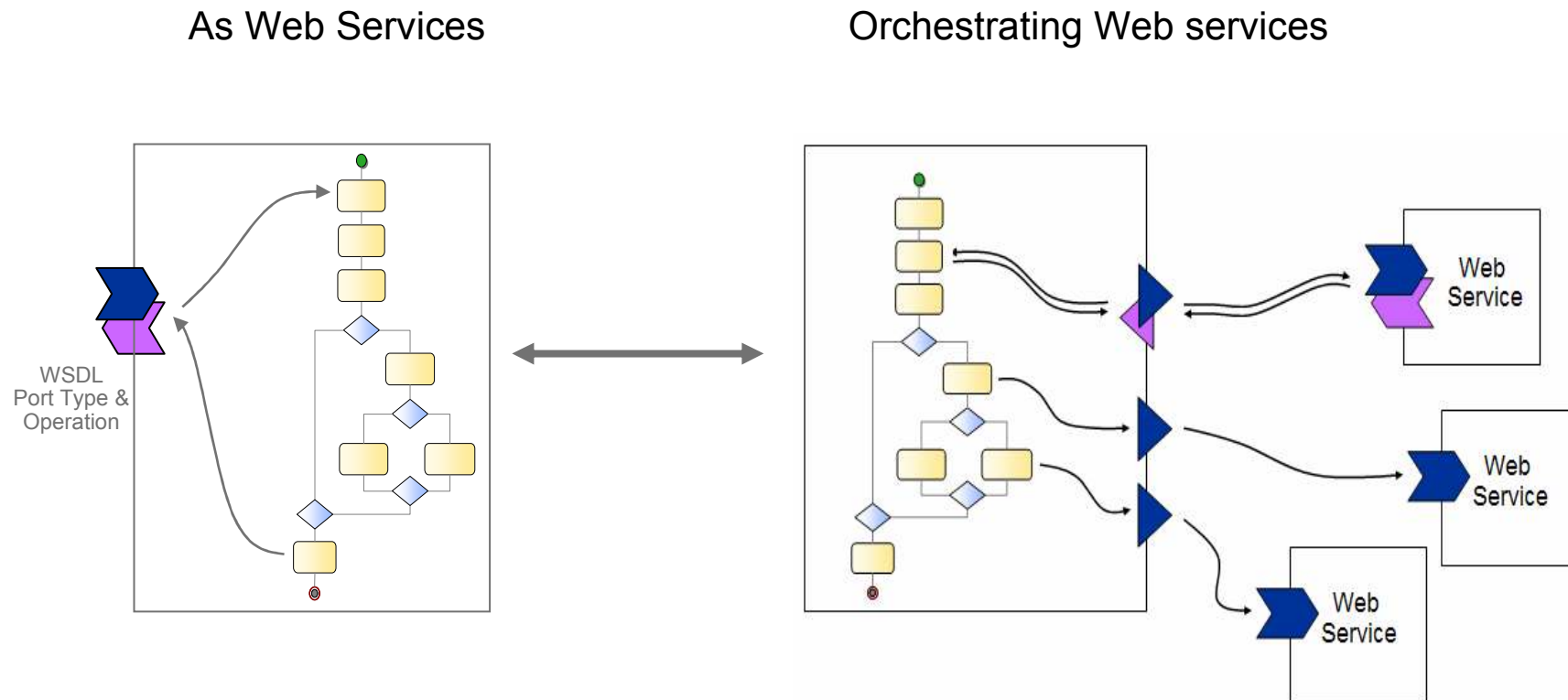
III. Programming Models for Business Process Realization (Assembly)

BPEL (Business Process Execution Language)

- Business Process Execution Language (or BPEL), is a business process modeling language that is executable. It is serialized in XML and aims to enable programming in the large. The concepts of programming in the large and programming in the small distinguish between two aspects of writing the type of long-running asynchronous processes that one typically sees in business processes.
- Industry standard (OASIS) for web services choreography that allows the assembly of process definitions and (web) services

What is BPEL (Business Process Execution Language)

- Use the specification of a Business process
- Assemble the process and (web) services



BPEL Activities

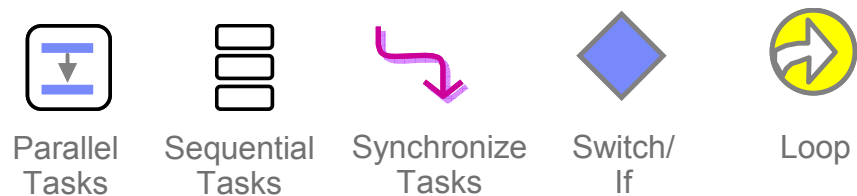
- Interact with people, other processes, business partners and services



- Process-internal tasks

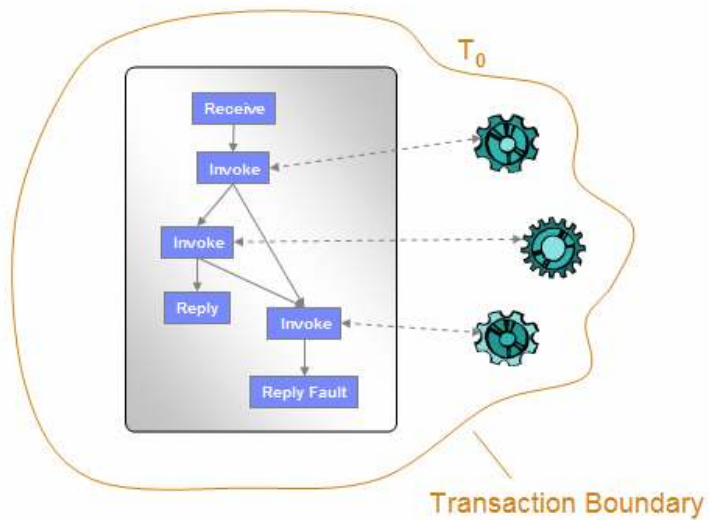


- Define the control flow

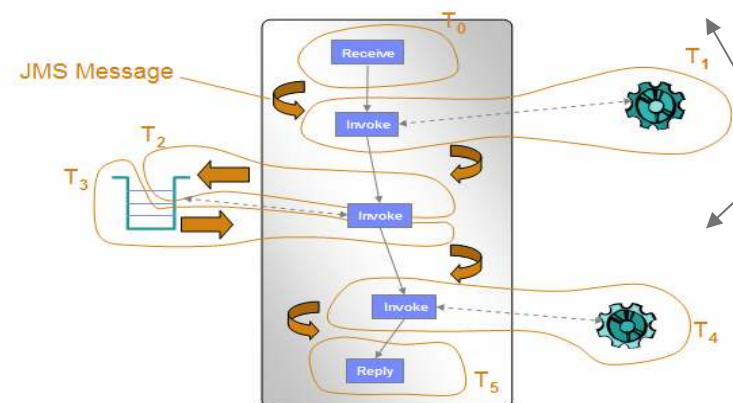


* BPEL 2.0

BPEL Business Process: Microflows and Macroflows

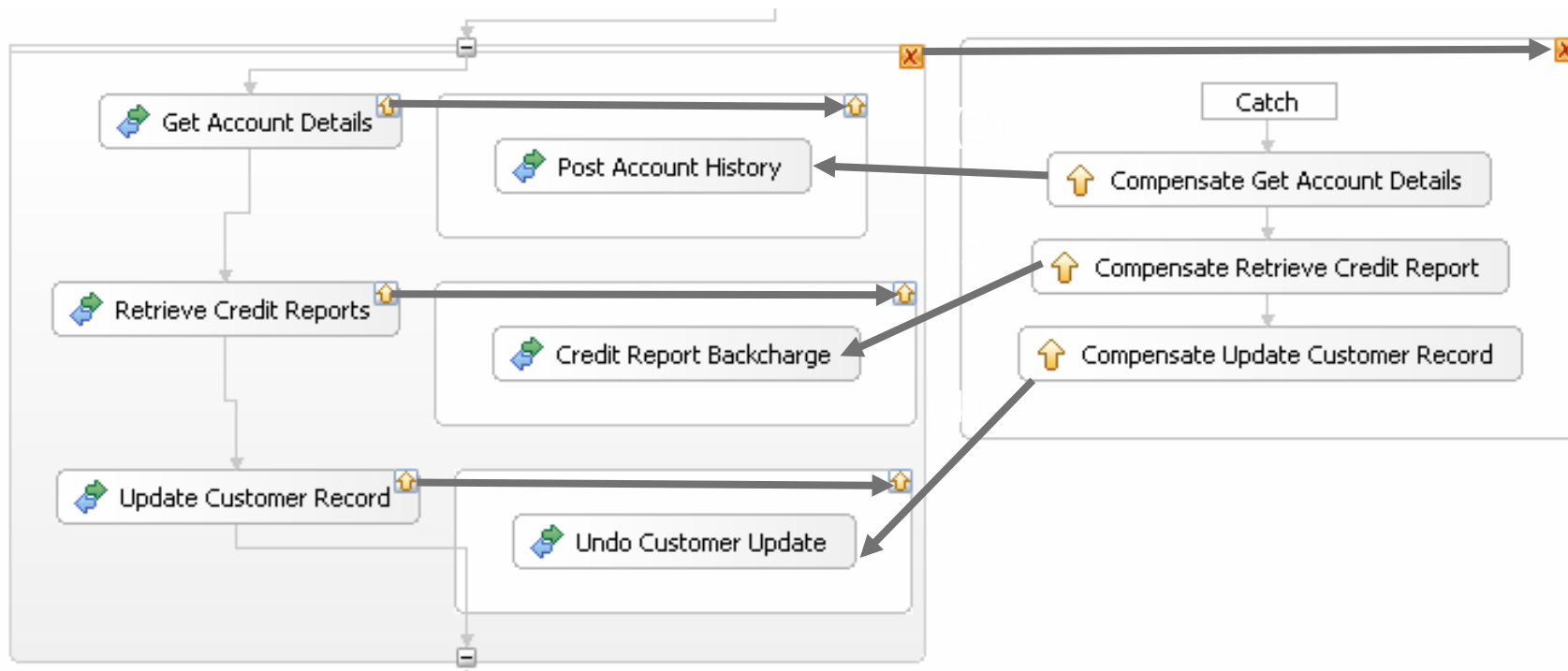


Microflows
One Transaction



Macroflows
Multiple Transactions
And compensation transactions

BPEL Business Process: Compensation



Working with BPEL through Graphical Editor (Eclipse Environment)

The screenshot displays the IBM WebSphere Integration Developer environment. The main workspace shows a BPEL process diagram for 'AccountVerificationToBe'. The process starts with a start node leading to 'AccountVerificationToBeReceive'. This is followed by a task 'Create CustomerInfo', then a call activity 'Customer Retrieval'. The 'Customer Retrieval' call activity branches into two parallel paths: one leading to 'Retrieve Account History' and another to 'Determine Applicant Eligibility'. The 'Determine Applicant Eligibility' task leads to an assignment 'Assign creditReportRequired'. This assignment leads to a call activity 'Credit Report Service - Electronic', which then branches into two parallel tasks: 'Insert Credit Report' and 'Extract Credit Score'. Both of these tasks lead to a final task 'Set creditScore'.

The left-hand side shows a project explorer with a tree view containing folders like 'Business Logic', 'Processes', and 'Interfaces', with 'AccountVerificationToBe' selected. The right-hand side shows a 'References' panel listing various partners and variables. The bottom panel shows the 'Properties' view for the selected process, including details like 'Display Name', 'Name', and 'Target namespace'.

Service Orchestration Assembly using Visual Tools for building Components

Defining human tasks

Human Task Editor

Detailed properties for a Participating human task

ManualClean

Receiver settings

Staff settings

Potential Owner
Editor
Reader
Administrator

Client settings

Client settings
Web Client URL

Escalation settings

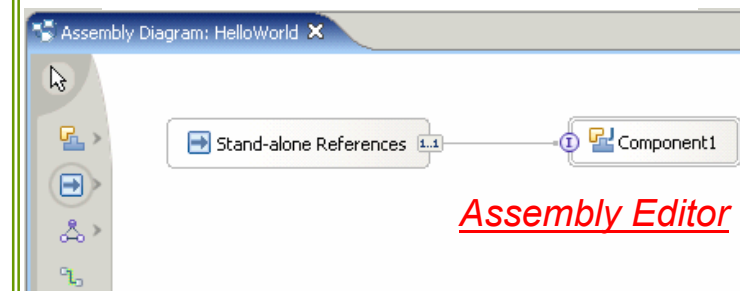
Ready
Not Claimed in 2 days
Not Claimed in 4 days

Claimed
Not Completed in 1 day

Subtask

Assemble Service Components

Assembly Editor



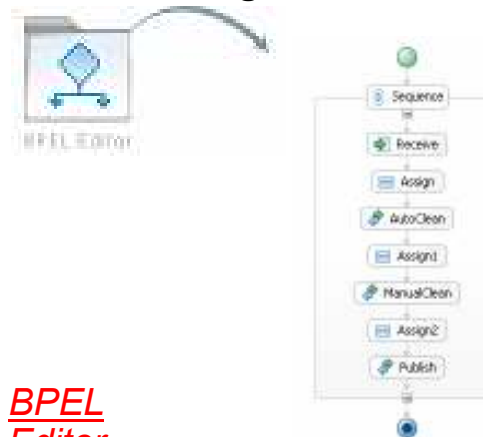
Defining business rules

Decision Table Editor



Creating Business Processes

BPEL Editor

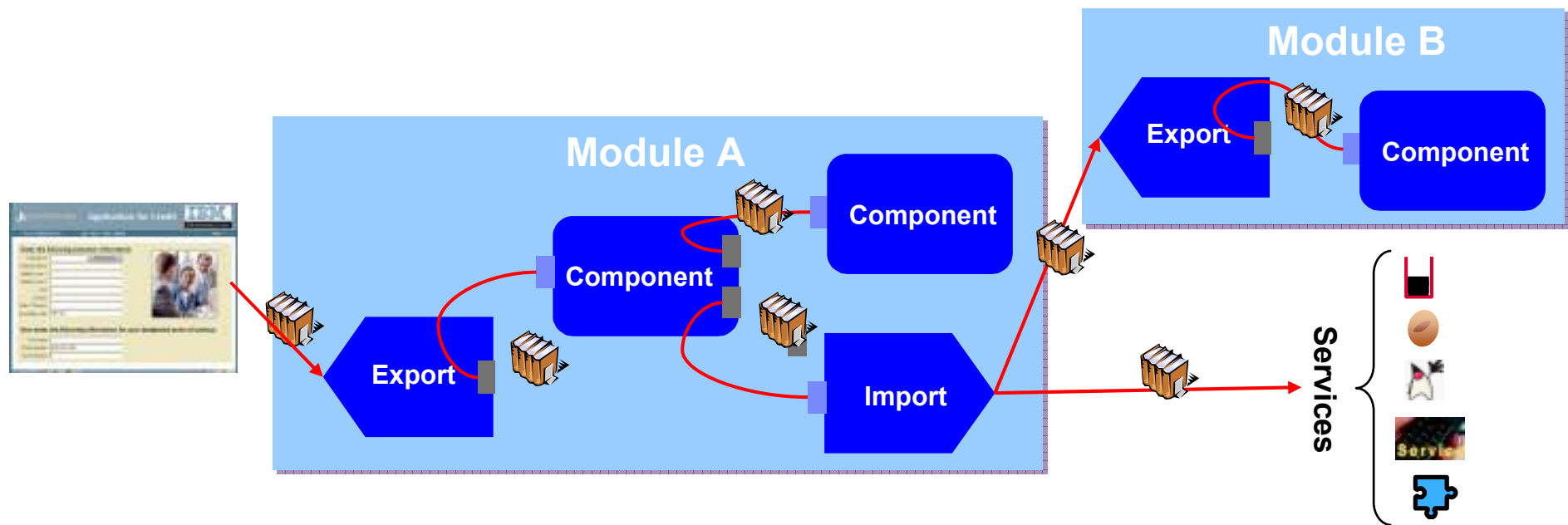


SCA (Service Component Architecture)

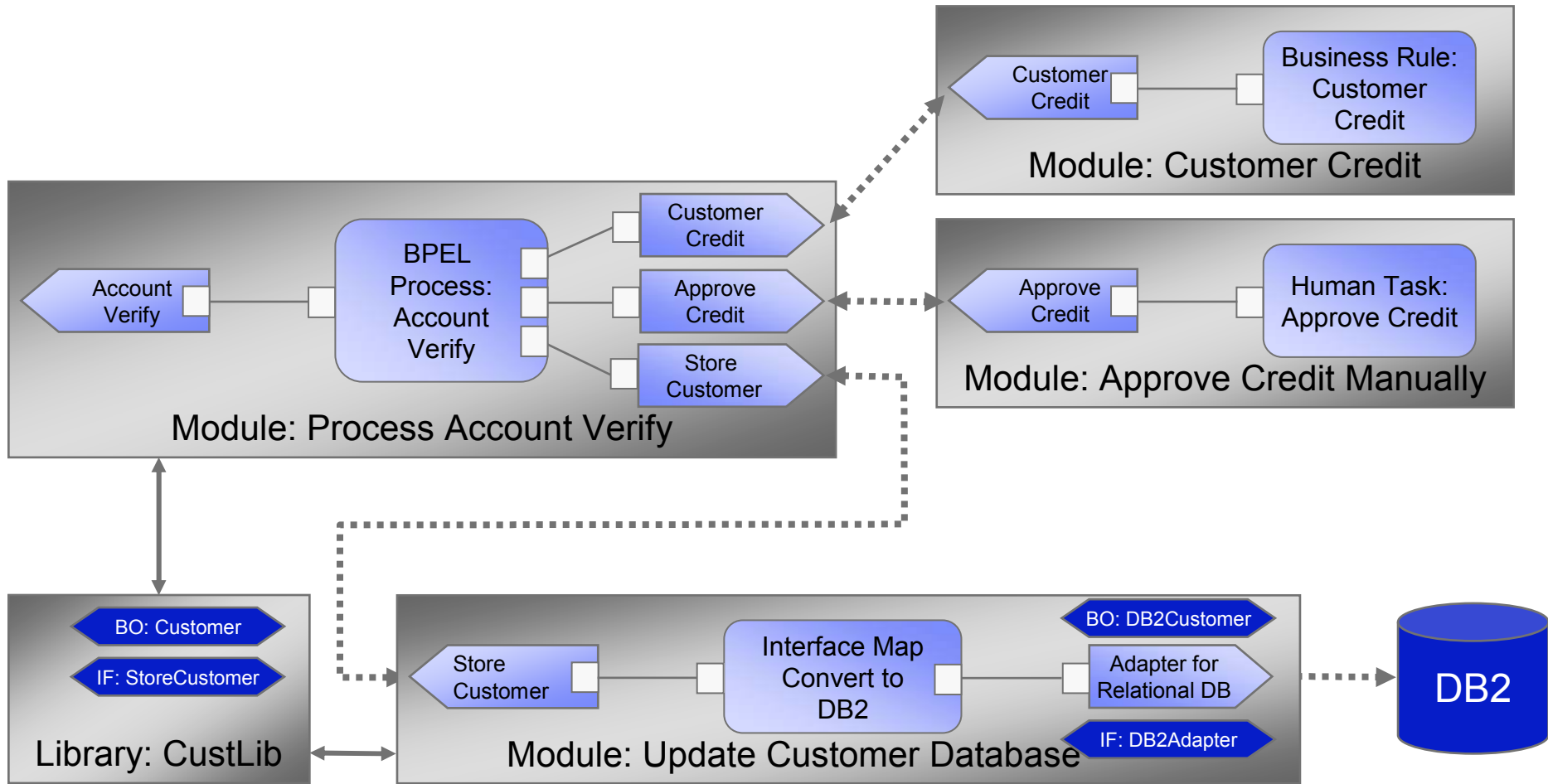
- **Service Component Architecture (SCA)** is a relatively new initiative advocated by major vendors of **Java EE** technology. Its proponents claim it is more natively suited for the delivery of applications that conform with the principles of service-oriented architecture. As such, SCA components are supposedly more **technologically agnostic**. (Wikipedia)
- SCA helps to define mediations in an ESB (Enterprise Service Bus)
 - **Modules** contain “wired” **Service Components**
 - Service Components use Business Objects/Service Data Objects for data
 - Modules have **port** to provide binding to other components
 - **Solutions** are a collections of Modules

SCA Programming Model

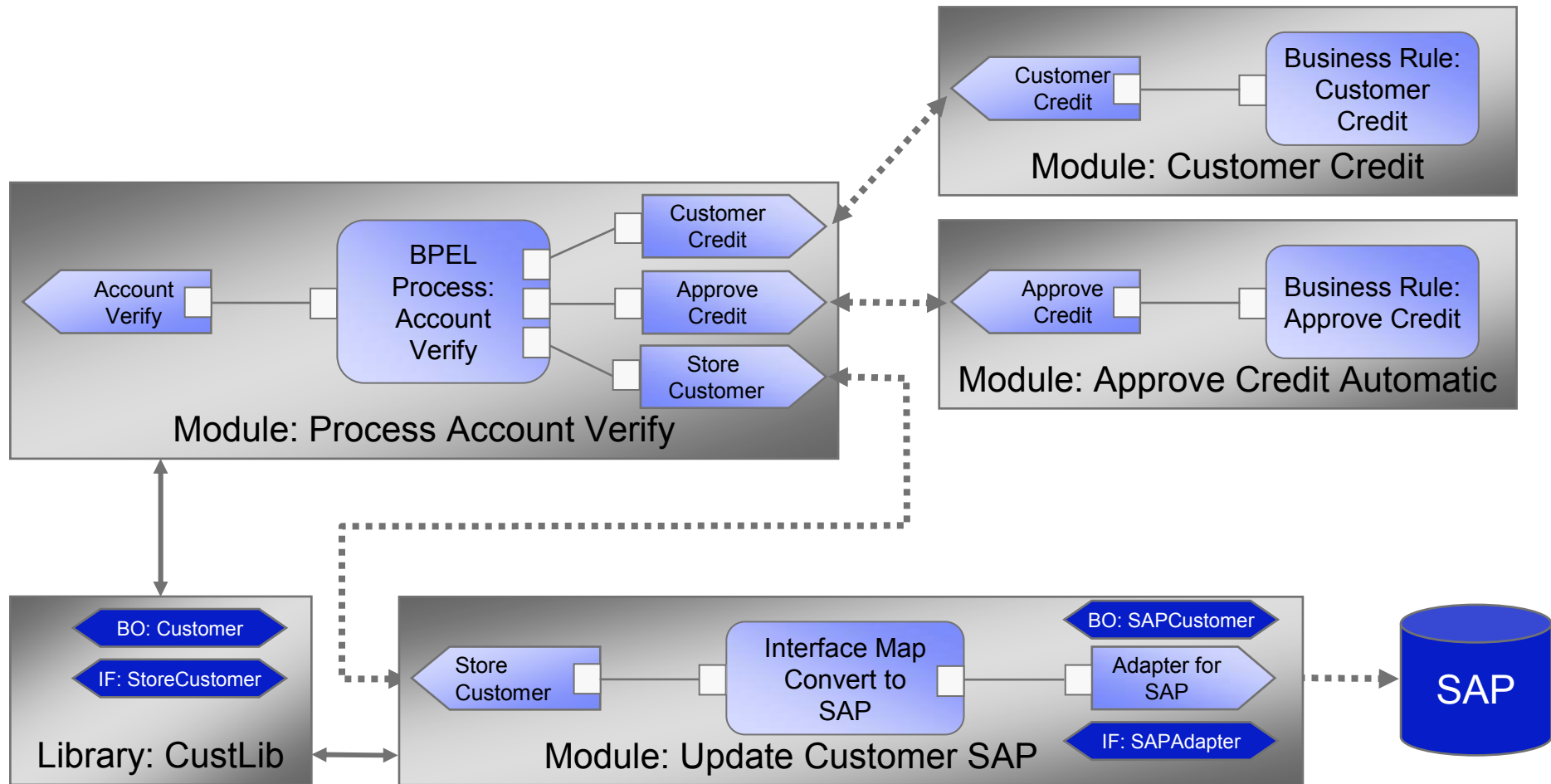
- Developer does not need to work about low level binding details or to provide code to support this function



Using Modules for Encapsulation and Reuse



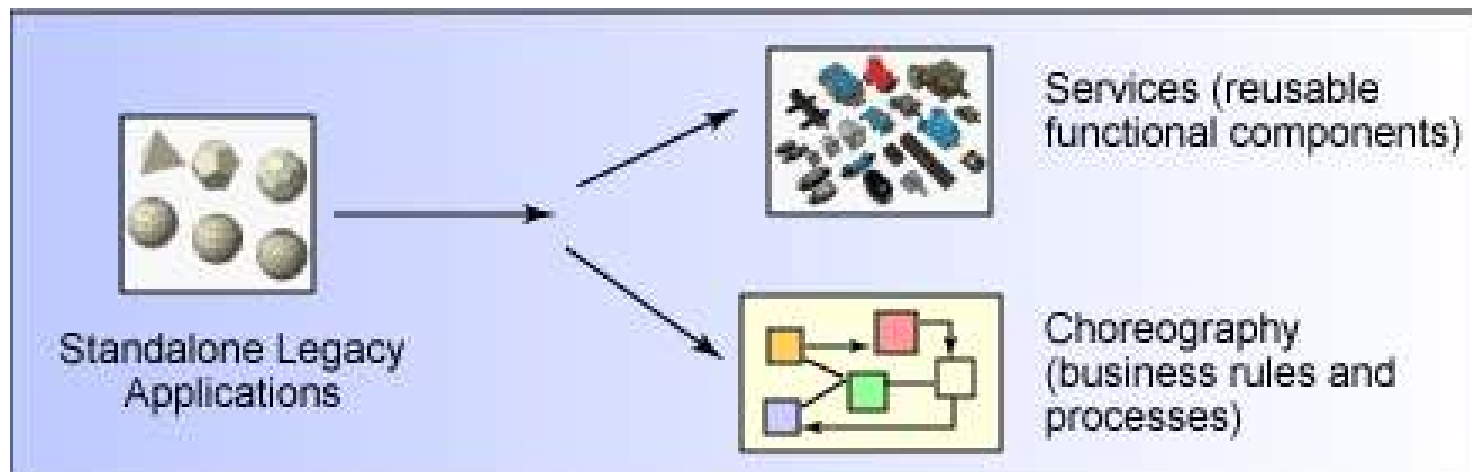
Using Modules for Encapsulation and Reuse – Change of Storing order (now SAP instead of DB2)



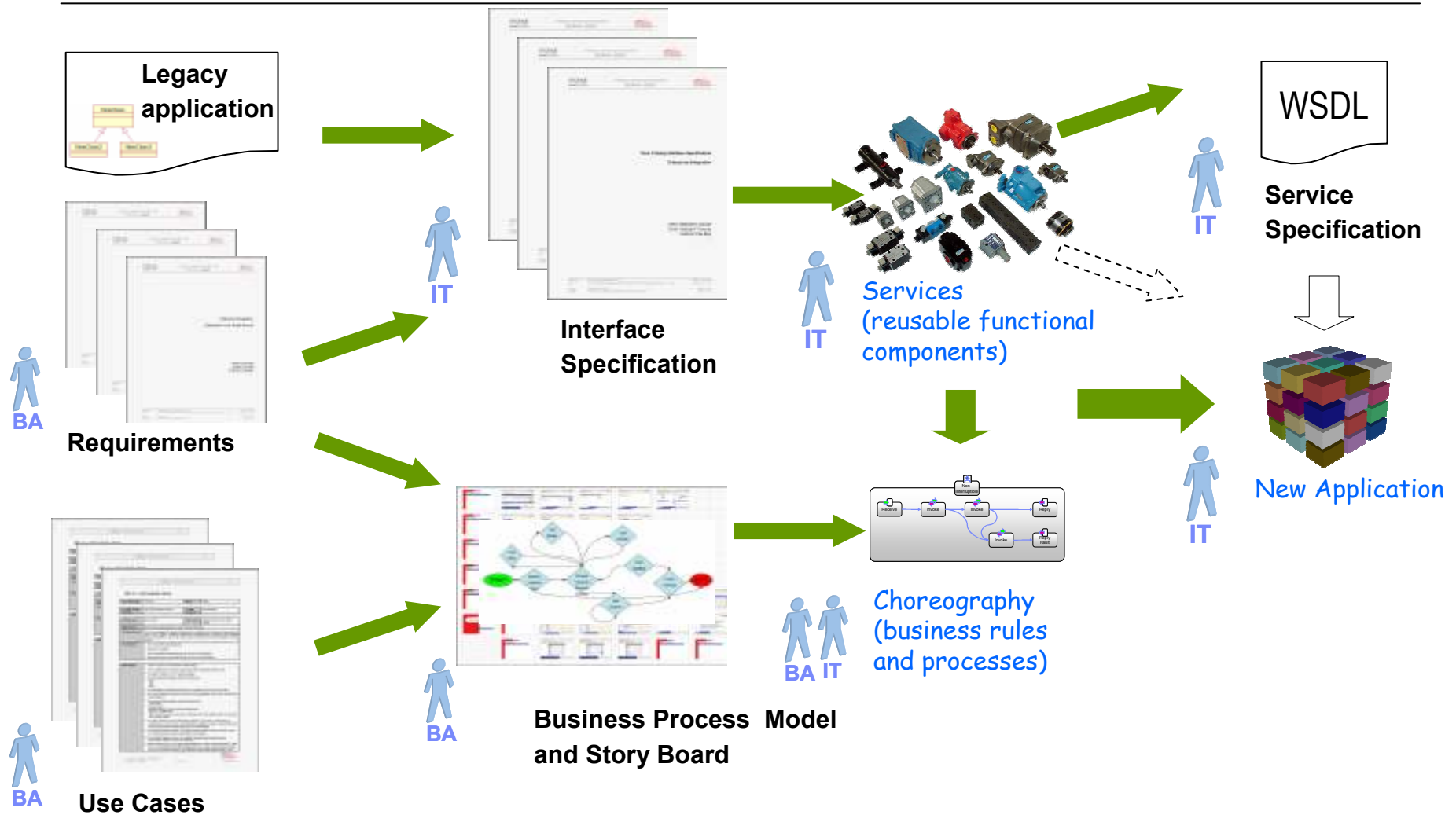
IV: Business Driven Development (BDD)

Enablement of Business Integration

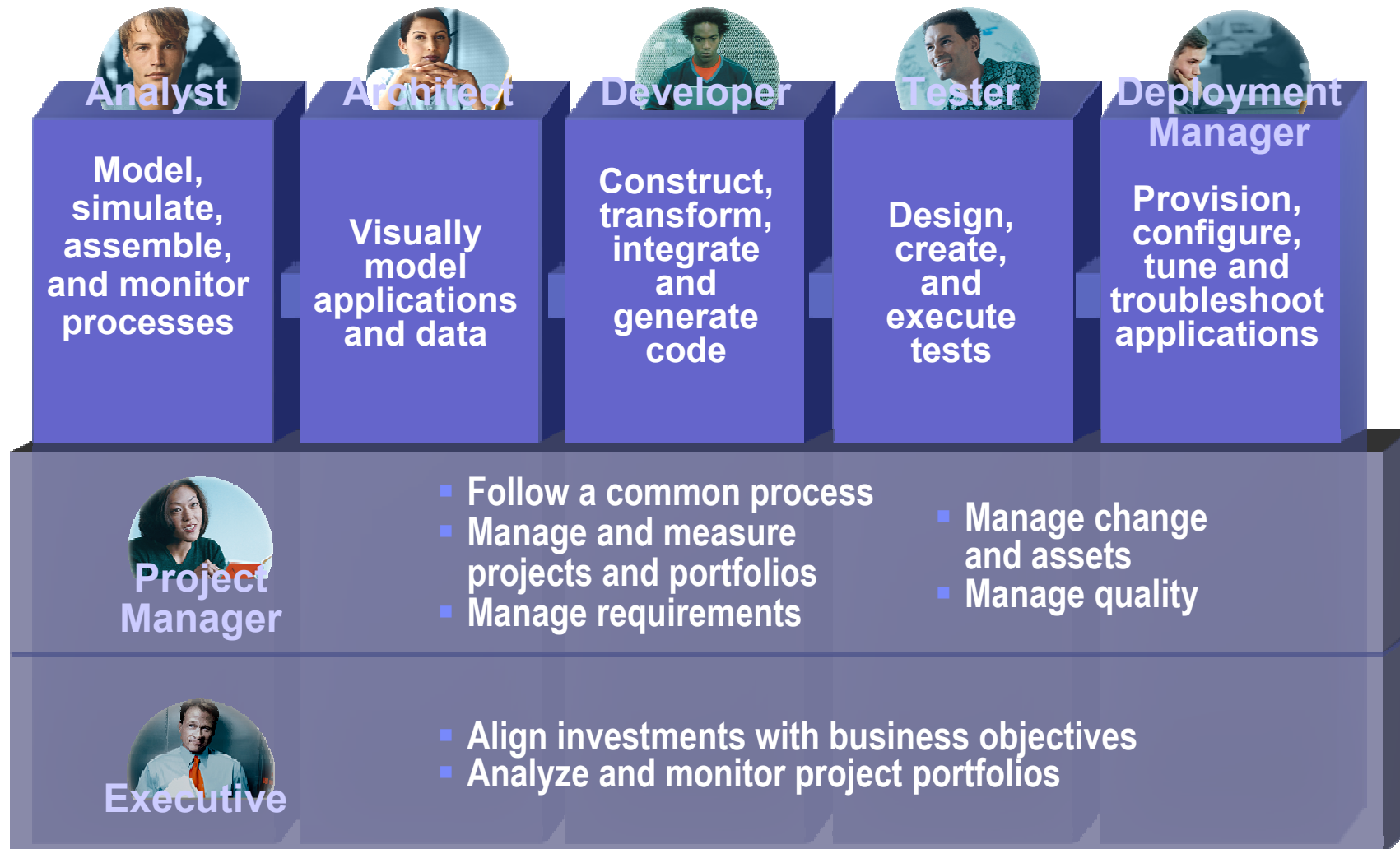
- Business and IT are no longer separate tracks
- Choreography of services
 - The sequencing, selection, and execution of operations



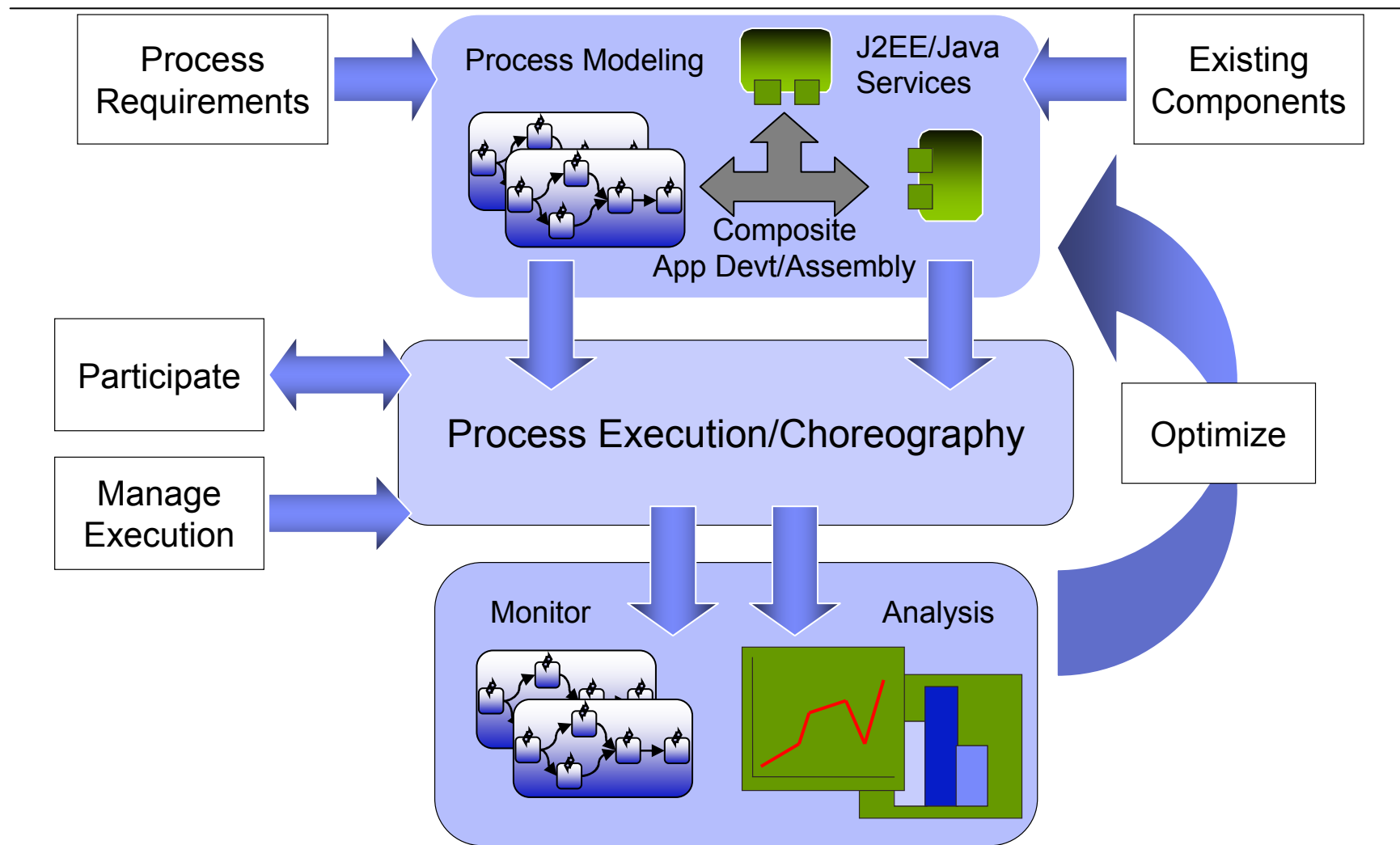
BDD Overview (including Legacy Applications)



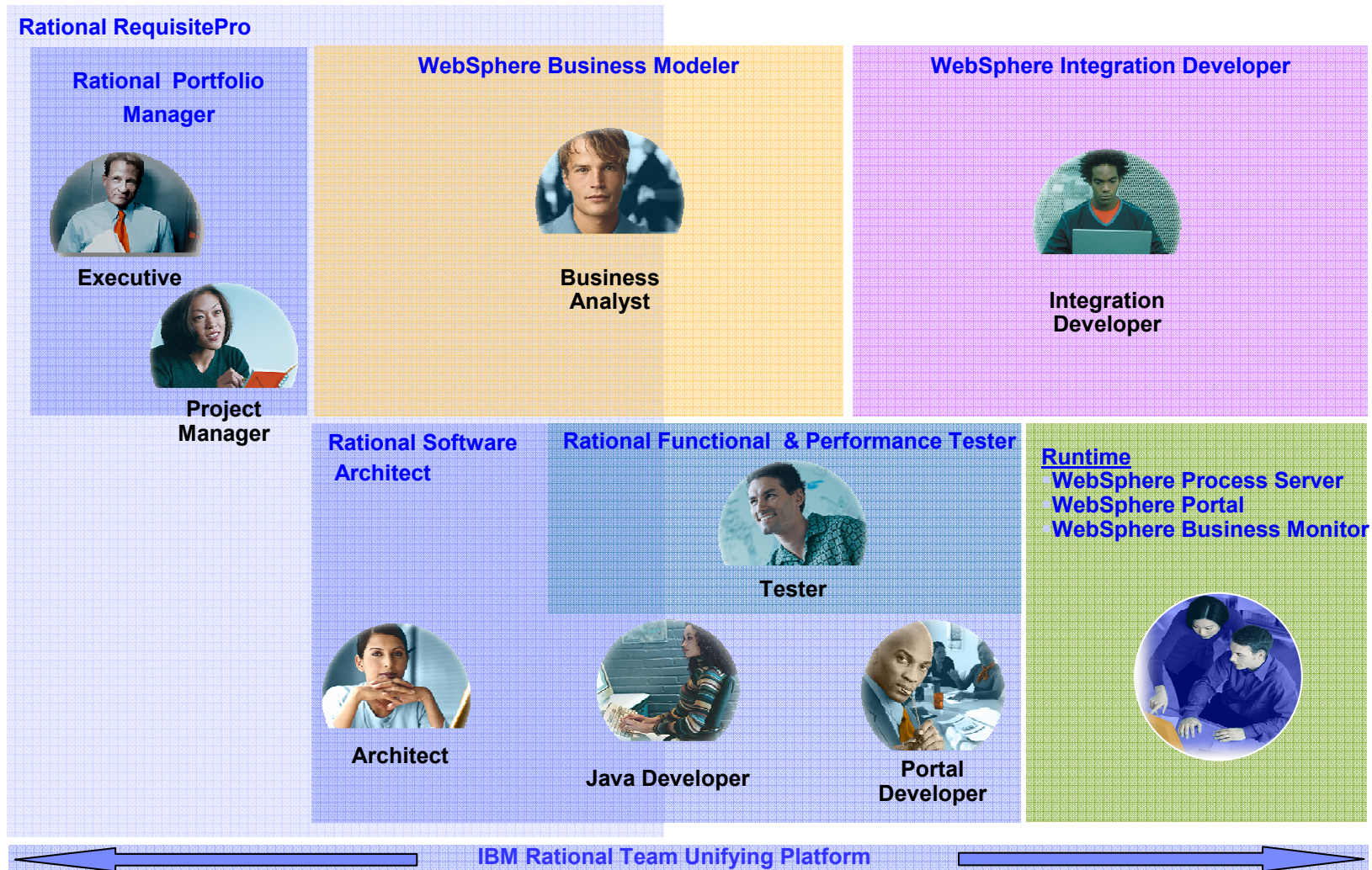
Roles to be taken within a Development Process



Business Process Development Life Cycle Tools

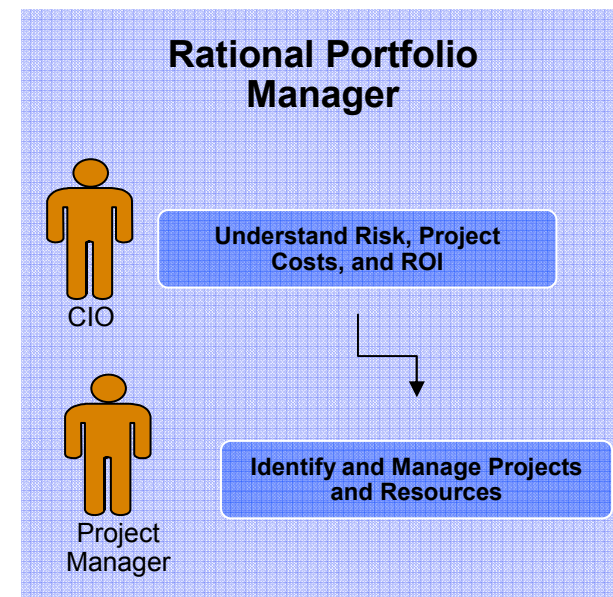


Areas for Business Driven Development



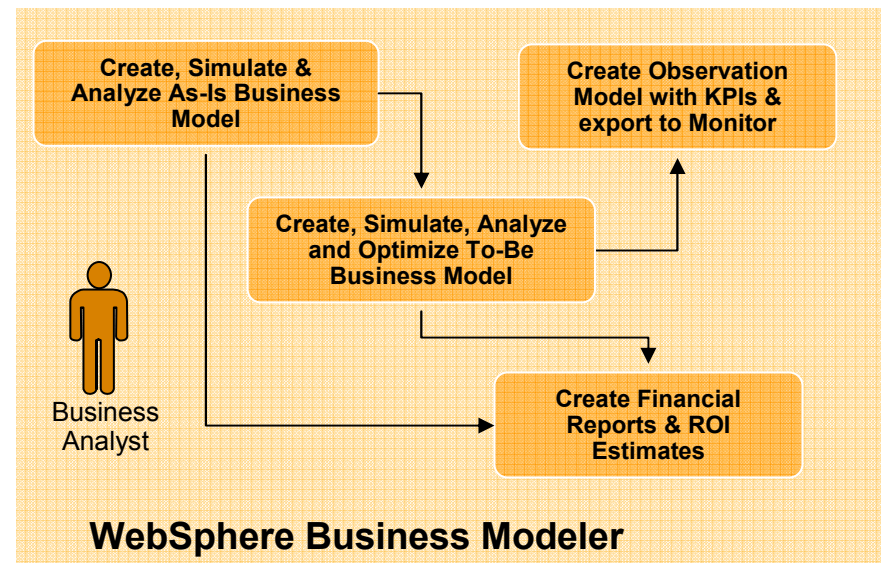
BDD Details 1 – Governance & Capturing Requirements

- Prioritize proposed, existing and under-construction services based on business priority, risk and return
- Track service level financials
- Provide deep insight into SOA development
- Manage SOA project-team dependencies
- Forecast demand for service creation and updates
- Understand the cost of SOA creation, operations and maintenance



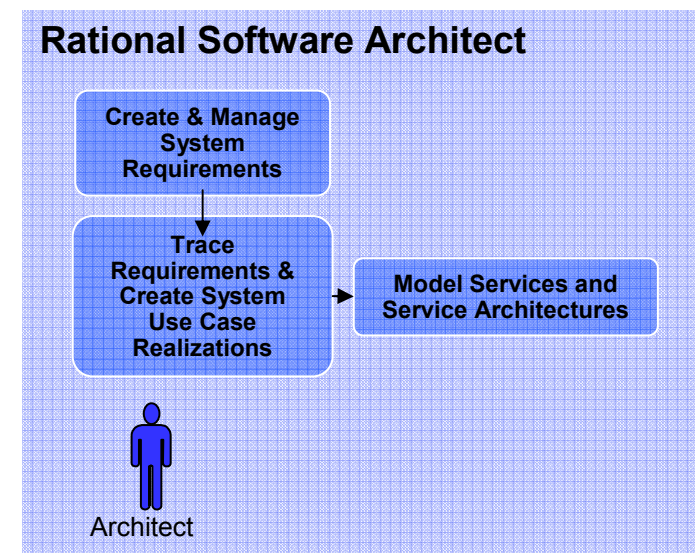
BDD Details 2 – Modeling Business Processes

- Discover and design key business processes
- Capture business data items exchanged between processes & tasks
- Assign tasks to roles that are responsible for their performance.
- Determine and allocate required resources
- Model the business organization & roles organizational units can play
- Determination of any other process/tasks (services) that must be provided by others



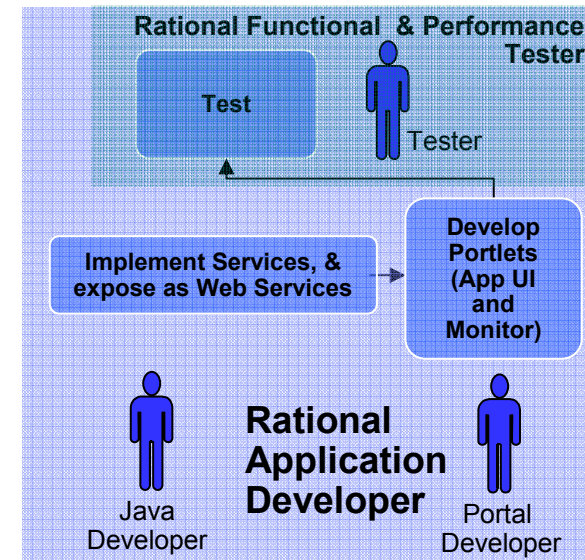
BDD Details 3 – Designing Services

- Architecture and design for service implementations
- Trace enterprise requirements to business processes and service implementations
- Define detailed system requirements or service implementations
- Modeling and architectural specification of services (using UML2)
- Discover and consume existing services



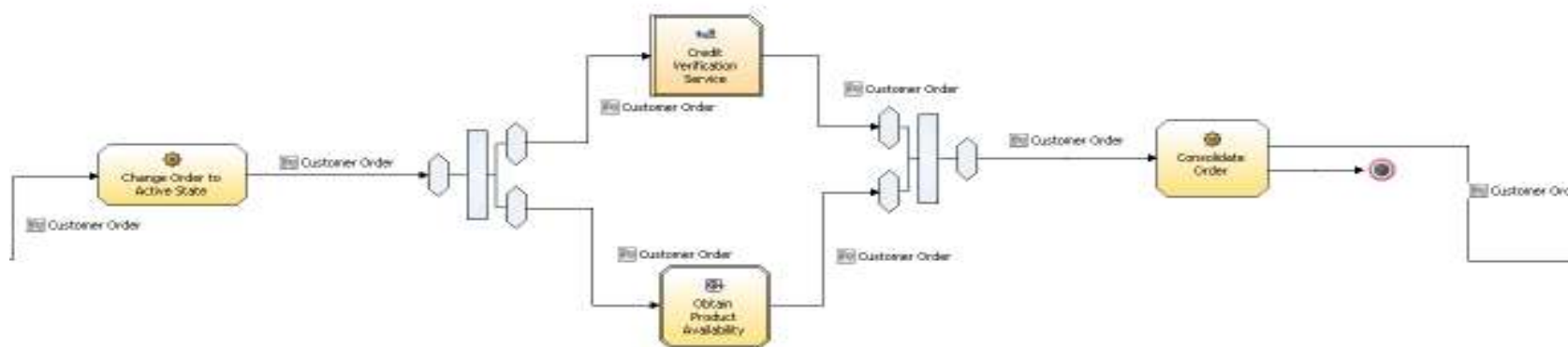
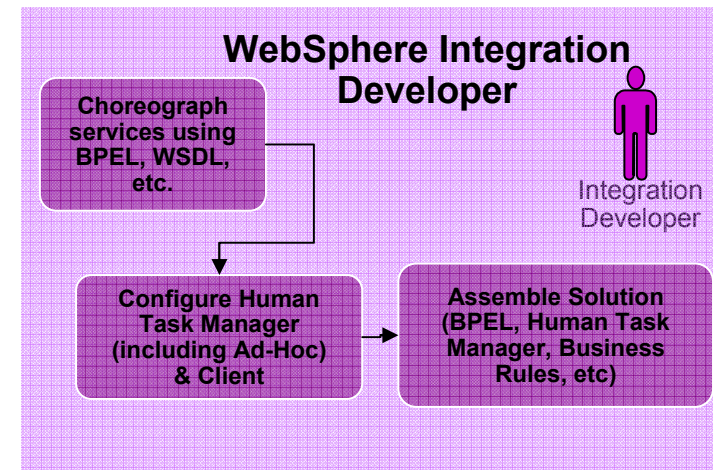
BDD Details 4 – Construct and Test the Services

- Build new services from scratch or enable existing applications for services
- Discover and consume existing services
- Test functionality
- Test performance
- Team development and life cycle integrations

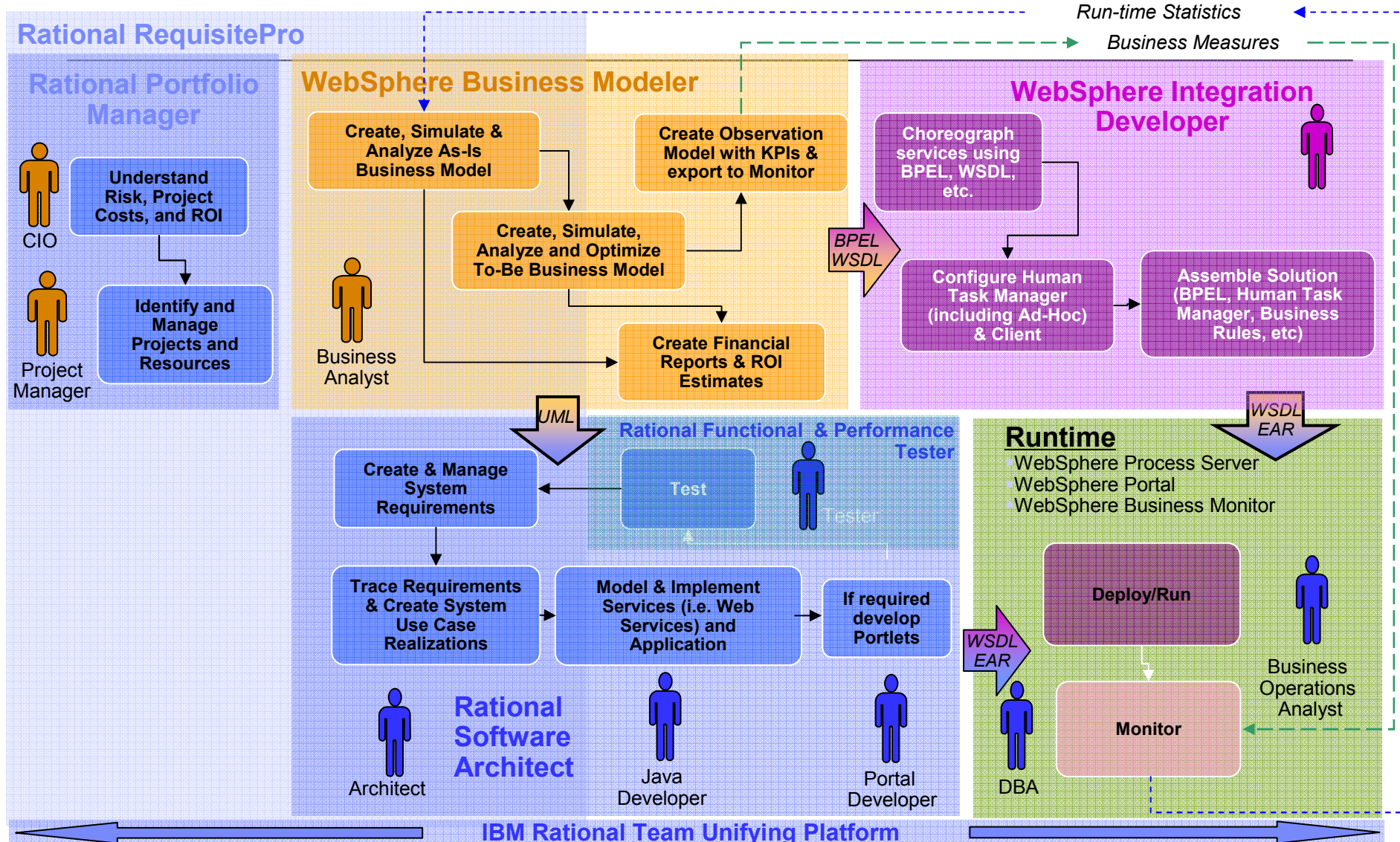


BDD Details 5 – Implementing Business Processes

- Implement business processes designed by Business Analysts using BPEL
 - Plug in Services
 - Plug in Human Activities (Staff)
- Composition with services
- Deploy and test



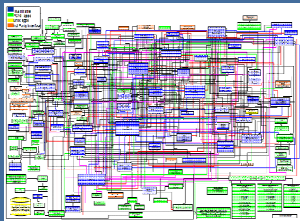
Big Picture of BDD for SOA



V. Business Process Management – from end-to-end

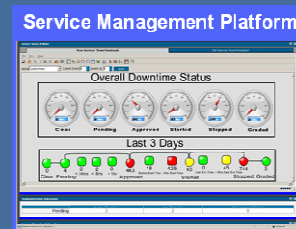
Overview Service Management

What's happening with the infrastructure?



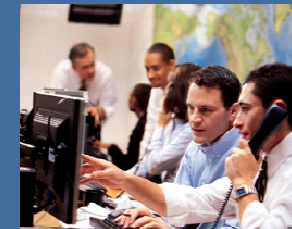
- Infrastructure and application discovery
- Server monitoring
- Storage monitoring
- Network monitoring
- Data monitoring
- Application monitoring
- Service monitoring

How does this relate to the business service?



- Dashboard
- Application dependency mapping
- Business service management
- Service level management

What actions do we take?



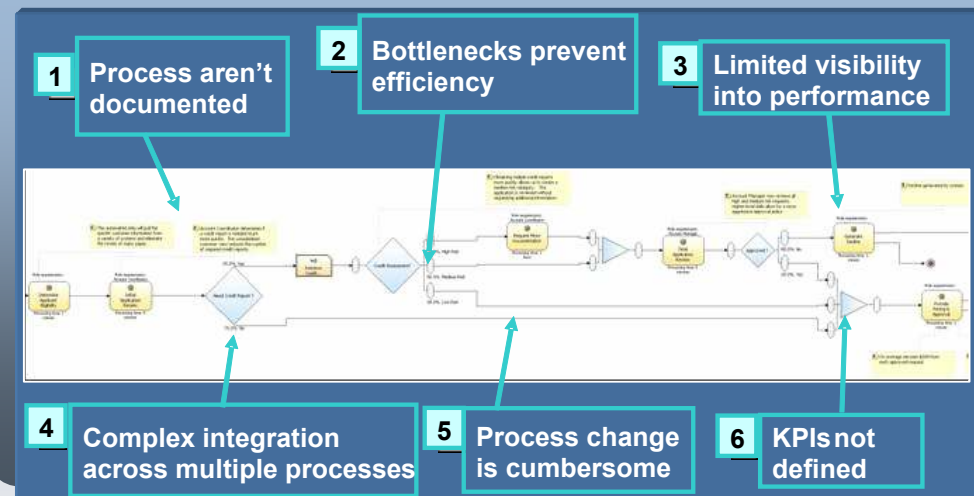
- System reconfiguration
- Data restore
- User identity provisioning
- System and application restart
- Infrastructure deployment
- Service mediation

Business Process Management

BPM is:

A discipline combining **software capabilities** and **business expertise** to **accelerate process improvement** and facilitate business innovation

BPM Solves:



BPM Includes:

Integration Modeling Monitoring

Software that Enables BPM

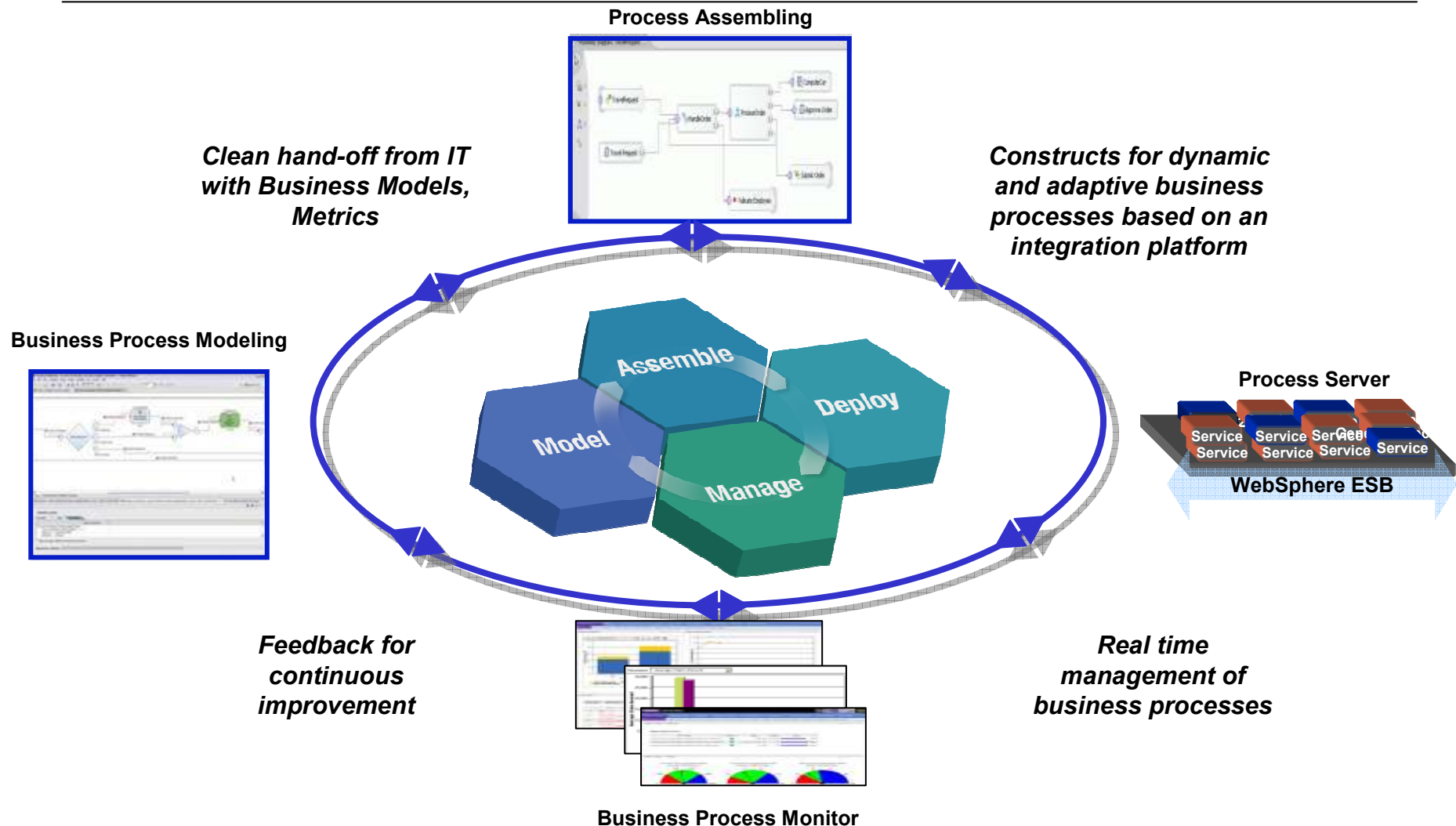
Forms SOA Workflow

Models and Maps Process Knowledge

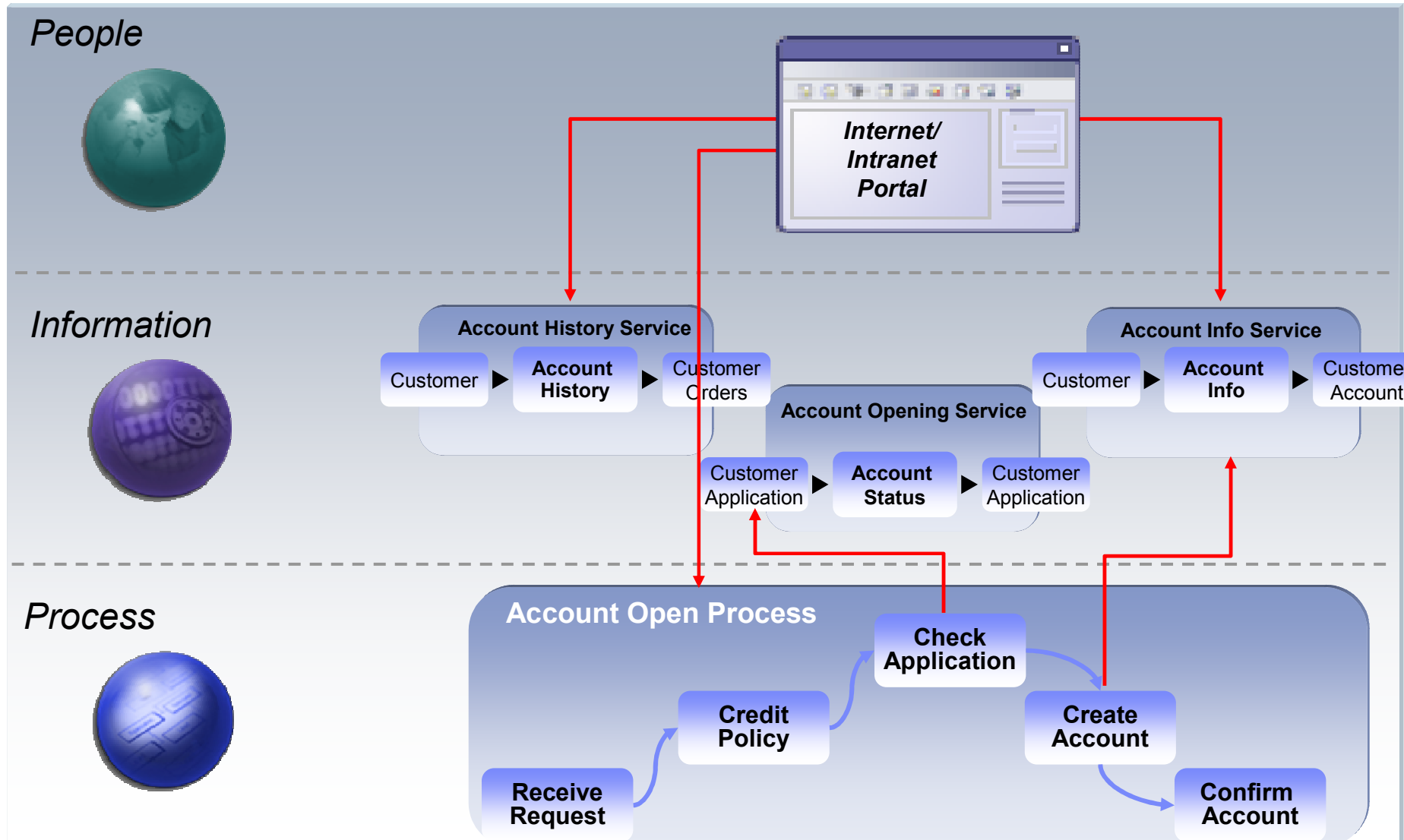
Expertise that Delivers BPM

Policies Rules Methodology


Managing Your Business Processes



The End-to-end Account Opening Solution



Building User Interaction Services



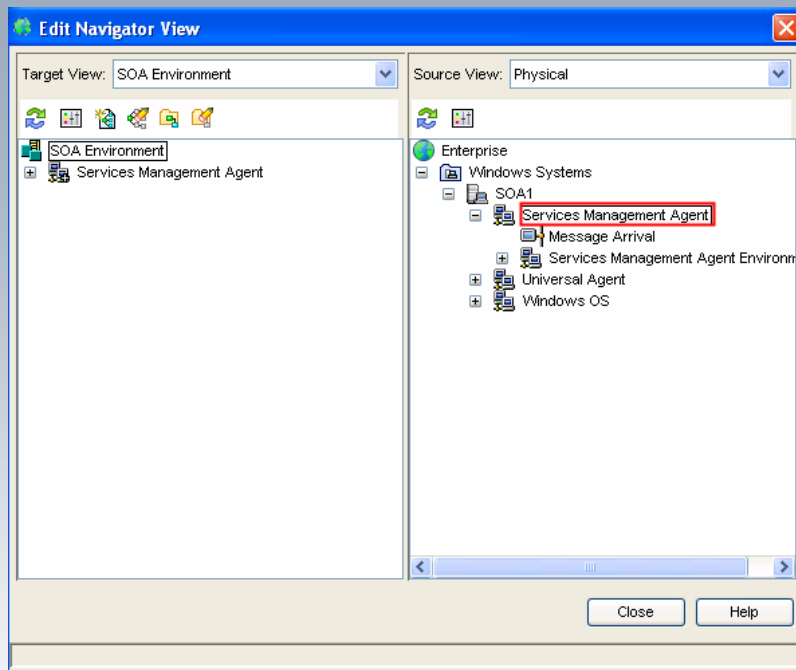
The left screenshot displays a web application titled 'Application for Credit' with an IBM logo. It features a form for entering customer information, including fields for Company Name, Address Line 1, Address Line 2, City, Country, State/Province, and Postal/Zip Code. Below this, there are fields for contact information: First Name, Phone Number, and Tax ID Number. A 'Get Data' button is visible next to the Company Name field. The right screenshot shows a 'Getting Started' dashboard for a user named Melissa Clark. It includes a search bar, a list of contacts (Dennis Wilhelm, John Hayden, Melissa Clark, Janet Wright, Maggie Azeal), and several portlets for 'Customer' (Customer Satisfaction, Grow Market Share) and 'Finance' (Achieve Revenue Goals, Grow Profit, Maintain Spending Target, Growth Through New Products, New Patents, ROI Compliance). A 'No matches were found' message is displayed at the bottom left of the dashboard.

*Developing and Deploying the
“New Account” Application*

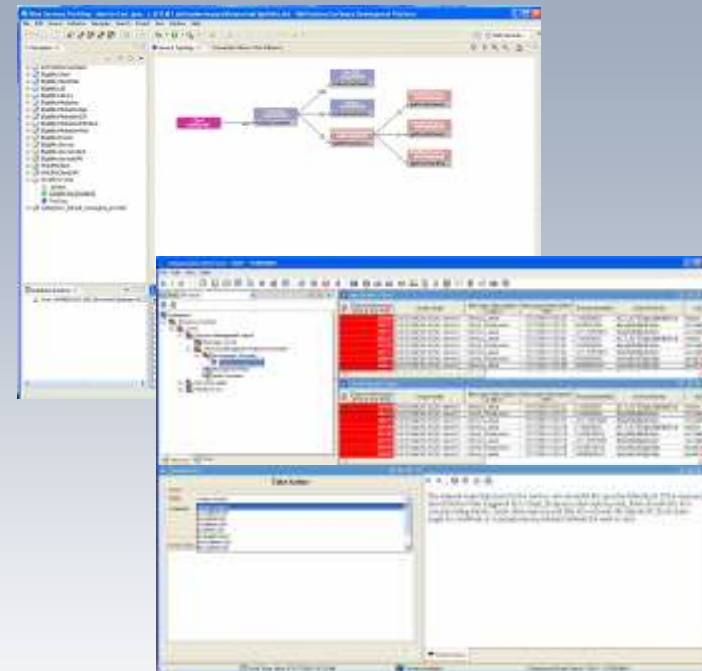
*Building Role-Specific
Portlets and Dashboards*

Infrastructure Architecture

Composite Application Management

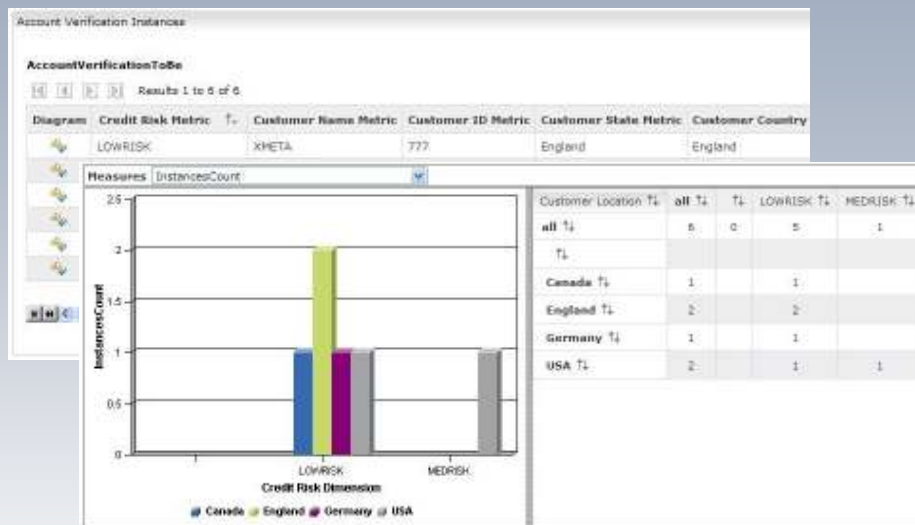


Configuring Service Management Agents



Monitoring Account Opening Performance and Availability

Process Monitoring and Management



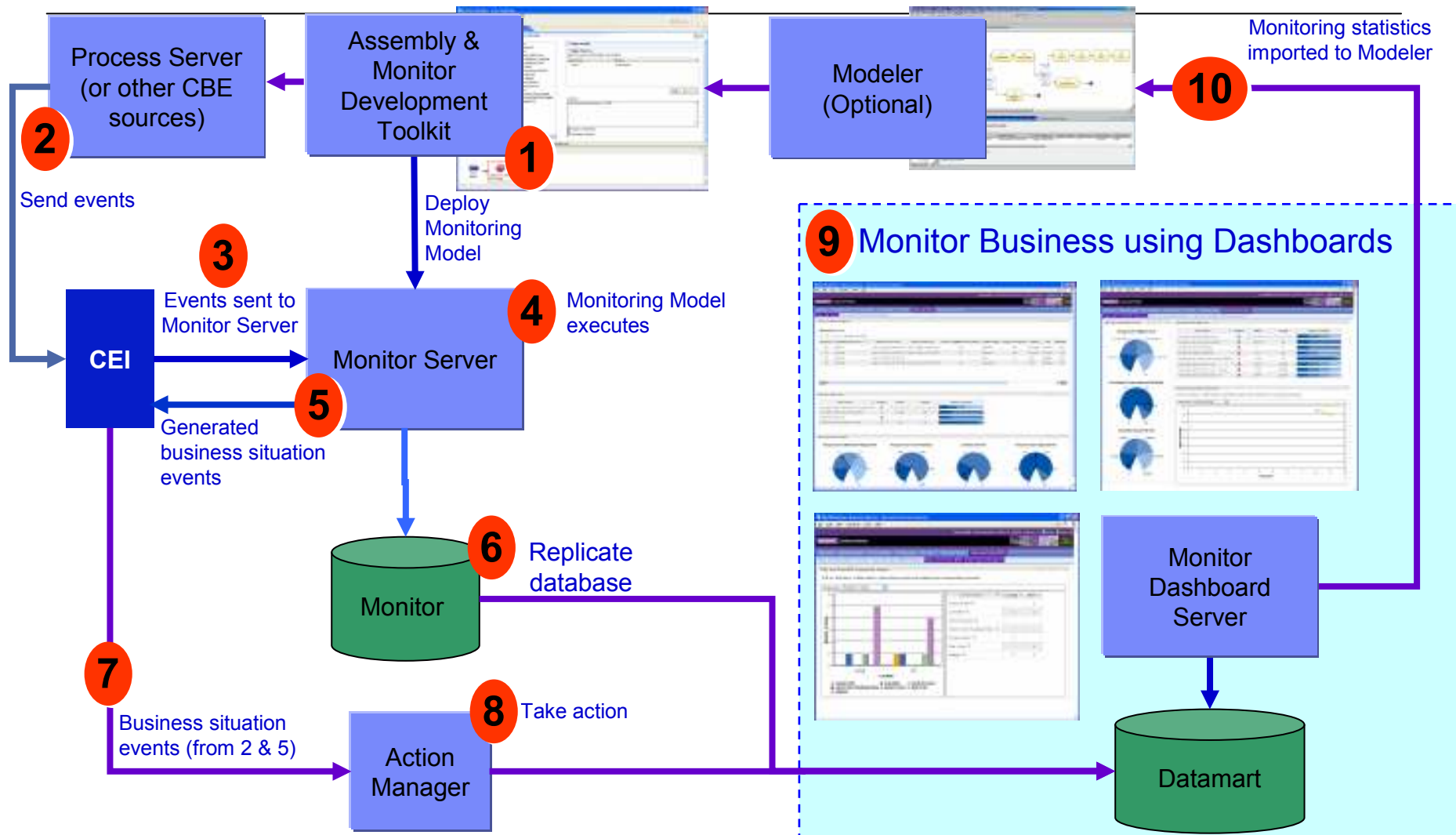
Monitoring Credit Risk

Account Verification Page Performance Indicator (KPI)

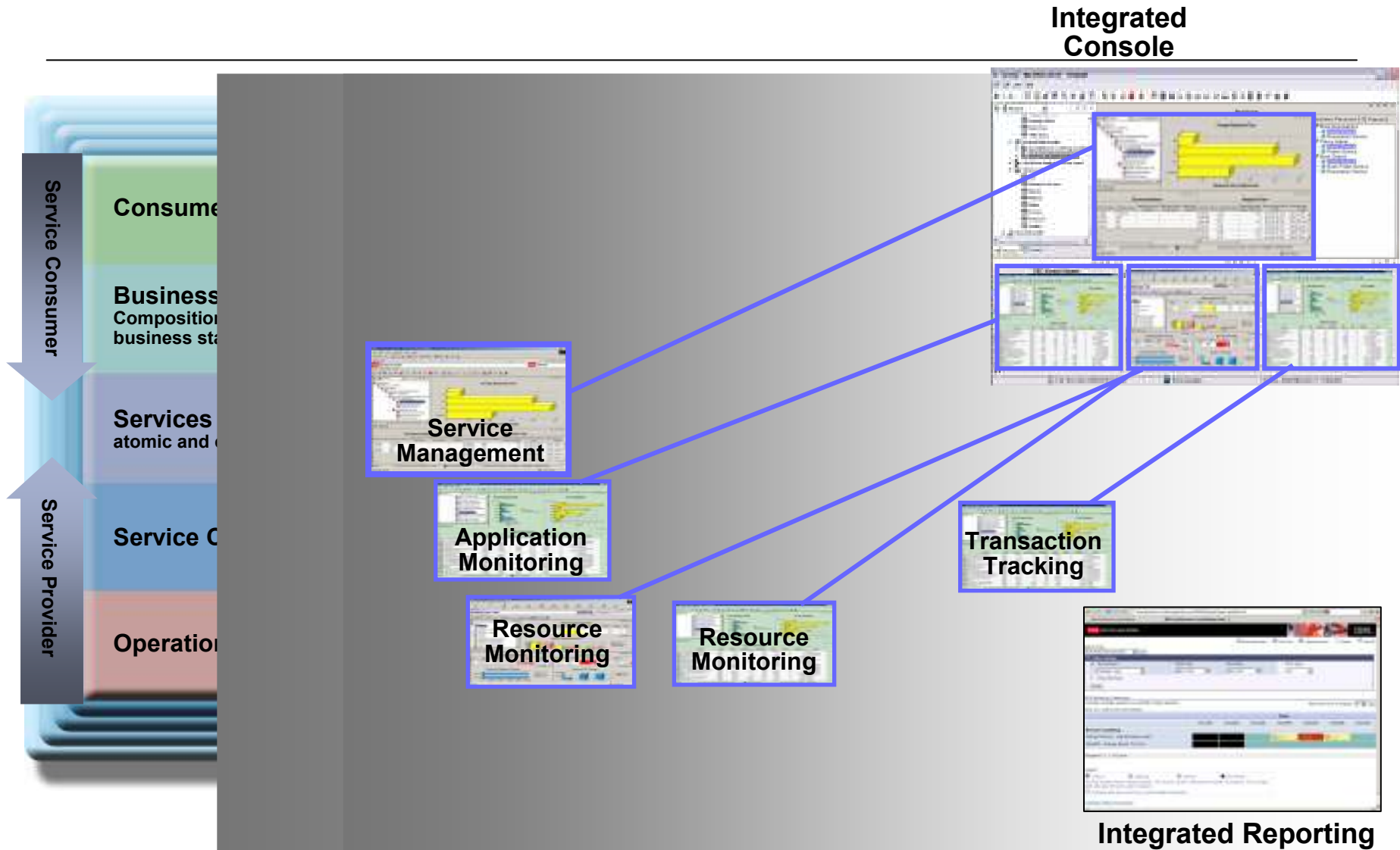
KPI Name	Status	Value	Target	Value in Range
Account Opening Duration Indicator		1 m, 9 s	14 h, 0 m, 0 s	<div style="width: 10%;"></div>
Manual Approval Indicator		33.33	5	<div style="width: 66.66%;"></div>
New Accounts Opened Indicator		66.67	90	<div style="width: 74.07%;"></div>

Building Components to Monitor Account Opening Duration

Logical Architecture for Business Activity Monitoring



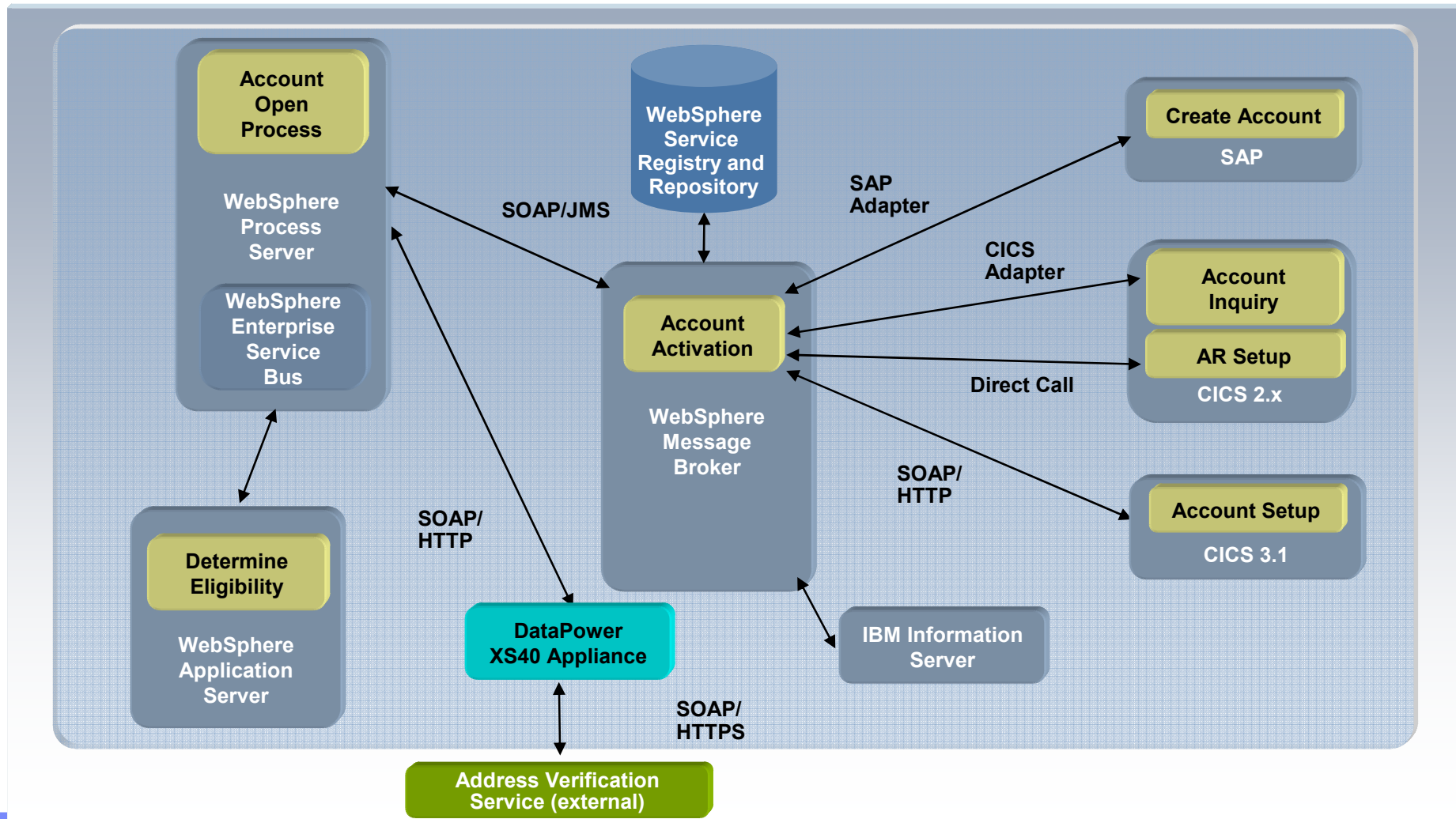
Integrated Visibility of SOA Resources



A Representative Dashboard Solution



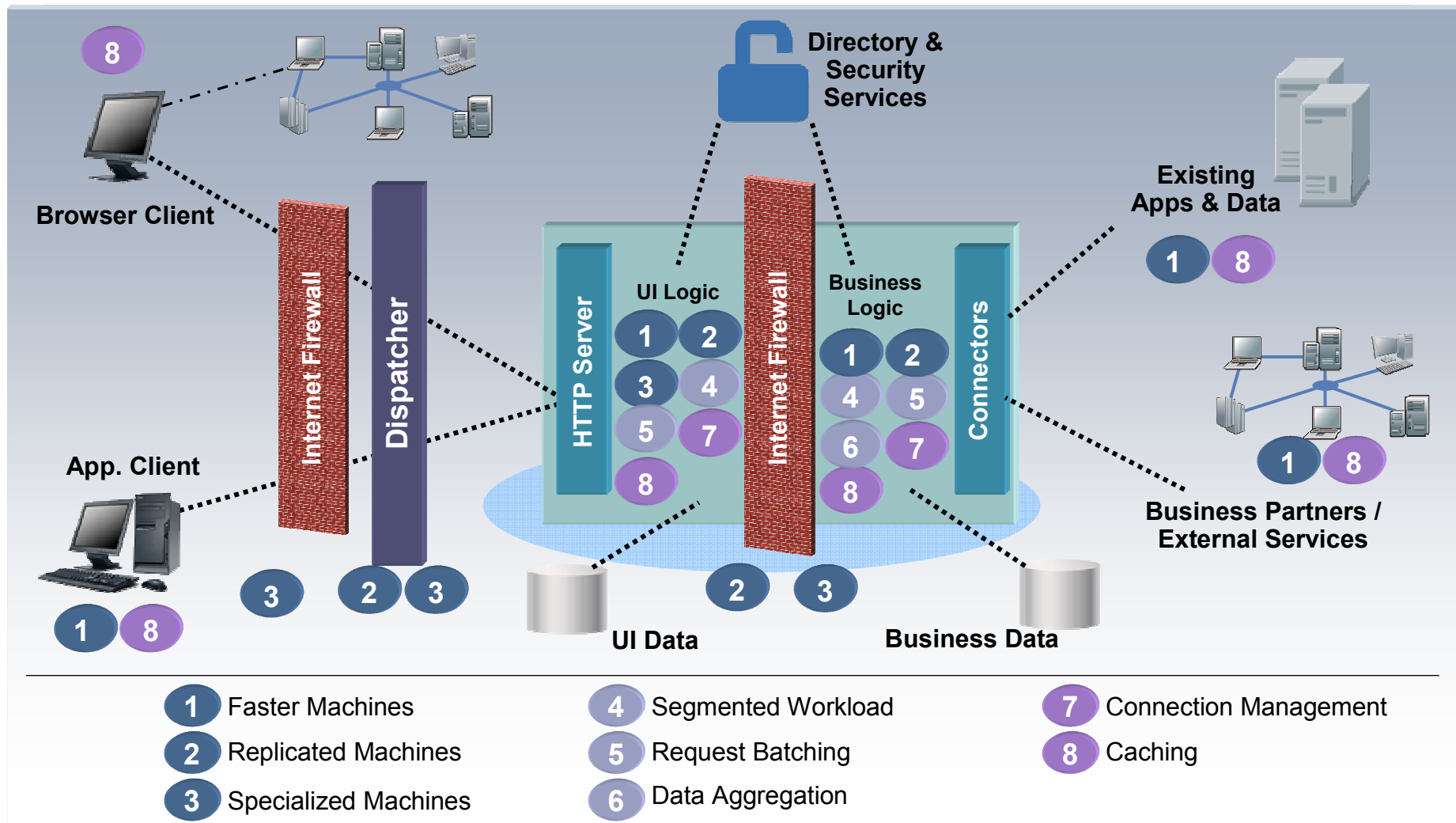
Deploying the Solution Architecture Implementation Topology for JK Enterprises



High Availability in the SOA World

- An application may exist on multiple servers in different locations
 - Applications need to be “availability” aware in case a service within the workflow is unavailable
- SOA applications impact service availability levels
 - SOA introduce new application dependencies, including externally provided services
 - Need to understand the end-to-end view
- Monitoring, management and reporting is required to achieve predictable availability in an SOA environment
- Plan for the unexpected
 - What are the non-functional requirements? What systems are you using? Distributed? Mainframe? Where are they located? How will they be accessed?
 - The more components in the transaction, the greater the risks for failure or human error

Techniques for High Availability and Scalability



Closing Remark