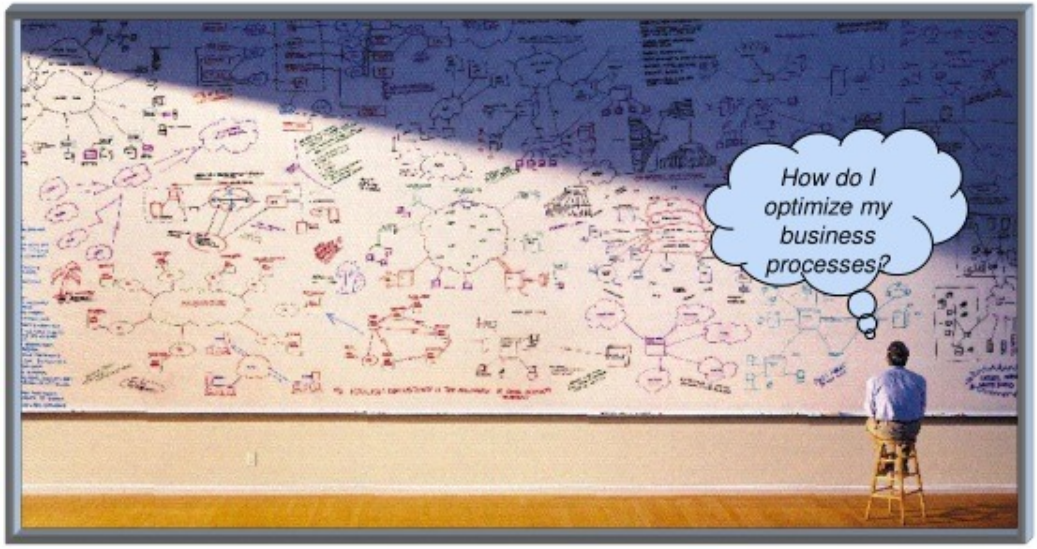
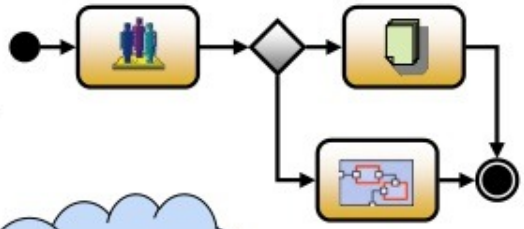
SOA Bridges the Gap between Business and I/T

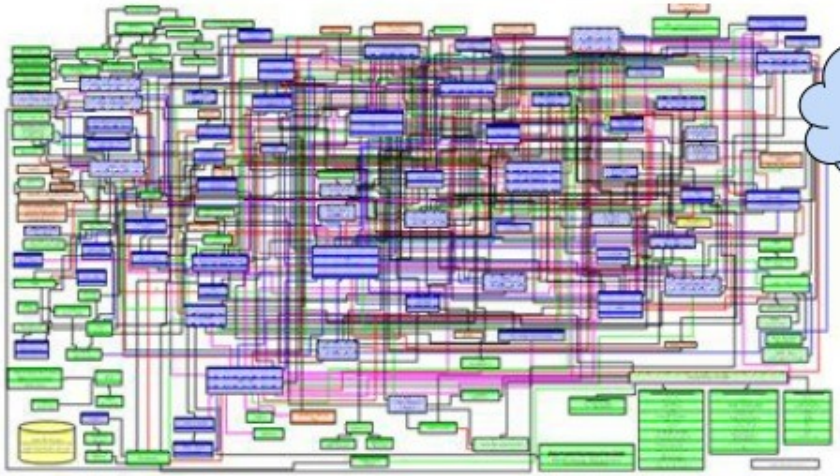


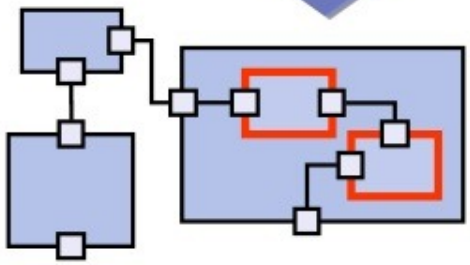
Business Models Identify Process Tasks



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

Business Process Tasks = I/T Services Granularity





I/T Components exposed as SOA Services

धन्यवाद

Hindi

多謝

Traditional Chinese

ขอบคุณ

Thai

Спасибо

Russian

Gracias

Spanish

شكرا

Arabic

Thank You

Obrigado

Brazilian Portuguese

Grazie

Italian

Danke

German

Merci

French

多谢

Simplified Chinese

நன்றி

Tamil

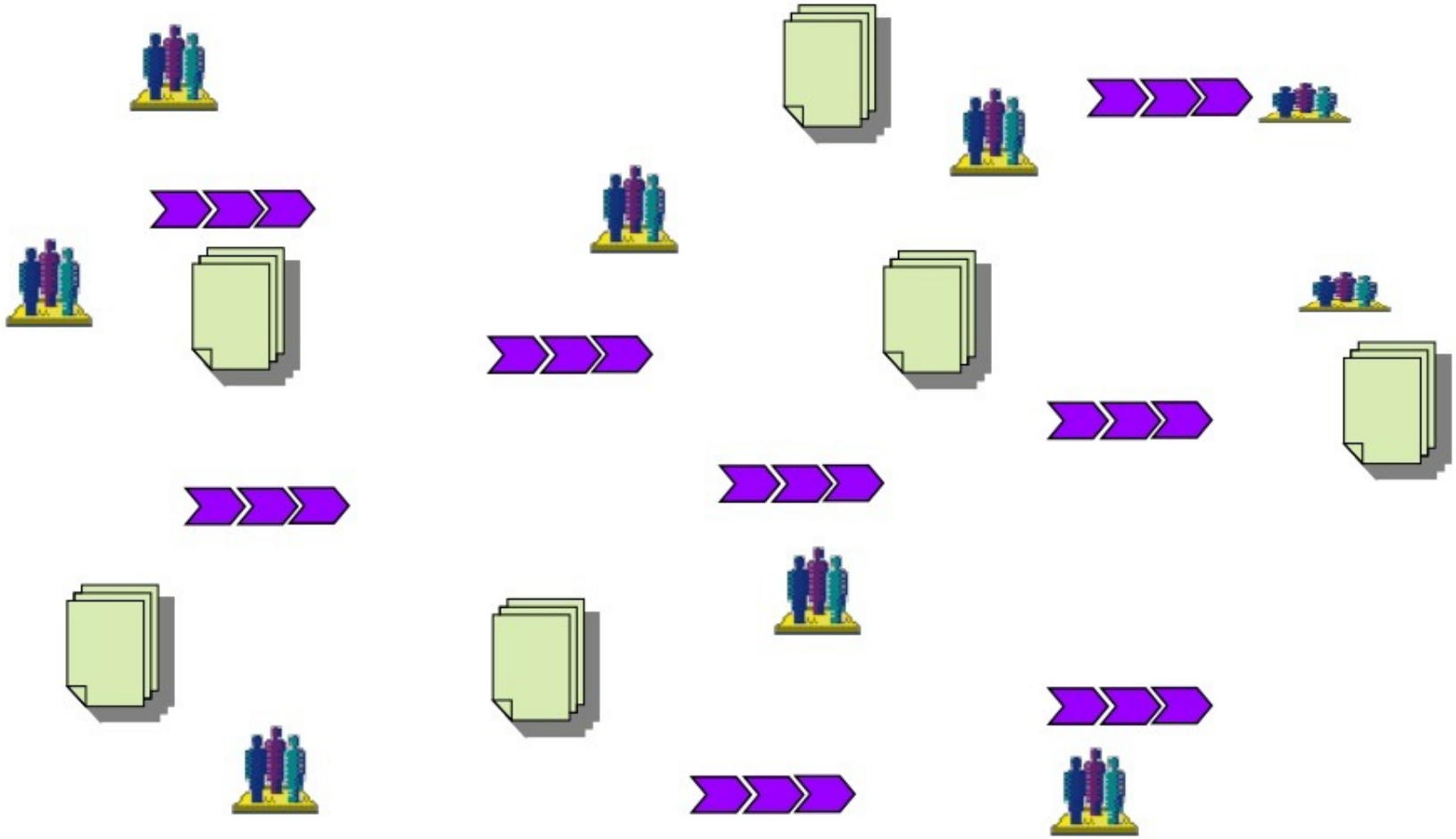
감사합니다

Korean

ありがとうございました

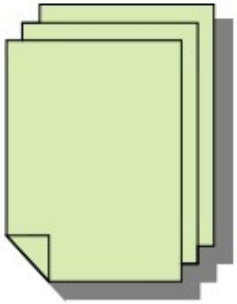
Japanese

Business people drive processes that involve much information



Why should IT use Service Oriented Architecture?

Organizations are composed of



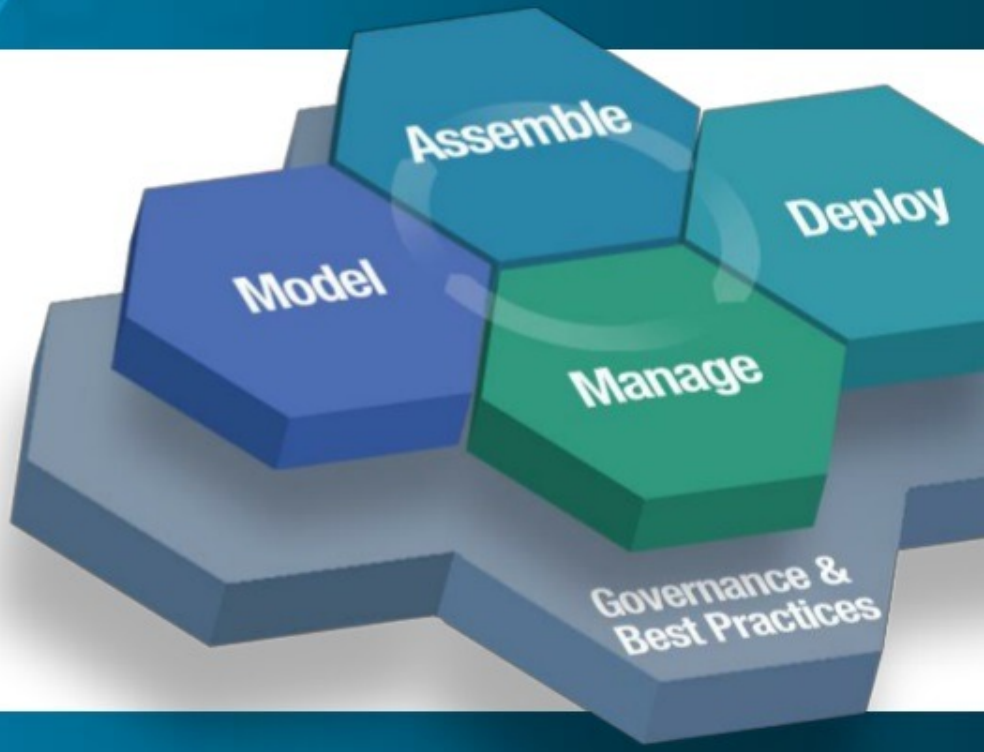
People

Processes they run

Information they use

IBM

Business Driven Development for SOA



Rational. WebSphere.

Tools, Servers and middleware

ON DEMAND BUSINESS™

Where we've come from….

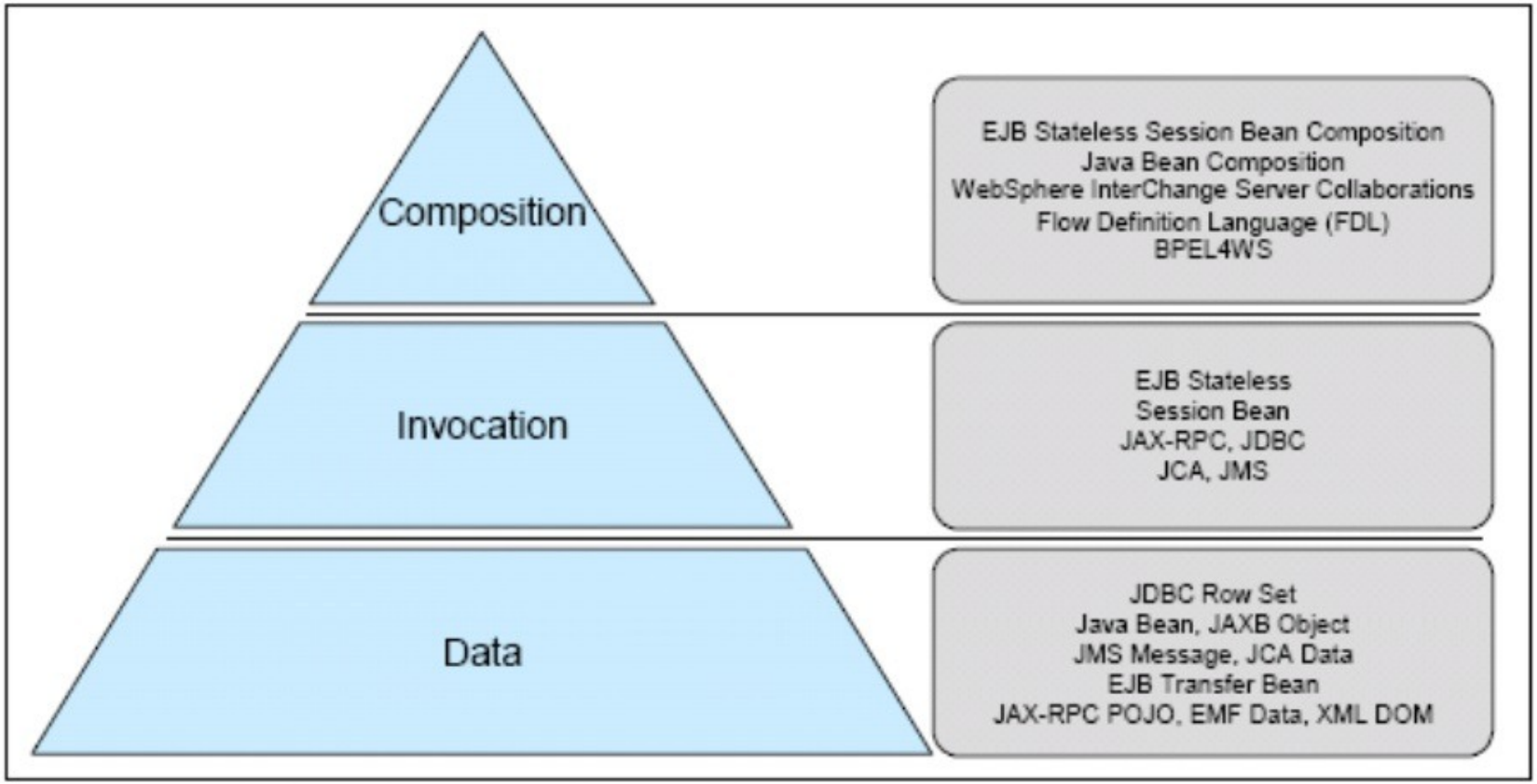


Figure 2-1 Traditional programming model

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)?

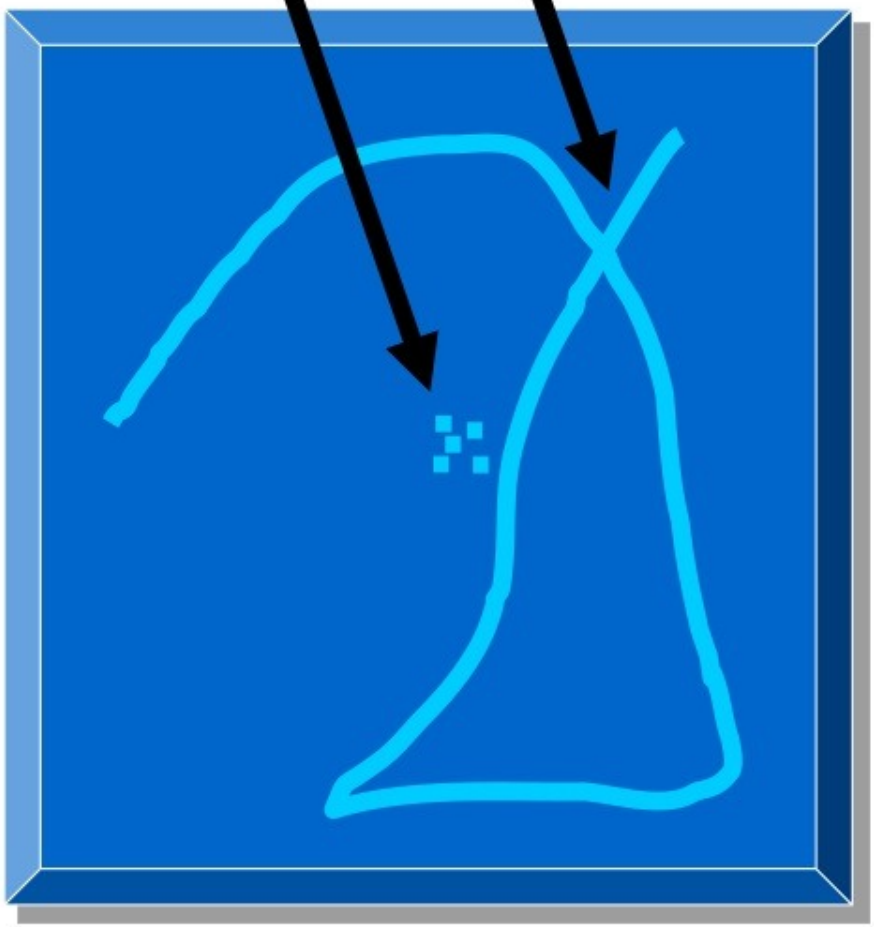
An IT **architectural style** that supports service orientation

… a composite application?

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

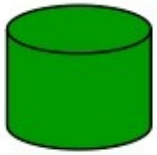
Business Services

Business Function



Integration through "service orientation"

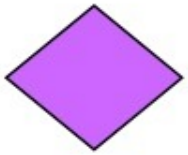
User Interaction Logic



Data Logic

Integration Logic

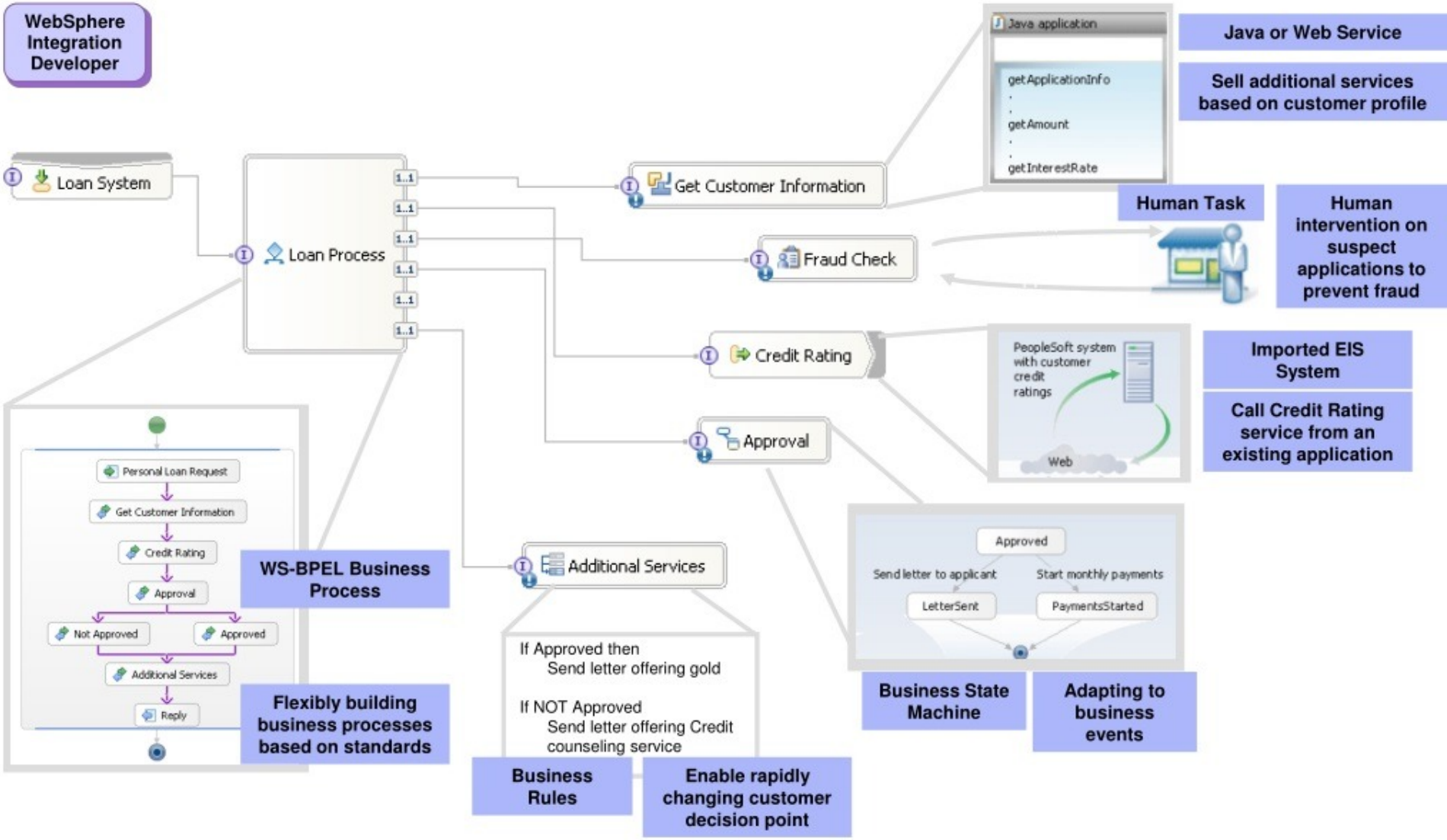
Process Logic



Business Rules

Monitoring & Management Logic

SOA Example - Composite Applications



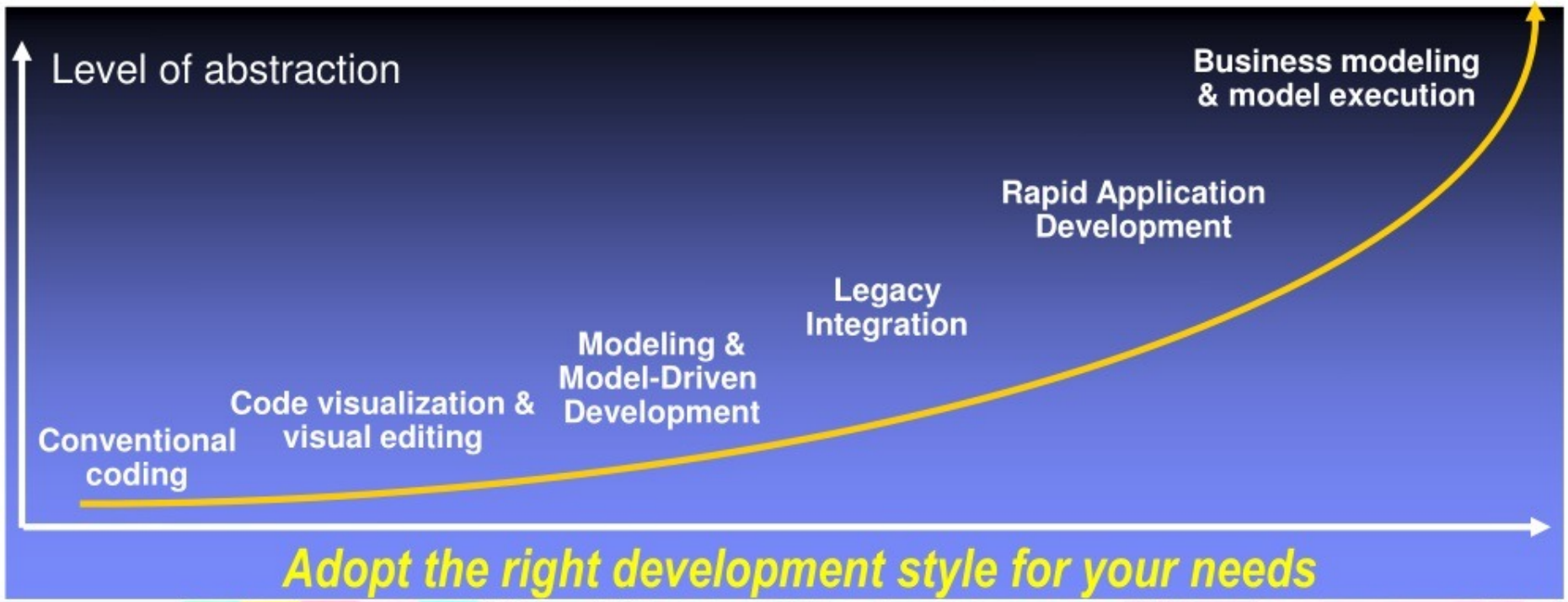
IBM Design & Construction Offerings

Benefits

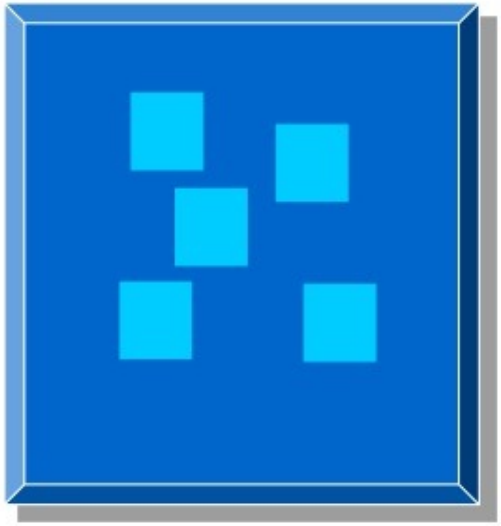
- Drive higher levels of productivity and time to value
- Maximize quality, robustness, reusability
- Maximize value from both code & models
- Choice of development styles

Capabilities

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



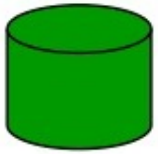
Business Services
(Tools help you Model & Assemble these)



- Modeled by business stakeholders
- Realized by I/T stakeholders
  - Transforming existing assets
  - Creating new assets
- Modular and re-usable
- Composed into applications, processes, and composite services

Application Infrastructure
(Server infrastructure is out-of-the-box)

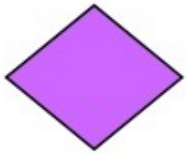
User Interaction Logic



Data Logic

Integration Logic

Process Logic



Business Rules

Monitoring & Management Logic

Business Services
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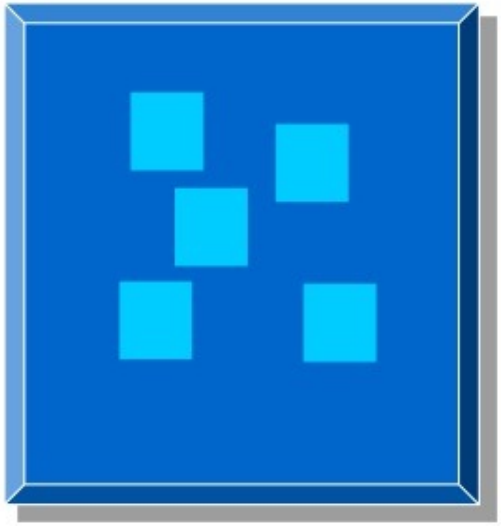

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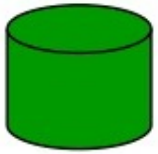
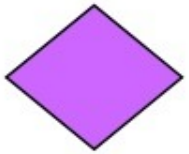


Data Logic

Integration Logic

Process Logic

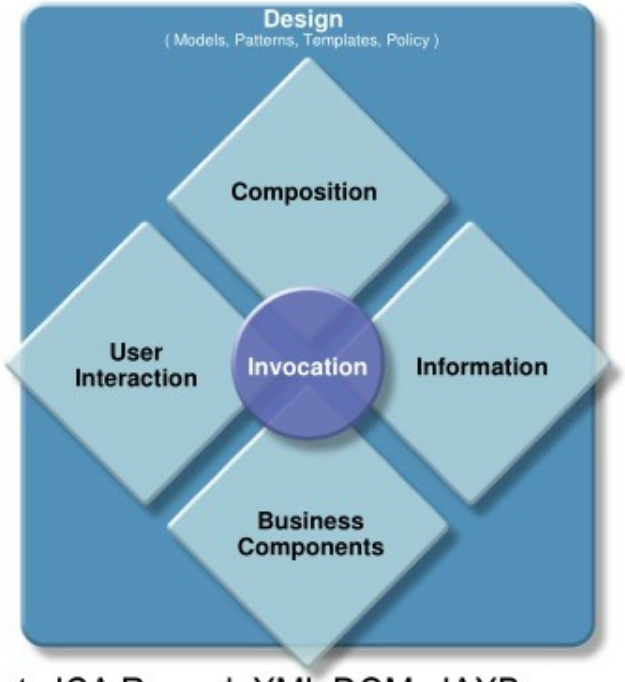


Business Rules

Monitoring & Management Logic

SOA Programming Model Supported by Key Standards

- JavaServer Faces
  - Standard way to construct user interfaces for web applications, JSR 168 portlets, etc.
  - MVC based User Interaction Framework



- Service Component Architecture (SCA)
  - Calling anything efficiently as a service, local or remote, human or system, cross-platform and open standards
  - Component services programming model which provides a consistent framework for assembling solutions
  - Jointly developed/endorsed by IBM, BEA, IONA, Oracle, SAP, and Sybase
  - Apache Open Source Incubator Project
    - http://incubator.apache.org/tuscany/

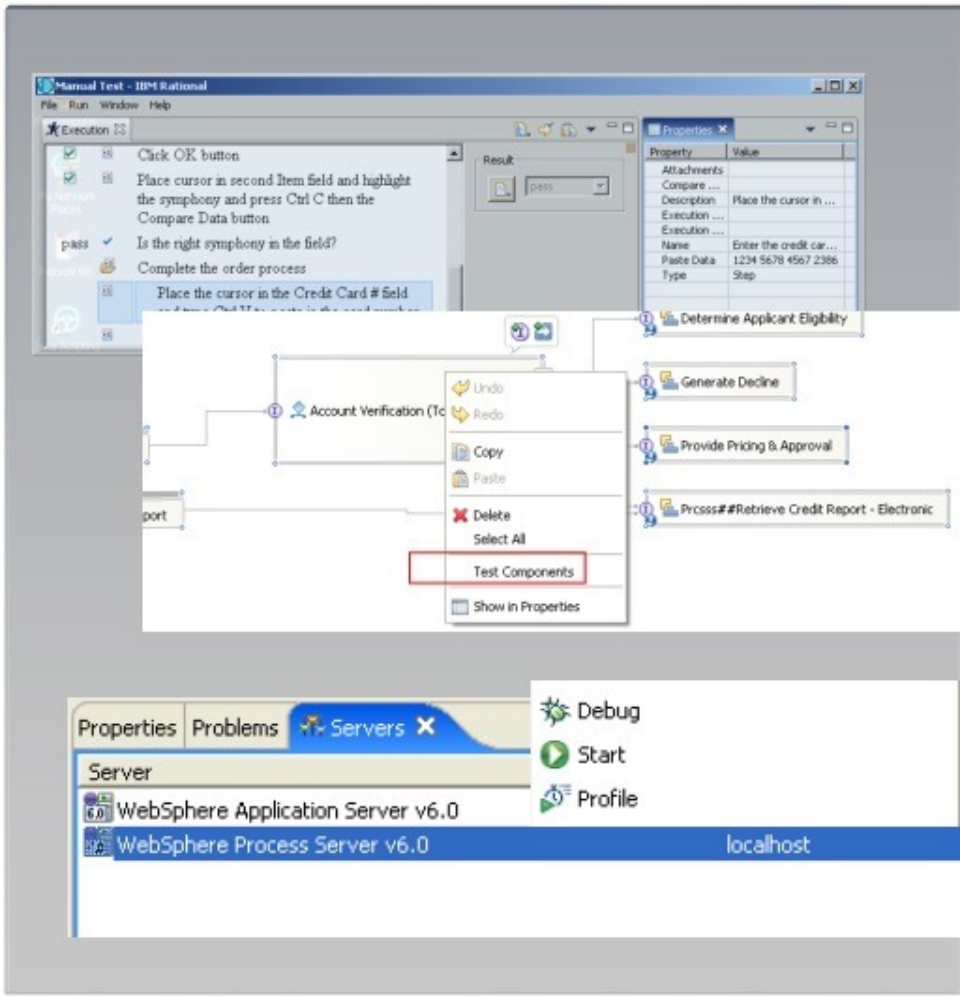
- Service Data Objects (SDO)
  - Uniform (technology independent) way to represent data
  - Provides *Single abstraction* (common API) across JDBC ResultSet, JCA Record, XML DOM, JAXB, Entity EJB, CMI (for MQ messages), and so on
  - Co-developed by IBM and BEA

- Business Process Execution Language (WS-BPEL)
  - Standard way to choreograph processes (a.k.a. orchestrate services) standardized through OASIS

Test Early, Test Often

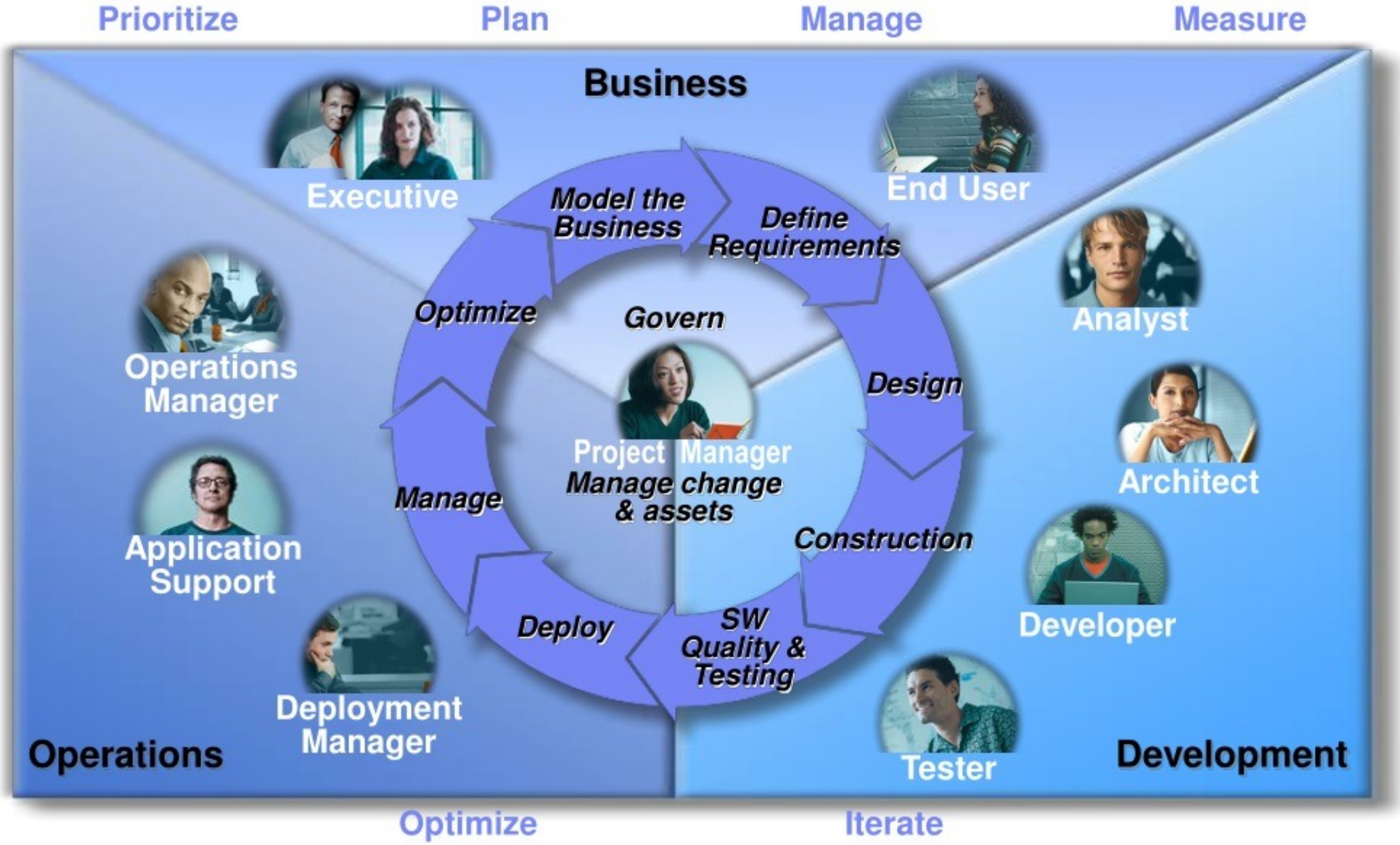
Developer

- **Testing needs to occur across Business Driven Development:**
  - Component
  - Service
  - Business Process
  - Composite Application
  - Functional
  - User Interface
  - Performance
  - Regression
  - System
- **Integrated set of test tools (that support SOA) and an integrated test environment is important**

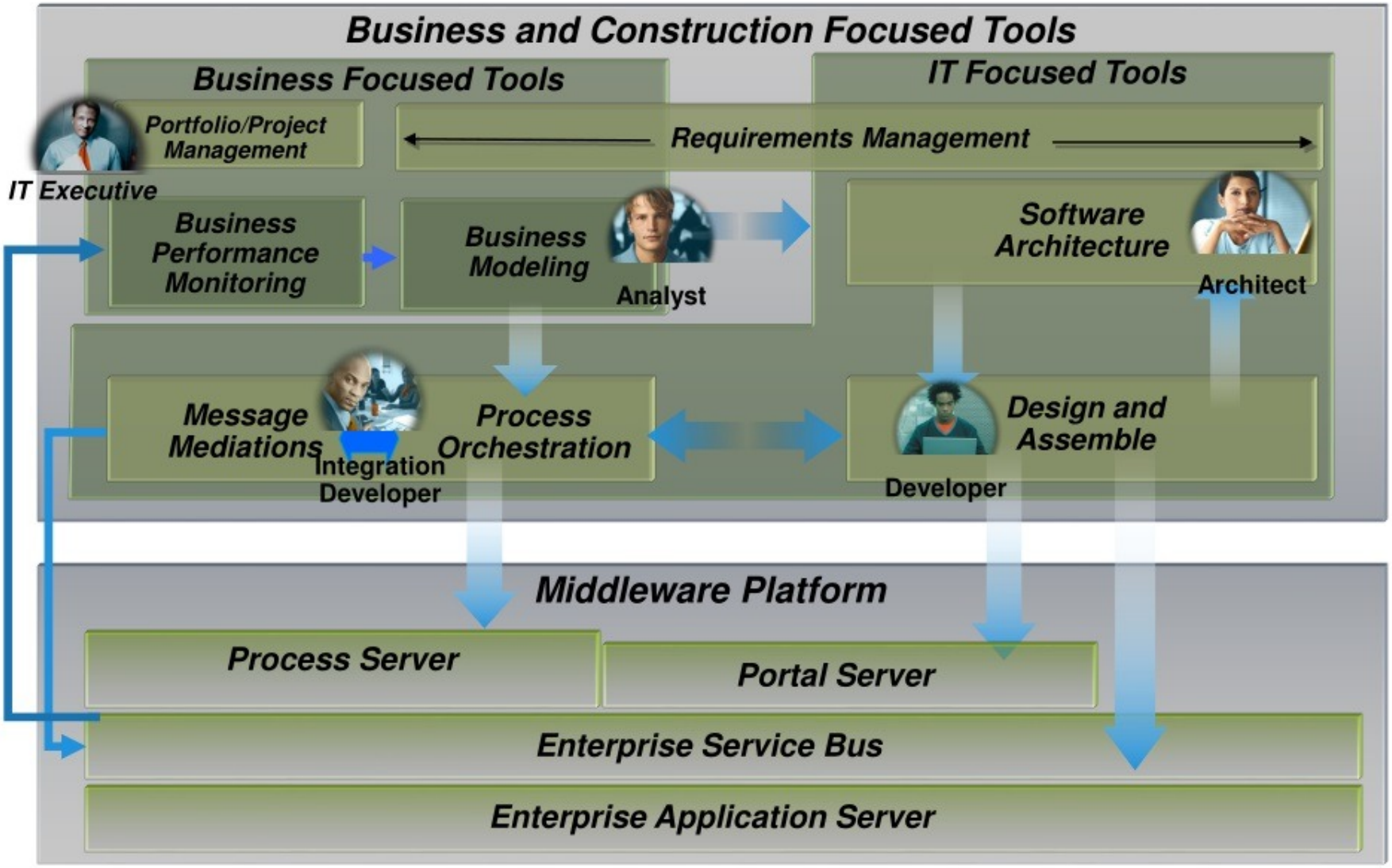


Business Driven Development for SOA

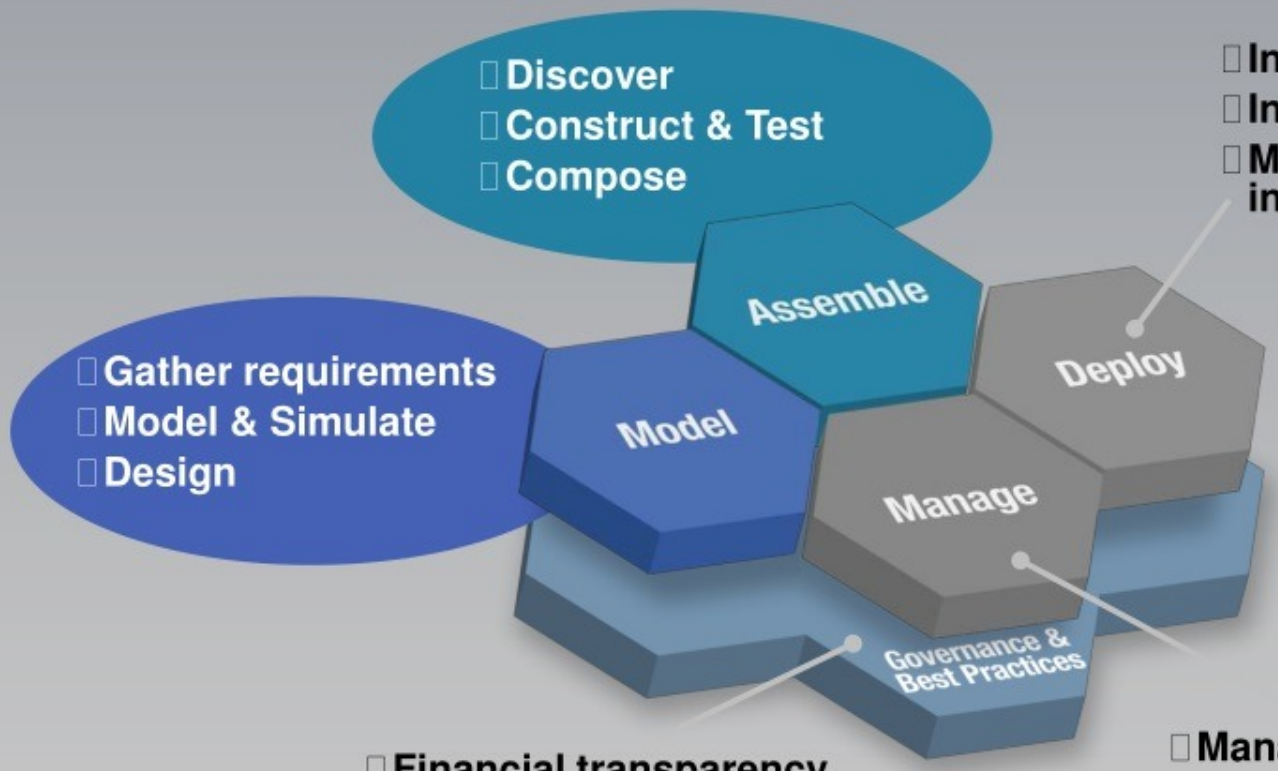
IBM Software Development Platform



Business Driven Development Tools & Server Middleware



Business Driven Development for the SOA Lifecycle



Where we are…a simplified SOA Programming Model

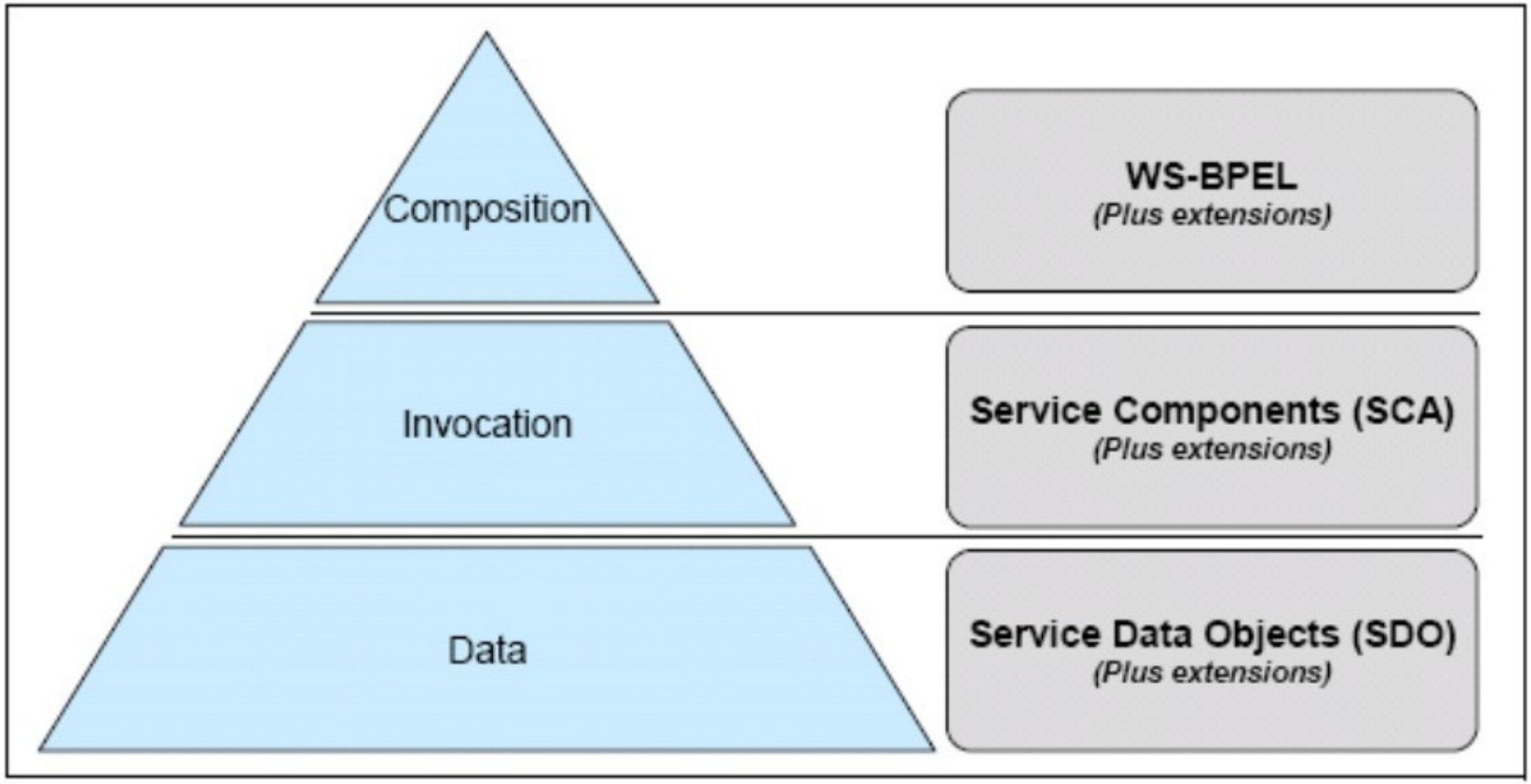


Figure 2-2 New programming model

SOA Foundation – Development Tools

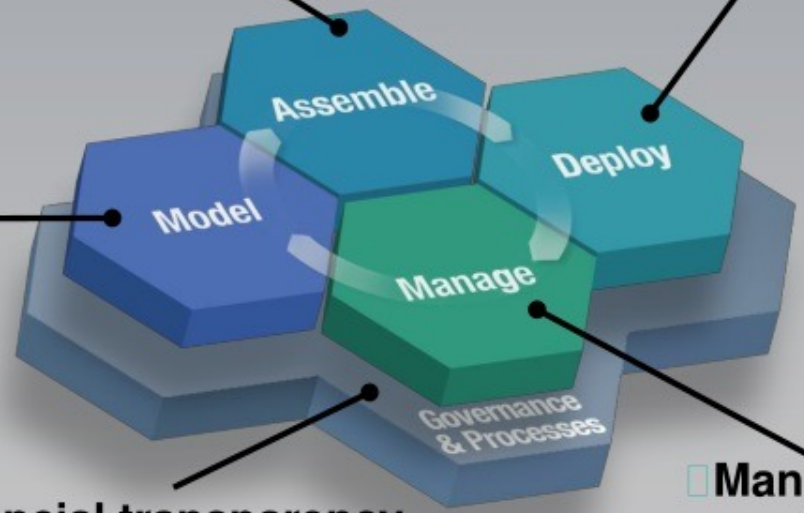
Role	Description	Development Tool
Business Analyst	Modeling business processes for optimization or to reengineer existing business processes or define new business processes	WebSphere Business Modeler No programming experience required Can focus on business performance & process
Software Architect	Model-driven development environment that automates the translation from design to implementation. Includes requirements and business modeling integrations with RequisitePro and WBI Modeler	Rational Software Architect Focused, specifically on UML modeling and J2EE implementation
Integration Developer / Specialist	Visual tools to configure integration logic with existing and new applications and humans in the network	WebSphere Integration Developer Some basic programming experience (loops, conditions, string manipulation) Expect tools to simplify and abstract advanced IT implementation details
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 Focused on J2EE implementation

SOA Lifecycle Bridges 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

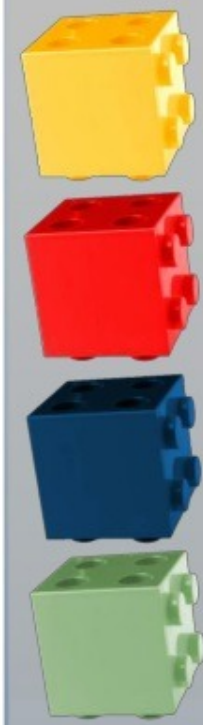
- Financial transparency
- Business/IT alignment
- Process control

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

Governance Using The IBM Software Development Platform

- **Lifecycle tool views are integrated into a <u>single</u> 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

Applications can implement business process workflows… by using services



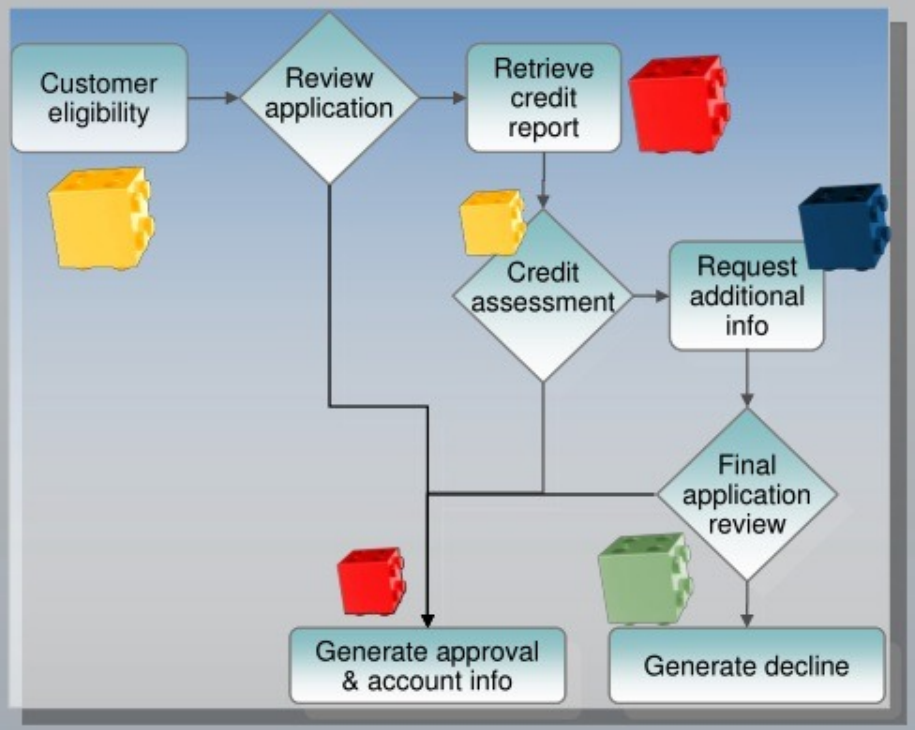
Determine Customer Eligibility

Retrieve Credit Report

Request additional info

Generate decline

Etc….



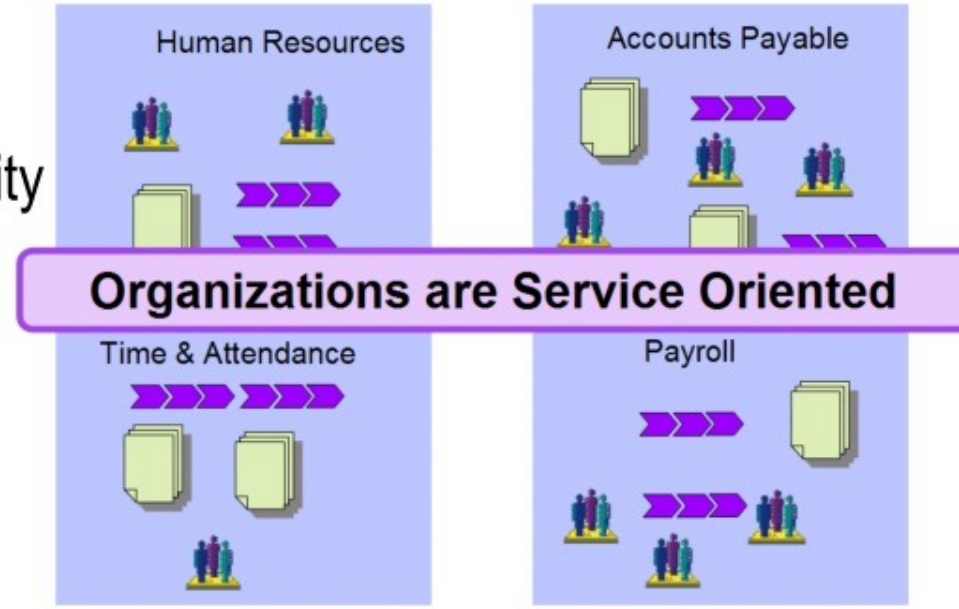
Business Process is implemented by integrating services

SOA Governance for Business Driven Development

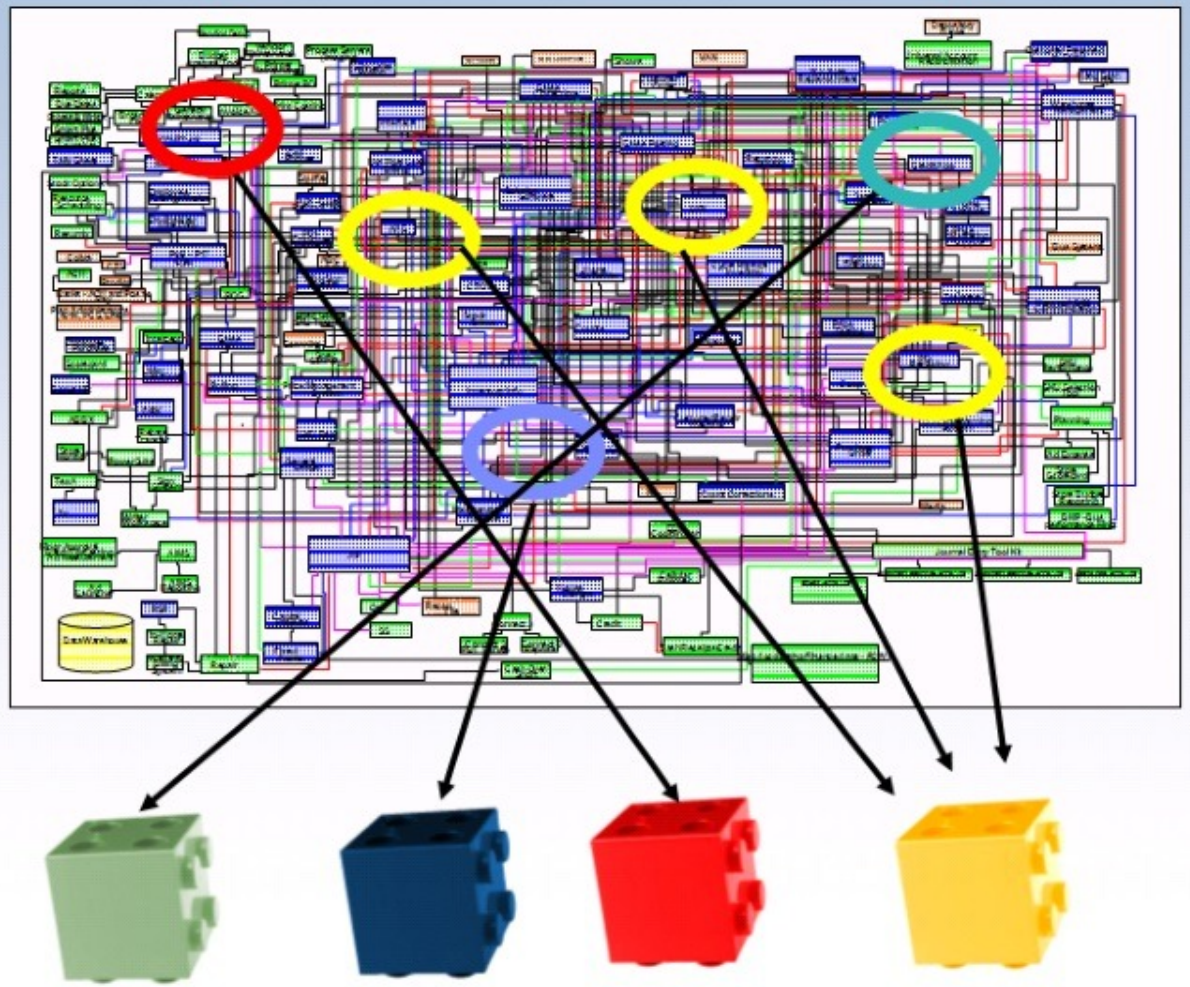
- **IBM SOA Governance & Management Method**
  - Defines Roles, Responsibilities, Tasks, and
  - Policies for SOA governance based on best practices and real-world experience
- **Tools can be used to help automate the governance process**
  - Method content can be customized content based on customer requirements
- **Manage SOA projects**
  - Build project plans and allocate resources

Why should I/T use Service Oriented Architecture?

- I/T should use SOA for the same reasons businesses are organized by services:
- More measurable and accountable
- For efficiency and optimization
  - Specialization and best practices
  - Well-defined interaction and processes
  - Independently scalable
  - Reduce duplication and reuse assets
- To isolate change & manage flexibility



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

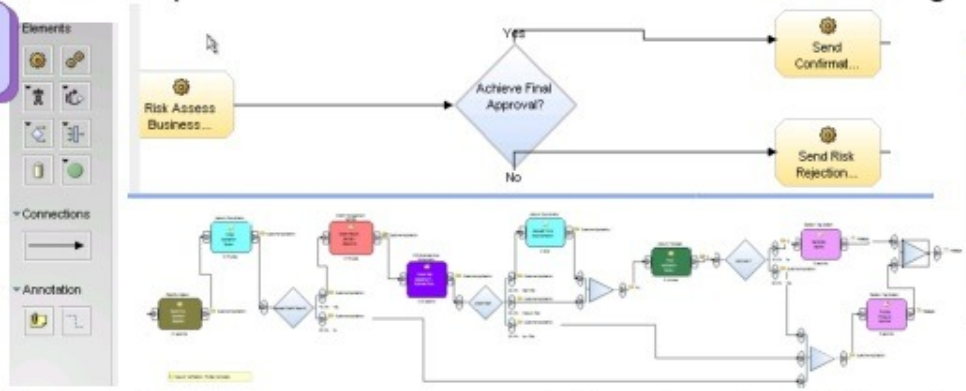
Step 4

Repeat

Business Models Driven into J2EE Web Service Workflows

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

WebSphere Business Modeler

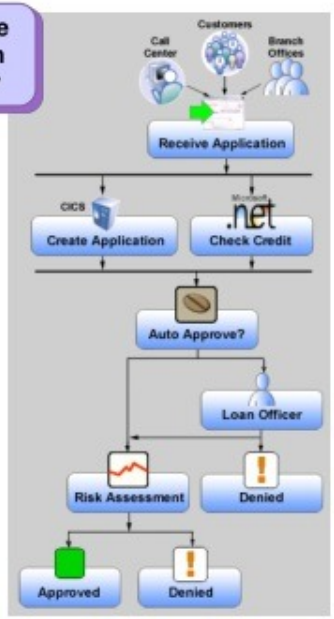


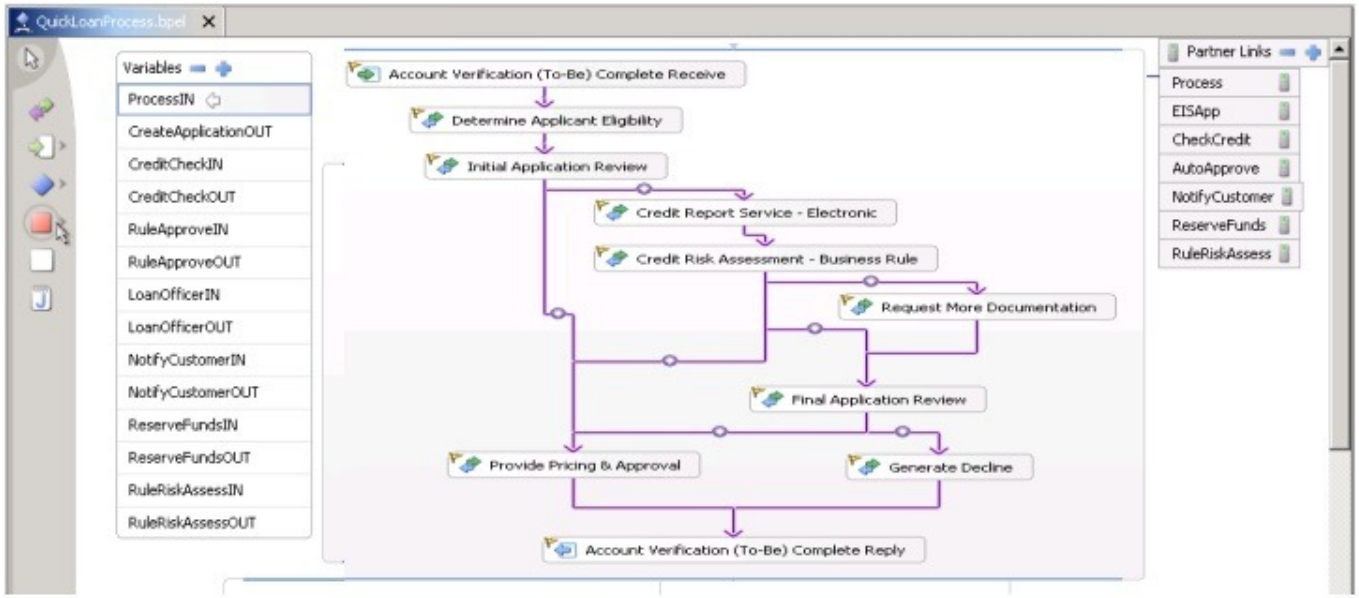
Resource Cost Analysis

	Start Time
	Thursday, January 1, 2004 12:00:00 AM CST
Total	
Average Cost Per Time Unit	$68.31 / 1 Hours
Average One Time Cost	$0.00
Average Cost Per Quantity	
Average Cost Per Quantity & Time Unit	
Annual Per TimeUnit Cost	$590,163.93

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

WebSphere Integration Developer

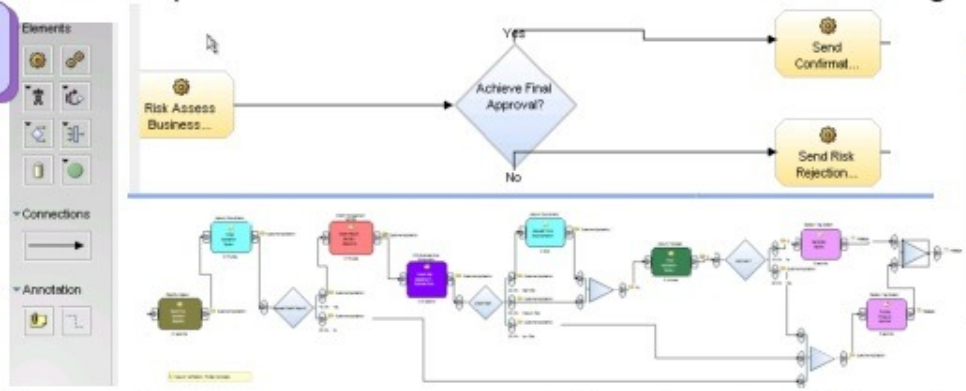




Business Models Driven into J2EE Web Service Workflows

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

WebSphere Business Modeler



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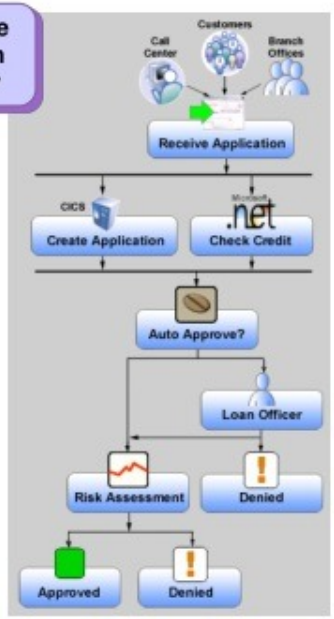
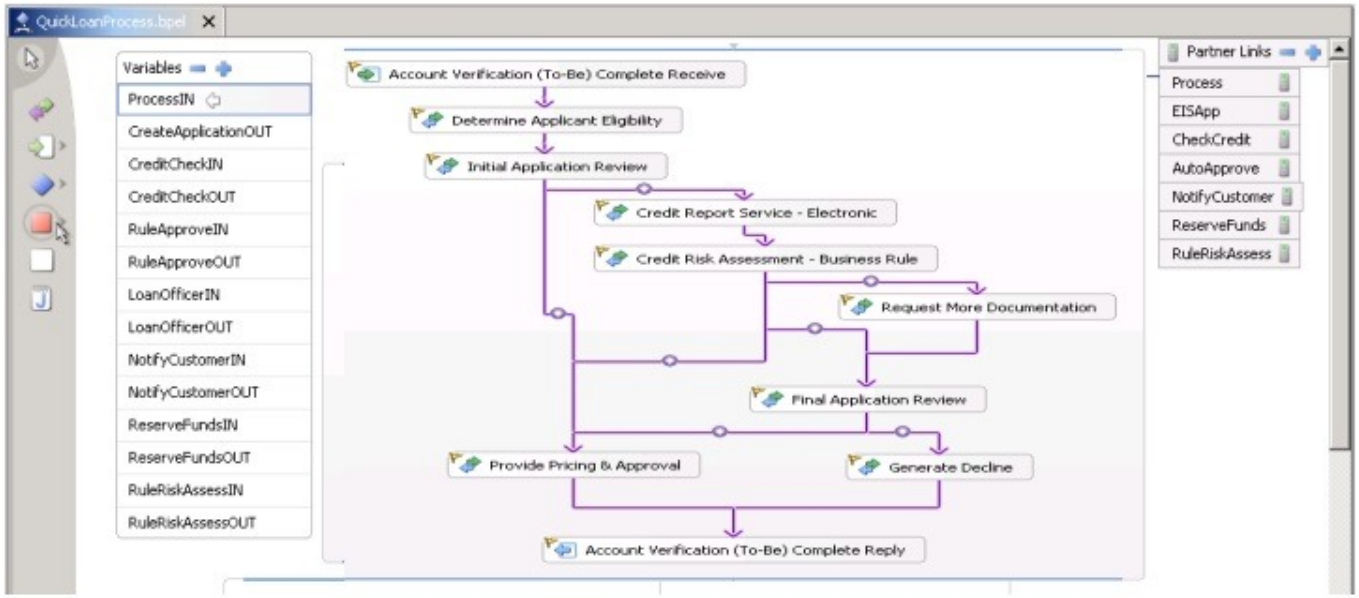


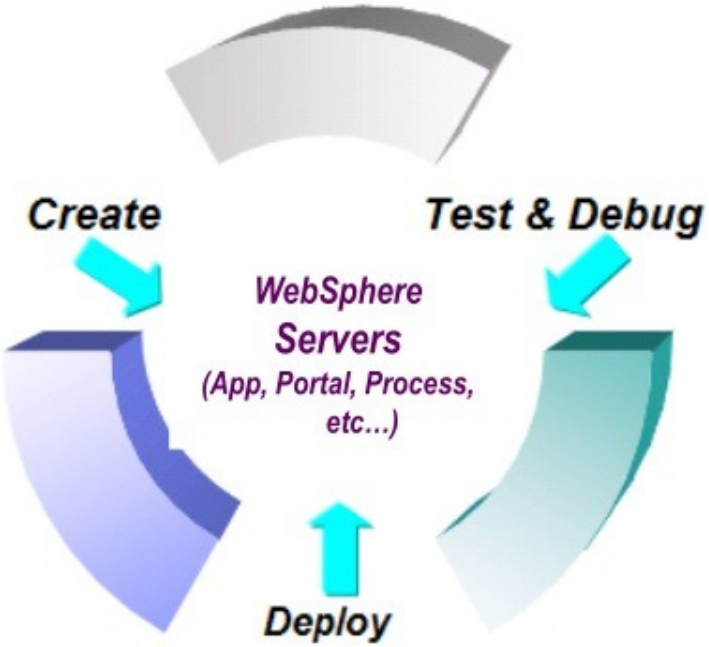


Accelerate Development for SOA, BPM, J2EE, Portal, Web Services, etc.

Model Assemble Deploy Manage

Simplify and Accelerate Development

- **Build**, test, debug and deploy tasks are highly automated
- **Test Server** environment is seamlessly integrated for automated testing & deployment
- **Page/Site** design look-n-feel is automated through drag-n-drop
- **Developer** ease-of-use includes:
  - **J2EE** tool integration for easily calling JavaBeans and EJBs from Portlets
  - **JSF** (JavaServer Faces) tool integration for creating rich thin client Portlet UIs
  - **Web Services** tool integration for creating and consuming web services in Portlets
  - **Service Data Objects** (SDO) tool integration for
    - Relational databases
    - Non-relational backend data and EIS app integration (Siebel, SAP, PeopleSoft, Legacy, XML, etc.)
  - **Cooperative** click-2-action tool integration for portlet-to-portlet communications
  - **SOA Business Process** development tools for Business Analysts & I/T Developers



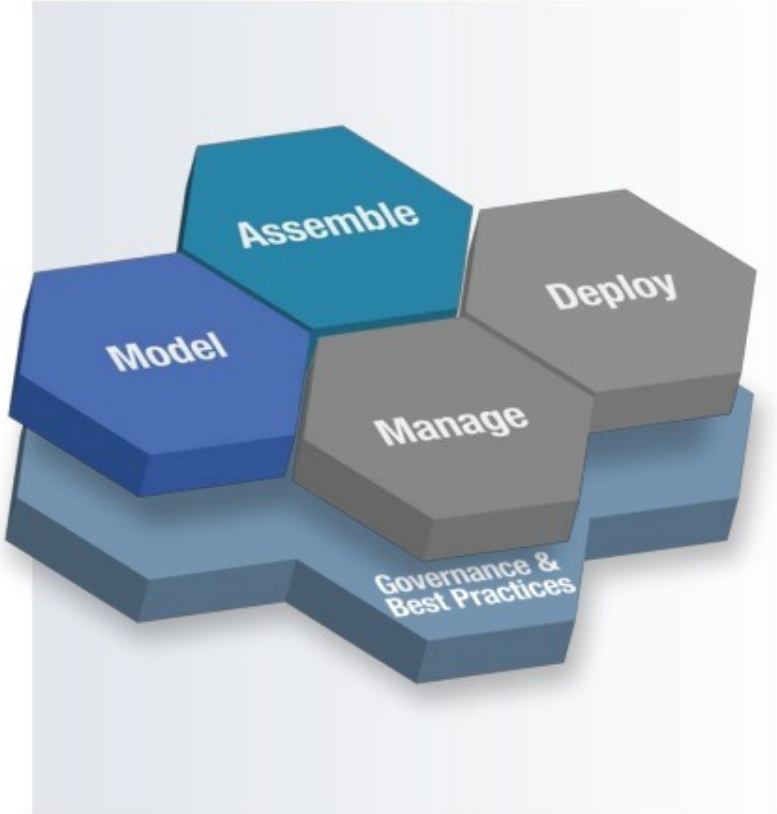
SOA is a Team Sport

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

Agenda

- Business Driven Development for SOA
- Software Development Platform for Business Driven Development and SOA
- **Summary**
  - Capabilities, products and Next Steps



Agenda

- Business Driven Development for SOA
- Software Development Platform for Business Driven Development and SOA
- **Summary**
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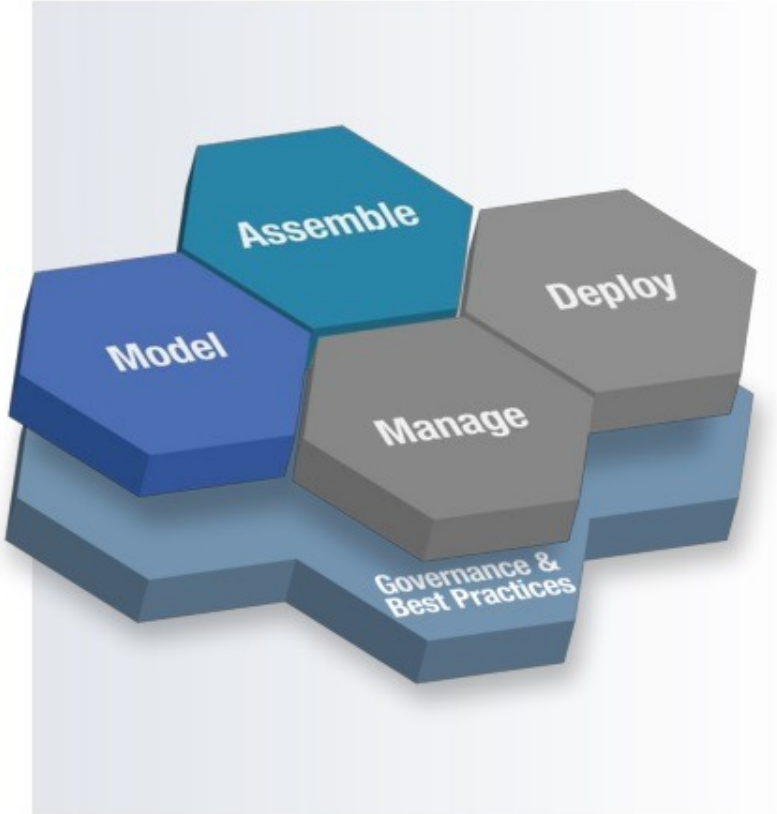

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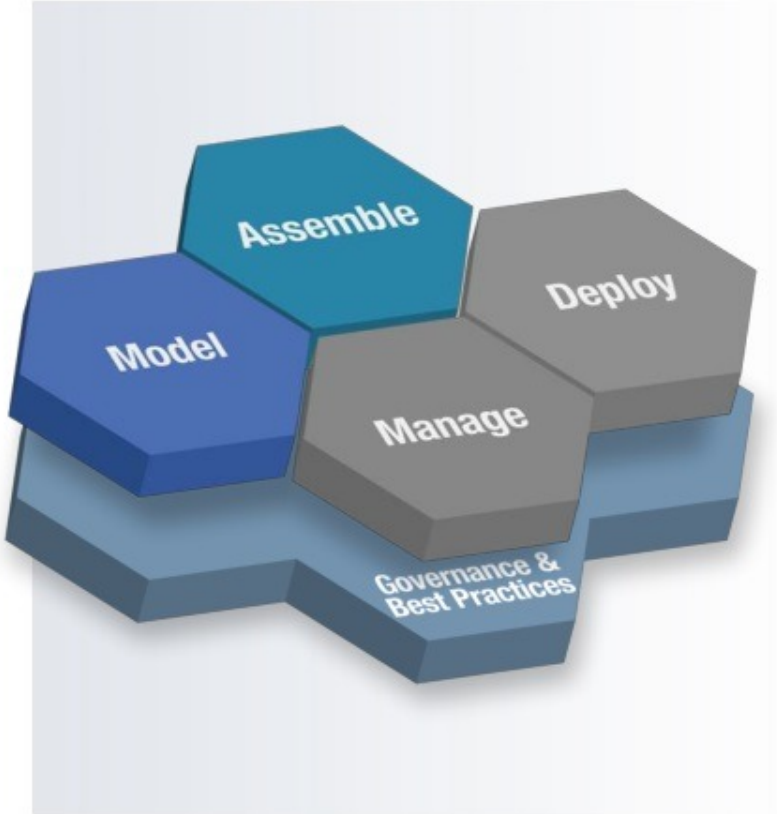


SOA Foundation – Development Roles

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
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**
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
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**

Service Oriented Analysis, Modeling, and Design

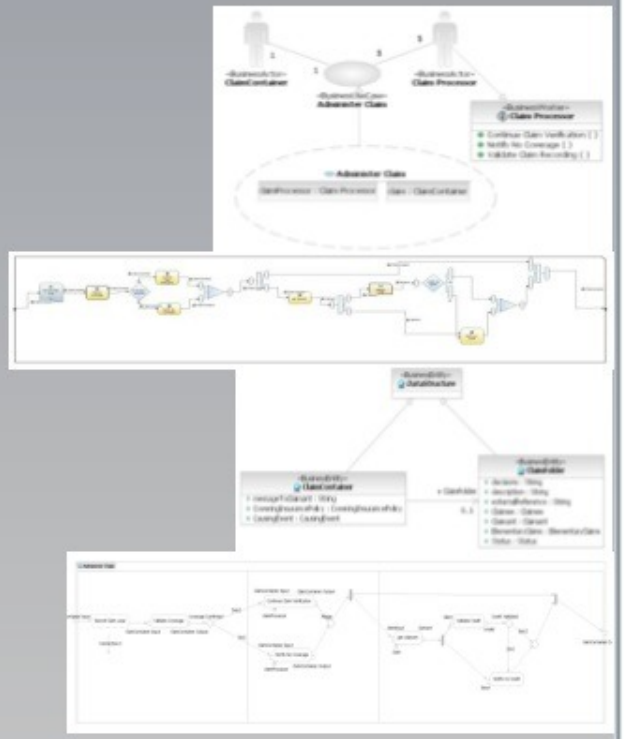
Architect

- **Business Process Model can be transformed and visualized as a UML model**
  - Create the design model from the business process model
  - Understand the business intent

- **IT service identification**
  - Create design model for new services (top-down)
  - Identify existing components for reuse (bottom-up)
  - Meet in the middle (most common)
  - UML Profile for Software Services aids in designing software services

- **Artifacts in Design Models can be transformed into service implementations**

Process



Customer Benefit:

- Architecture and design of services
- Automation speeds the transformation, from analysis and design, into implementation

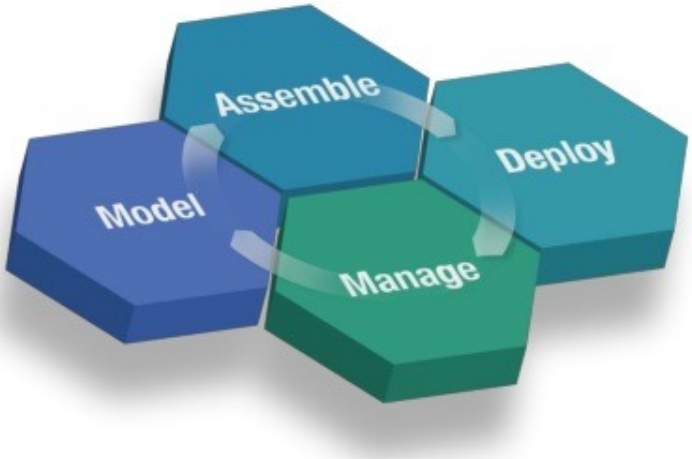
SOA Governance for Business Driven Development

A Governed Lifecycle End-to-end

Development Process

An approach and tools that effectively enable organizations to

- Determine the business priorities
- Execute development against those priorities
- Measure their effectiveness



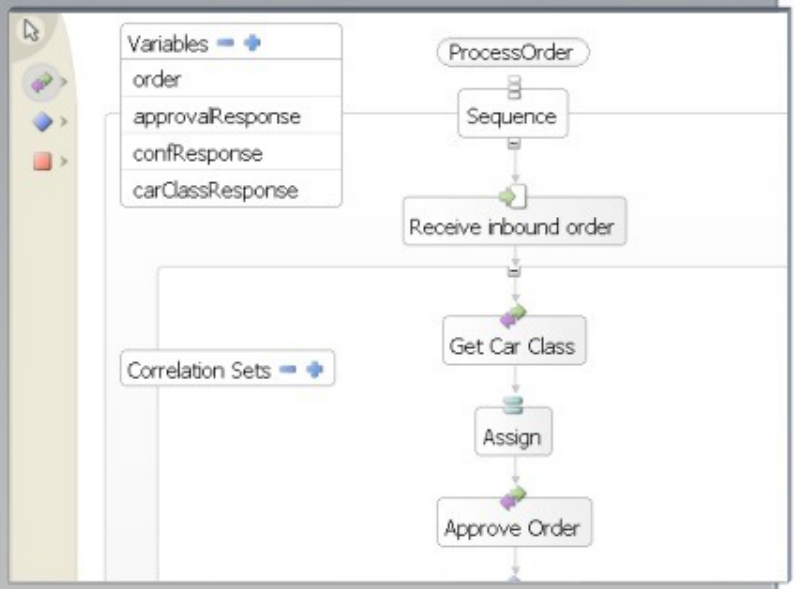
Development Infrastructure

In the context of a secure / governed infrastructure

- Supports complex sourcing models (including geographically disperse)
- Provides development compliance (audit trails and security that is transparent to the developers)

Business Process Choreography & Mediation

- **Business Process Choreography is linking services together to form *deployable* business processes:**
  - Deployable process model based on WS-BPEL
  - Both Flow and Event based Business Process can be modeled
    - *BPEL Editor (Flow based)*
    - *Business State Machine Editor (Event based)*
  - Choreography includes automated and human based services



- **Mediation creation to transform/route service requests and responses**

Customer Benefit:

- Simplified, standards-based, business process development
- Connect human interactions with re-usable enterprise services and orchestrate workflow

Key Products - Business Driven Development

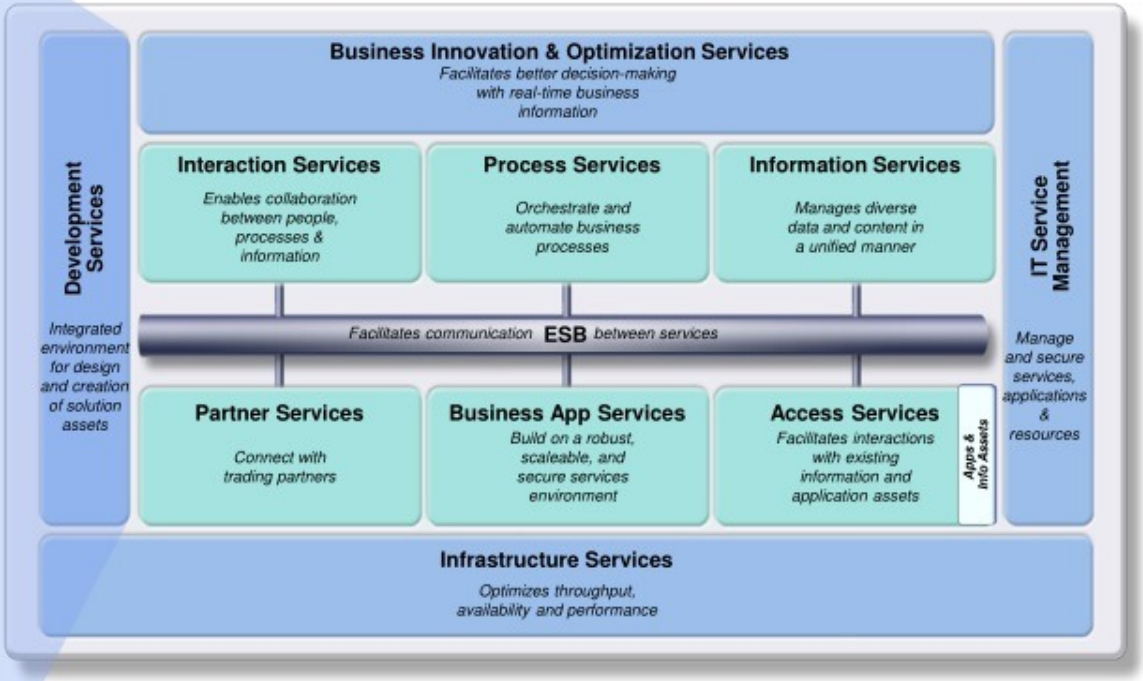
WebSphere Business Modeler

Rational RequisitePro

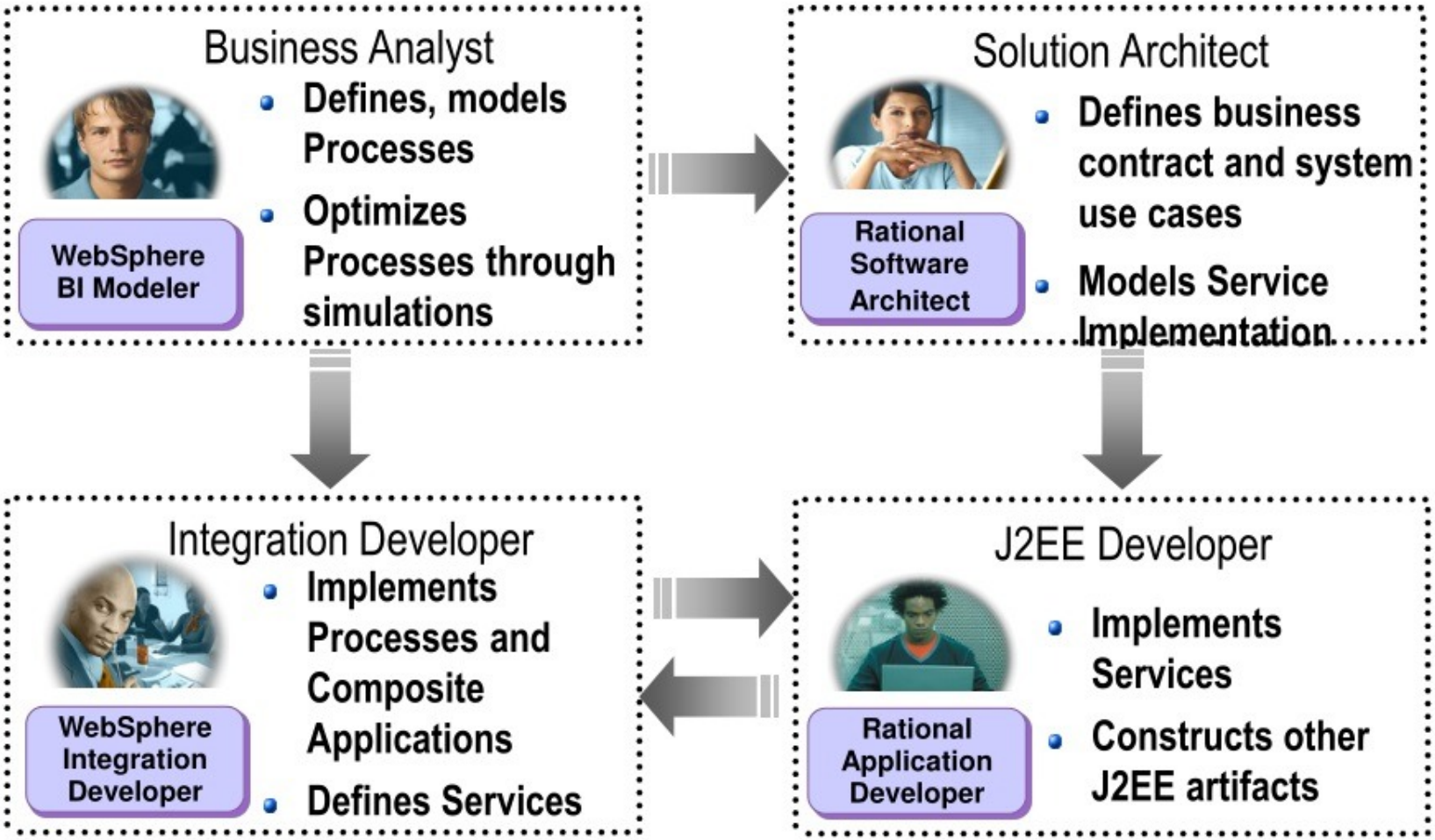
Rational Software Architect

Rational Application Developer

WebSphere Integration Developer

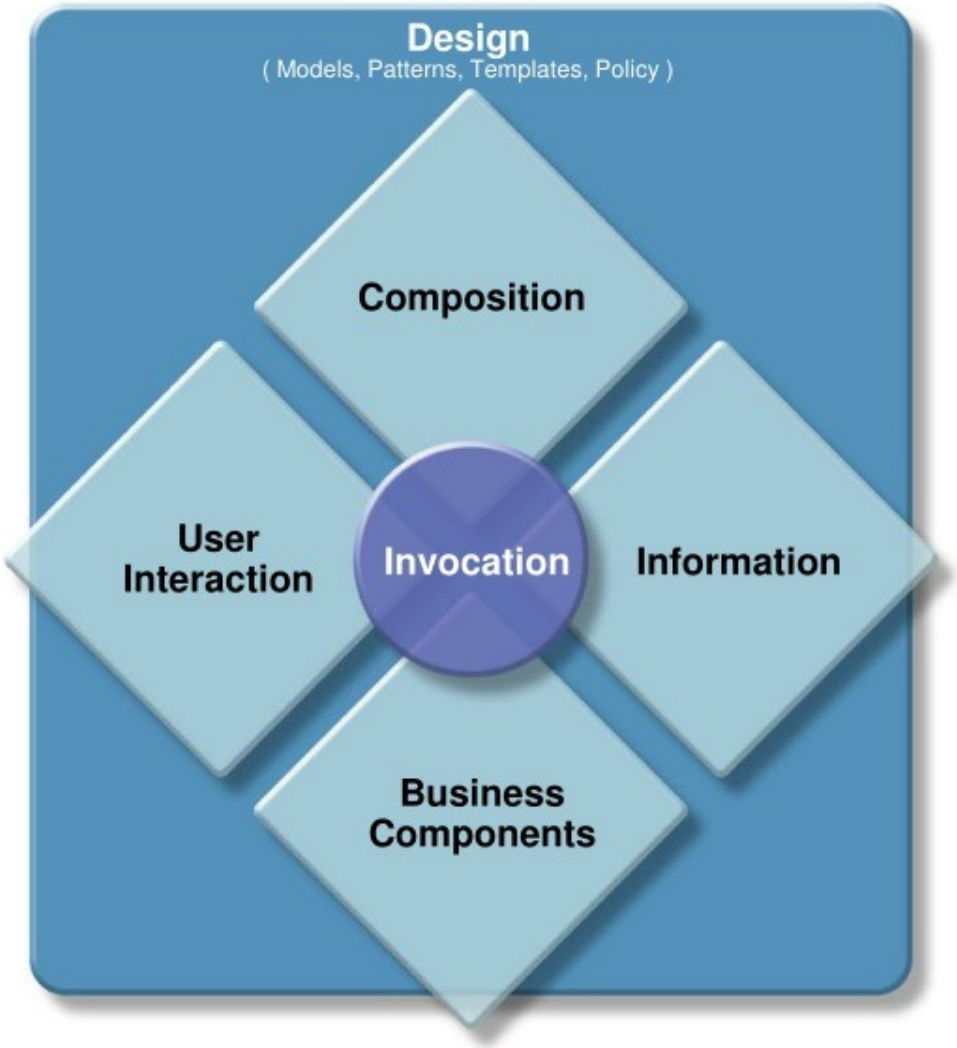


SOA Business Driven Development – Roles and Tools



SOA Programming Model

- Design
  - Focus on business design modeling, simplification, and role-based collaboration
  - Use of declarative policy to control execution behavior and relationships
- Invocation
  - Loosely-coupled call-style and event-driven interconnection of services with built-in support for topology transparency, mediation, and brokering featuring standards-based interoperability
- User Interaction
  - Dynamic support for people integration into the business design
- Composition of Business-level Apps
  - Wired assembly of services to form business applications, workflows, & service orchestration
- Information
  - Built-in access to service state, disconnected service-data exchange, information composition and transformation
- Business Components
  - Composable and reusable services



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

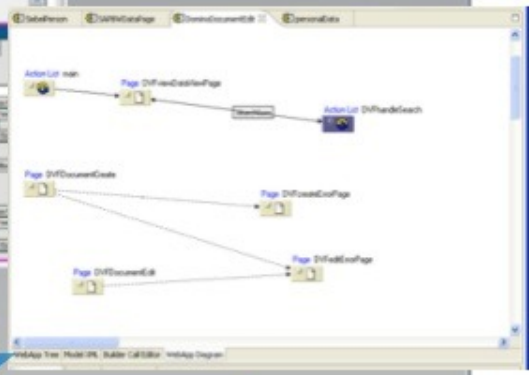
Flexibility

As Patterns Have Evolved, So Has IBM

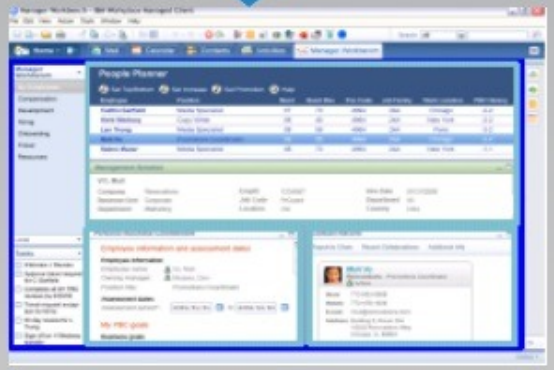
User Interface Development

Developer

- **Use automated tools to build web pages an portlets that expose business capabilities (services)**
  - Wizards to face J2EE applications with portal UI
  - eForms to extend user interactions beyond the the Enterprise and offline
  - Custom-built "situational" applications to fill in missing capabilities



- **Personalized user interface is role sensitive**

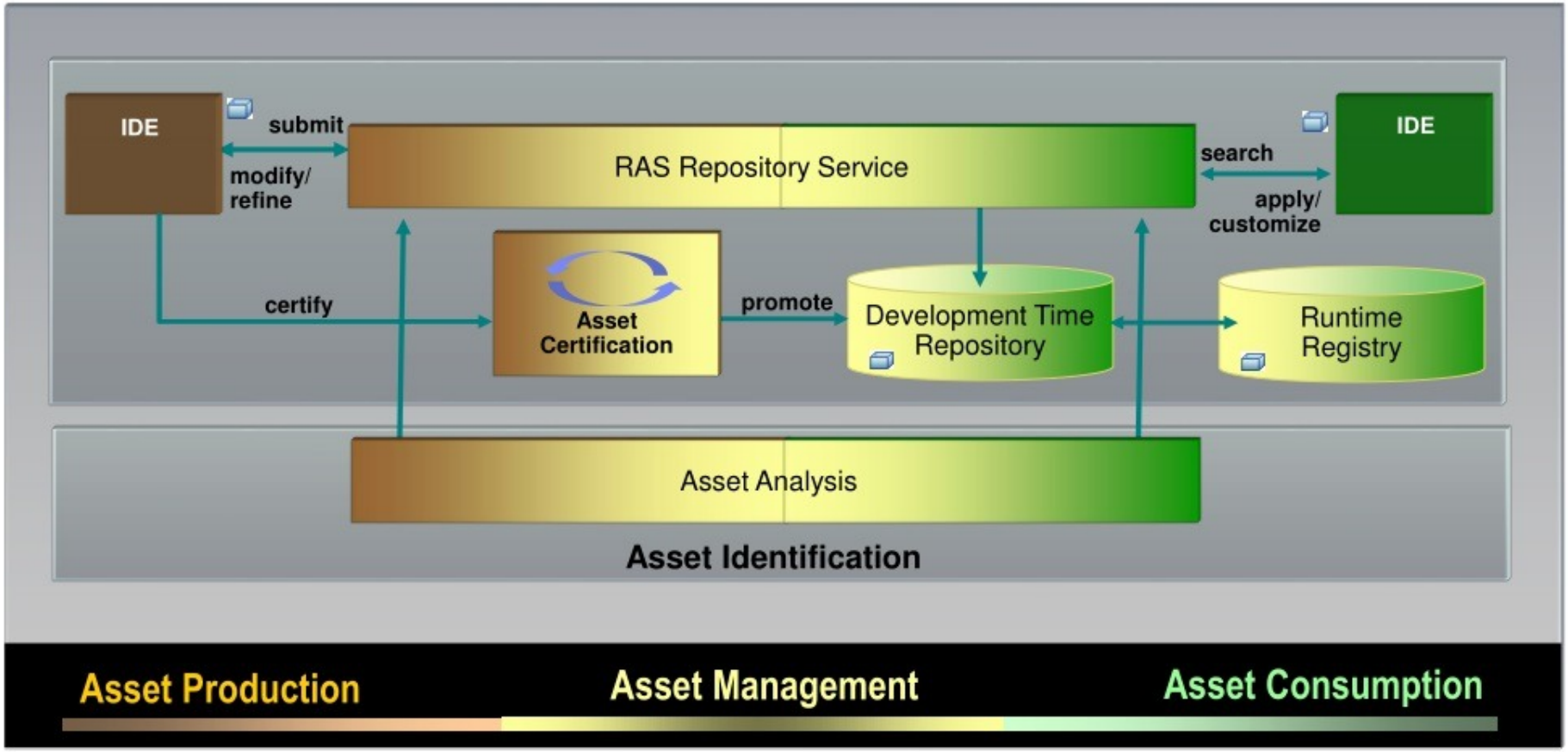


Customer Benefit:

- Rapid time-to-value
- Role-appropriate user interface
- Only relevant portions of applications and services are exposed

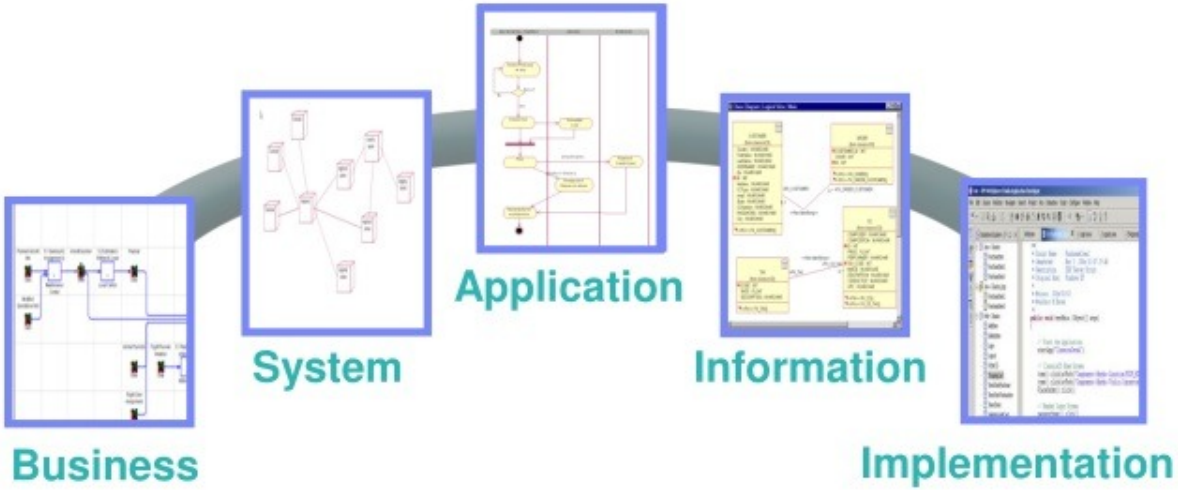
Development-time Service Lifecycle

- **At development time services are:**
  - Identified, Produced, Consumed, and Managed



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

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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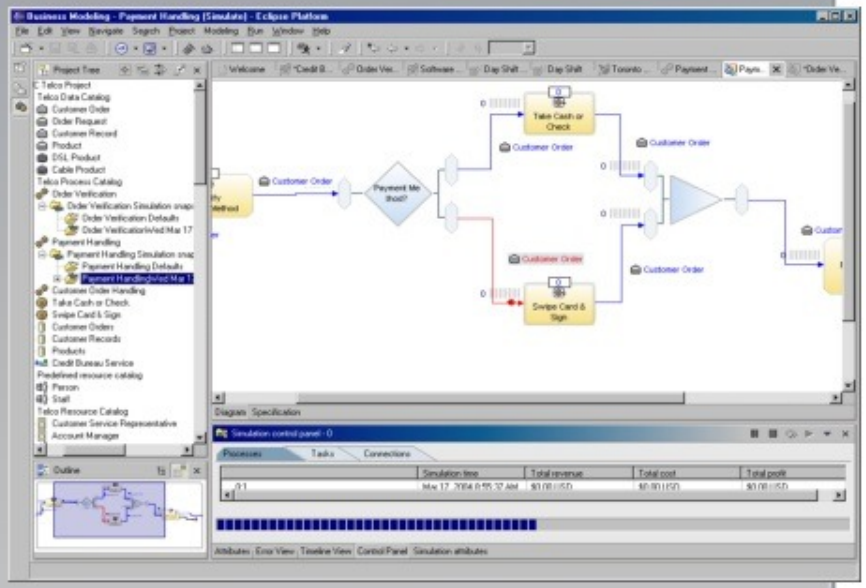
Business Process Modeling and Analysis

- **Business analyst analyzes, designs, and simulates business process**
- **Model from a Business perspective**
  - As is and to be modeling
  - Business service identification
  - Specification of business KPI's
    - e.g. Average time to open an account should be <18 hours
    - 80% or more of the total account opening requests should be approved
- **Business-level simulation**
  - Used to optimize business process by understanding Process Duration, Costing, ROI, etc.



Customer Benefit:

- Business-level tools for modeling and simulation
- Describes business-level services in context of business improvement

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.)

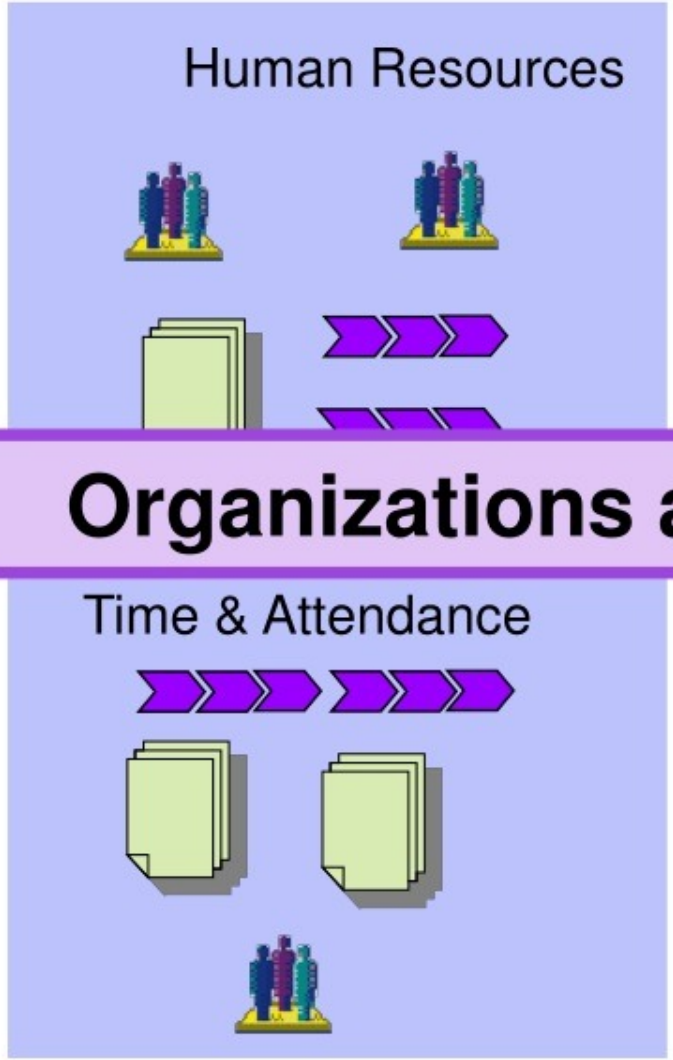
developerWorks
- DB2
- eServer
- Lotus
- Rational
- Tivoli
- WebSphere

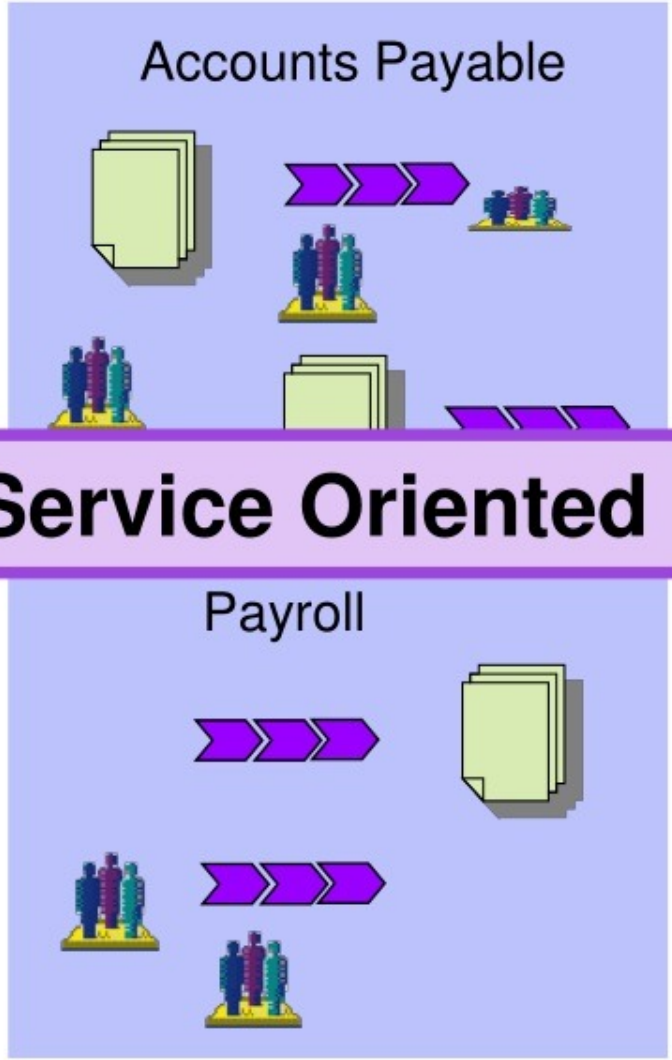
- Autonomic computing
- Grid computing
- Java™ technology
- Linux
- Open source
- Power Architecture™
- SOA and Web services
- Web architecture
- Wireless technology
- XML

Feedback

Related links
- ISV resources
- alphaWorks (emerging technologies)
- Academic program
- IBM Redbooks
- IBM Press books

Organizations have been service-oriented for years…

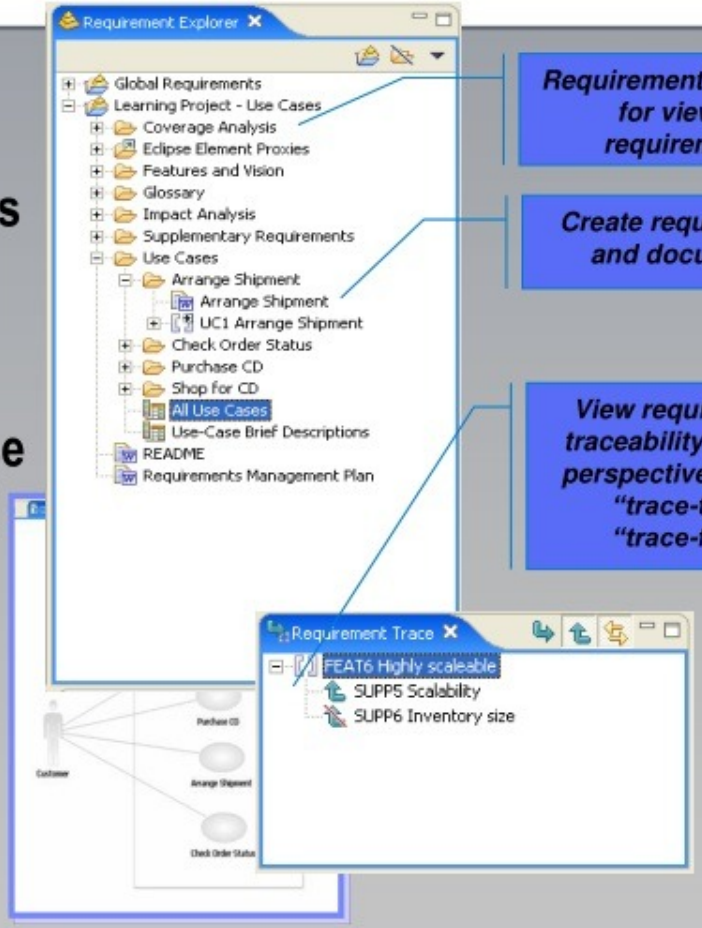




Organizations are Service Oriented

Detailed Requirements Management

- **Create Business Vision Documents**
- **Create Business Use Case Specifications**
- **Define/Document Business Rule, Business Goal Requirements**
- **Define detailed system requirements (use cases and supplementary requirements)**
- **Trace enterprise requirements to business processes and service implementations**



Customer Benefit:

- Document and capture business requirements
- Traceability between business priorities and elements in the application
- Business and I/T stakeholders have common way to communicate requirements

What is Business Driven Development?

Development as a Business Process

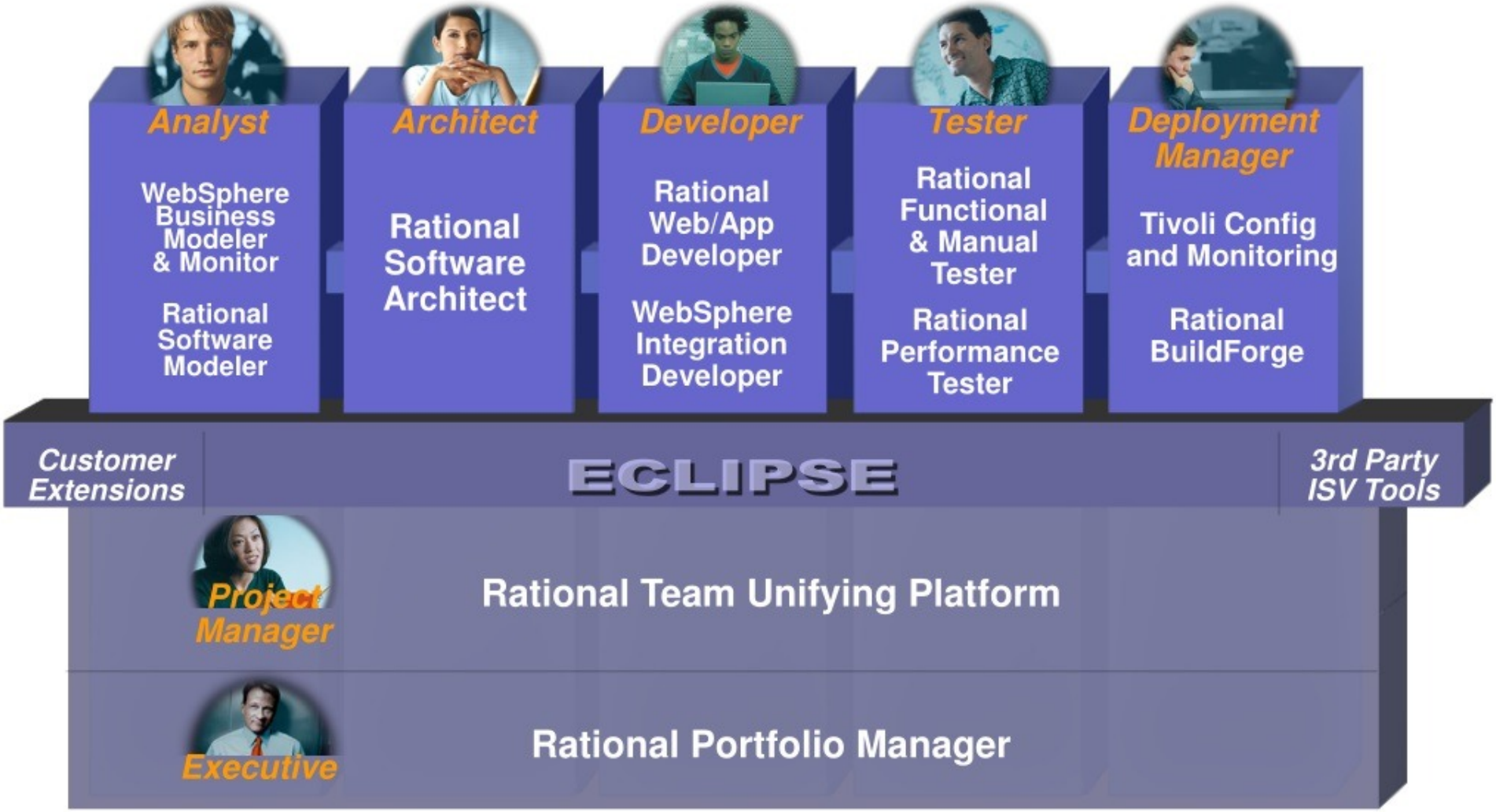
An integrated approach to software development that aligns line-of-business, development and operations teams to improve business performance

- Align Technology and Business priorities
- Improve efficiency and responsiveness
- Address Governance and Compliance requirements

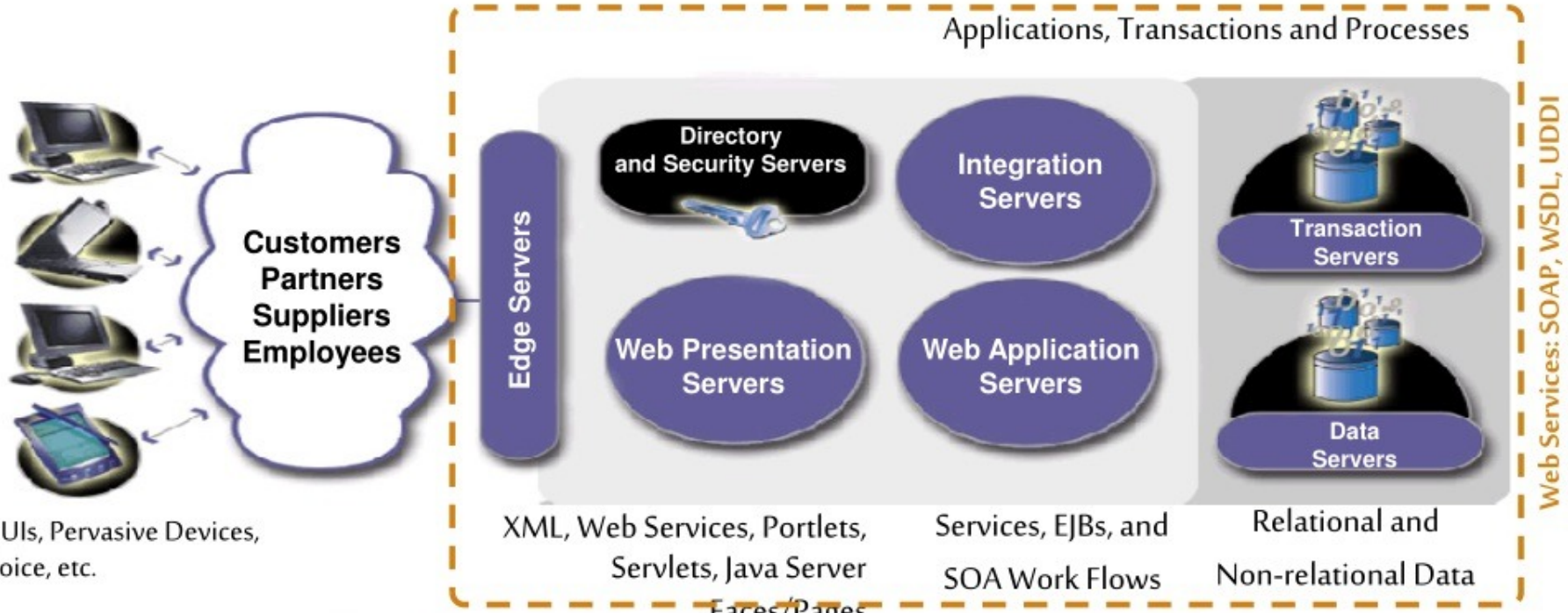
Software development becomes a driver of competitive advantage

The IBM Software Development Platform

Development Tools

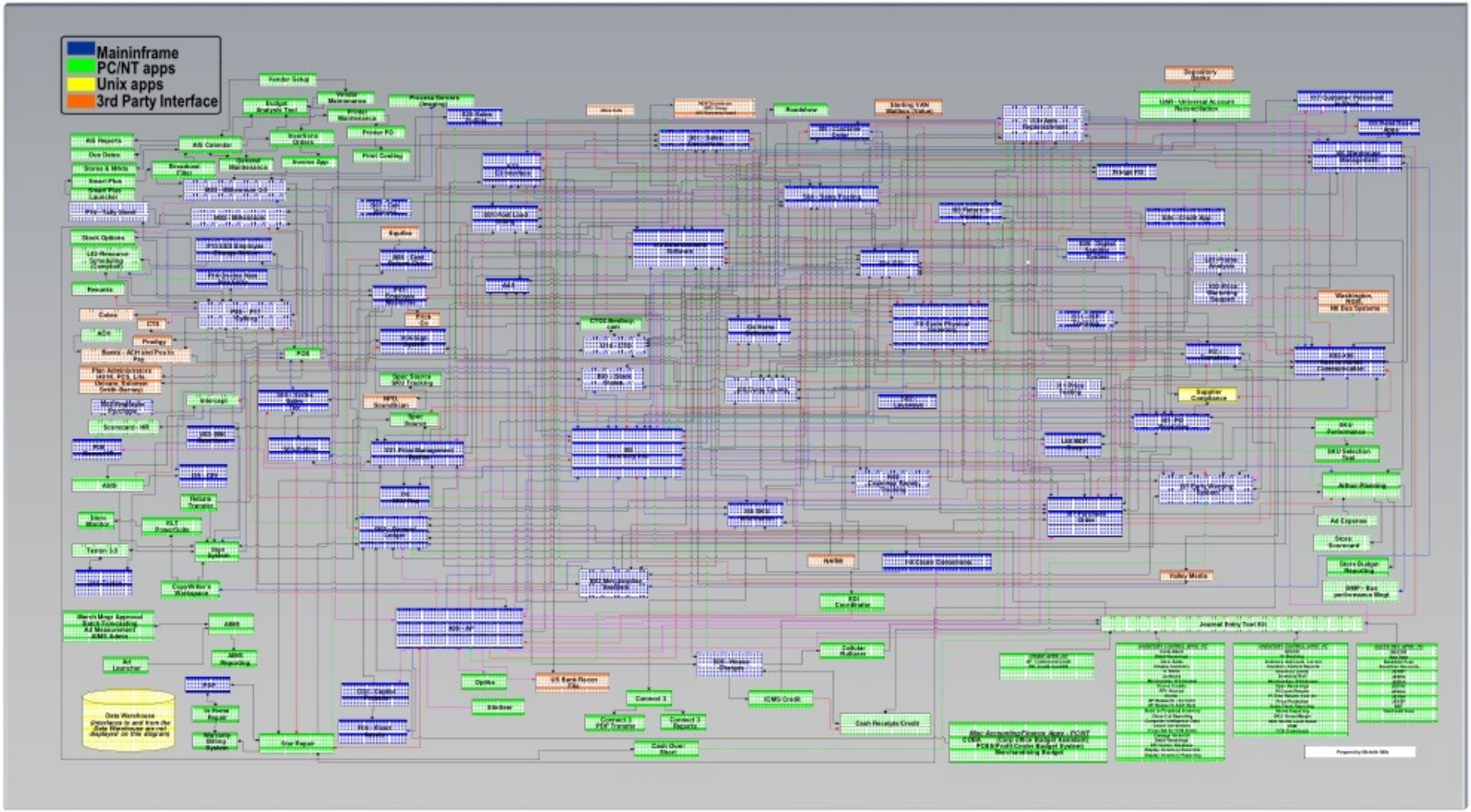


End-2-End Design & Construction



Complexity is Forcing Change

Actual Application Architecture for Consumer Electronics Company



Three Key Concepts

To Adapt for Business Driven Development

Service Oriented Architecture

Focus on Flexibility and Reuse

An approach for designing and implementing distributed systems that allows a tight correlation between the business model and the IT implementation

Model Driven Architecture

Focus on Efficiency and Quality

A style of enterprise application development and integration based on using automated tools to build system independent models and transform them into efficient implementations

Business Innovation and Optimization

Focus on Responsiveness and Optimization

A monitoring and management approach that leverages integrated resources to achieve aligned, accountable, and action-oriented business operations

IBM Software Development Platform

Development Roles

Analyst

Model the business & identify the business services

Architect

Design the services architecture

Analyze assets for reuse

Developer

Construct the services

Assemble & deploy the composite application

Tester

Test the individual services & composite application

Deployment Manager

Provision, configure, tune and troubleshoot composite applications

Project Manager

- Follow a service-oriented process
- Manage requirements
- Manage SOA assets
- Manage quality

IT Executive

- Align business strategy with IT execution
- Govern SOA – align, execute and control investments