

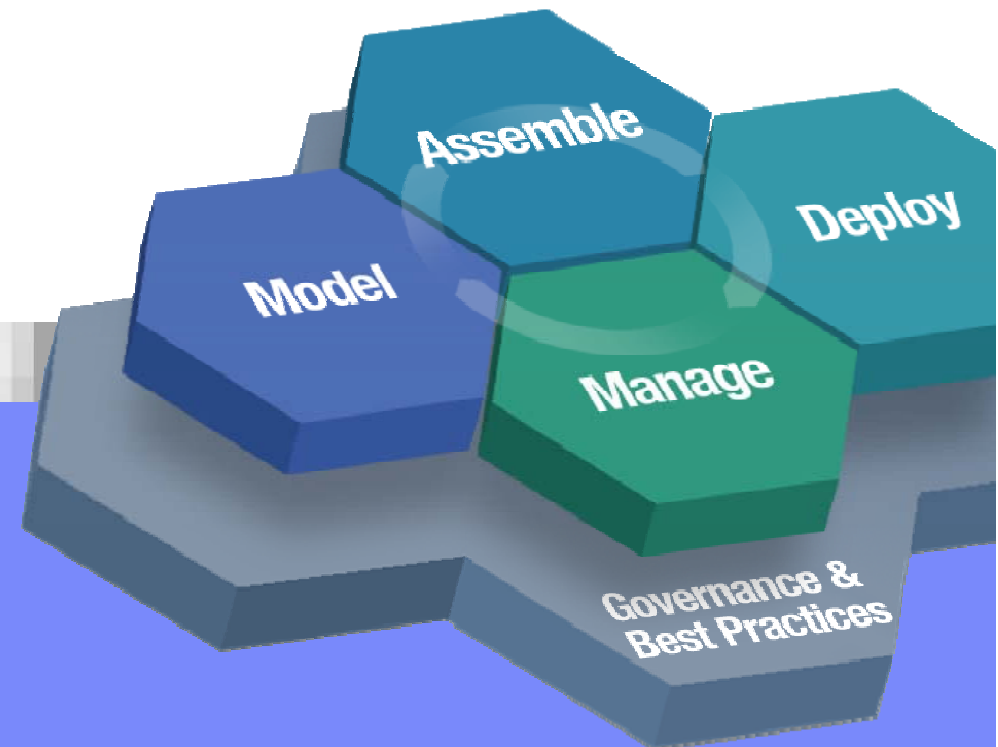


IBM Software Group

Building Better Software:

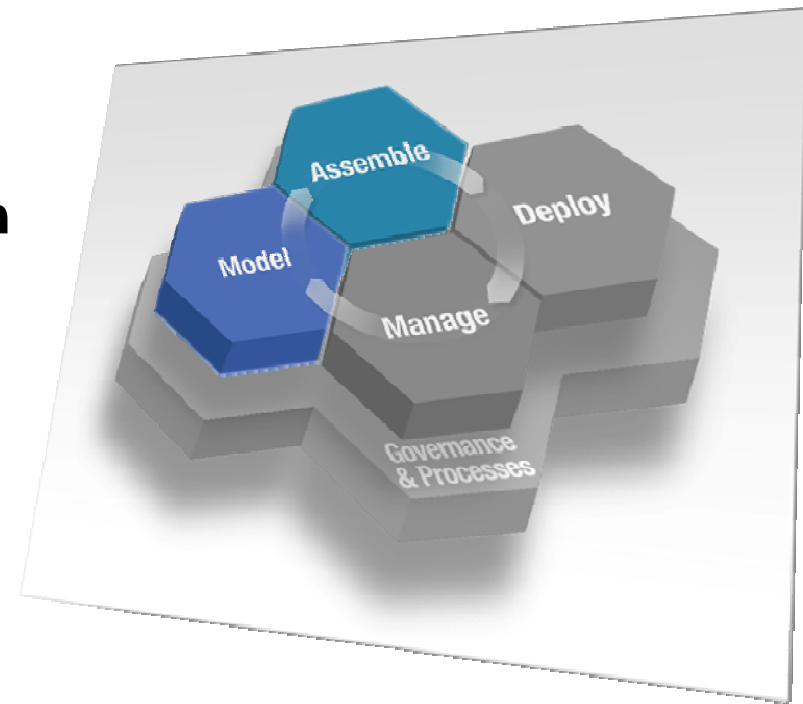
Business Driven Development for Service-Oriented Solutions

Alan W. Brown
Distinguished Engineer
IBM Rational



Agenda

- **Business Driven Development**
- **Three Key Concepts for Successful Software**
- **Putting it All Together –
Creating an Integrated Workbench**
- **Lessons and Next Steps**



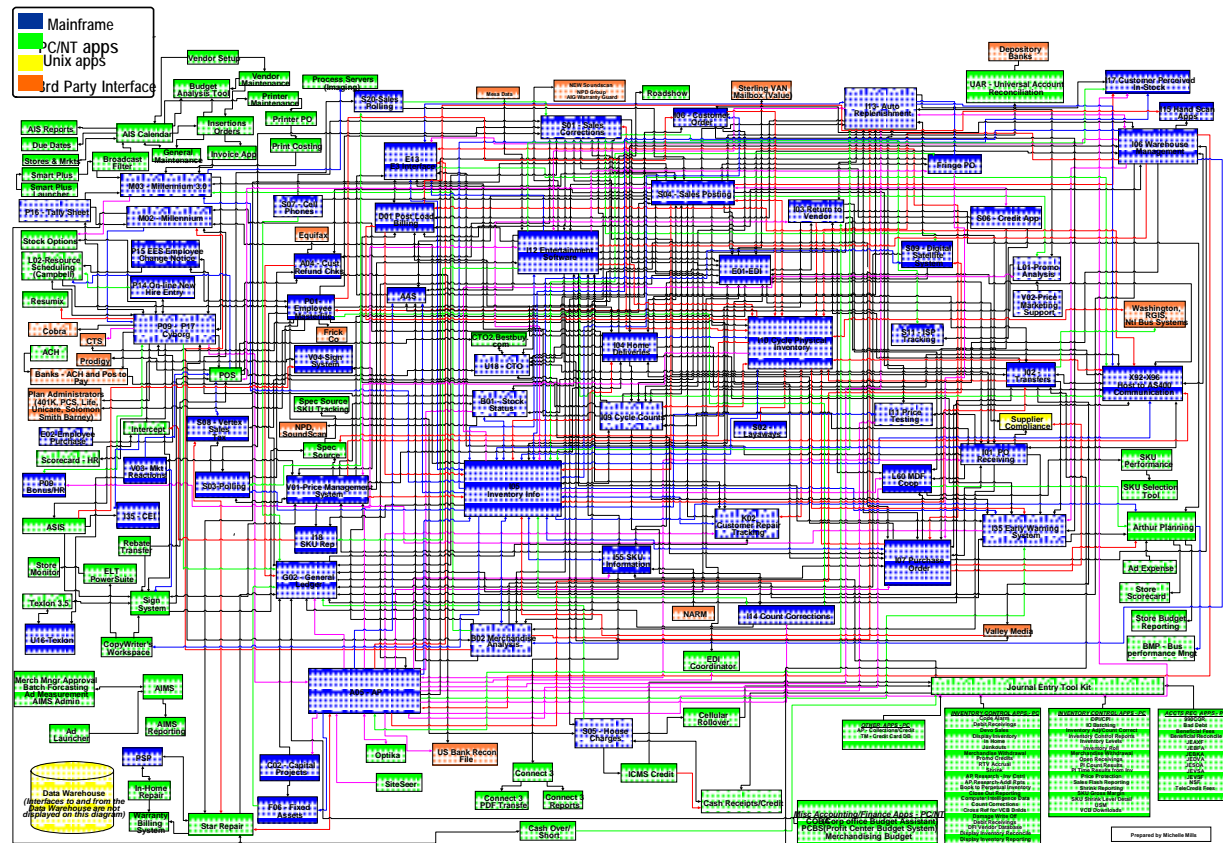
We Know Why it is Hard to Develop Software....

$$\text{Time or Cost To Build} = (\text{Complexity})^{(\text{Process})} * (\text{Team}) * (\text{Tools})$$

- Complexity** → Volume of human-generated code
- Process** → Methods, notations, maturity
- Team** → Skill set, experience, motivation
- Tools** → Process automation

Complexity is Forcing Change

- Business Processes
- Systems and Software
- Partner Interactions

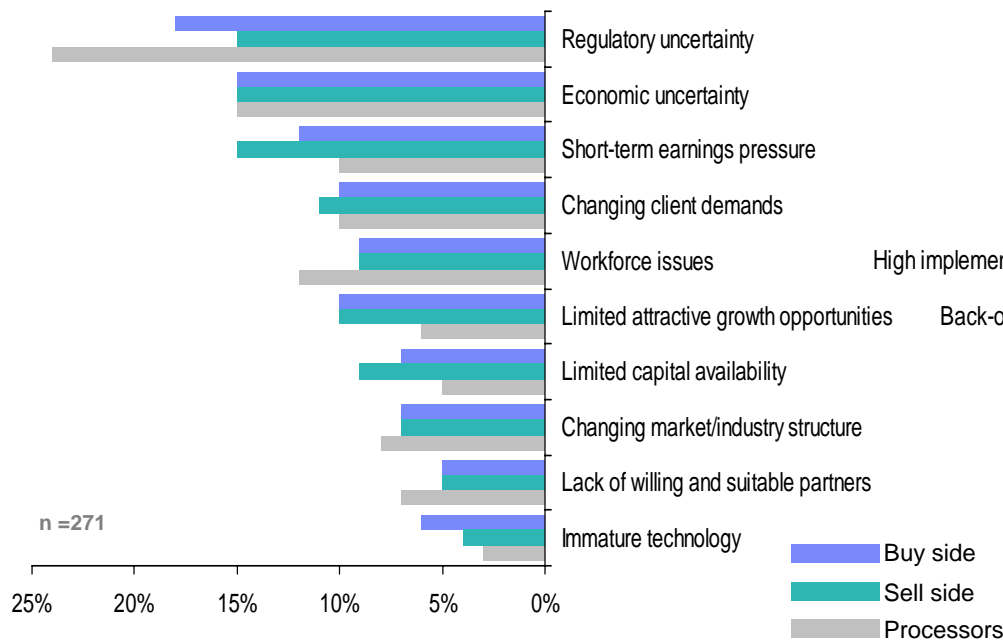


An actual application architecture

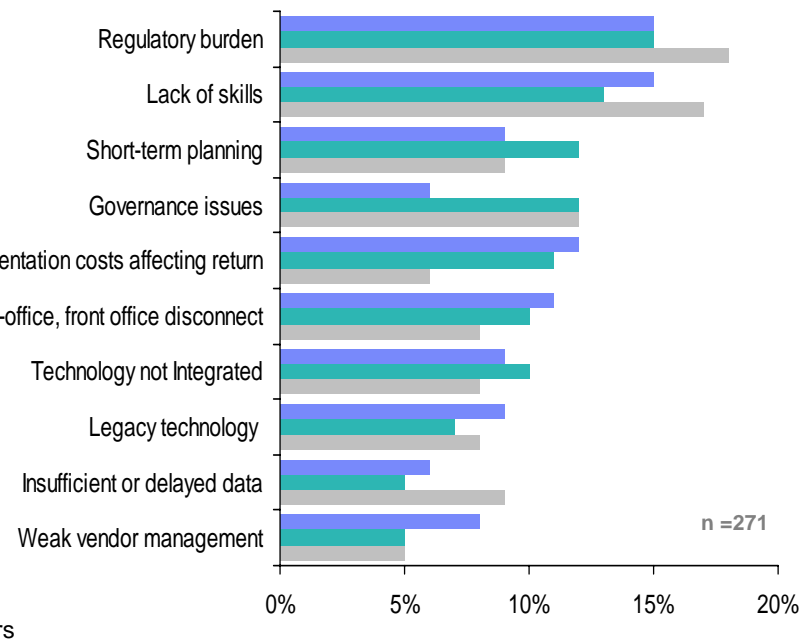


IT organizations must overcome challenges posed by external uncertainty and internal inflexibility

External Challenges over the Next Ten Years¹
 (Percentage of Survey Respondents by Segment)



Internal Challenges over the Next Ten Years¹
 (Percentage of Survey Respondents by Segment)



“Technology exists today but it’s not leveraged. This nets out to ‘we’re not implementing well enough.’” – Head of Client Service, Universal bank, London

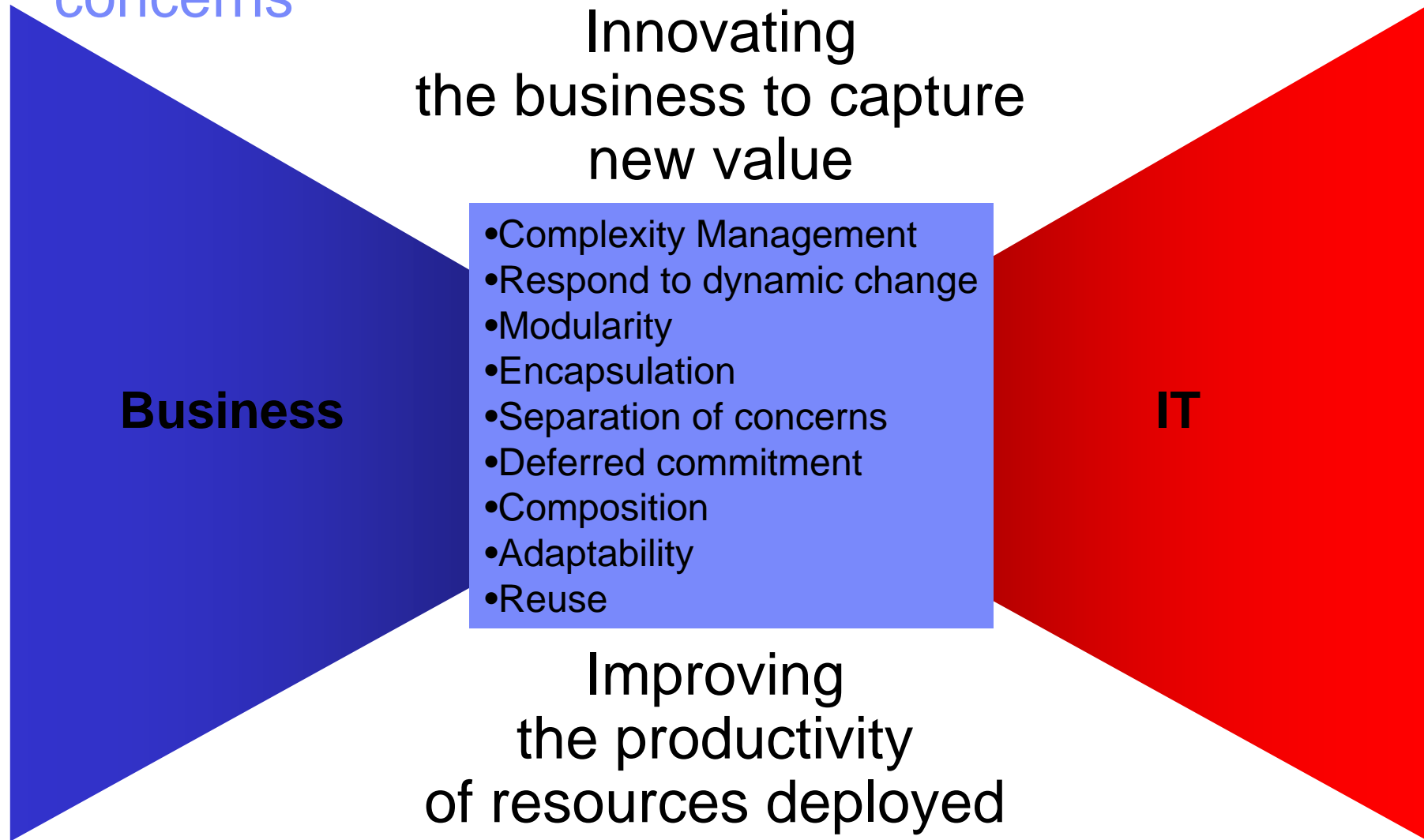
On average, financial markets managers spend 20-30% of their time handling regulatory requirements; this is expected to continue into the foreseeable future.

Note: ¹Executives asked: Which of the following external and internal barriers are most likely to impede your firm’s ability to execute its strategy over the next 10 years? (Choose up to 3)

Source: IBV/Economist Intelligence Unit Survey



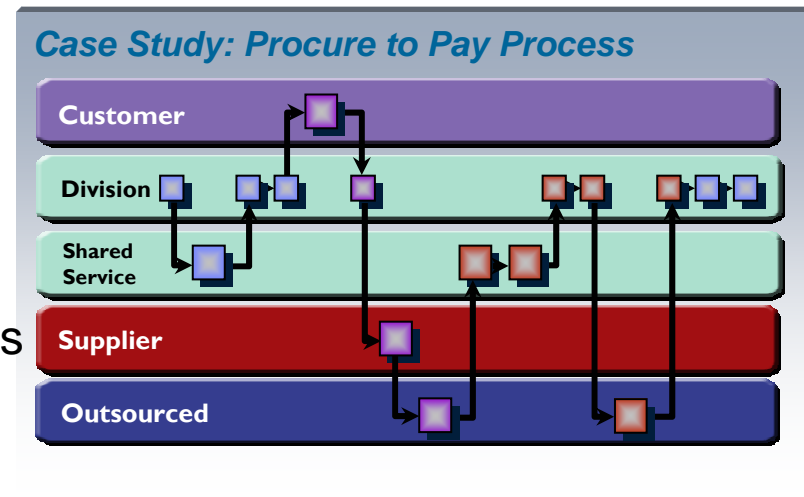
The Business and IT have to address similar concerns



Development process can bridge the gap

Pave the Way for Successful Business Innovation

- **Drive development processes and delivered solutions from business goals and objectives**
- Standards (including open source) for interoperability
- Model Driven Architecture (MDA)
- Self-defined, loosely coupled interfaces
- Tools to visualize and integrate existing assets
- Declarative specifications and languages
- Architecture is the key to successful business innovation



What is Business Driven Development?

Business-driven development

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



Development as a business process

- Align Technology and Business priorities
- Improve efficiency and responsiveness
- Create innovative products

**Software development
becomes a driver
of competitive advantage**



Business Driven Development means.....

- Business and IT are aligned
 - ▶ Priorities are aligned
 - ▶ Execute against priorities
 - ▶ Measure against priorities

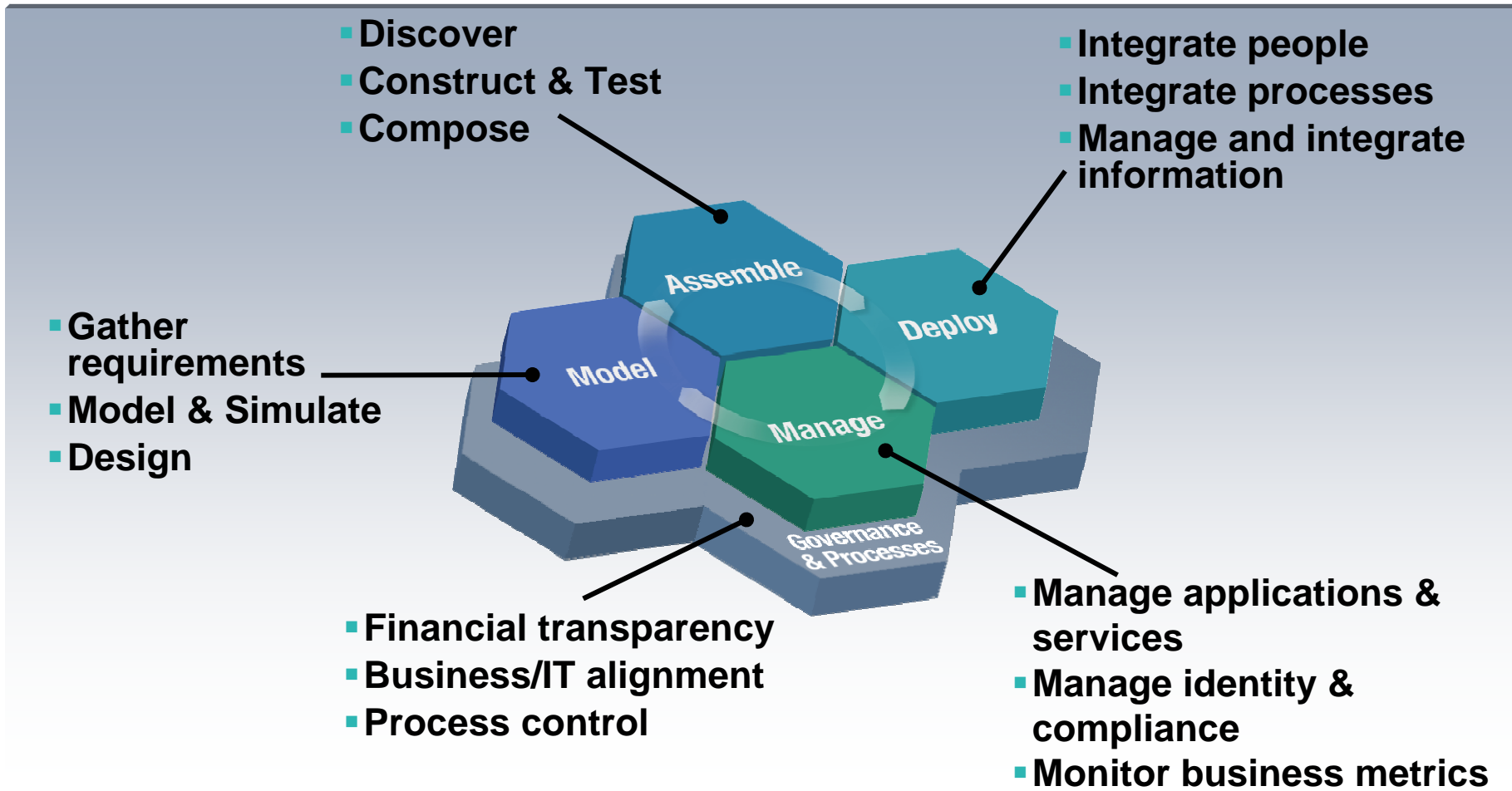
- A converged infrastructure across the IT organization
 - ▶ Governance
 - ▶ Compliance-driven development
 - ▶ Development across organizational & geographical boundaries
 - ▶ Common, open development environment
 - ▶ Leveraging assets
 - ▶ Expedites implementation to more flexible middleware architectures

Business Driven Development in Practice is.....

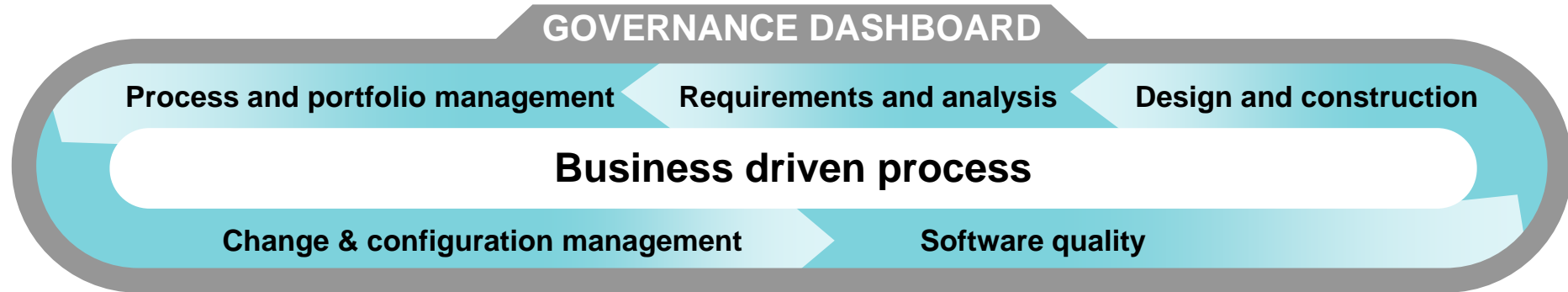
- Adopting more flexible technical architecture based on services
 - ▶ Focus on business agility
 - ▶ Improve reuse
 - ▶ Adoption of innovative technologies and practices
- Move to a standard process framework using industry best practices
 - ▶ Consistent delivery of process guidance across the organization
 - ▶ Aligned and leveraging industry best practice
- Measurably improving process maturity
 - ▶ Certification based on a clear improvement framework (e.g. CMMi)
- Automating best practices through integrated tools
 - ▶ Adoption of tools platform supporting best practices
 - ▶ Strategic use of models and generative approaches



Business Driven Development Lifecycle



What's the Role of Enterprise IT?



Manage value

- Know what you got
- Know who's doing what
- Know when things change, and what it means

Develop flexibly

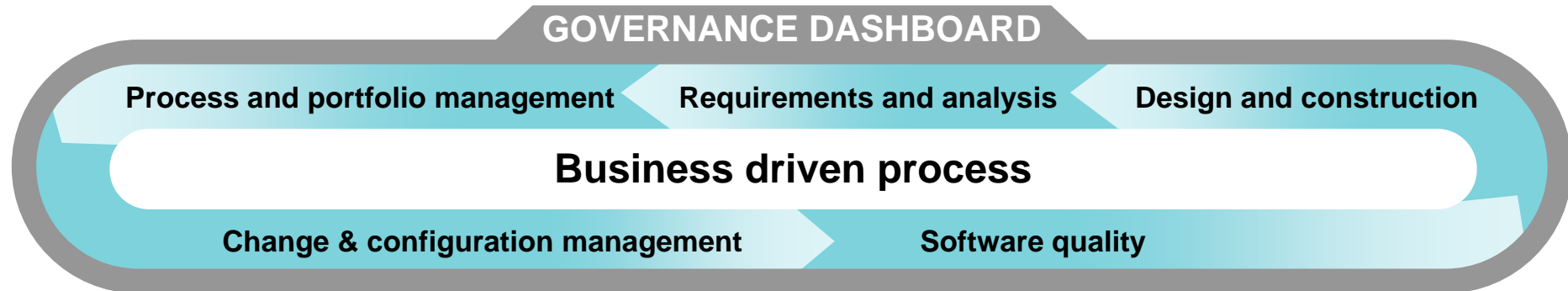
- Standardize best practices
- Understand and prioritize needs and requests
- Innovate and adopt new technologies
- Work as a team

Control risk and change

- Manage change across all assets
- Report on what's going on for compliance
- Deploy high-performing solutions
- Measure, Monitor, and optimize



The IBM Rational Software Delivery Platform



Manage value

- Real-time analytics linking financial and software information
- Real-time resource management
- Comprehensive dashboard reporting and drilldown

Develop flexibly

- Proven best practices
- Integrated requirements management
- SOA design and construction capabilities
- Open, role-based team environment

Control risk and change

- Lifecycle change and asset management
- Built-in audit and status information on projects and assets
- Performance testing
- Service-level monitoring

IBM Rational Software Delivery Platform

GOVERNANCE DASHBOARD

Solutions for geographically distributed development, compliance, SOA

Process & portfolio management

- IBM Rational® Portfolio Manager
- IBM Rational Method Composer
- Best practices content (IBM Rational Unified Process®, IBM Tivoli Unified Process®, Portfolio Management)

Requirements & analysis

- IBM WebSphere® Business Modeler & Monitor
- IBM Rational Requisite Pro®
- IBM Rational Software Architect
- IBM Rational Data Architect
- IBM Websphere Studio Asset Analyzer

Design & construction

- IBM Rational Software Architect
- IBM Rational Data Architect
- IBM Rational Application Developer
- IBM WebSphere® Developer for z
- IBM WebSphere Integration Developer

Software quality

- IBM Rational Performance Tester
- IBM Rational Functional Tester
- IBM Rational Manual Tester
- IBM Rational PurifyPlus

Change & configuration management

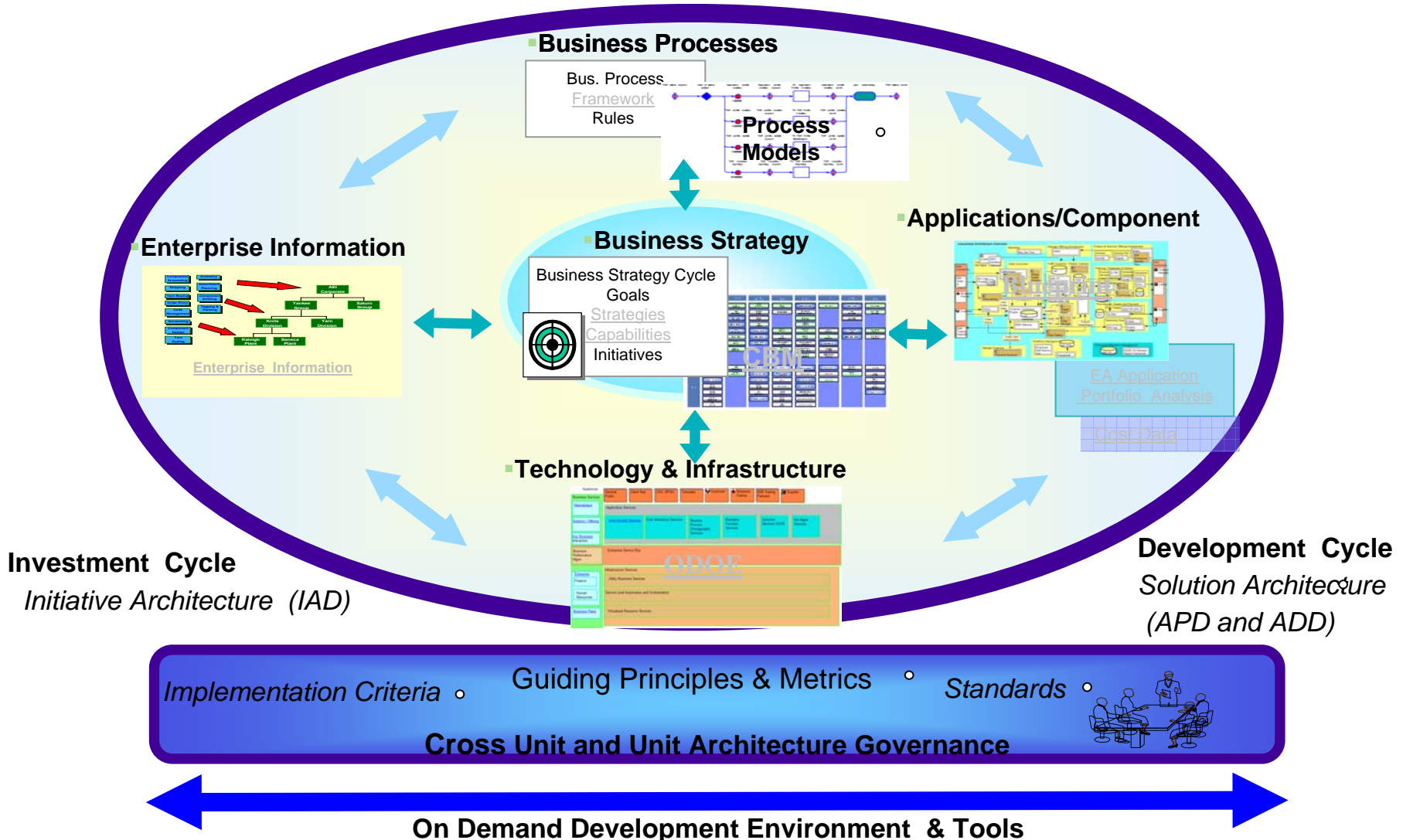
- IBM Rational ClearCase®
- IBM Rational ClearQuest®
- IBM Rational Team Unifying Platform™
- IBM Tivoli Provisioning Manager
- IBM Tivoli Configuration Manager
- IBM Tivoli Intelligent Orchestrator

Partner ecosystem & open computing

Eclipse™, Linux®, Microsoft® Windows®, UNIX®, IBM z/OS®

Enterprise Architecture Framework

EA provides a business framework for adding new processes, applications, data & infrastructure and a system for managing the lifecycle – current & future investments



Key EA Measurements track success in enabling key Business and IT Drivers

Major Business / IT Drivers	EA Measurements
Migrate to Target Architecture Enable Strategic Applications	<ul style="list-style-type: none"> ▪ Progress in Deployment of Strategic Apps ▪ 'Red' Applications – Strategic Applications which are Not Deployed ▪ % Strategic Portfolio strategic: planned / funded / deployed ▪ Progress in delivering required business strategies capabilities
Design to Enable SOA Reuse Assets Reduce Dev Cost – improve speed/flexibility	<ul style="list-style-type: none"> ▪ % Portfolio providing components/services ▪ \$ savings based on service reuse (Project Dev analysis) ▪ % Components: Deployed, Planned, Required ▪ # services Deployed, Planned, Required ▪ # services reused (Captured in Dev cycle) ▪ % reusable objects reused (align to SOA Repository)
Effective Alliance & 'Buy/Build strategy SAP instance reduction	<ul style="list-style-type: none"> ▪ Alliance coverage & cost: Tier 1 alliances, other alliances ▪ SAP instance reduction. # instances governed at Enterprise. level, ▪ Cost reduction ▪ Alliance exceptions
Simplify Current Environment Sunset Legacy Reduce IT Costs	<ul style="list-style-type: none"> ▪ # Sunsets, ▪ Cost Savings achieved. Legacy to Strategic investment ▪ % targeted sunsets achieved by Geo, PTE, Process, BTE/Unit ▪ Total # of Business Apps, % which are strategic
Achieve Business Value ▪ Growth / Innovation ▪ Stakeholder Value ▪ ...	<ul style="list-style-type: none"> ▪ Bus. value supported by Key Initiatives, Processes, Applications Value / Metrics Structured by External & Internal Stakeholders: Shareholder, Customer, Bus. Partner, Supplier, ,Employee, ▪ Align with actual for Key Business Metrics ▪ Value Achieved via Key Initiatives, Processes and Applications

Focus on Results that Drive Business Priorities

Customer

- On-time delivery process improved to 97% from 30%
- Order-to-delivery cycle time improved by 46%

Business Partner

- Average Business Partner order-process cycle time reduced by 90%

End to End Process

- Price and product change to Web from 9 days to 2 hours
- Supply / Demand planning time from 45+ days to 5+ days

Application Architecture

- Common Services Hub (Enterprise Service Bus) manages Dynamic Fulfillment across Delivery Chains
- 63 instances of ibm.com portal to one
- Common commerce engines from 14 to three

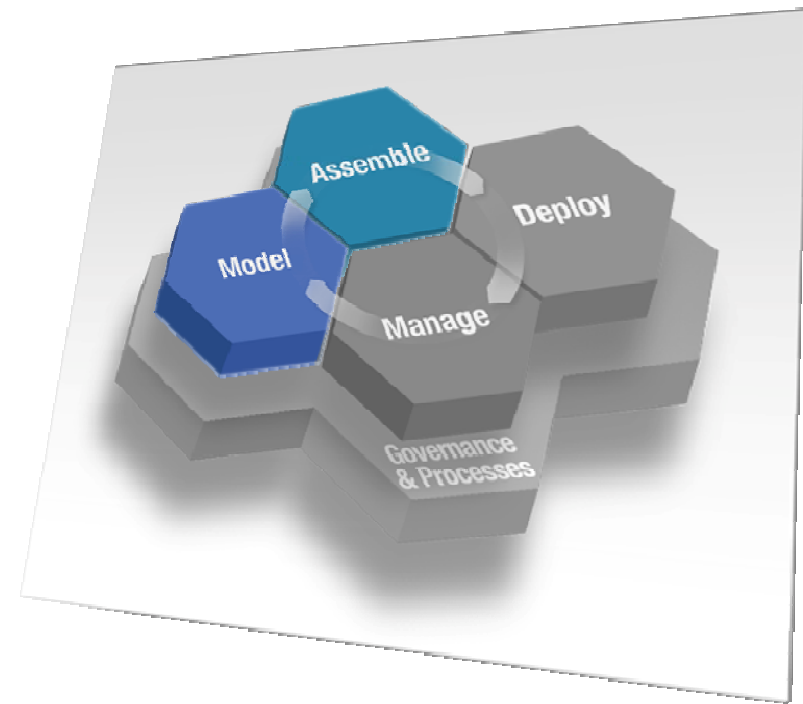
Information / Data

- Customer databases from over 65 to 2
- Offering Catalogs from 14 to 2
- Executive dashboard
- Common order status



Agenda

- Business Driven Development
- **Three Key Concepts for Successful Software**
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Three Key Concepts For Successful Software

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 Development

Focus on Efficiency and Quality

- *A style of enterprise development and integration based on creating, evolving, and relating models of the problem domain and the solution domain*

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*



What is Service-Oriented Architecture (SOA) ?

SOA is different things to different people:

- ▶ a **set of capabilities** that a business wants to expose to their customers and partners, or other portions of the organization

Business
Executive,
Analyst

- ▶ an **architectural style** which requires a service provider, requestor and a service description

- ▶ a **set of architectural principles, patterns and criteria** which address characteristics such as *modularity, encapsulation, loose coupling, separation of concerns, reuse, composability*

IT
Architect

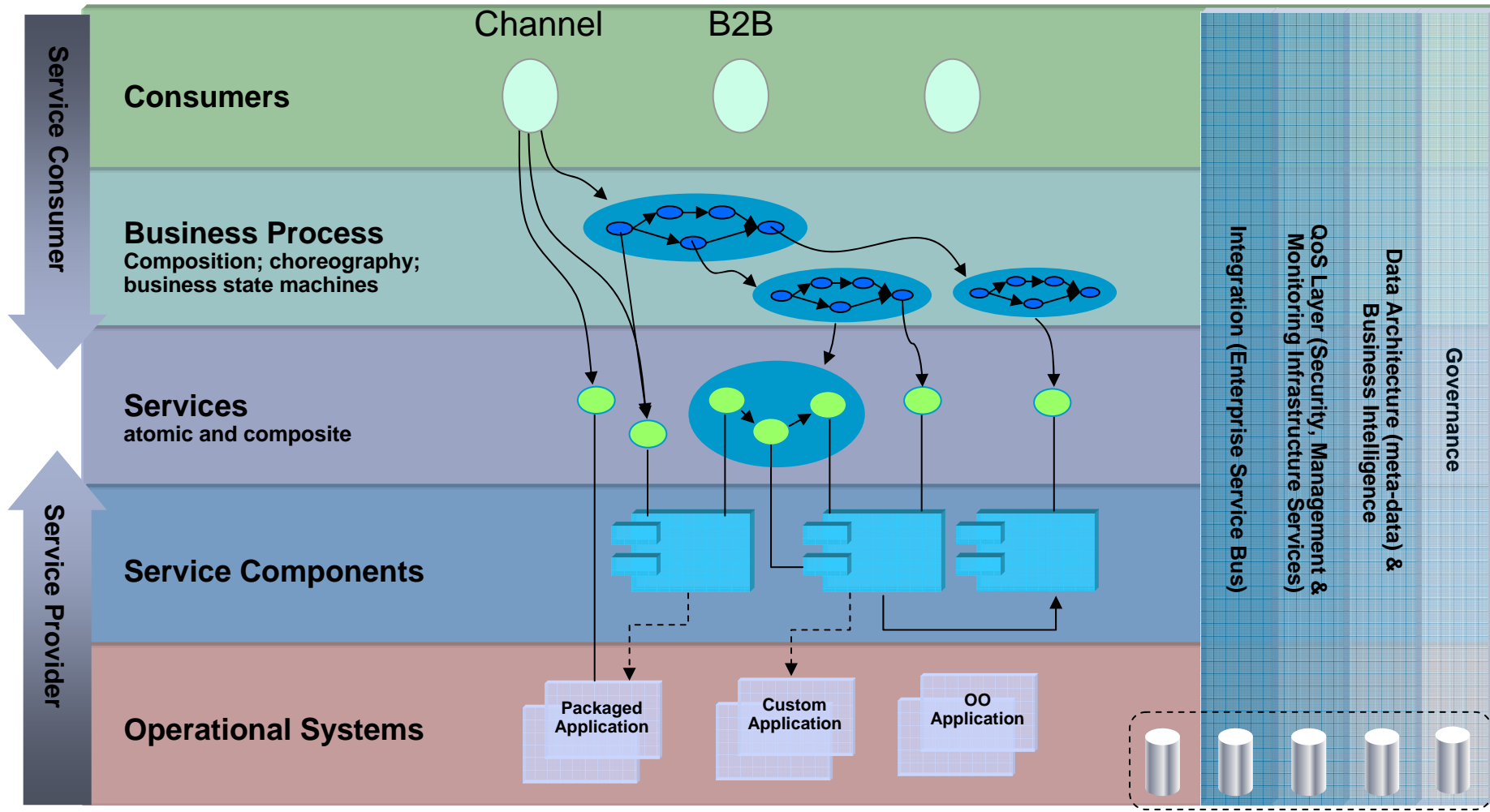
- ▶ a **programming model** complete with standards, tools and technologies such as Web Services

- ▶ A **middleware solution** optimized for service assembly, orchestration, monitoring, an management

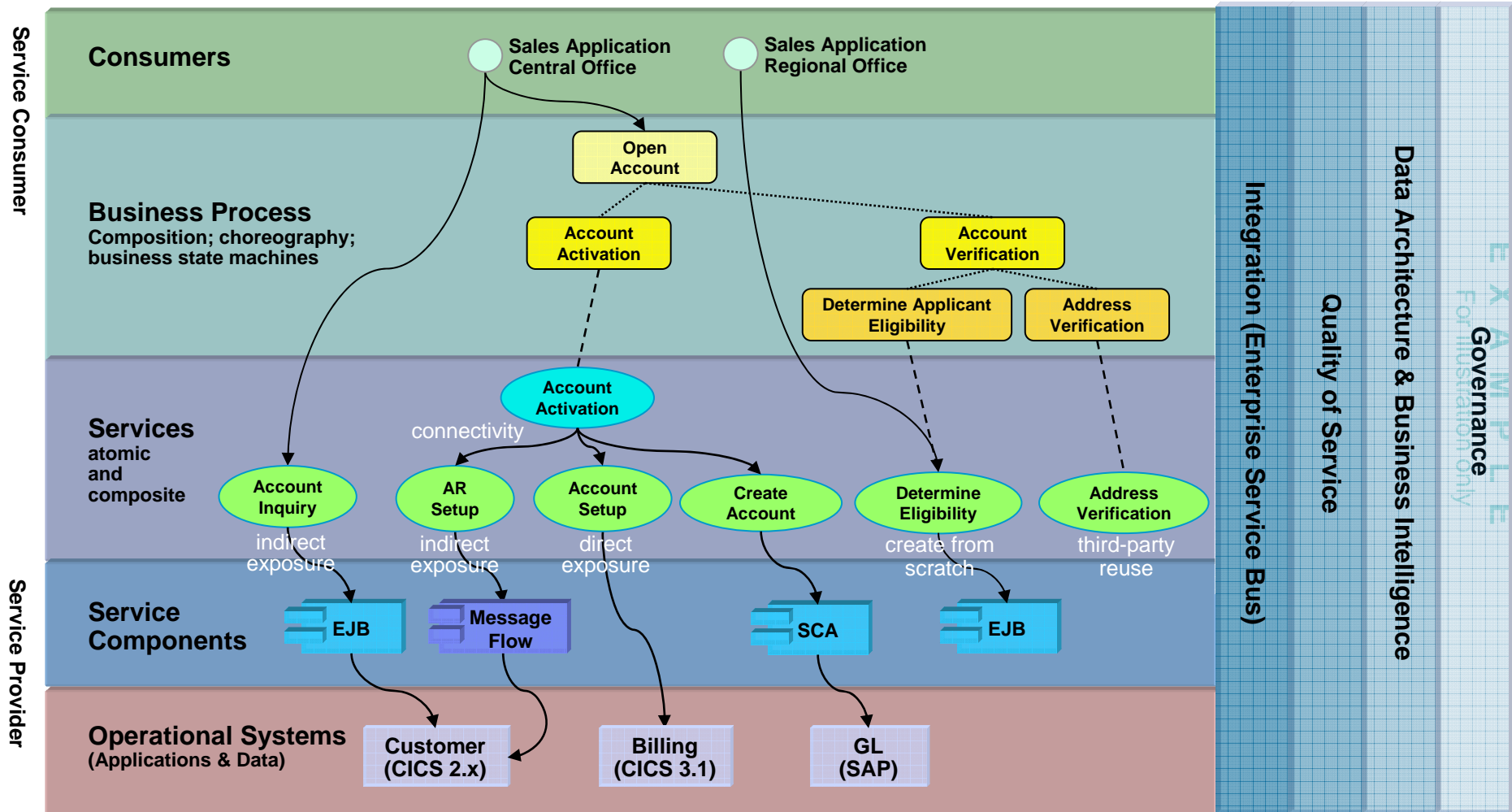
Software and
System
Developer



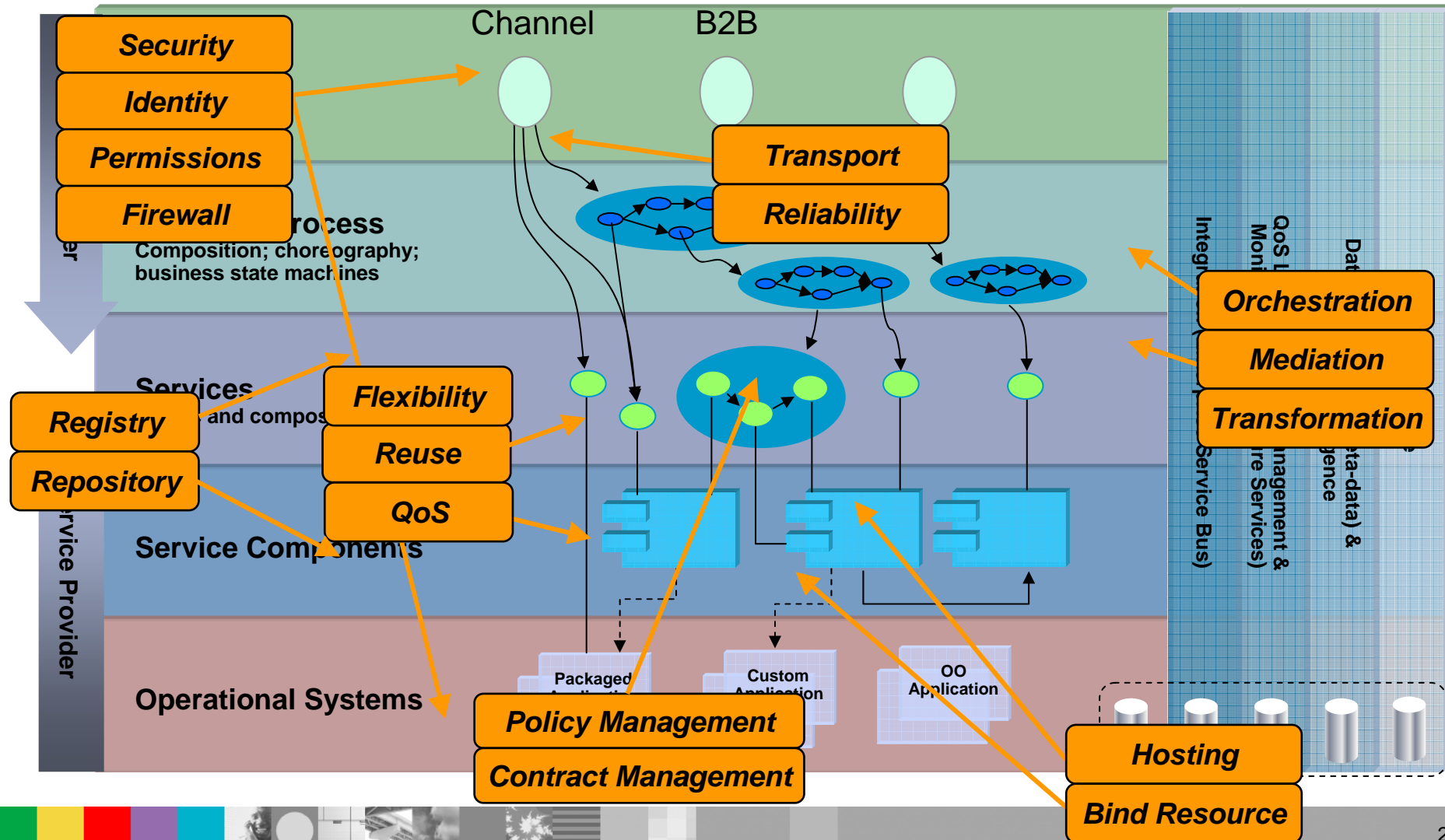
Moving to Services-Oriented Solutions



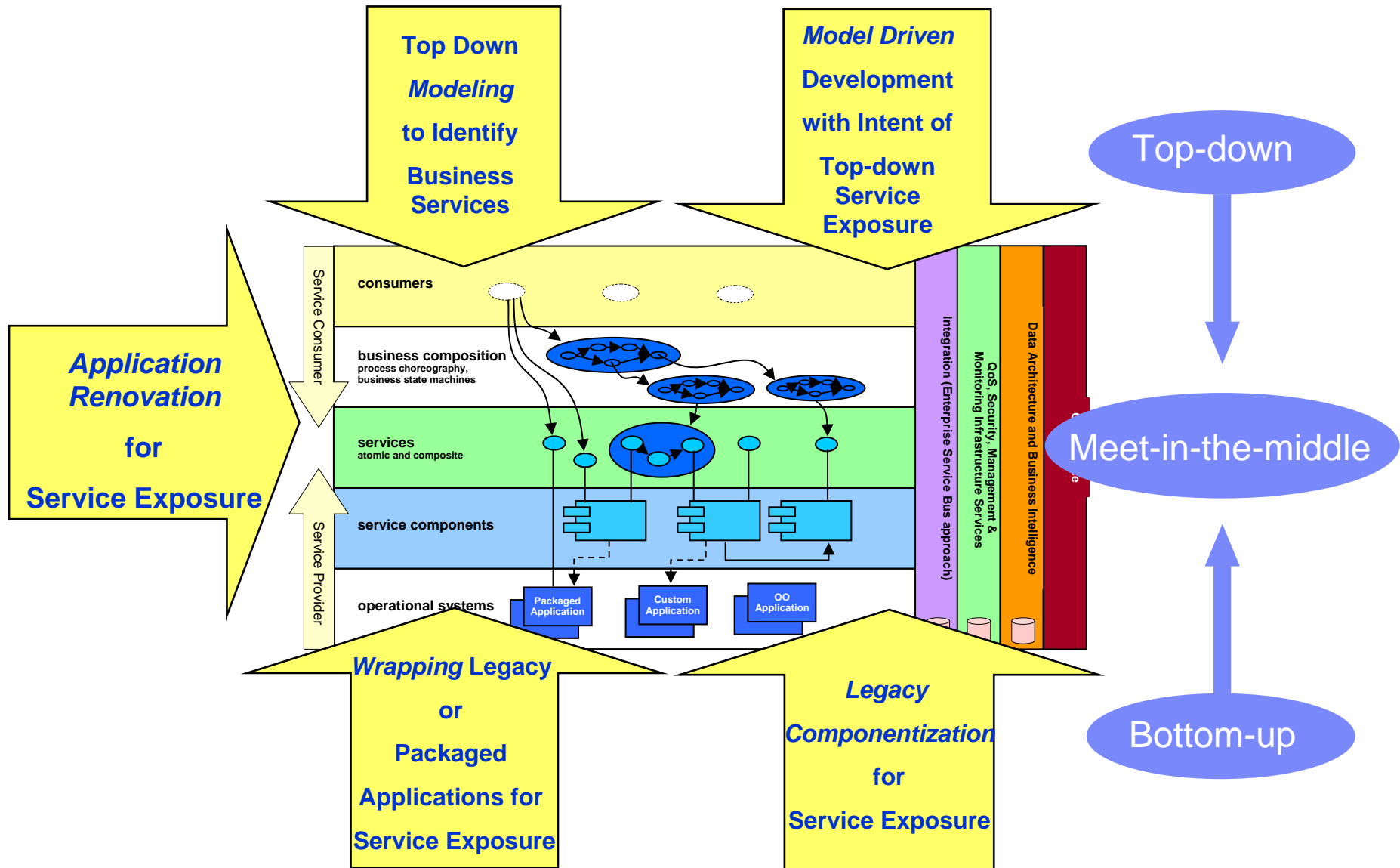
Illustrative Example: Account Opening



Moving to Services-Oriented Solutions – Challenges



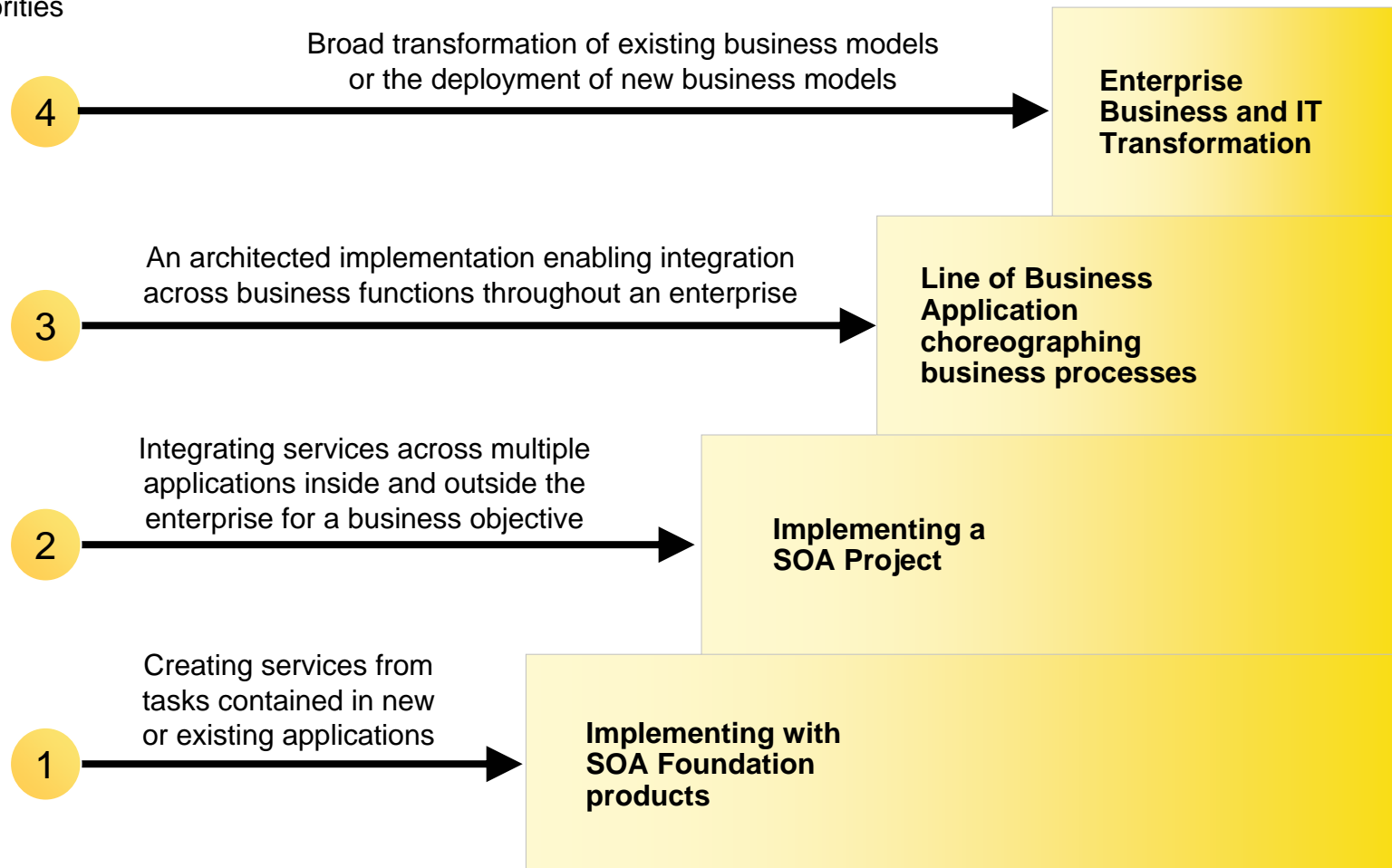
How: Approaches to SOA Solutions



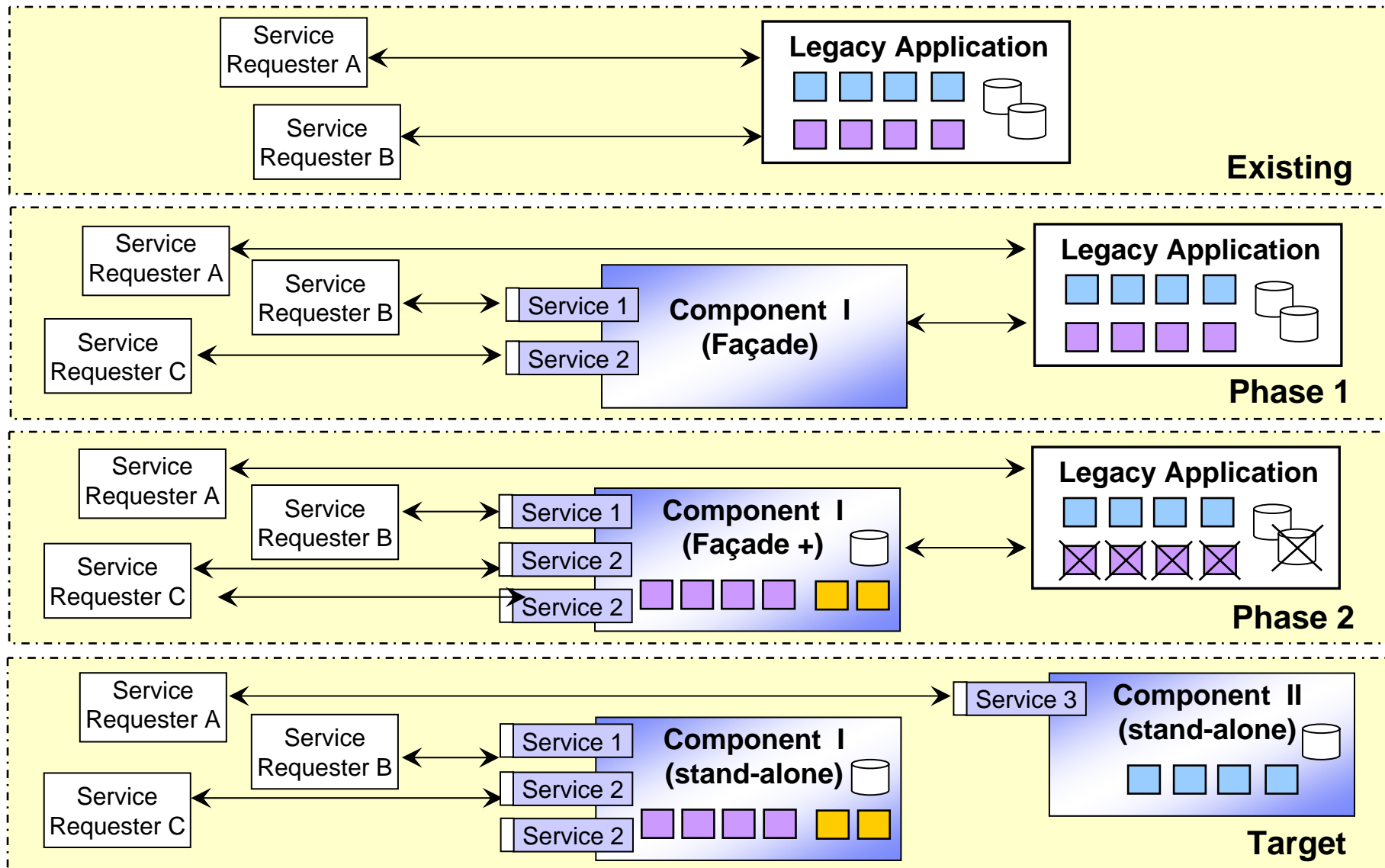
Organizations take different paths to SOA adoption based on business goals and IT constraints

Entry Points

Based On Business Priorities



Legacy Migration Example



Recover, Transform, and Rearchitect Services



Model & Implement Services, & expose as Web Services

COBOL/CICS Developer

Rational Software Architect
WebSphere Developer for zSeries
Asset Transformation Workbench

zSeries Application Developer discovers and analyzes traditional mainframe-based core-business application assets



WebSphere Studio Asset Analyzer for Multiplatforms Version 4.1

Home Explore Impact analysis Database

Explore MVS assets

Explore MVS assets: Go Type mixed case [Advanced search](#)

Run time	Total	Program	Total	Data	Total
Batch job	64	BMS map definition	20	Data element	255694
CICS group	79	BMS map set definition	17	Data set	432
CICS online region	4	Concatenation set	40	Data store	1604
CICS transaction	434	DB2 stored procedure	1	DB2 column	8745
DB2 system	2	Entry point	708	DB2 table	438
IMS subsystem	3	IMS PSB	116	DD name	1442
IMS transaction	23	Literal	19804	I/O record description	5912
IMS DBD	176	Program	725		
Run unit	912				

```

Line 1 Column 1 Insert
-----A-1-B-----2-----3-----4-----5-----6-----
Identification Division.
Program-ID. PRINTAPP.

Data Division.
Working-Storage Section.
01 Work-Farms.
05 In-Len PIC S9(4) BINARY.
05 Char-count PIC S9 Value ZEROS.
05 Out-Name PIC X(100).

Linkage Section.
01 Recvd-Farms.
05 In-name Pic x(30).

Procedure Division using Recvd-Farms.
Move spaces to Out-Name.
    
```

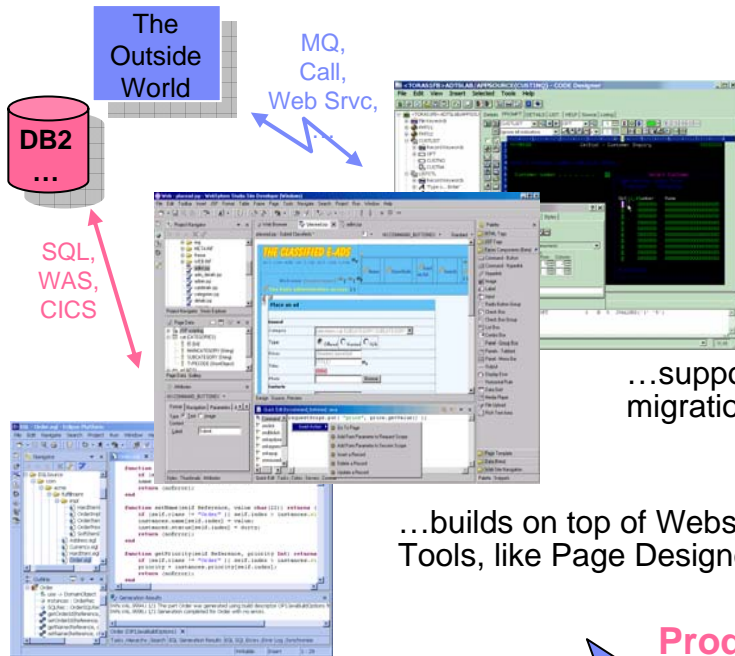
zSeries Application Developer restructures existing applications as reusable, shareable business components



Developing for the zSeries

- Development tools for zSeries applications remains a strategic investment area for IBM. Therefore, we are focusing on:
 - ▶ Improving and adding tools focused on increasing productivity
 - ▶ Integrating these tools with the rest of the IBM SDP
 - ▶ Ensuring these tools track and exploit the latest advancements in technology and middleware (e.g. SOA) without requiring your staff to become technology experts
- We offer 3 options:
 1. Host-based text editors and tools for COBOL & PL/I (e.g. ISPF)
 2. Eclipse-based WYSIWYG, visual and text editors and tools for COBOL & PL/I (e.g. WDz)
 3. Eclipse-based WYSIWYG, visual, declarative and text editors and tools for our MDD EGL language (e.g. WDz + EGL COBOL option)

EGL: The Essential Values

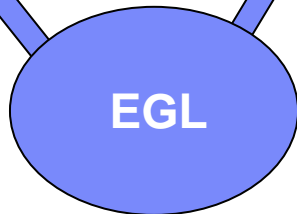


...supports Text-based UI's for migration of existing apps

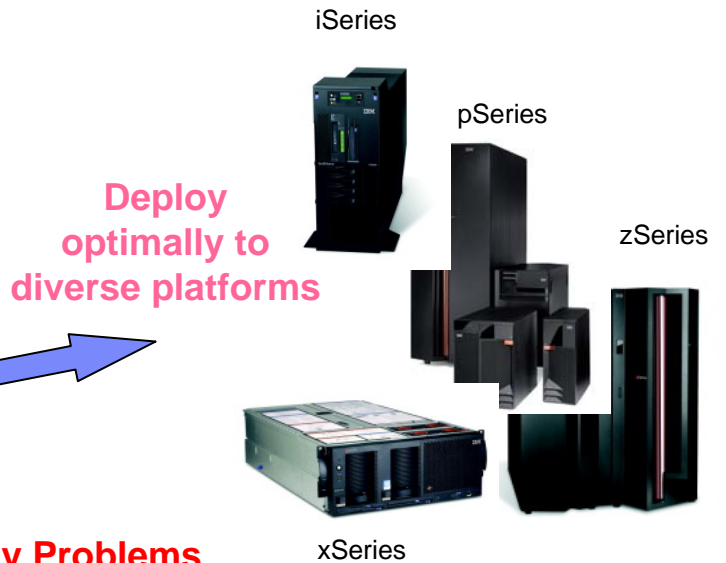
...builds on top of Websphere Studio Tools, like Page Designer.

...Highly productive and intuitive 4GL, simplifies complex runtimes & enhances quality by reducing amount of code needed

Productivity, High Quality



Enable broad class of business developers for leading-edge technical work



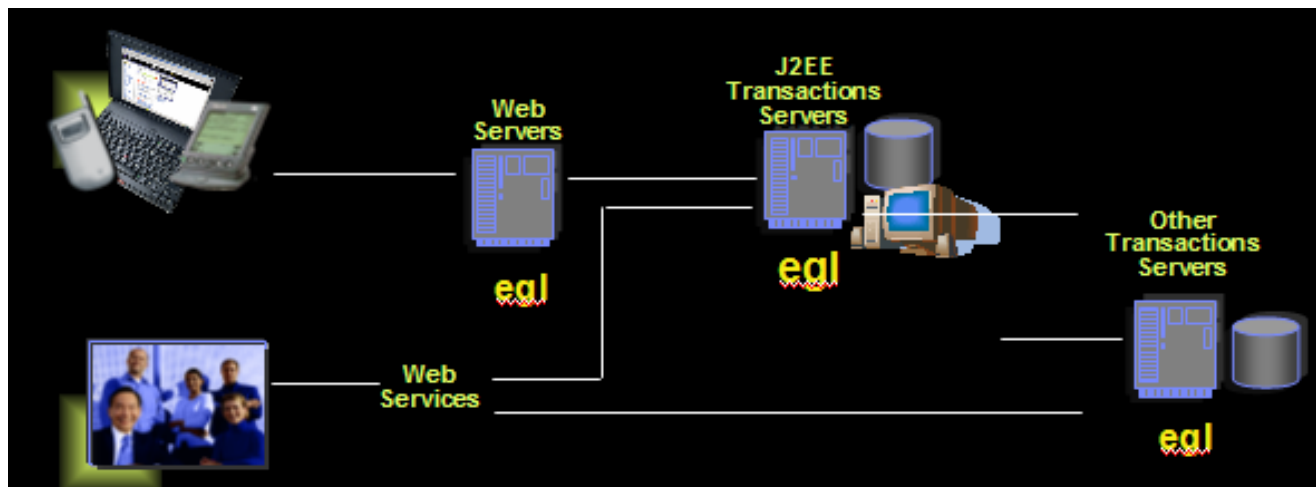
Deploy optimally to diverse platforms

Developers who need to solve Business Problems, not Technology Problems

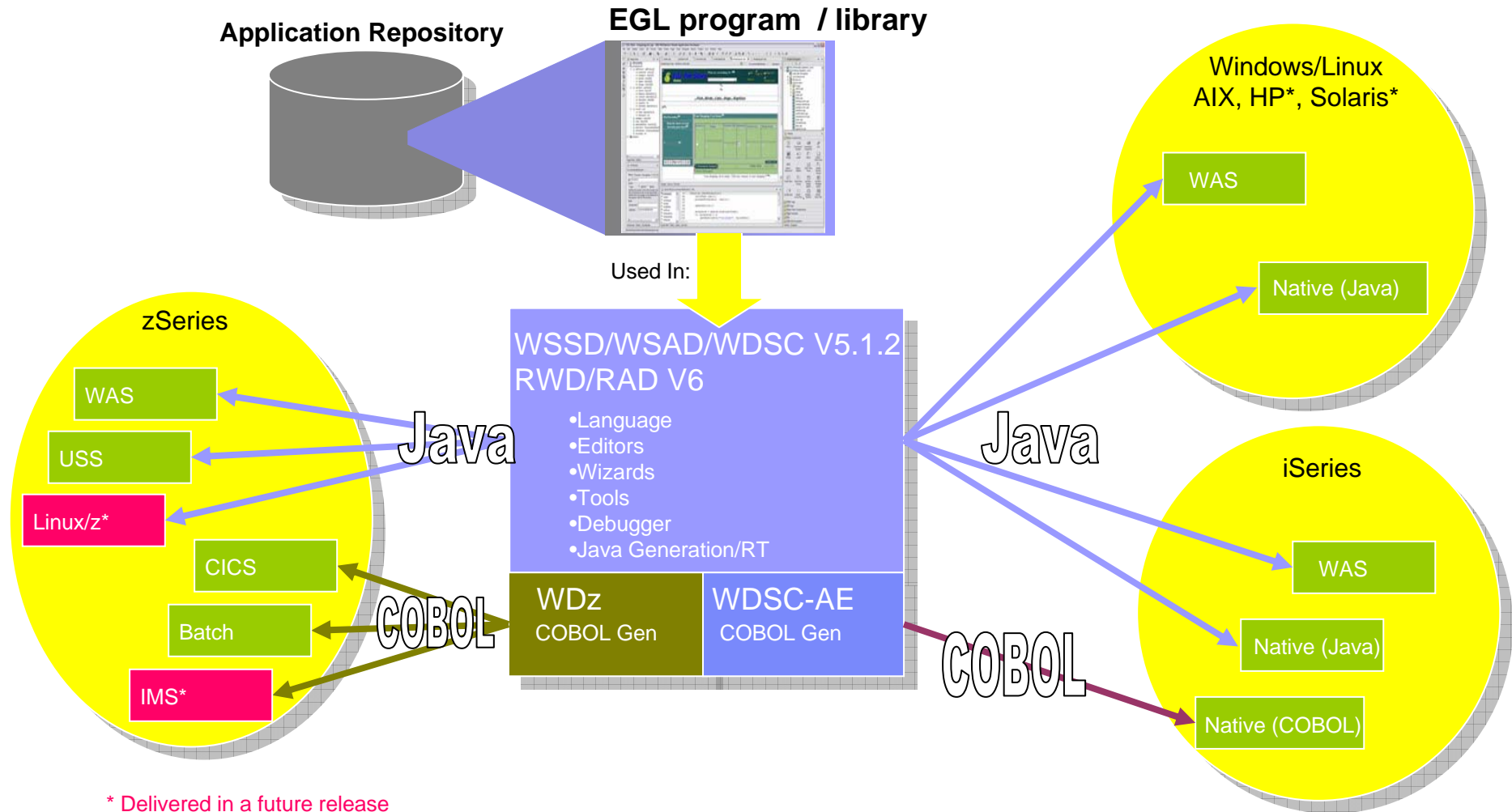


What Applications can be developed in EGL?

- Internet applications
- Callable Web Services
- Database applications
- Callable programs from traditional Java rich GUI clients
- Standalone batch applications
- Standalone TUI applications
 - For iSeries, CICS (zOS), Linux, AIX, Windows



Environments supported



* Delivered in a future release

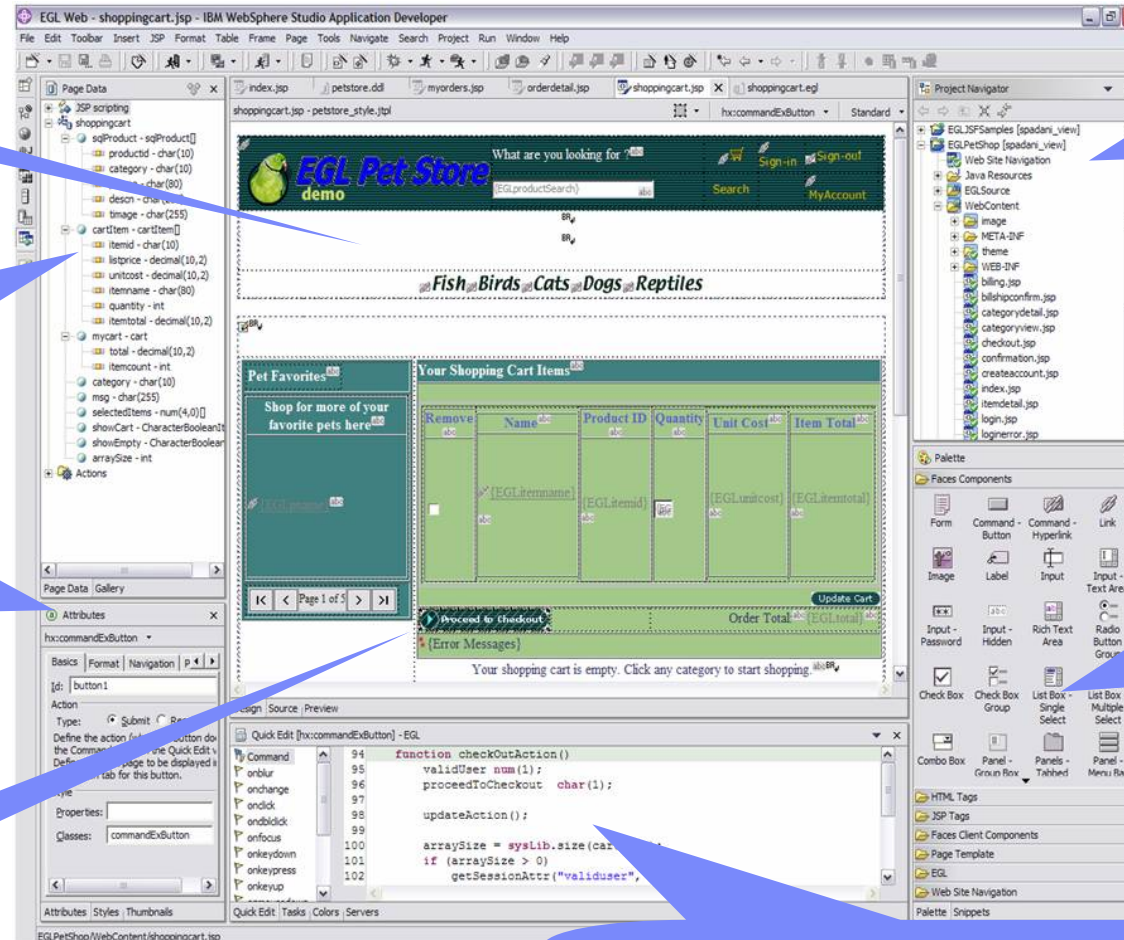
EGL Presentation – Design, Deploy, Debug and Test Dynamic Web Pages

Page Designer:
JavaServer Faces based
GUI Page Designer for Web

Page Data: Drag and Drop
EGL Data Model Records
and Data Items to build
dynamic web pages using
Page Designer

Control Attributes:
Customize visual, formatting,
validation, paging, navigation
properties for GUI controls

Command Event: Trigger
Server side EGL business
logic from visual controls



Project Navigator:
Application Artifacts
include Records,
Data Items, Page
Handlers, Libraries,
Pages, Styles,
Templates, etc...

Control Palette:
Faces
Components,
Faces Client
Components,
HTML Tags, JSP
Tags, EGL Data
Controls, etc...

Business Logic: Interactive logic development and debugging
in EGL (For developers experienced in COBOL, RPG, PL/SQL,
PowerBuilder, Informix, Visual Basic and other 4GL
programming languages.

For developers who need to solve Business Problems, not Technology Problems



EGL In Use

- We have over 200 Customers at various stages of deployment with EGL
 - ▶ Some are already in production
 - ▶ Includes:
 - New
 - Developing new systems for WAS, CICS, native distributed
 - Examples:
 - Worldwide auto manufacturer...their car-based concierge service will be EGL-based
 - Software company providing software to help run the World Cup in 2006
 - Large Cable company in the U.S.
 - A Caribbean Island's Internal Revenue Service
 - Informix 4GL to EGL Migrations
 - Customers now migrating (conversion tool shipped late 1Q05)
 - Several new POCs initiated every week
 - VA/G to EGL Migrations
 - Many major installations will complete migration in next 12-18 months
 - Most were waiting for WDz v6 because earlier versions of EGL were “incomplete”
 - Many more will start with WDz 6.0.1 – contains Web Transactions and IMS support



Development in the Real World – an Example

- Online Retail Company in U.S.
 - ▶ Several hundred COBOL developers
 - ▶ About a dozen Java developers
 - ▶ CICS is their current production runtime
 - ▶ Want to begin to adopt J2EE runtime - and run their business on WebSphere
 - ▶ Can't afford to trade out their current development staff and each person's decade(s) of online/retail business knowledge - unique to this company
 - ▶ Their COBOL programmers have struggled with Raw J2EE development
 - ▶ Want to move key elements of their business processing to WAS - but realize that a multi-year transition will be required

- Solution:
 - ▶ Small group of COBOL developers (10) in 4 weeks did:
 - Trained in EGL and JSF – 1.5 days
 - Built a web app that was reasonably complex – 12 production quality pages
 - Deployed it to their WAS integration server
 - Now they're training all of the COBOL developers in EGL and JSF

Development in the Real World – an Example

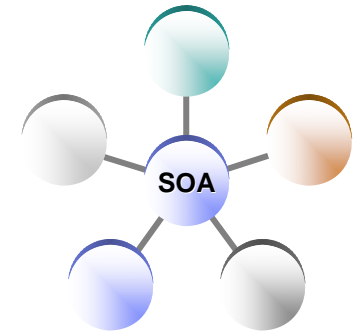
- Large Bank in Belgium
 - ▶ 250 VisualAge Generator (VG) developers
 - ▶ 300 COBOL and PL/I developers
 - ▶ 50 Java developers
 - ▶ IMS is their transactional runtime
 - ▶ Also need to deploy to Linux and iSeries due to some acquisitions
 - ▶ They want their business application developers to focus on business problems, not technology issues
 - ▶ They want their Java developers to focus on technology and infrastructure issues

- Solution
 - Migrating their existing VG applications and 250 developers to EGL
 - Moving 250 of their COBOL and PL/I developers to EGL for:
 - more platform flexibility
 - better productivity

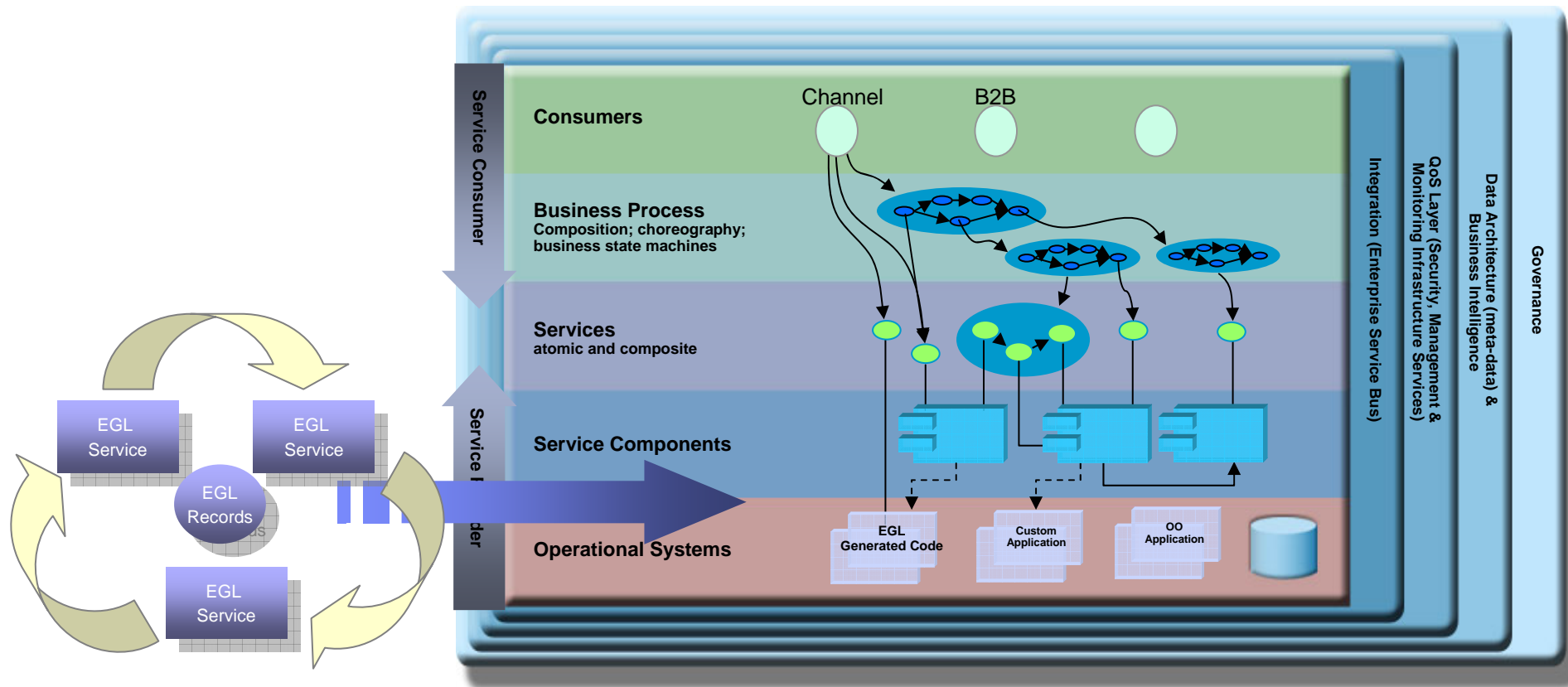


The Power of Services

Seamless integration with SOA stack

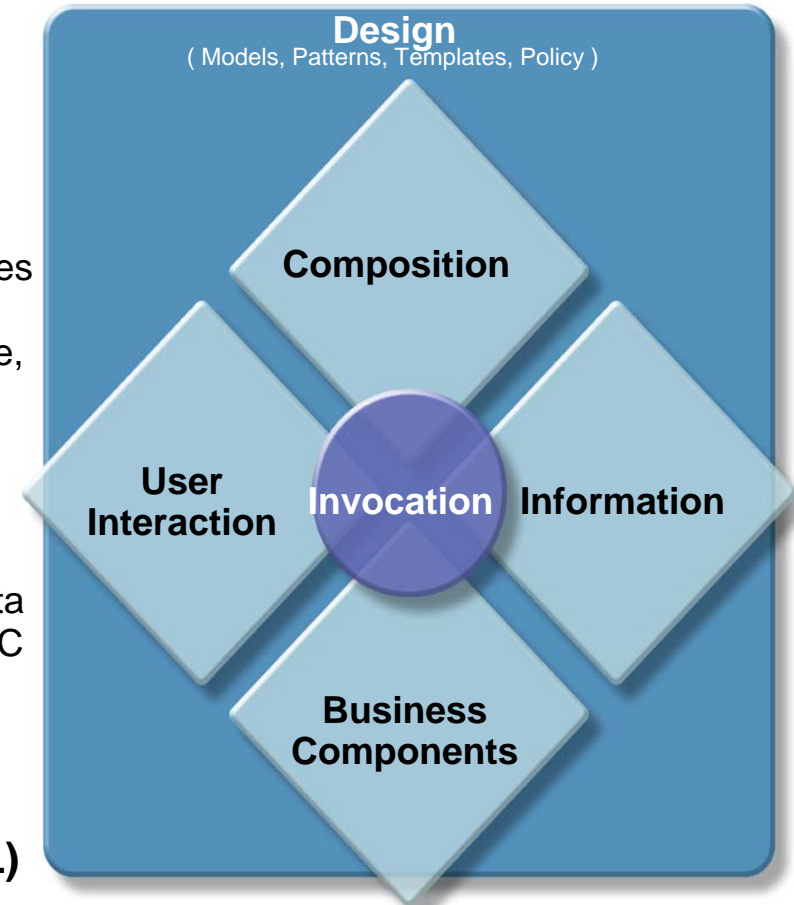


EGL Services can be generated into deployable artifacts that are accessible as Web Services
 EGL data appears as XML payload with no need for transformation

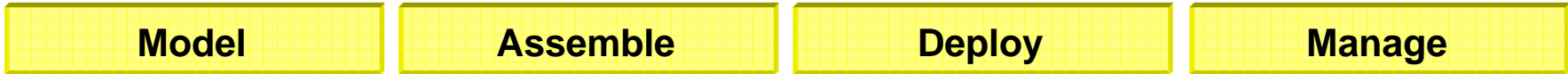


SOA Programming Model Supported by Key Standards

- **JavaServer Faces (JSF)**
 - ▶ Standard way to construct user interfaces for web applications, JSR 168 portlets, etc.
 - ▶ MVC based User Interaction Framework
- **Service Component Architecture (SCA)**
 - ▶ 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 business processes
 - ▶ Standardization through OASIS



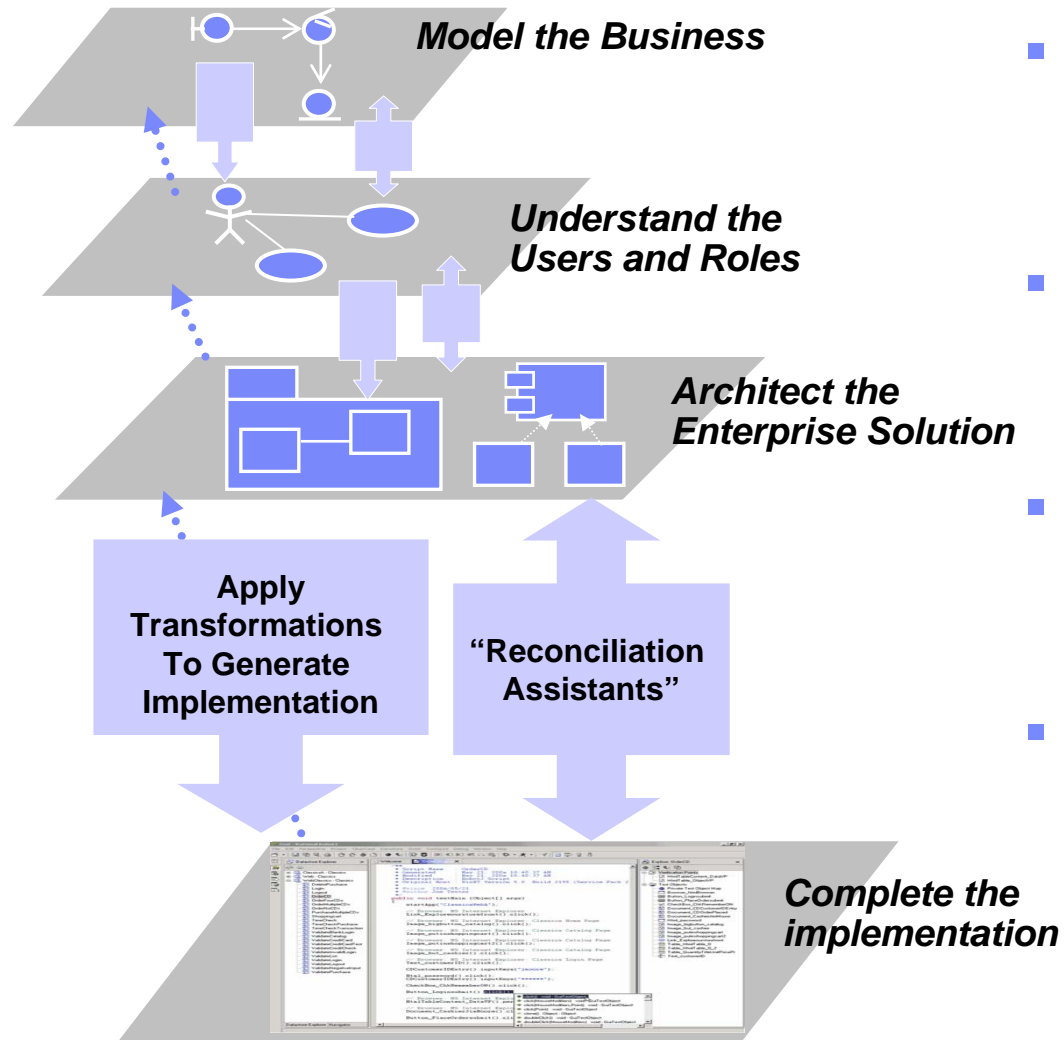
SOA Impacts the Whole Application Lifecycle



Model		Assemble		Deploy		Manage	
Business Analyst	Application Developer	Integration Developer	Service and Solution Tester	IT Service Manager	IT Operations		
<p><i>"Which business services do I optimize? What impact will that have on my IT systems?"</i></p> <p><i>"How can I debug my production application without reproducing the problem."</i></p> <p><i>"How do I design and implement services based on my existing systems?"</i></p> <p><i>"What are the business objectives and how would I know when I meet them?"</i></p>		<p><i>"Before I deploy it in production, how can I be sure that the service flow matches the design?"</i></p> <p><i>"How do I test a composite solution when many of the pieces are external to me?"</i></p> <p><i>"Does my new SOA application meet it performance goals?"</i></p> <p><i>"How do I make sure it works reliably and securely with other services I'm dependent on?"</i></p>		<p><i>"Some of our services are used by our partners? How can I be sure they are meeting their SLAs?"</i></p> <p><i>"Which part of the SOA infrastructure is causing this service problem? The app server or the messaging connections?"</i></p> <p><i>"What's the root-cause of this service problem – the requirement, the service flow or the application?"</i></p>			
Rational		WebSphere		Lotus	DB2	Tivoli	

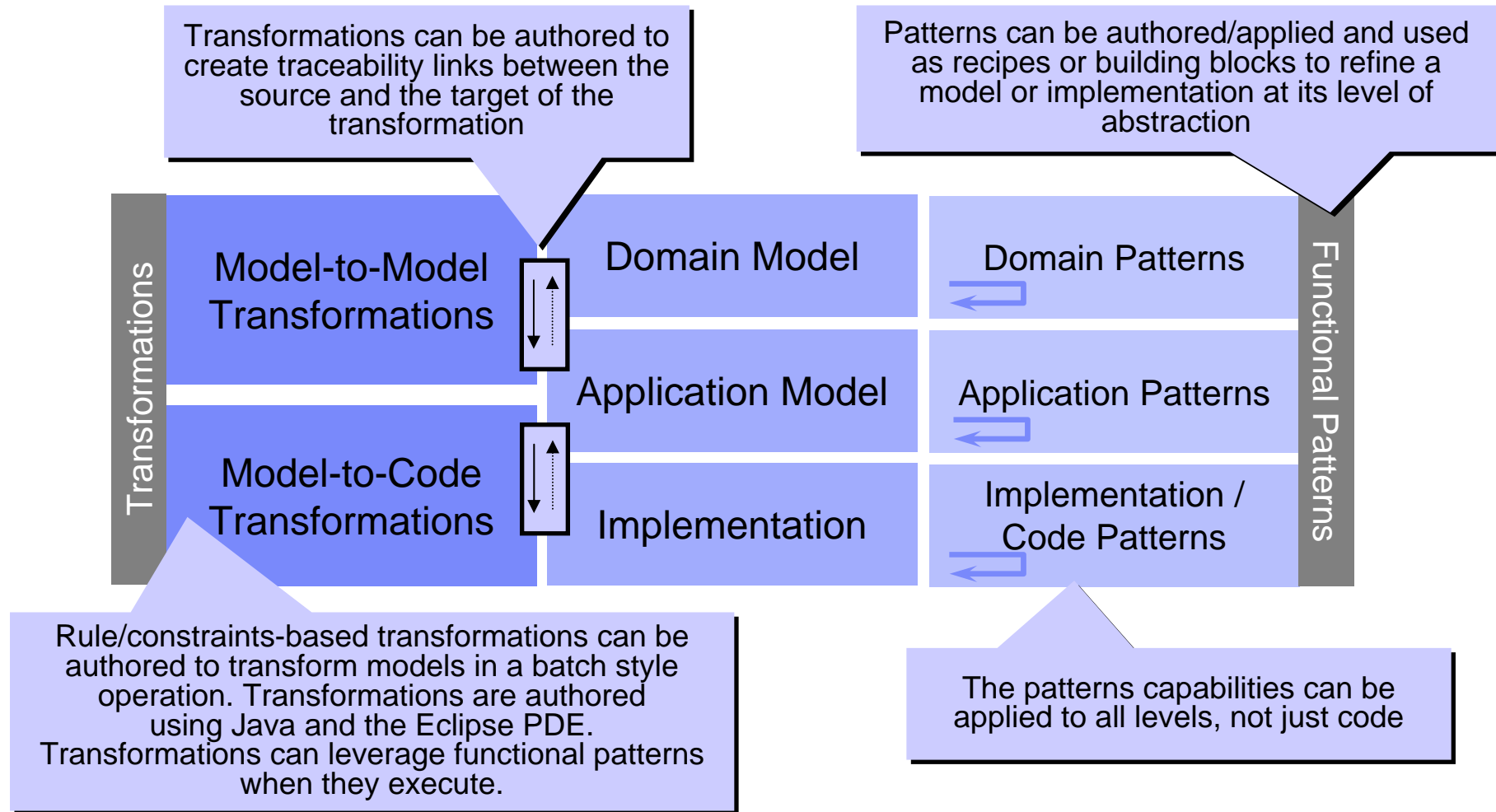


Productivity and Quality with Model Driven Development



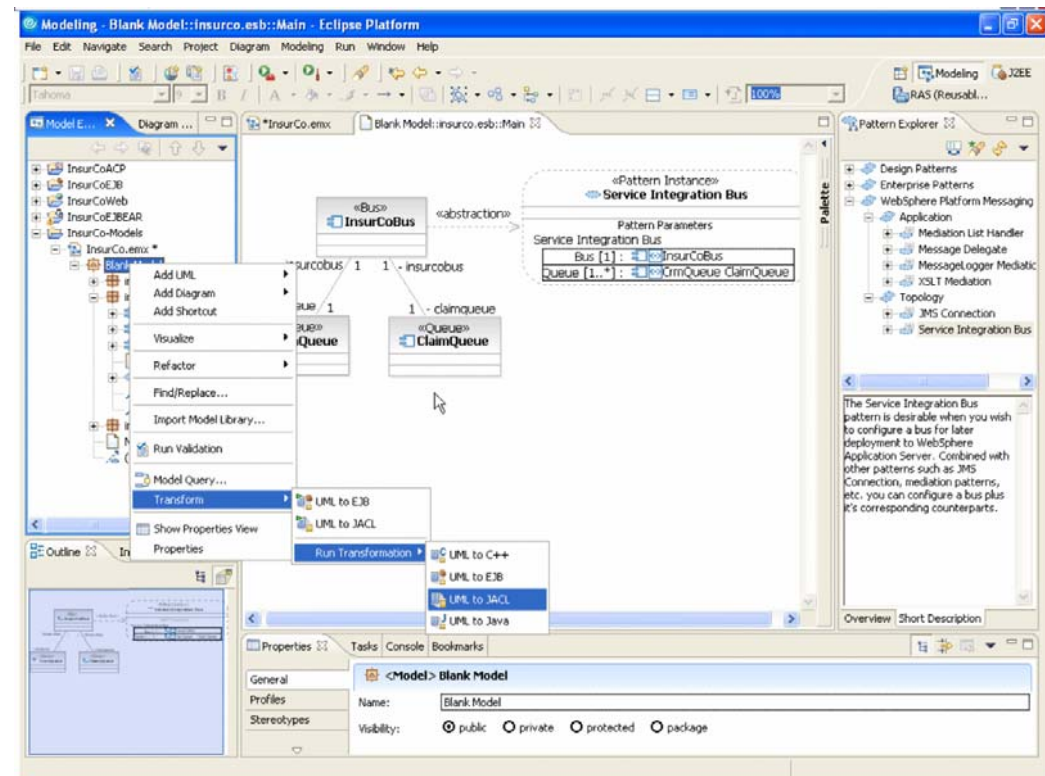
- Raise the level of communication through a common language
- Reduce complexity
 - ▶ Create and manage abstract representations
- Improve quality
 - ▶ Seamless model integration reduces translation errors
- Manage change
 - ▶ Maintain traceability across artifacts

Author and Implement Patterns and Transformations



An Example of MDD In Rational Software Architect: Applying a Service Bus Pattern

1. Create a new UML Model
 - Add appropriate profiles to model
2. Create UML classes for data
3. Apply RSA Patterns to to:
 - ▶ Define views
 - ▶ Bind data to view
 - ▶ Add additional parameters
4. Invoke UML to JAQL Transform to to:
 - ▶ Generate service bus implementation artifacts
5. Add your own customization code
6. Deploy and Test



Models and Code Visualization

Architectural Analysis, Discovery, and Control

- Architecture discovery for J2SE
 - High-level software visualization
- Application architecture is reflected in the running code
 - Analyzing code can help assess its maintainability
- Govern the architecture with the assistance of rules
 - Template-based rule authoring
- Anti-pattern and pattern detection
 - Detection of cyclic dependencies, hubs, breakable, etc.
 - Wizard assisted automated quick-fix

The screenshot displays the IBM Rational software interface, illustrating architectural analysis and code review capabilities. The main window shows a 'Diagram Navigator' on the left, listing various architectural topics such as 'Component', 'Global Breakable', 'Global Hub', 'Implementation Dependency', 'Local Breakable', 'Local Hub', 'Tangle', 'Package', 'OOP Diagrams', and 'Packages'. The central area displays a complex dependency diagram with nodes like 'item.jsp', 'product.jsp', 'customer.jsp', 'CatalogHelper', 'CatalogEJB', 'CatalogDAO', 'GenericCatalogDAO', and 'CatalogDAOImpl'. A 'Code Review: JUnit' pane at the bottom shows a list of detected issues, including 'Globalization:Character (Score 20)' and 'Globalization:String (Score 122)', with specific error messages like '[Unresolved] Assert.java:270 Avoid using + operator'. A 'Details View' pane on the right provides an overview and avoidance guidance for anti-patterns.

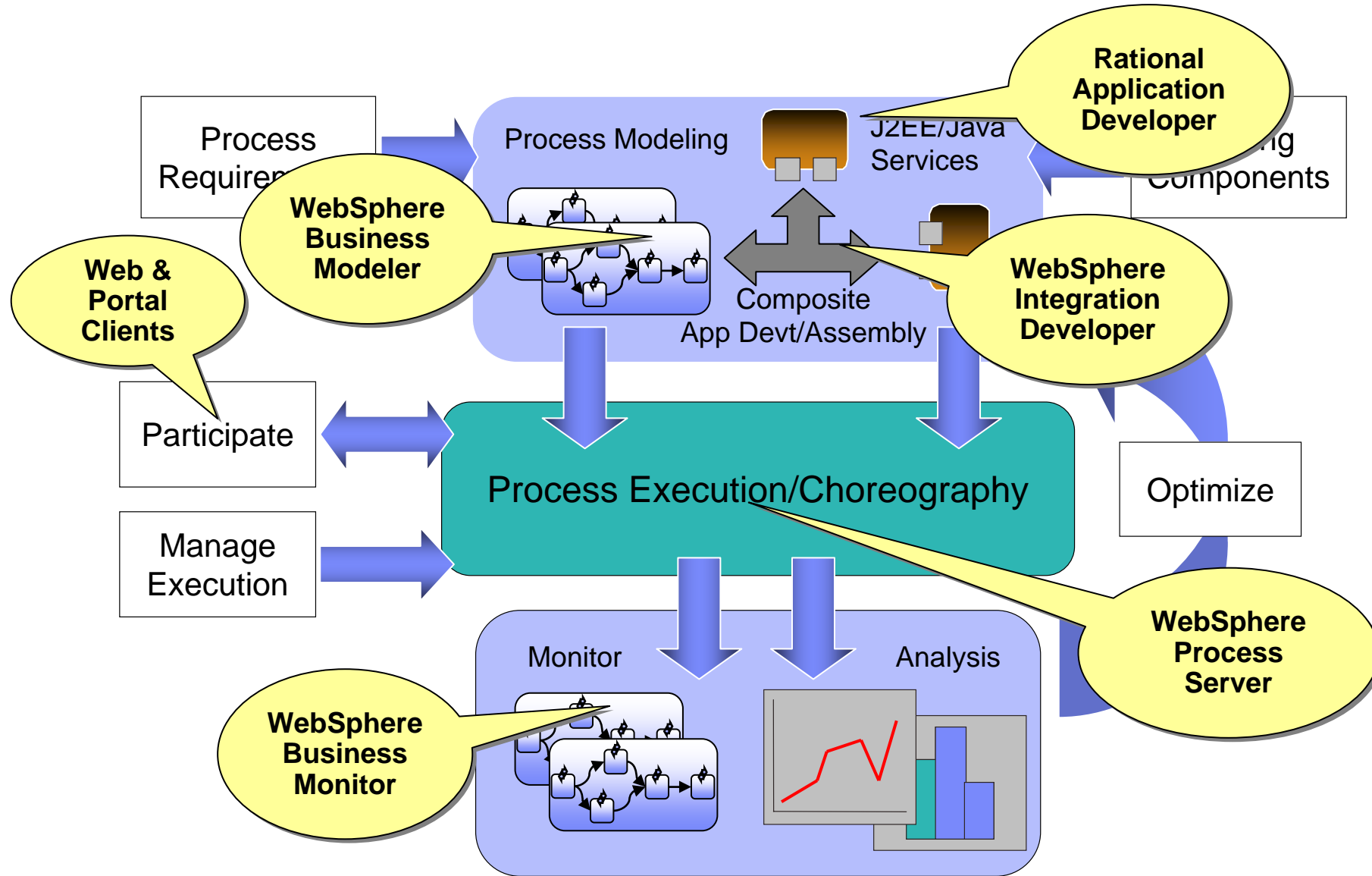
Automatic generation of "topic" diagrams based on the results of the code analysis

Patterns and anti-patterns are rendered in the diagram editor. Navigation to detailed code is supported.

Code review pane providing a report of detected issues.

"Details View" providing an overview and avoidance guidance for anti-patterns.

Business Process Development Life Cycle Tools



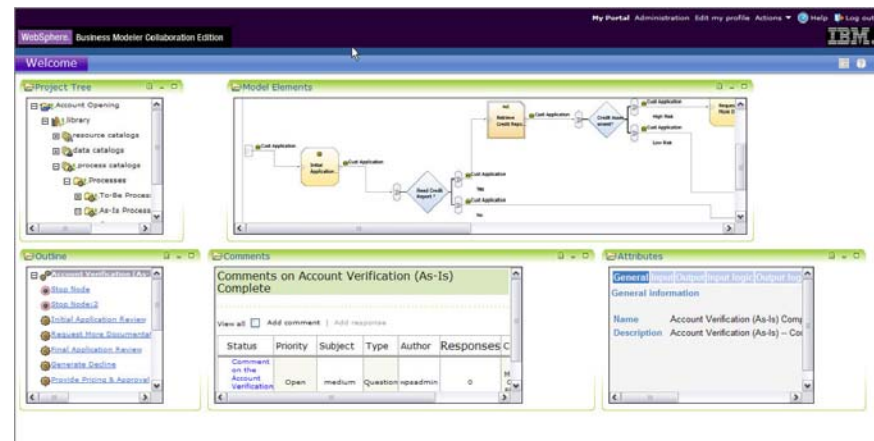
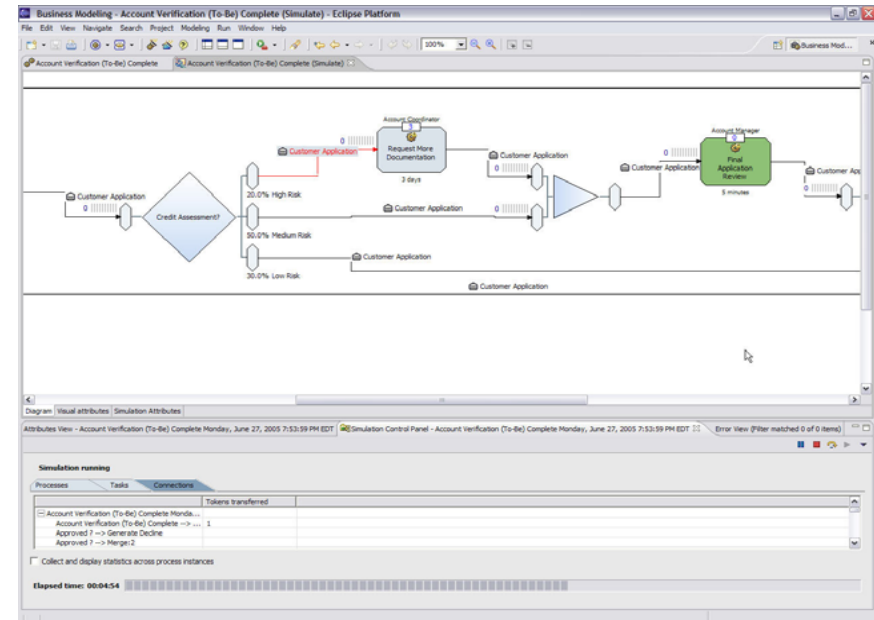
Understand the Business Process

- Simple to use business modeling tool
 - ▶ Allow the people who know the business to model
 - ▶ Drag and drop for the business analyst

- Precise modeling of the vital aspects of the process
 - ▶ Understand your business models and make informed decisions before deployment
 - ▶ Resources, roles, organization, information, business metrics

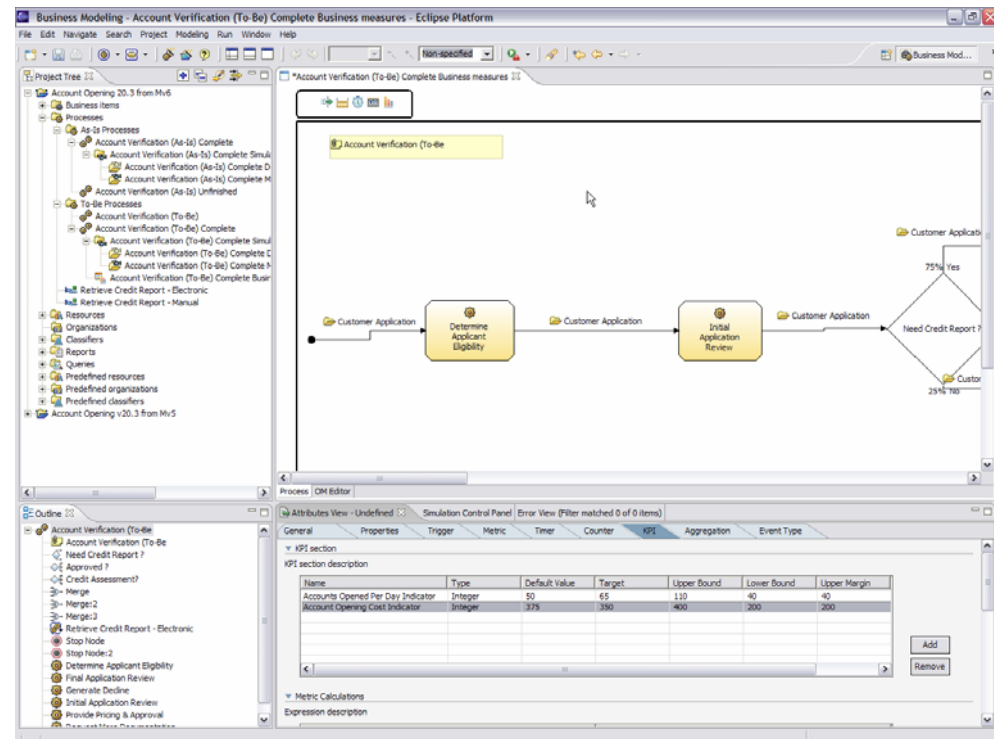
- Collaborative modeling
 - ▶ Communicate and participate across your enterprise
 - ▶ Enables team work and web publication

- Clean hand-off to I/T
 - ▶ Rapid and accurate deployment of your solutions
 - ▶ Business modeling is the starting point for I/T deployment



Explicitly Define KPIs and Metrics

- Defines the contexts of what is monitored during the execution of the business process
- Key Performance Indicators (KPI's) and Metrics are defined both at a business process and activity level of granularity
- Situation and situation outcomes can be defined in order to make KPI's and metrics actionable



Monitor the Business Performance of Active Processes

View Key Performance Indicators (KPI's) calculated from live process data

- Display KPIs graphically as scorecards and gauges

Key Performance Indicators (KPI's)

The KPI view allows users to monitor Key Performance Indicators

KPI	↑↓	Status ↑↓	Value
Retail.Forecast Cost		N/A	48
Retail.Actual Cost MTD		N/A	8
Retail.Actual Cost YTD		✓	47
Retail.Actual Capital MTD		N/A	0
Mortgage.Actual Cost MTD		N/A	2.4
Mortgage.Actual Cost YTD		⬇	6
Retail.Actual Capital YTD		N/A	0
Retail.Actual Interest Income YTD		✓	470
Retail.Actual Interest Income MTD		N/A	83

⬇ Below limit
✓ Within limits
⬆ Above limit

Internal Business Process

KPI Name	↑↓	Status ↑↓	Value	Target	Score	↑↓
Mortgage.Actual Interest Income YTD		⬇	10.8	15	72%	
Credit Cards.Actual Interest Income YTD		⬇	140	155.8	90%	

Learning & Growth

KPI Name	↑↓	Status ↑↓	Value	Target	Score	↑↓
Credit Cards.Actual Interest Income YTD		⬇	140	155.8	90%	
Wholesale.Actual Interest Income YTD		⬆	160	150	107%	

Customer

KPI Name	↑↓	Status ↑↓	Value	Target	Score	↑↓
Trade Finance.Actual Interest Income YTD		⬆	85	79	108%	
Wholesale.Actual Interest Income YTD		⬆	160	150	107%	

⬇ Below target
✓ On target
⬆ Above target

Gauges

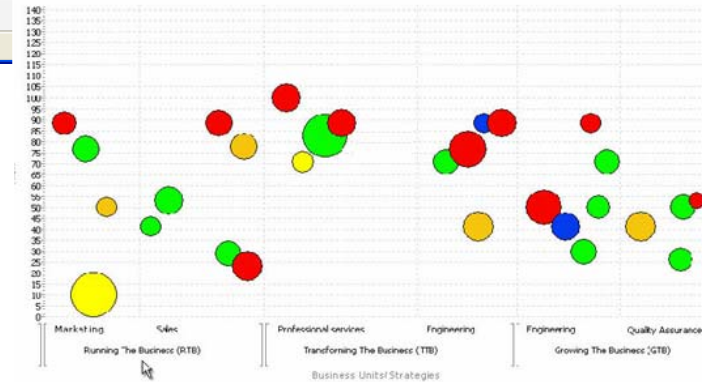
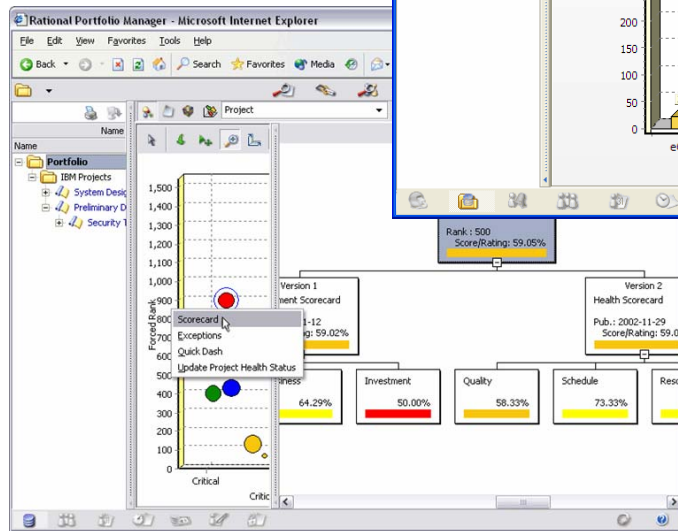
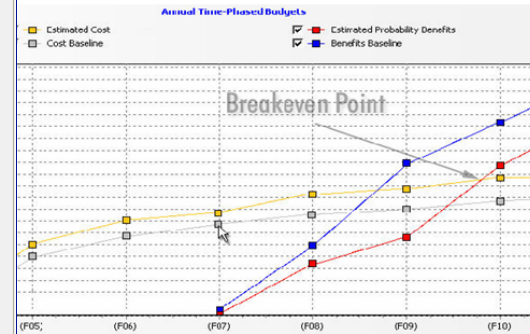
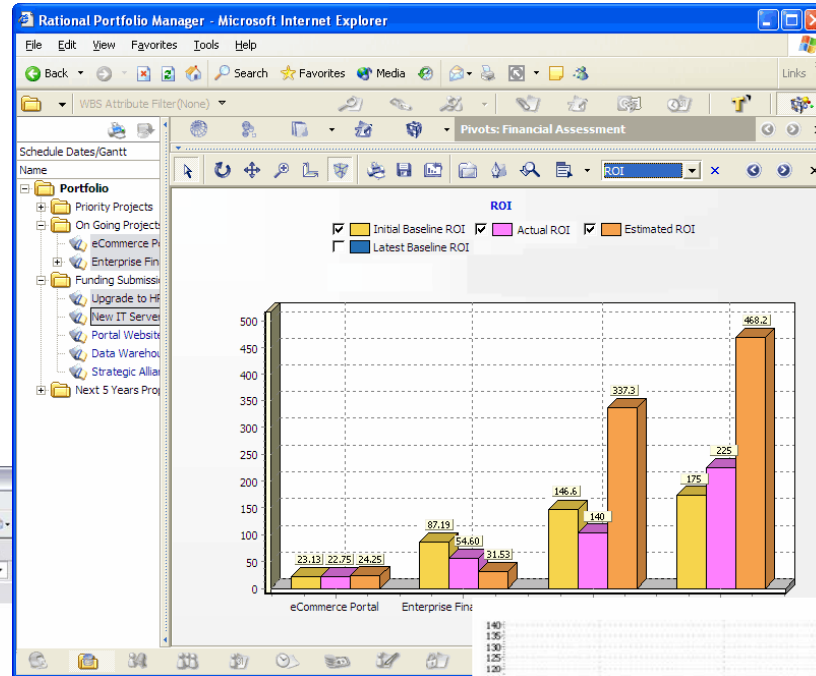
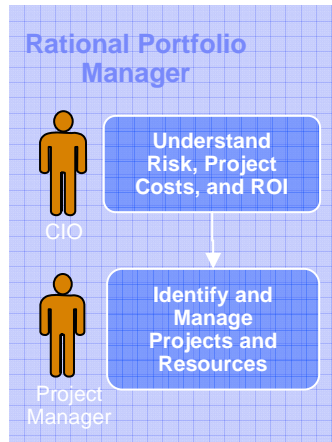
The Gauges view allows users to display the values of aggregate Key Performance Indicators (KPIs) relative their limits or targets.

Retail.Actual Cost YTD

Mortgage.Actual Cost YTD

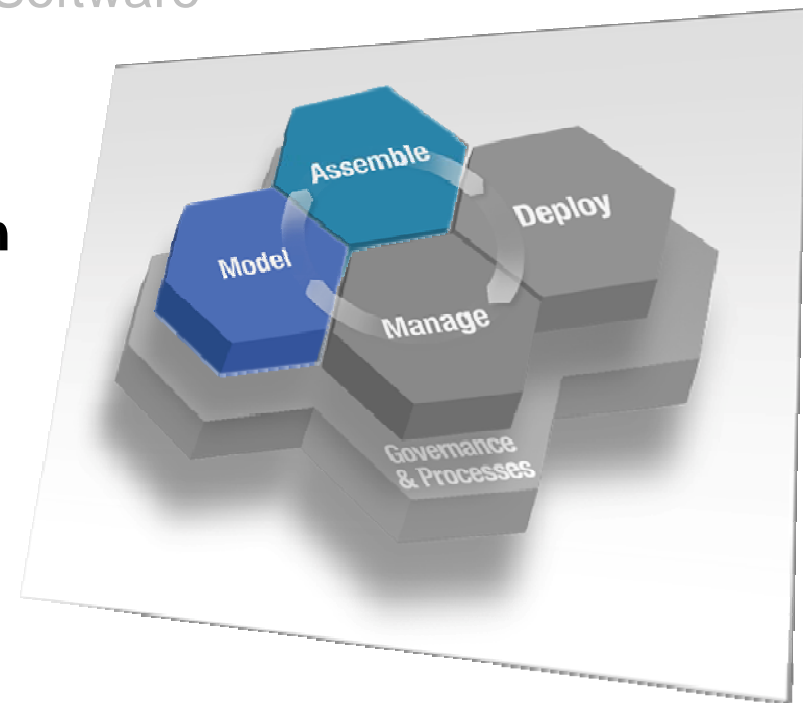
Govern SOA – Align, execute and control investments

Maximize Revenue Growth: Control Cost And ROI

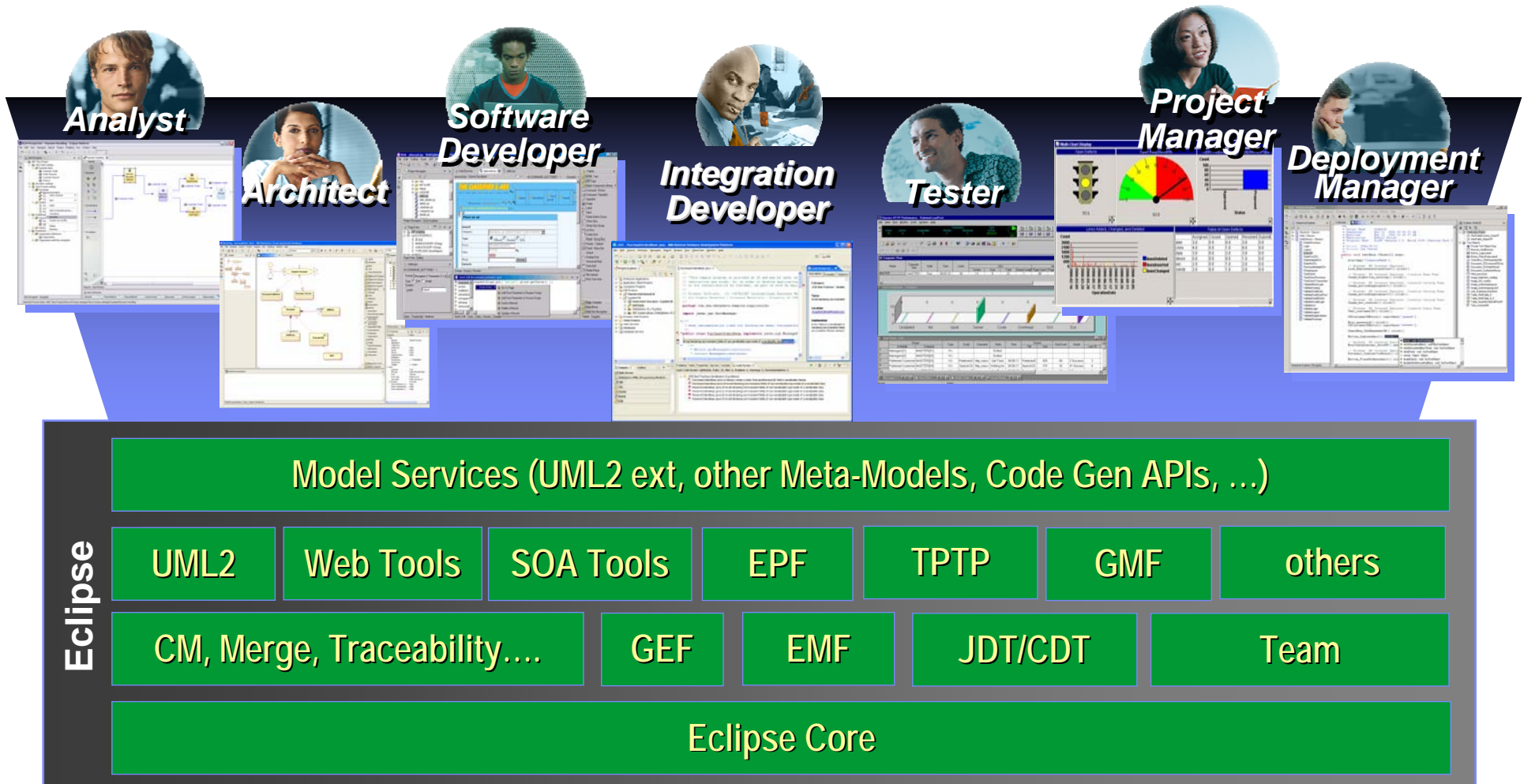


Agenda

- Business Driven Development
- Three Key Concepts for Successful Software
- **Putting it All Together –
Creating an Integrated Workbench**
- Lessons and Next Steps



An Extensible Integrated Workbench Architecture



Rational SDP Integration in Eclipse

Manage assets from multiple sources

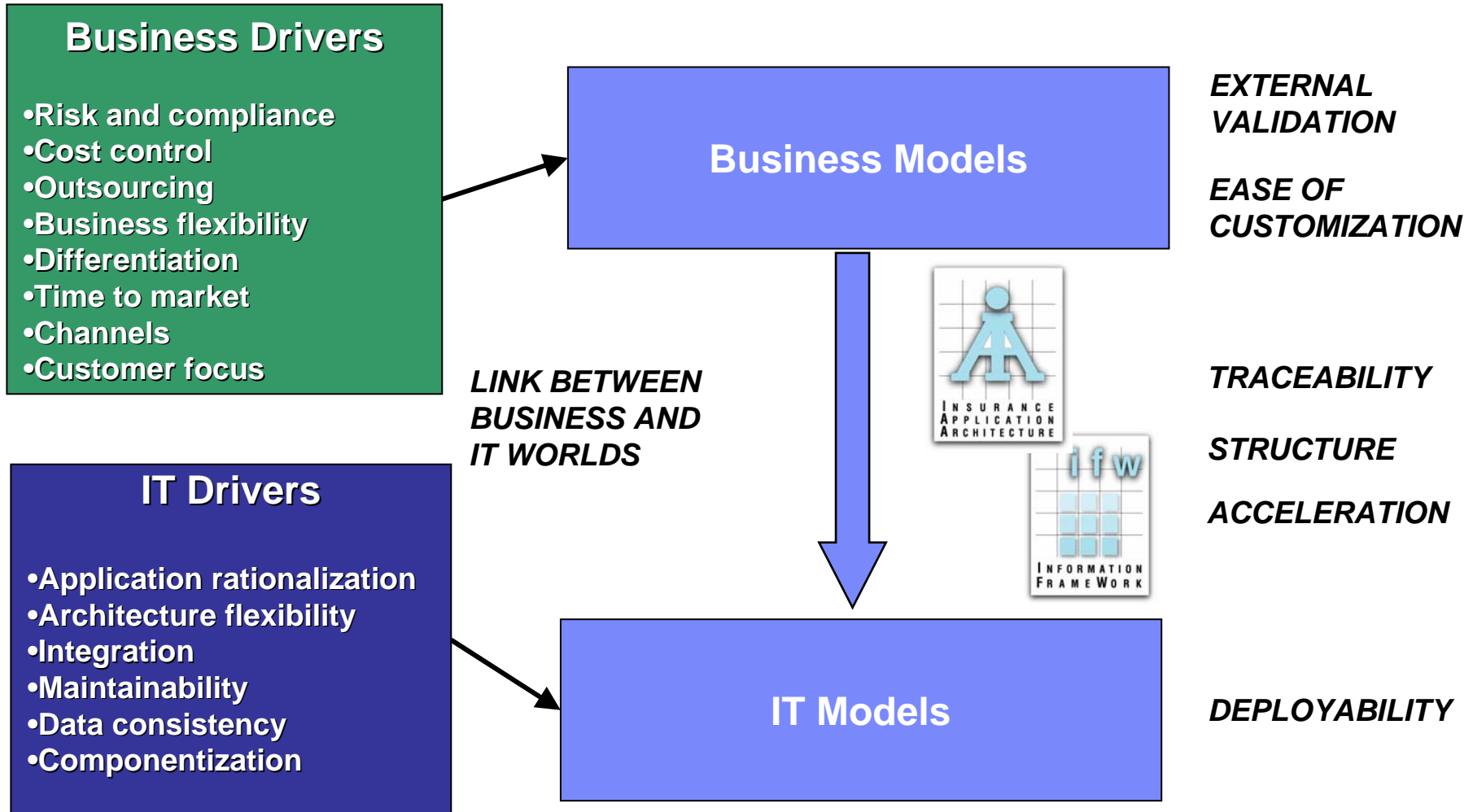
Different models representing different perspectives

Requirements can be browsed, queried, and traced

Process guidance provided in context

Property	Value
GUID	{5F4BB983-B224-49E6-9895-A976DF38C2}
Name	BDD - Start
Path	C:\Program Files\Rational\RequisitePro\Re...

Industry Models for Governing Software Architecture



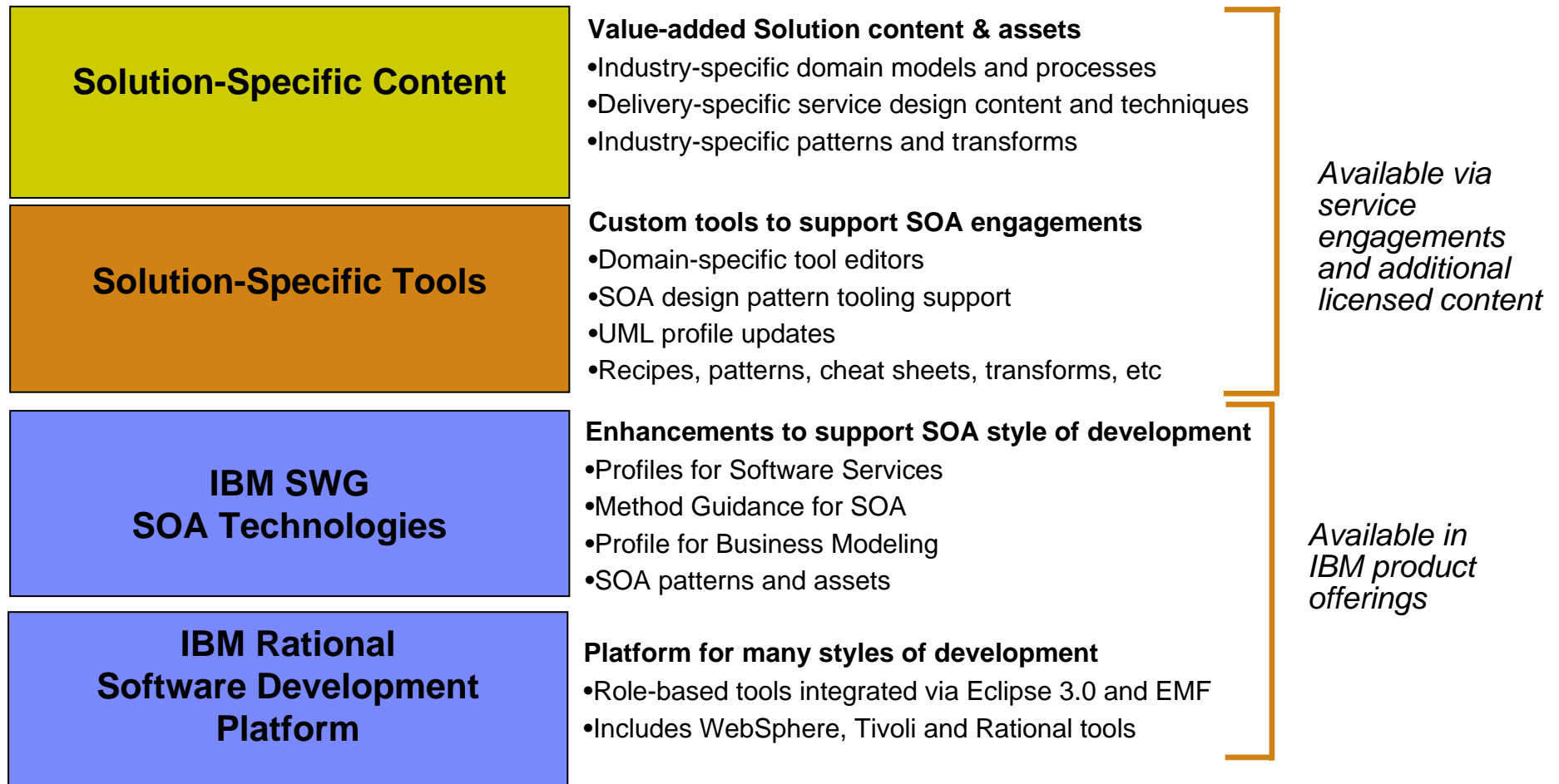
Rational software

DB2 Information Management Software

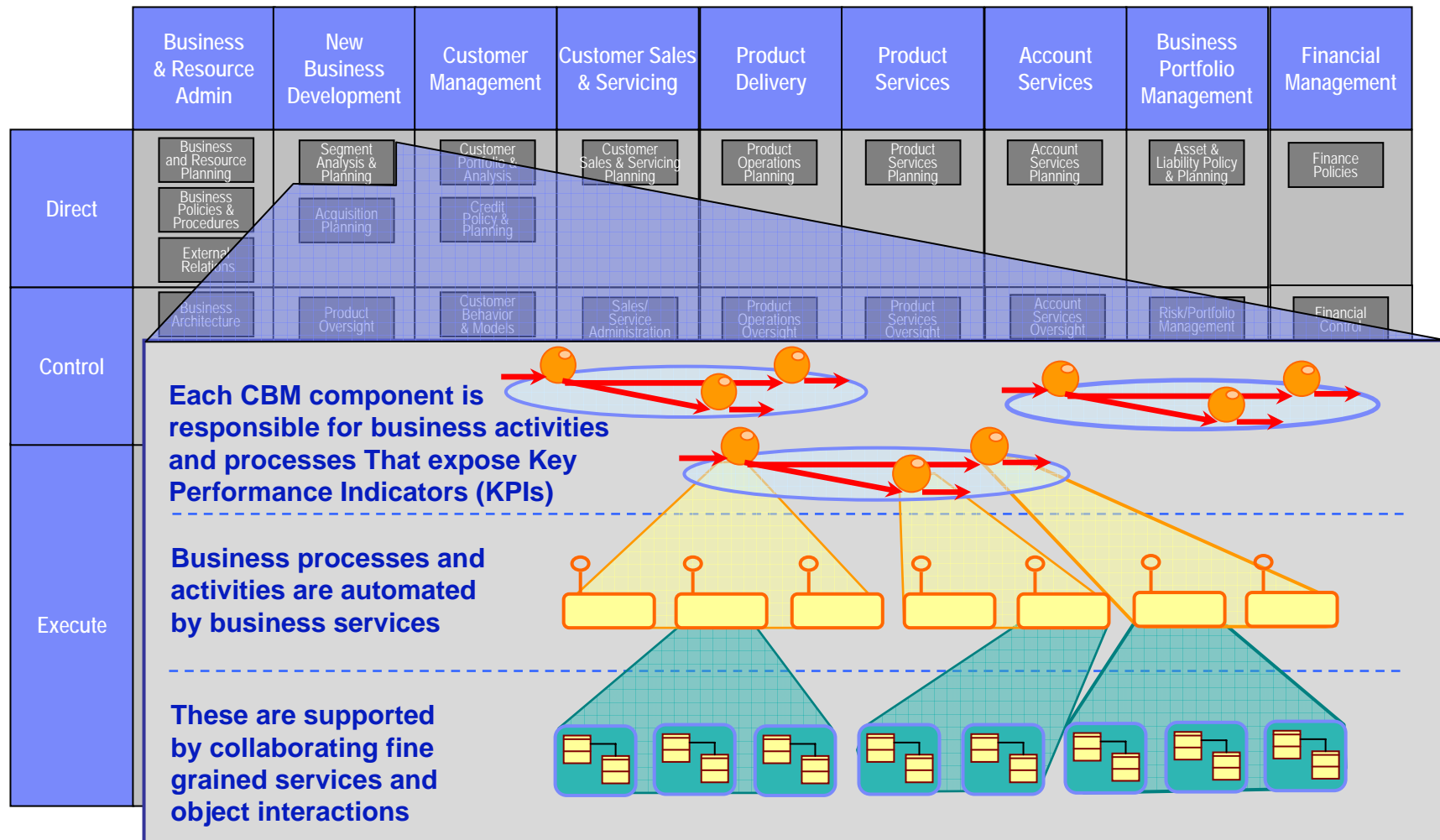
WebSphere software

Creating a Solution-specific SOA Workbench

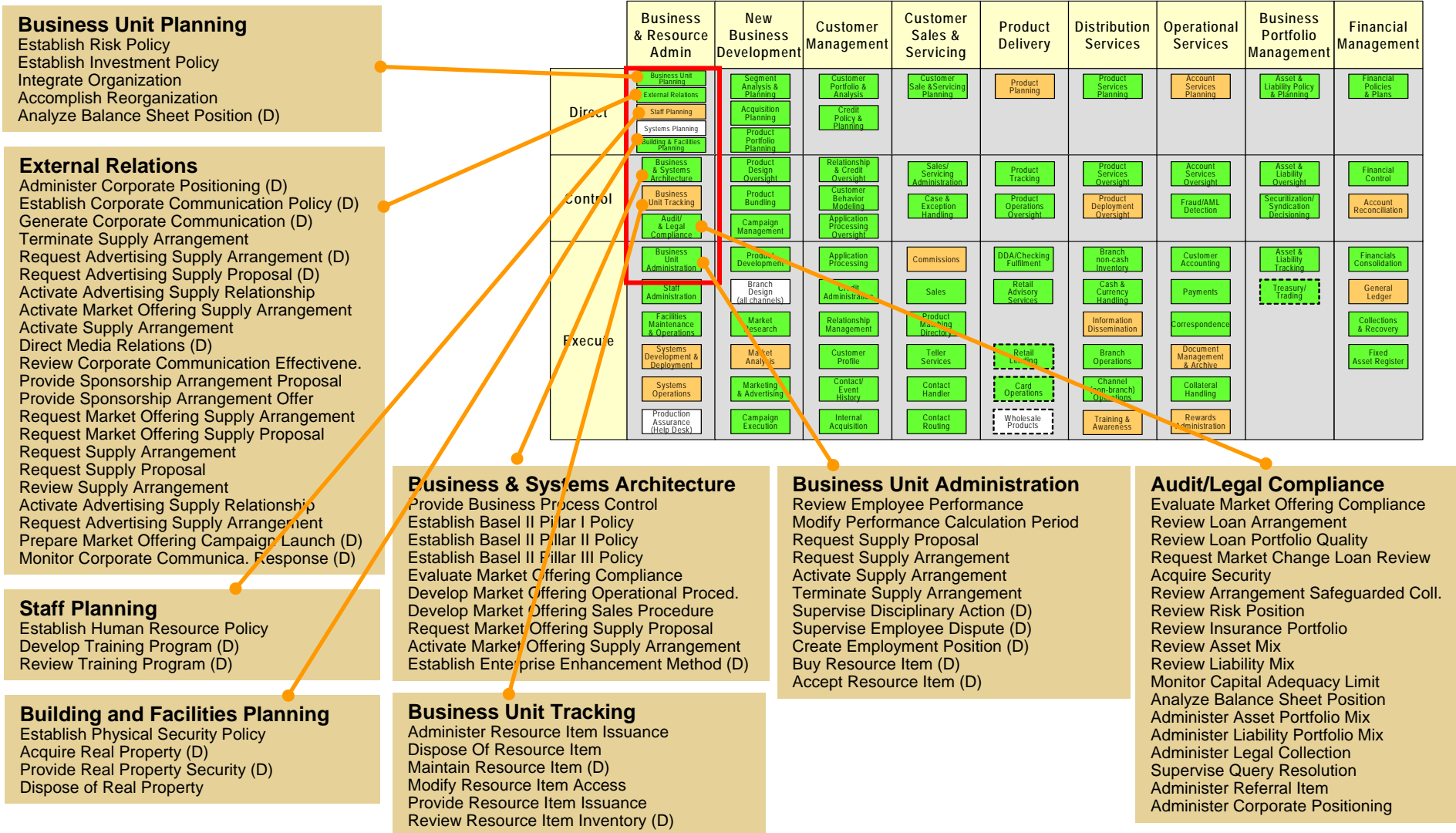
Extending the platform with tools and assets that greatly speed service-based Solution delivery



Understand Business Domain using a Technique Such as CBM



IBM Process Models underpin each CBM Component for Banking and Insurance



Business Unit Planning
 Establish Risk Policy
 Establish Investment Policy
 Integrate Organization
 Accomplish Reorganization
 Analyze Balance Sheet Position (D)

External Relations
 Administer Corporate Positioning (D)
 Establish Corporate Communication Policy (D)
 Generate Corporate Communication (D)
 Terminate Supply Arrangement
 Request Advertising Supply Arrangement (D)
 Request Advertising Supply Proposal (D)
 Activate Advertising Supply Relationship
 Activate Market Offering Supply Arrangement
 Activate Supply Arrangement
 Direct Media Relations (D)
 Review Corporate Communication Effectiveness
 Provide Sponsorship Arrangement Proposal
 Provide Sponsorship Arrangement Offer
 Request Market Offering Supply Arrangement
 Request Market Offering Supply Proposal
 Request Supply Arrangement
 Request Supply Proposal
 Review Supply Arrangement
 Activate Advertising Supply Relationship
 Request Advertising Supply Arrangement
 Prepare Market Offering Campaign Launch (D)
 Monitor Corporate Communication Response (D)

Staff Planning
 Establish Human Resource Policy
 Develop Training Program (D)
 Review Training Program (D)

Building and Facilities Planning
 Establish Physical Security Policy
 Acquire Real Property (D)
 Provide Real Property Security (D)
 Dispose of Real Property

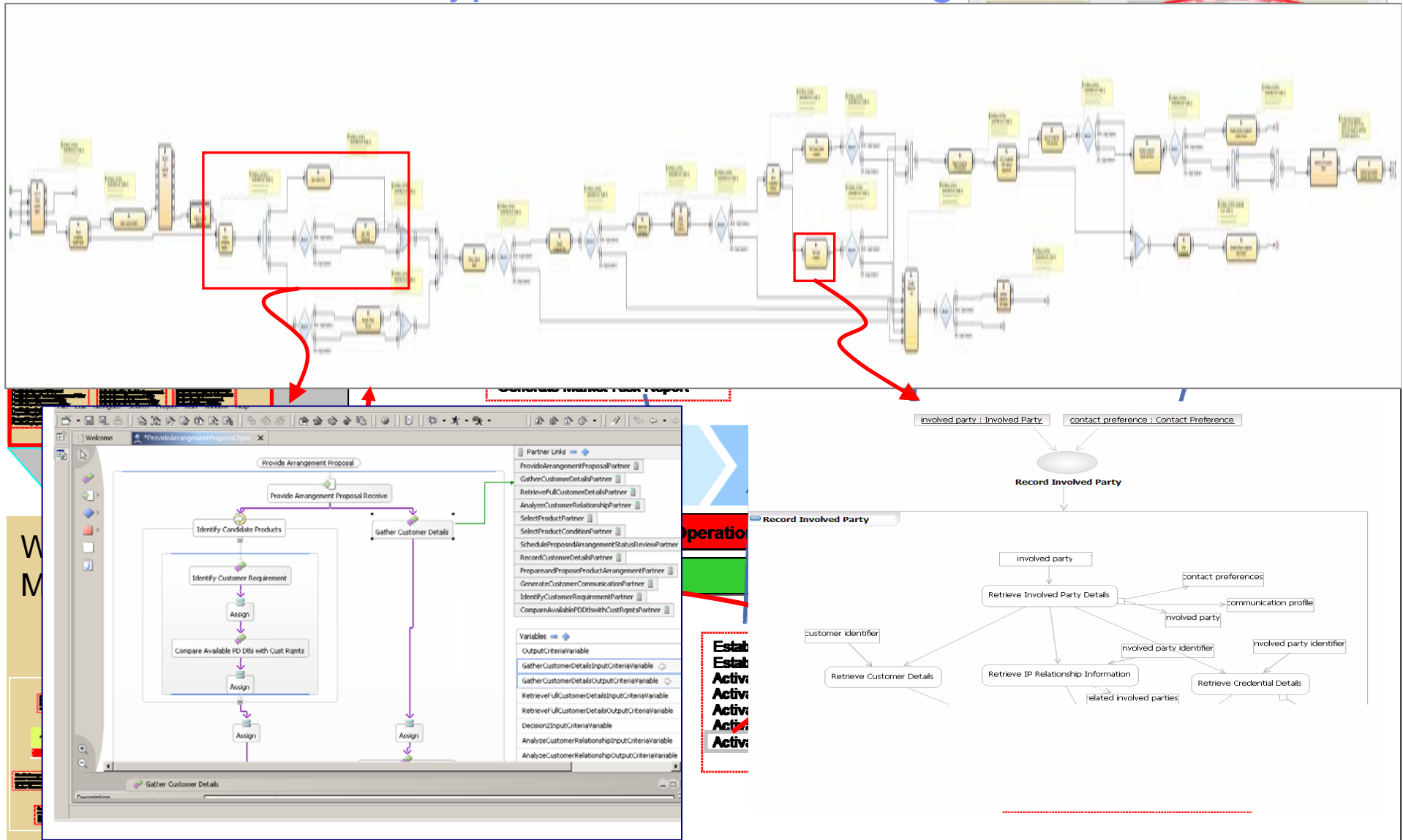
Business & Systems Architecture
 Provide Business Process Control
 Establish Basel II Pillar I Policy
 Establish Basel II Pillar II Policy
 Establish Basel II Pillar III Policy
 Evaluate Market Offering Compliance
 Develop Market Offering Operational Procedure
 Develop Market Offering Sales Procedure
 Request Market Offering Supply Proposal
 Activate Market Offering Supply Arrangement
 Establish Enterprise Enhancement Method (D)

Business Unit Tracking
 Administer Resource Item Issuance
 Dispose Of Resource Item
 Maintain Resource Item (D)
 Modify Resource Item Access
 Provide Resource Item Issuance
 Review Resource Item Inventory (D)

Business Unit Administration
 Review Employee Performance
 Modify Performance Calculation Period
 Request Supply Proposal
 Request Supply Arrangement
 Activate Supply Arrangement
 Terminate Supply Arrangement
 Supervise Disciplinary Action (D)
 Supervise Employee Dispute (D)
 Create Employment Position (D)
 Buy Resource Item (D)
 Accept Resource Item (D)

Audit/Legal Compliance
 Evaluate Market Offering Compliance
 Review Loan Arrangement
 Review Loan Portfolio Quality
 Request Market Change Loan Review
 Acquire Security
 Review Arrangement Safeguarded Coll.
 Review Risk Position
 Review Insurance Portfolio
 Review Asset Mix
 Review Liability Mix
 Monitor Capital Adequacy Limit
 Analyze Balance Sheet Position
 Administer Asset Portfolio Mix
 Administer Liability Portfolio Mix
 Administer Legal Collection
 Supervise Query Resolution
 Administer Referral Item
 Administer Corporate Positioning

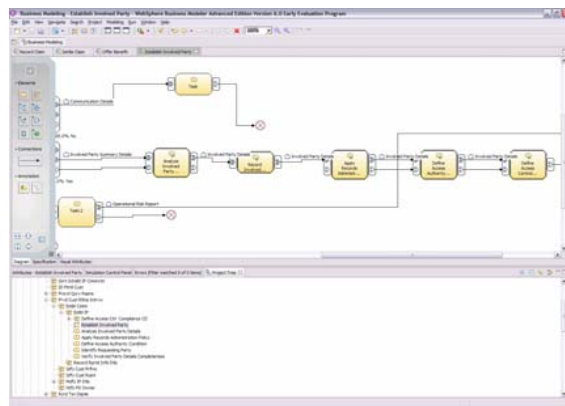
Process Models – Typical Content - Banking



Process and Services Models

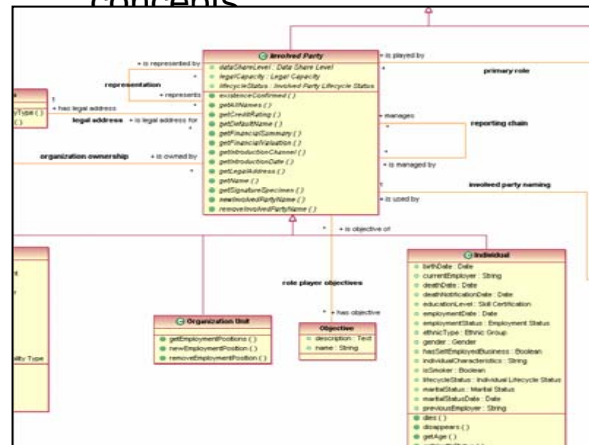
Business Process Models

Over 400 processes across Financial Services. Pre-defined processes exist for all of the key business areas such as Customer Onboarding, Claims Handling, Transaction Processing, Payments, Product Setup and monitoring



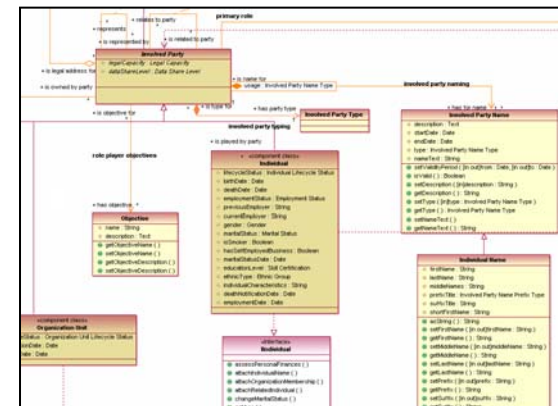
Business Object Model

Provides enterprise-wide generic & flexible model which is the main communication point between the Business and IT. Provides a flexible view of the business which can be customized according to specific requirements. Contains Use cases definitions
Class model of all Financial Services concepts



Interface Design Model

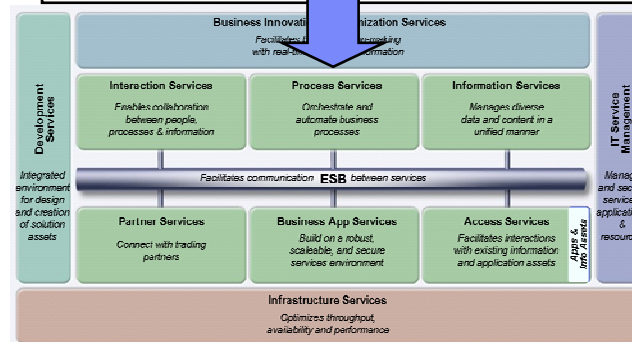
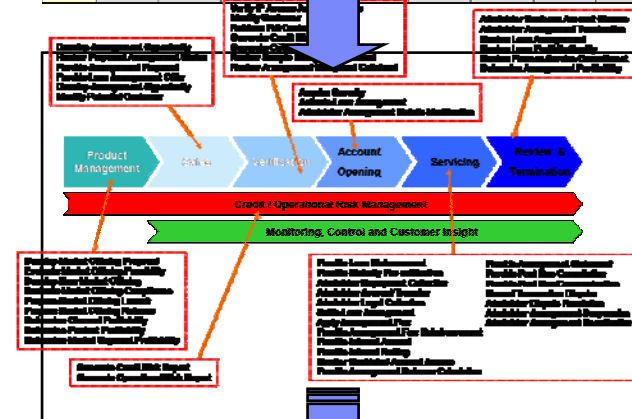
IDM builds out a set of components and interfaces that support analysis level business concepts identified in the BOM. Provides a standard set of interface definitions that promote the development of interoperable software across an organization. Technical definition of services (530 service-level operations grouped on 60 manager interfaces)
Component hierarchy and interface collaboration



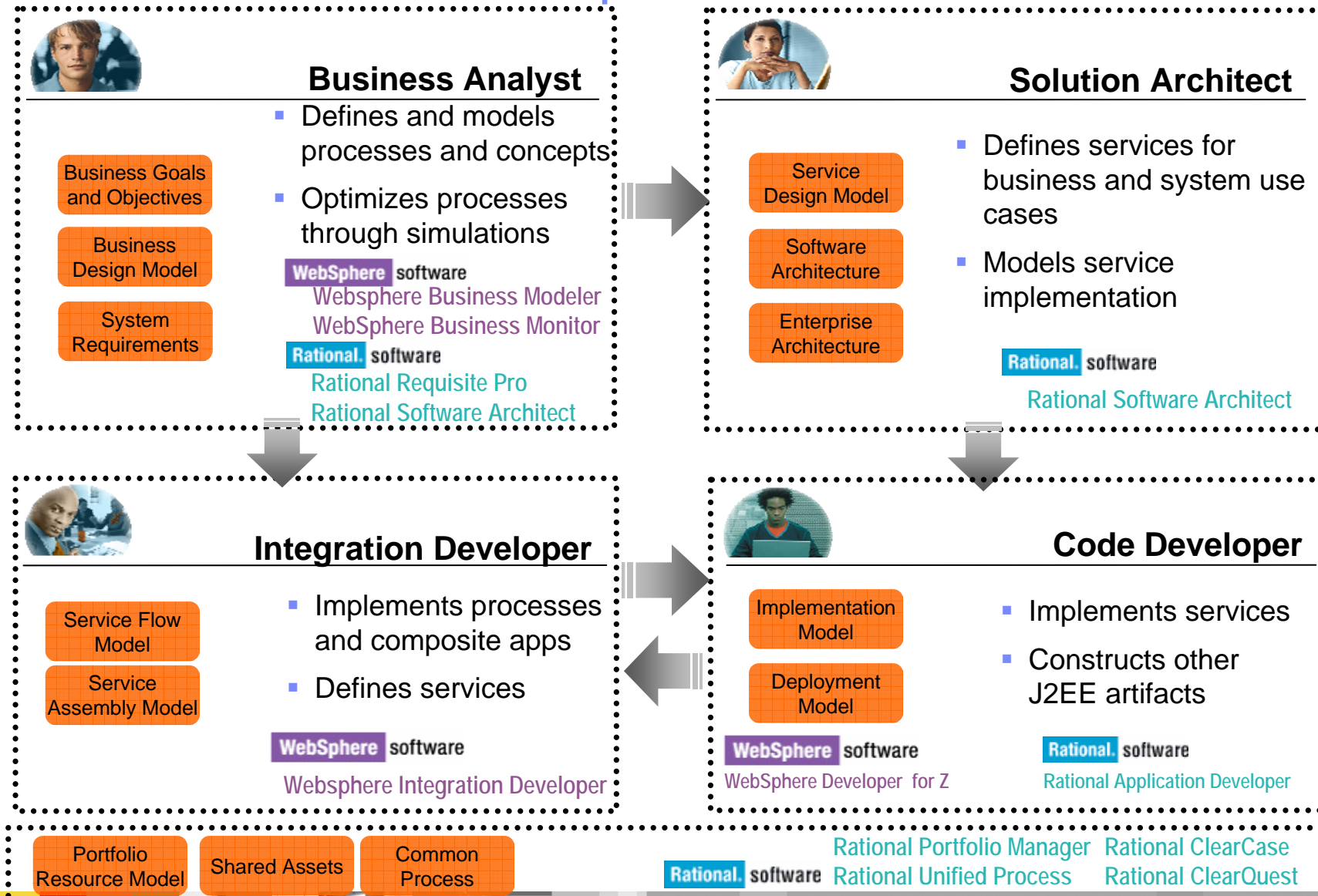
IBM's Industry Models – a natural link point from the Business Strategy view to implementation via IBM's Services Oriented Architecture

- Business Strategy
- Application-specific Models
- IBM Technology

	Business & Resource Admin	New Business Development	Customer Management	Customer Sales & Servicing	Product Delivery	Distribution Services	Operational Services	Business Portfolio Management	Financial Management
Direct	Product Sales, Account Management, Sales Enablement, Sales Training, Sales Support, Sales Analytics	Product Sales, Account Management, Sales Enablement, Sales Training, Sales Support, Sales Analytics	Product Sales, Account Management, Sales Enablement, Sales Training, Sales Support, Sales Analytics	Product Sales, Account Management, Sales Enablement, Sales Training, Sales Support, Sales Analytics	Product Sales, Account Management, Sales Enablement, Sales Training, Sales Support, Sales Analytics	Product Sales, Account Management, Sales Enablement, Sales Training, Sales Support, Sales Analytics	Product Sales, Account Management, Sales Enablement, Sales Training, Sales Support, Sales Analytics	Product Sales, Account Management, Sales Enablement, Sales Training, Sales Support, Sales Analytics	Product Sales, Account Management, Sales Enablement, Sales Training, Sales Support, Sales Analytics
Control	Product Sales, Account Management, Sales Enablement, Sales Training, Sales Support, Sales Analytics	Product Sales, Account Management, Sales Enablement, Sales Training, Sales Support, Sales Analytics	Product Sales, Account Management, Sales Enablement, Sales Training, Sales Support, Sales Analytics	Product Sales, Account Management, Sales Enablement, Sales Training, Sales Support, Sales Analytics	Product Sales, Account Management, Sales Enablement, Sales Training, Sales Support, Sales Analytics	Product Sales, Account Management, Sales Enablement, Sales Training, Sales Support, Sales Analytics	Product Sales, Account Management, Sales Enablement, Sales Training, Sales Support, Sales Analytics	Product Sales, Account Management, Sales Enablement, Sales Training, Sales Support, Sales Analytics	Product Sales, Account Management, Sales Enablement, Sales Training, Sales Support, Sales Analytics
Execute	Product Sales, Account Management, Sales Enablement, Sales Training, Sales Support, Sales Analytics	Product Sales, Account Management, Sales Enablement, Sales Training, Sales Support, Sales Analytics	Product Sales, Account Management, Sales Enablement, Sales Training, Sales Support, Sales Analytics	Product Sales, Account Management, Sales Enablement, Sales Training, Sales Support, Sales Analytics	Product Sales, Account Management, Sales Enablement, Sales Training, Sales Support, Sales Analytics	Product Sales, Account Management, Sales Enablement, Sales Training, Sales Support, Sales Analytics	Product Sales, Account Management, Sales Enablement, Sales Training, Sales Support, Sales Analytics	Product Sales, Account Management, Sales Enablement, Sales Training, Sales Support, Sales Analytics	Product Sales, Account Management, Sales Enablement, Sales Training, Sales Support, Sales Analytics



Business Driven Development – Roles and Tools

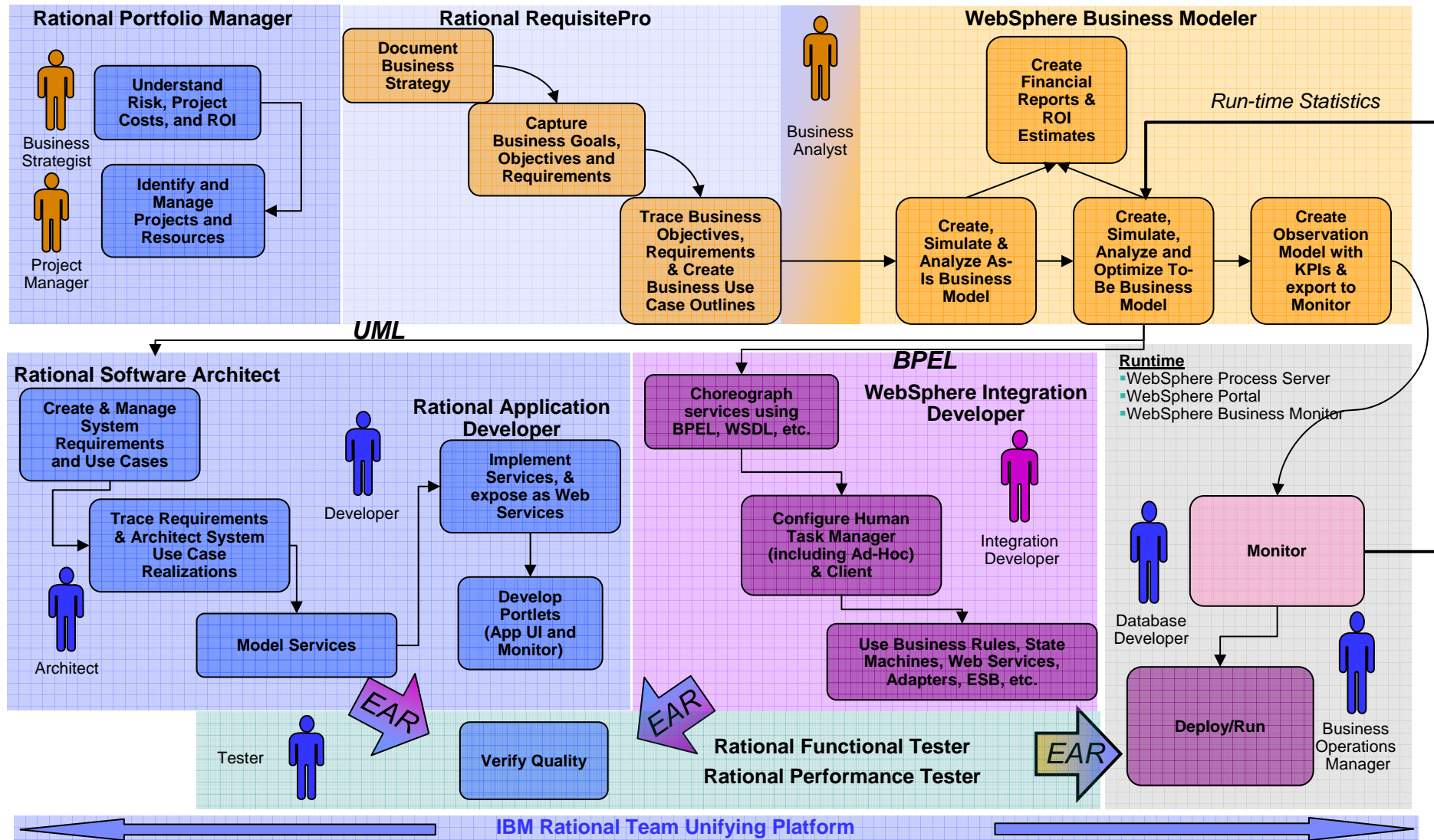


Ambulatory Transformation Case Study



DEMO

BDD for SOA in the Larger Context



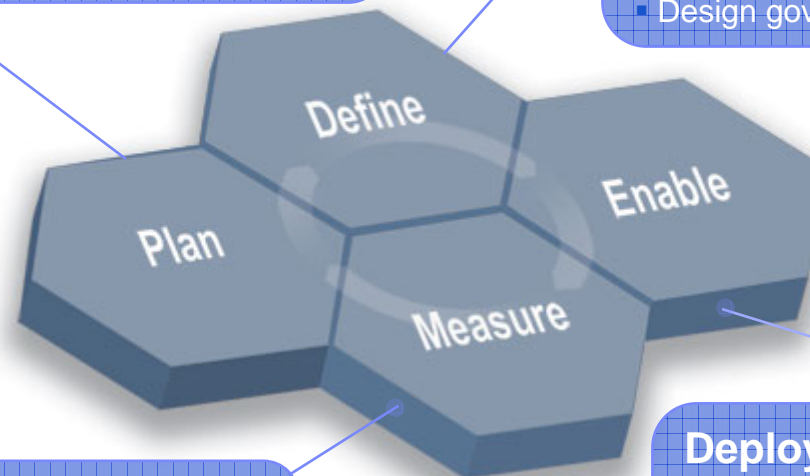
SOA Governance Lifecycle

Establish the Governance Need

- Document and validate business strategy for SOA and IT
- Assess current IT and SOA capabilities
- Define/Refine SOA vision and strategy
- Review current Governance capabilities and arrangements
- Layout governance plan

Define the Governance Approach

- Define/modify governance processes
- Design policies and enforcement mechanisms
- Identify success factors, metrics
- Identify owners and funding model
- Charter/refine SOA Center of Excellence
- Design governance IT infrastructure



Monitor and Manage the Governance Processes

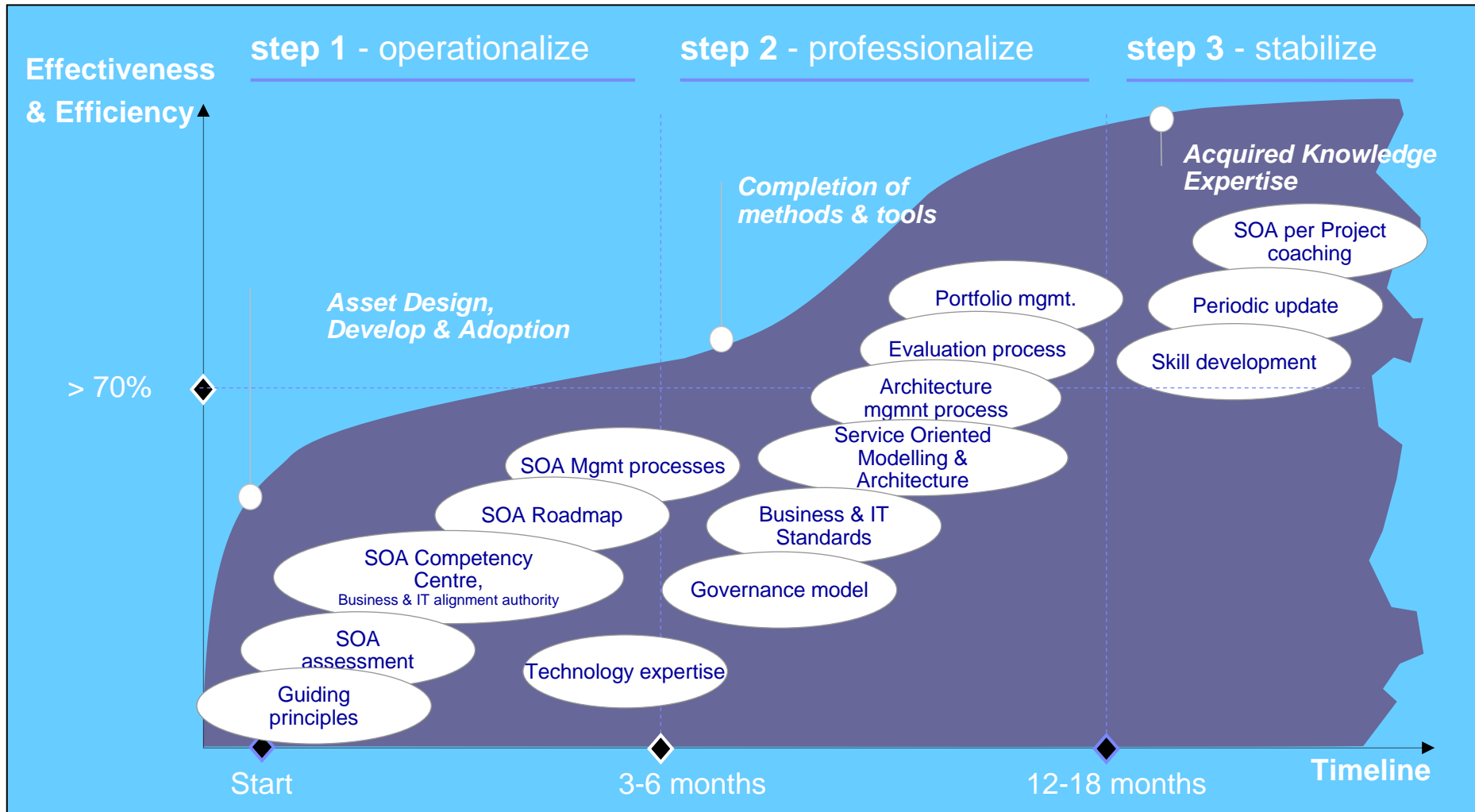
- Monitor compliance with policies
- Monitor compliance with governance arrangements
- Monitor IT effectiveness metrics

Deploy the Governance Model Incrementally

- Deploy governance mechanisms
- Deploy governance IT infrastructure
- Educate and deploy on expected behaviors and practices
- Deploy policies

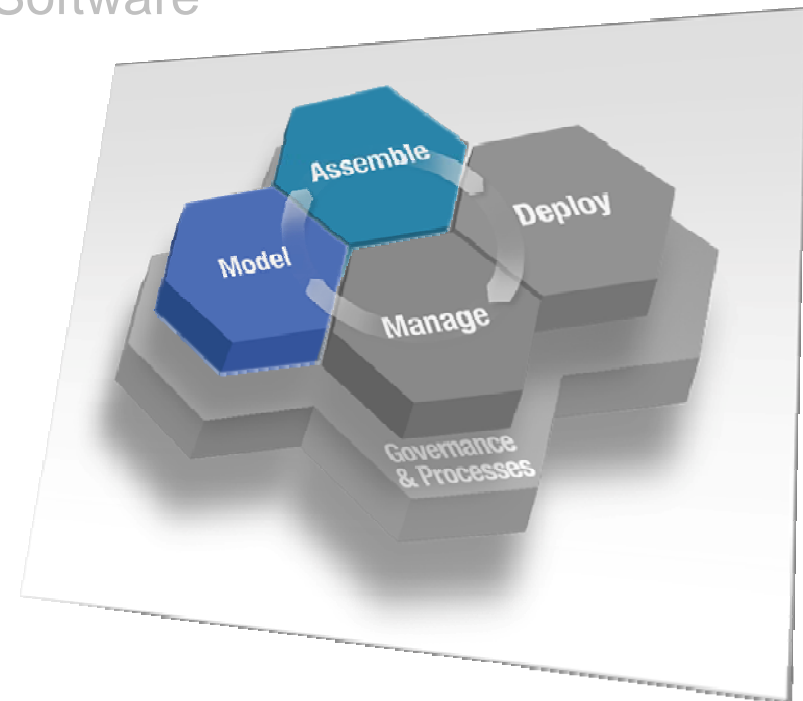


SOA Operational Time vs. Efficiency Grid



Agenda

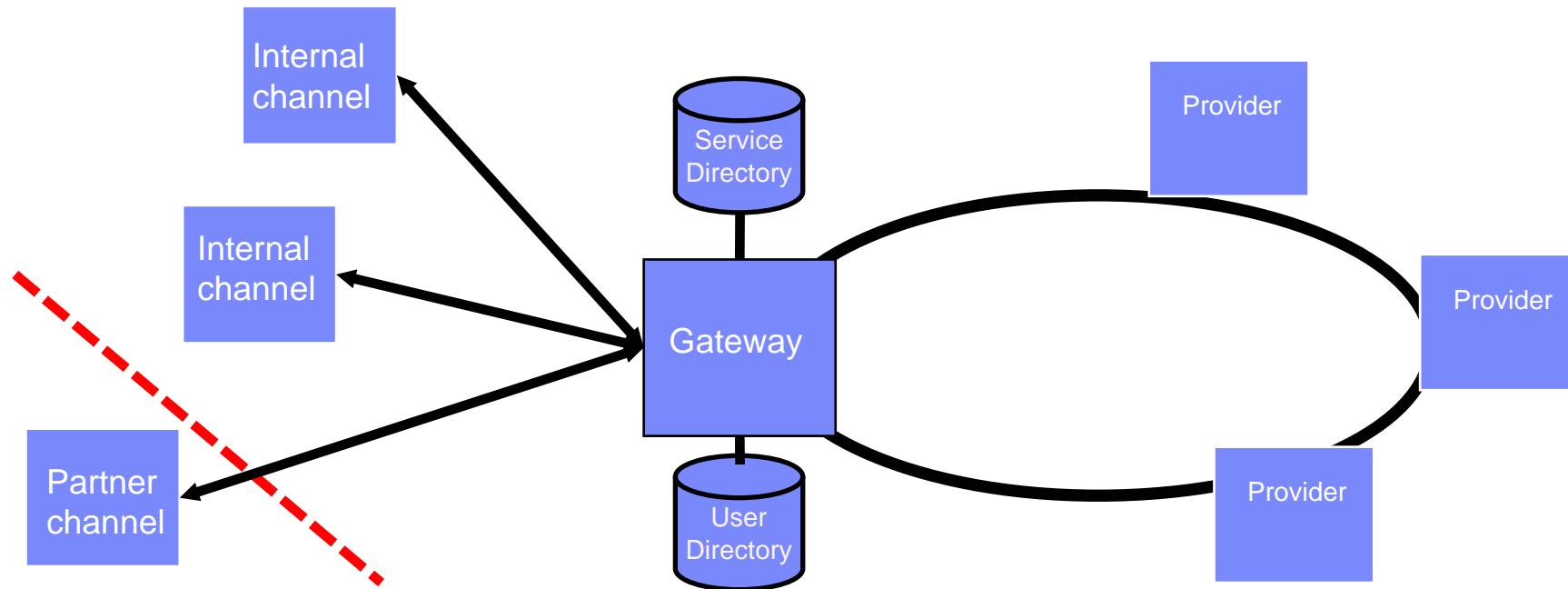
- Business Driven Development
- Three Key Concepts for Successful Software
- Putting it All Together –
Creating an Integrated Workbench
- **Lessons and Next Steps**



Customer Scenarios Appropriate for SOA

- With experience we are seeing several common situations where an SOA approach is useful
- Common situations include:
 - ▶ Service Aggregation
 - ▶ New market opportunity for an intermediary
 - ▶ Information aggregation
 - ▶ **Multi-channel access to core services**
 - ▶ **Building IT infrastructure for SOA**
 - ▶ Process automation
 - ▶ Electronic Forms workflow

Multi-Channel Access to Core Services

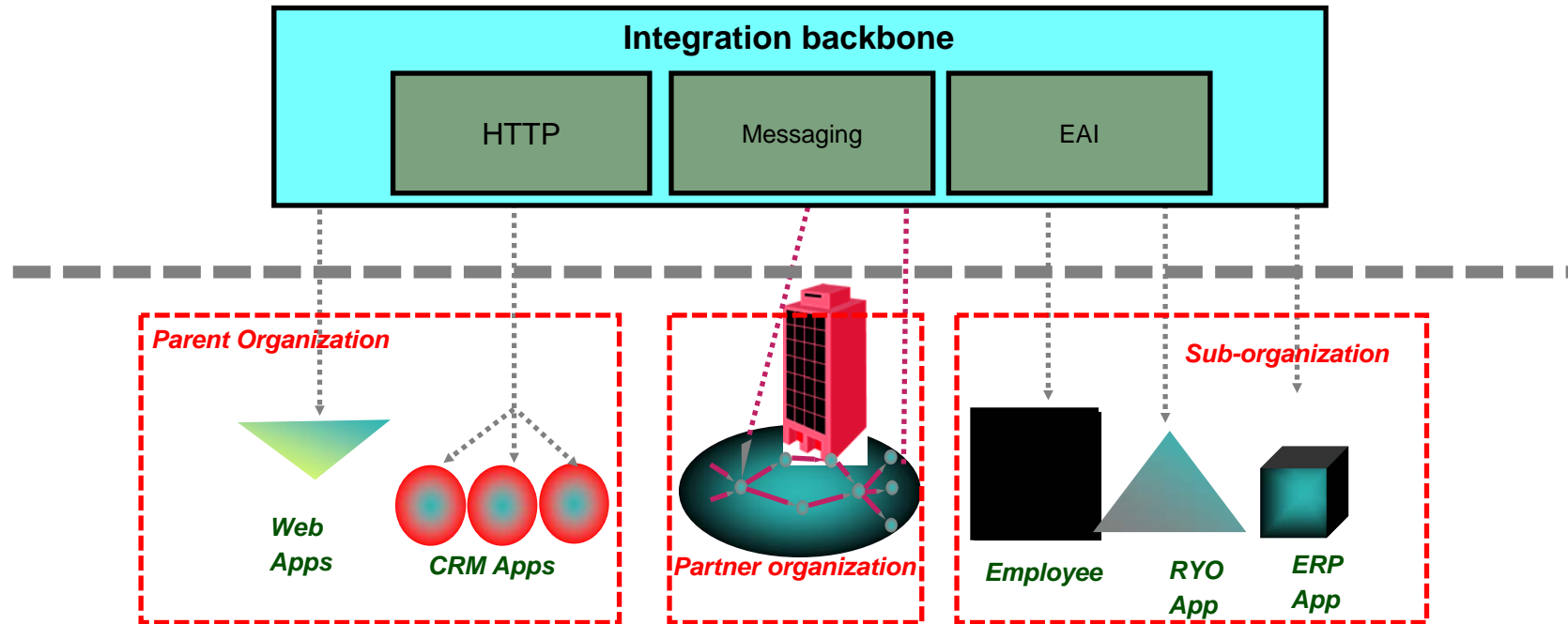


Drivers

- ▶ Enabling a variety of applications, platforms and devices to access services
- ▶ Expose core business transactions to new internal and external channels
- ▶ Support multiple client types - e.g. thick client, thin client, desktop, interactive voice response
- ▶ Support new business channels - e.g. self-service web applications such as online banking
- ▶ Support existing or new front office applications - e.g. branch infrastructure renewal
- ▶ Support call centre applications
- ▶ Expose business transactions through new brands, resellers, agents etc.



Building IT infrastructure for SOA



- Drivers
 - ▶ Simplify integration of services in a distributed environment
 - ▶ May be driven by IT rather than business, e.g. as a response to ever more dynamic integration requirements from multiple lines of business or projects.

Detailed SOA Guidance is Becoming Available

Service-Oriented Architecture Compass

Business Value, Planning, and Enterprise Roadmap

Norbert Bieberstein, Sanjay Bose, Marc Fiammante, Keith Jones, and Rawan Shah

Forewords by Vinton Cerf, Daniel Sazban, and Jason Weisser



Extreme Leverage | Service Oriented Architecture Special Interest Group - Microsoft Internet Explorer

Service Oriented Architecture Special Interest Group

Document Type(s): Overview Updated on: 06 Mar 2006

"If you don't know where you are going, any road will take you there."
-- Lewis Carroll, "Alice in Wonderland"

SOA SIG

The Service Oriented Architecture (SOA) Special Interest Group (SIG) is focused on enabling the field with best practices related to the use of MDO in the creation of SOA based solutions. SOA is a key area for IBM and a number of products within the software group. As a team we need to ensure that we:

- Understand the underlying concepts supporting SOA
- Understand the ways in which the Rational tooling and methodology support SOA projects
- Understand how the Rational tooling and methodology aligns with and support the other IBM brands
- Use this knowledge to guide our customers to successful SOA implementations

Tech Chats

No chats are currently scheduled. If you have a suggestion or would like to volunteer, please contact [Lee Ackerman](#).

Get Connected

- Join the SOA MDO SIG and share your interest and expertise with others ([Click here to join](#)).
- Check out SOA intellectual capital in the [Rational Knowledge Base](#). Navigate to the Search by Categories page, then select Model Drive Development for the Community of Practice, and then in the Initiative field choose "Service Oriented Architecture"
- Join the [Community Source](#) project set up for the SIG.

Contacts

For more information about the ADC SOA Special Interest Group, contact one of the SOA SIG leads, [Lee Ackerman](#) or [Alan Brown](#).

Resources:

Training

- RUP DEV406 Mastering PSA course: http://pubgqa.ibm.com/projects/cps/dss_cen/dev406/dev496.html
- WBV's available from the EIS team: <http://w3-03.ibm.com/software/sales/saletool.nsf/salestools/es/Education>

Articles

- Modeling Service-oriented solutions: <http://www-128.ibm.com/developerworks/rational/01tracy/jul05/johnston/index.html>
- Using SOA and CBD to build Web service application: <http://www-128.ibm.com/developerworks/rational/library/S10.html>
- A. W. Brown, M. Delbaere, P. Feles, S. Johnston, R. Weaver, "Realizing Service oriented Solutions with the IBM Software Development Platform", IBM Systems Journal, pages 727-752, Vol. 44, #4, October 2005. <http://www.research.ibm.com/journal/S104/05n4.pdf>
- A. W. Brown, S. Johnston, G. Larsen, J. Palistrant, "SOA Development Using the IBM Rational Software Development Platform: A Practical Guide", IBM White Paper, September 2005. <http://fp.software.ibm.com/software/atlona/web/whitepapers/S107-0956-00.pdf>

Books

Available at Books24x7: there are a number of books on web services and SOA available at Books24x7. To access the server, start at IBM Global Campus and click on the Books24x7 link.

Redbooks:

- Number of books on this SOA: <http://www.redbooks.ibm.com/cgi-bin/searchsite.cgi?query=SOA>

Web

External

- IBM SOA and Web Services <http://www-306.ibm.com/software/solutions/webservecps/>
- WebSphere Developer Technical Journal: <http://www-128.ibm.com/developerworks/webSphere/techjournal/>

Internal

Modules Index - SOA Workshop for Architects - w304 - Microsoft Internet Explorer

ISSW - SOA Workshop for Architects

The templates for the current version V2.x can be found under the [Guidelines](#).

List of modules

Module	Type	Version	Status	Duration(min)
SOA Experience	Exercise	V2		short
What is SOA?	Lecture	V2		75
Definition of SOA, services. What are the SOA topics for Architects?	Exercise	V2		short
First look at services	Lecture	V2		45
SOA Business Scenarios	Lecture	V2		45
What are the common business scenarios where SOA can help?	Lecture	V2		45
Component Business Models	Lecture	V2		45
A short introduction to CBM.	Lecture	V2		45
Processes and SOA	Lecture	V2		30
This lecture provides a process oriented view of SOA.	Lecture	V2		30
Roadmaps to SOA	Exercise	V2		long
Details about a phased approach to SOA deployment. SOA milestones. Web services evolution.	Lecture	V2		45
Yellow - SOA Engagement initiation	Lecture	V2		45
The exercise focuses on the consulting skills required to initiate an SOA engagement.	Lecture	V2		45
Methodology for SOA	Lecture	V2		90
what are the available methodologies for architects? (focus on RUP for SOA)	Lecture	V2		90
Service Identification and Modeling	Exercise	V2		long
How to identify services in businesses, what are the techniques?	Lecture	V2		75
Yellow - Service Identification	Lecture	V2		45
How to categorize services? How categorisation can help to identify services?	Lecture	V2		45
Service Description	Lecture	V2		60
How to best describe services beyond WSDL?	Lecture	V2		60
Open standards	Lecture	V2		60
Why the adoption of Open standards is key to SOA?	Lecture	V2	work in progress	60
SOA Reference Architectures				
Reference architectures is a good place to start for any architect to design a solution.				

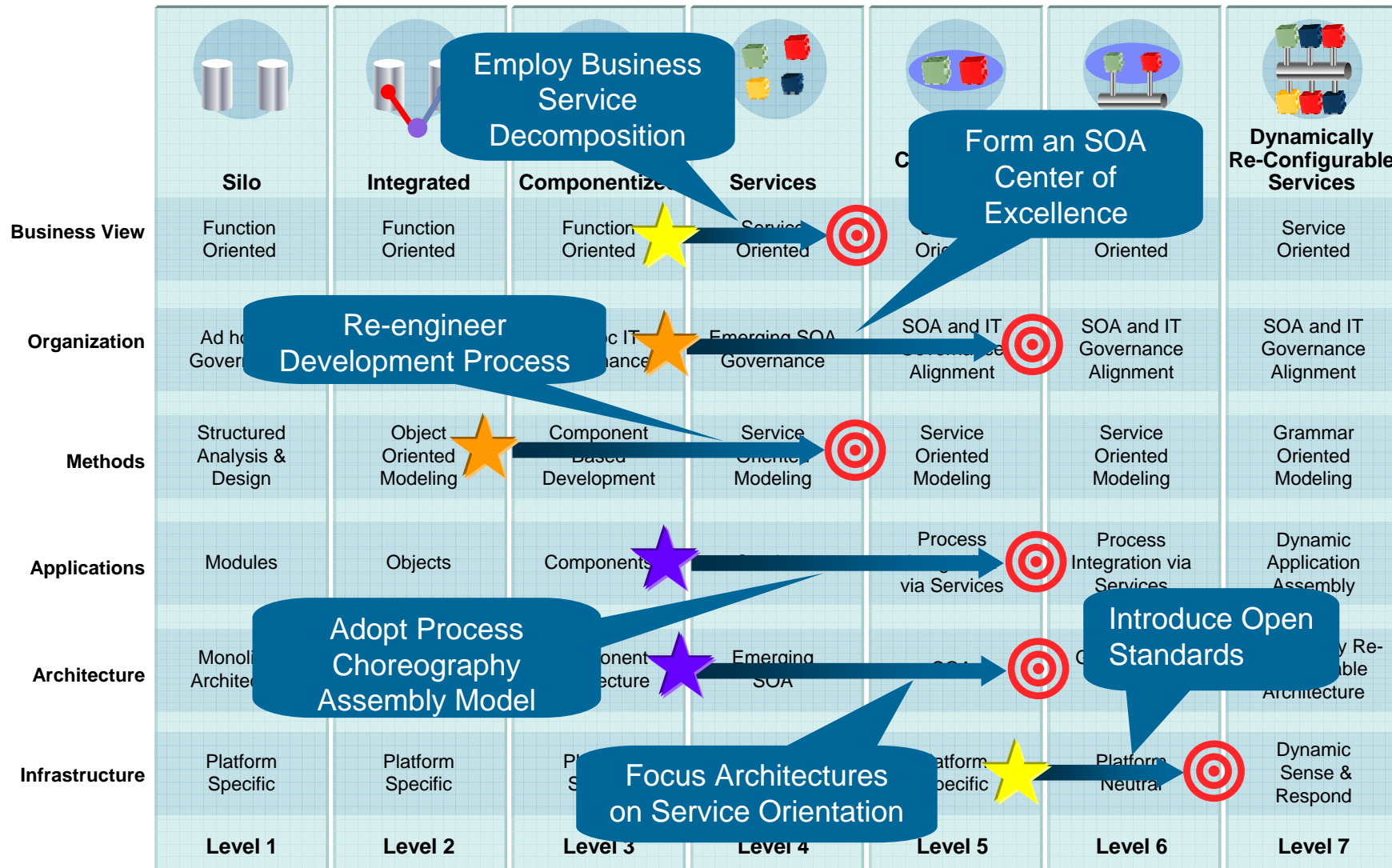


Service Integration Maturity Model (SIMM)

	 Silo Function Oriented	 Integrated Function Oriented	 Componentized Function Oriented	 Services Service Oriented	 Composite Services Service Oriented	 Virtualized Services Service Oriented	 Dynamically Re-Configurable Services Service Oriented
Business View	Function Oriented	Function Oriented	Function Oriented	Service Oriented	Service Oriented	Service Oriented	Service Oriented
Organization	Ad hoc IT Governance	Ad hoc IT Governance	Ad hoc IT Governance	Emerging SOA Governance	SOA and IT Governance Alignment	SOA and IT Governance Alignment	SOA and IT Governance Alignment
Methods	Structured Analysis & Design	Object Oriented Modeling	Component Based Development	Service Oriented Modeling	Service Oriented Modeling	Service Oriented Modeling	Grammar Oriented Modeling
Applications	Modules	Objects	Components	Services	Process Integration via Services	Process Integration via Services	Dynamic Application Assembly
Architecture	Monolithic Architecture	Layered Architecture	Component Architecture	Emerging SOA	SOA	Grid Enabled SOA	Dynamically Re-Configurable Architecture
Infrastructure	Platform Specific	Platform Specific	Platform Specific	Platform Specific	Platform Specific	Platform Neutral	Dynamic Sense & Respond
	Level 1	Level 2	Level 3	Level 4	Level 5	Level 6	Level 7

Service Integration Maturity Model (SIMM)

★ = current level
 🎯 = target level



Some Critical Success Factors

- Enterprise change perspective
 - ▶ Focus on sustained cultural change
 - **Anti-pattern:** a lot of over expectation, little sustained commitment across the organization to the support required to really effect the change, a couple of small semi-successful projects, and reverting back to the old ways of working....
- Reuse perspective
 - ▶ Focus on service management life-cycle
 - **Anti-pattern:** explosive growth of “service libraries”, no clear ownership for supporting assets, no feedback loop for updates, no metrics on use
- Enterprise Architecture perspective
 - ▶ Focus on service model from top-down and bottom up analysis
 - **Anti-pattern:** separate idealized vision for services and current application map, no clear link between the two, a lot of frustration and churn on how to connect them
- Technology Infrastructure perspective
 - ▶ Focus on connection architecture and ESB pattern
 - **Anti-pattern:** complete technology change before gaining architectural design experience, no clear value from change, performance issues in key areas

Seven Guiding Principles To Consider -1

Based on IBM's Experience with more than 100 recent SOA Customers

1. Requires CEO and CIO level commitment
 - ▶ SOA is not a product... standard IT ROI equations do not apply
 - ▶ Justification will require consideration of both IT and business benefits
2. Business Team and IT Team work hand-in-hand
 - ▶ SOA is all about flexible business processes.... IT is the means to implement
 - ▶ Business analysis is a critical first step
3. Avoid The “Big Bang” Approach
 - ▶ Start Small: Select a well defined application or business process area
 - ▶ Use the SOA Blueprint to establish an initial target architecture
 - ▶ Leverage Existing data and back-end process via adaptor technology (legacy integration)
4. Full Embrace the Use of Standards
 - ▶ Open Standards
 - ▶ Open Source

Seven Guiding Principles To Consider -2

Based on IBM's Experience with more than 70 SOA Customers in 2004 and 2005

5. Governance is critical for success

- ▶ Use the first project to establish or enhance end-to-end implementation process
- ▶ Build an "SOA Center of Excellence" based on early project experiences
- ▶ Use well defined processes and documentation
- ▶ Establish Architectural guidelines early
- ▶ Establish organizational infrastructure to ensure optimal reuse
- ▶ Integrate all aspects of application lifecycle including deployment

6. The first step is the hardest one ... so plan ahead

- ▶ Leverage best practices and patterns experience (tooling, consulting)
- ▶ Use experienced practitioners to define first set of infrastructure and business services
- ▶ Integrated tooling (SOA Workbench) bridges the "language" gap: translating business requirements into implementation

7. Adopt Innovative Software Engineering Principles

- ▶ Open Source Development
- ▶ Service-based design techniques



Summary

- Business Driven Development
 - ▶ Break down the walls between business, operations and IT
 - ▶ Make the right systems decisions from the right business decisions
 - ▶ Close the loop between business strategy and the implemented system

- Three key elements to successful Enterprise Software
 - ▶ Service-oriented architecture
 - ▶ Model driven development – Business, domain, system, application.....
 - ▶ Business innovation and optimization

- Creating an Integrated Workbench requires
 - ▶ A flexible platform based on industry standards
 - ▶ An end-to-end set of capabilities for the complete SOA life-cycle



Thank You

Please send comments or questions

Alan W. Brown
awbrown@us.ibm.com



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Example: Screenshots if we don't show the live demo



The customer objectives via C-level exec interviews

Improve Revenue & Volume	Reduce Costs & Errors	Improve Outcome & Quality	Exceed Regulation/ Compliance	Reduce Risk & Exposure
<ul style="list-style-type: none">• Increased reimbursement• Reduced denials and no shows• Decreased accounts receivable days	<ul style="list-style-type: none">• No lost charts• Information availability• Built-in disease mgmt• Decreased procedure costs & duplication	<ul style="list-style-type: none">• Decision support for doctors & nurses• Reduced waiting time for patients• Integrated data across all parties	<ul style="list-style-type: none">• Alerts and triggers for out of range events/ data• Reminders to keep information up-to-date	<ul style="list-style-type: none">• Reduce number of litigations• Document availability for inquiries• Reduce medical errors

The requirements captured with priority, status & need

Requirements:	Priority	Status	Difficulty	Stab
OPP1: Staff backlogged Existing staffing issues => frequent backlog -> somehow need to do it better, faster	Medium	Approved	Medium	Medi
OPP1.1: Need to automate some of the tasks, reduce manually hand over	Medium	Approved	Medium	Medi
OPP2: Need a way to fill forms once, and... Right now need to enter several forms -chart (update), billing sheet, test ordering etc => some way to fill once, complete...	High	Approved	Medium	Medi
OPP3: Alleviate signing charts Need to sign many, many forms. Any way to alleviate this?	Medium	Approved	Medium	Medi
OPP4: Doctors don't always document everything.. Doctors don't always document everything that's done Missing/incomplete documentation	High	Approved	Medium	Medi
OPP5: Floating ancillaries Floating ancillaries - filled claims that aren't attached to a patient visit (code) - why? How?	Medium	Approved	Medium	Medi
OPP6: Do not need to generate visit code if can't.. Why do we generate visit codes if we can't bill e.g. nurse visits?	Medium	Approved	Medium	Medi
OPP7: Patient data get archived after 2 years and. Patient data older than 2 years gets archived (sent to storage) and patient records get archived after an absence...	Medium	Approved	Medium	Medi
OPP8: Billing sheet can't be replaced Billing sheets cannot be replaced - used and discarded after 3-6 weeks	Medium	Approved	Medium	Medi
OPP9: About 30% of scheduled visits are no-shows Approximately 30% of scheduled visits are no-shows	Medium	Approved	Medium	Medi
OPP10: No visit reminders No visit reminders	Medium	Approved	Medium	Medi
OPP11: System cannot handle appointment any	Medium	Approved	Medium	Medi



Analyst defines business requirements and refines them into software requirements and use cases

Analyst defines priorities of the requirements

Analyst defines status, difficulty and development status of the requirements



The requirements mapped to technical features

The screenshot shows the Rational RequisitePro interface for a project named 'AmbulatoryCare_ReqPro'. The left pane displays a hierarchical tree of requirements, including 'Issues and Business Opportunities' and 'Medical Record Access'. The center pane lists technical features such as 'ITC3.8.3: Database Monitoring', 'ITC2.1: General Positioning', and 'ITC2.1.4: Team Collaboration'. The right pane is a grid mapping business opportunities (OPP1 through OPP19) to these technical features. An orange arrow points from a text box on the right to the 'ITC2.1.4: Team Collaboration' feature in the grid.



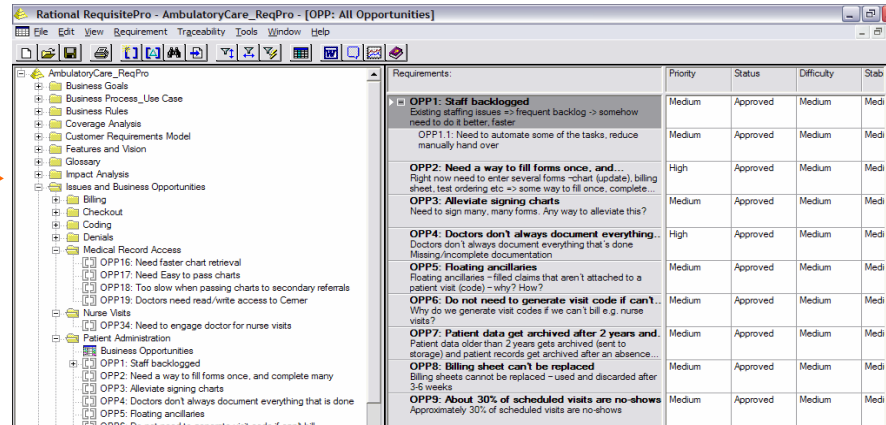
Analyst defines business requirements to technical features

IBM Rational RequisitePro, WebSphere, Tivoli, Lotus, and DB2

Document business processes and user interactions

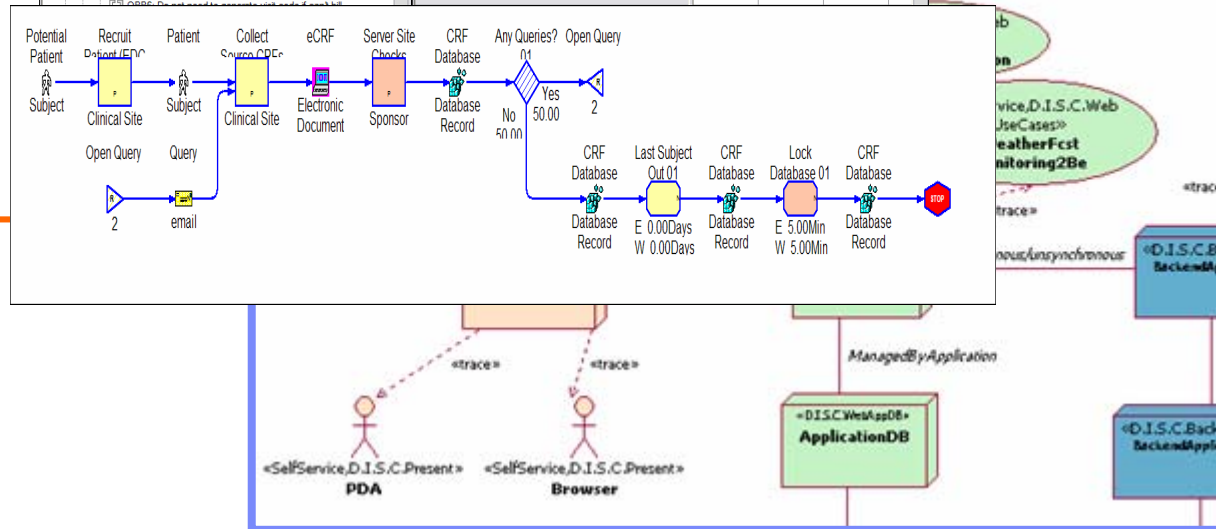


Analyst design, test and simulate business processes



Model from a Business perspective

- As is and to be modeling
- Business service identification

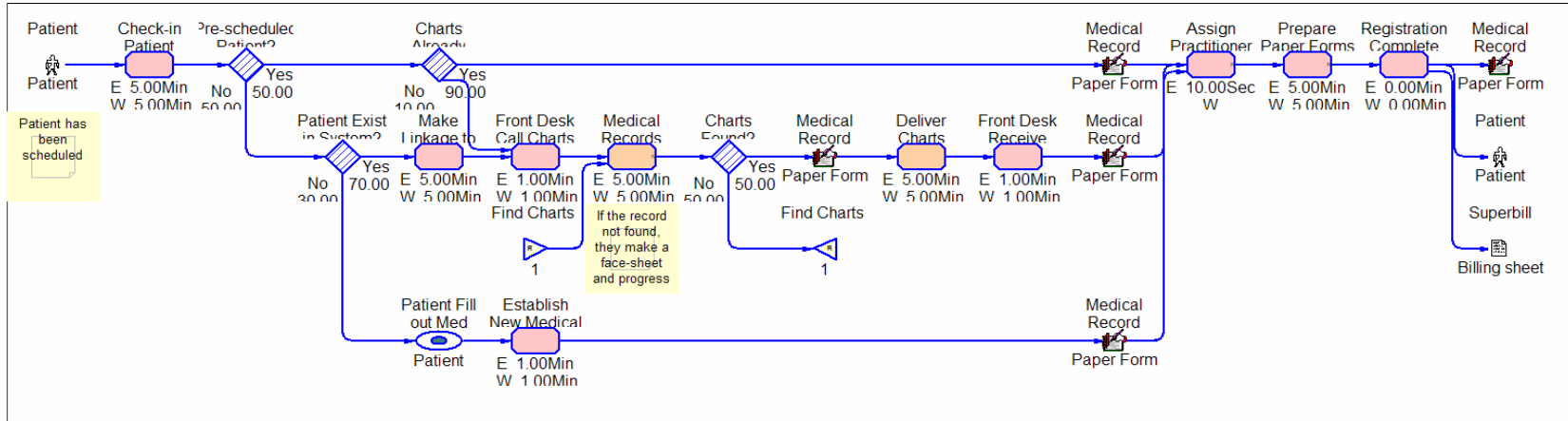


IBM WebSphere Business Modeler
IBM Rational Software Architect

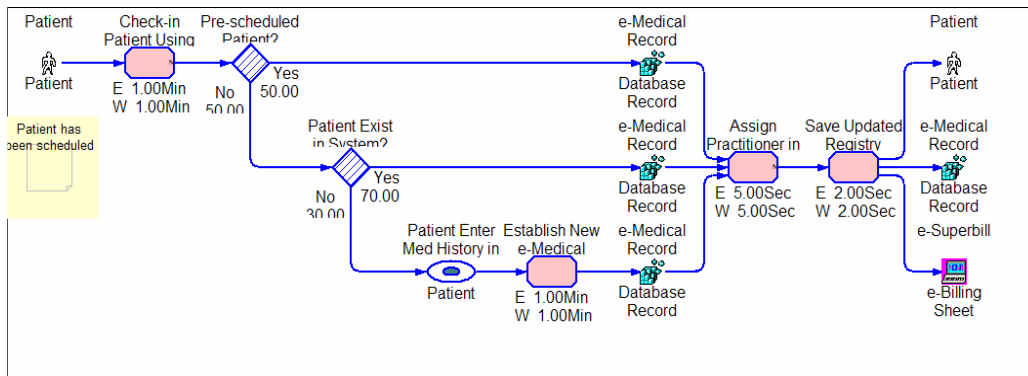


Value of streamlining & transformation via comparisons

Traditional Paper Process (as-is)



EMR Process (to be)



Criteria	Paper	EMR
Cycle time	76 min	2.3 min
Cycle Cost	\$497	\$18
Max Queue of Patients	6	1
% of Missing Records	50%	0
Res. Cost of Med Records	\$165	0
Res. Cost of Front Desk	\$116	\$16.5



Associate quantitative business case for transformation



Benefits of process modeling:

- **Knowledge Tool:** Defines process steps, responsibilities of individuals/systems and how departments interact
- **Discovery Tool:** Determines process weaknesses and strengths to understand where value is generated
- **Customer Service Tool:** Understand how and where customer touch-points occur and make changes to improve 'experience'
- **Decision-Making Tool:** Provides cost and ROI data to financial executives to justify projects
- **Integration Tool:** Transforms business process models requirements into Rational RSA/RSM and BPEL

SUMMARY OF COSTS AND BENEFITS AND VALUE PARAMETERS

Costs to the Customer	Year 1	Year 2	Year 3	Total
One-off Hard Costs	1,387,500			1,387,500
Ongoing Hard Costs	12,000	12,600	13,230	37,830
One-Off Soft Costs	54,000			54,000
Ongoing Soft Costs	2,280,000	2,394,000	2,513,700	7,187,700
Total Costs	3,733,500	2,406,600	2,526,930	8,667,030

Benefits to the Customer	Year 1	Year 2	Year 3	Total
On-Off Hard Benefits	2,871,000	8,254,550	8,667,278	19,792,828
On-Off Soft Benefits	0	0	0	0
On Going Soft Benefits	0	0	0	0
Total Benefits	2,871,000	8,254,550	8,667,278	19,792,828

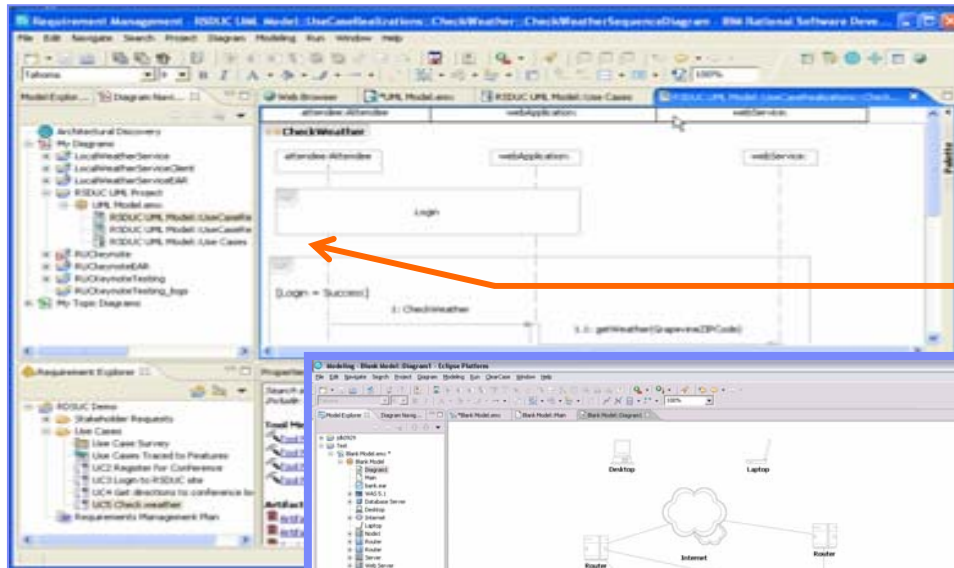
Value Measures	
ROI	128.37%
Payback Period	1.17300344
NPV	9,828,754
TCO	8,667,030



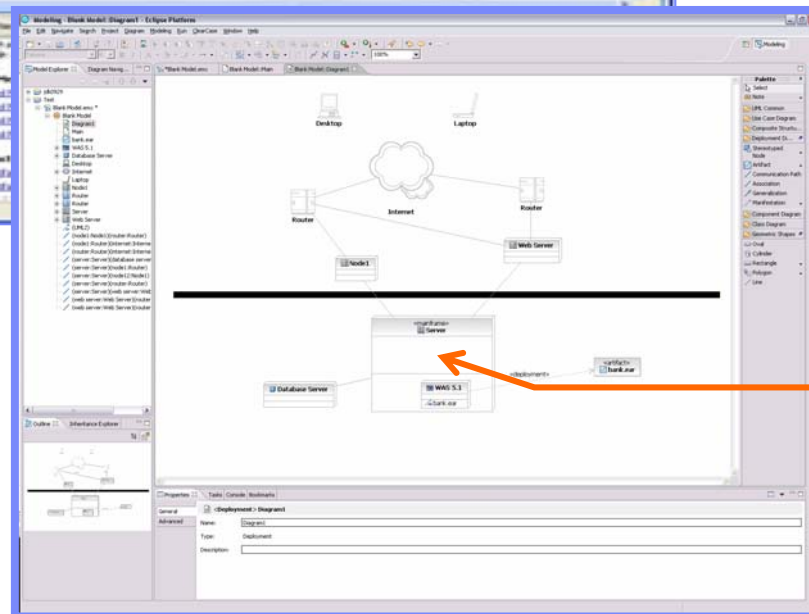
Analyst applies financial models for return on investment

*IBM WebSphere Business Modeler
IBM Rational Software Architect*

Analyze & design system from process models



Architect imports business processes and refines application design, based on best practices, and existing assets



Architect models operational model

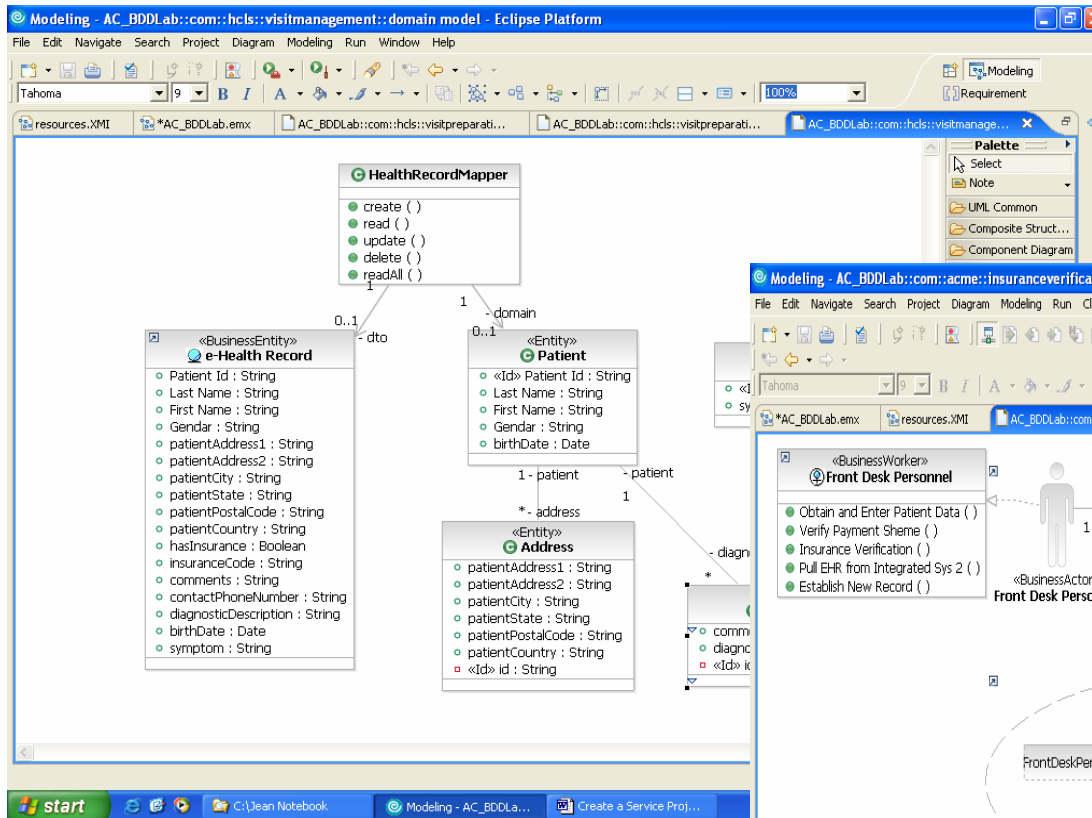
Customer Benefit:
Minimize risks by understanding architectural dependencies

IBM Rational Software Architect

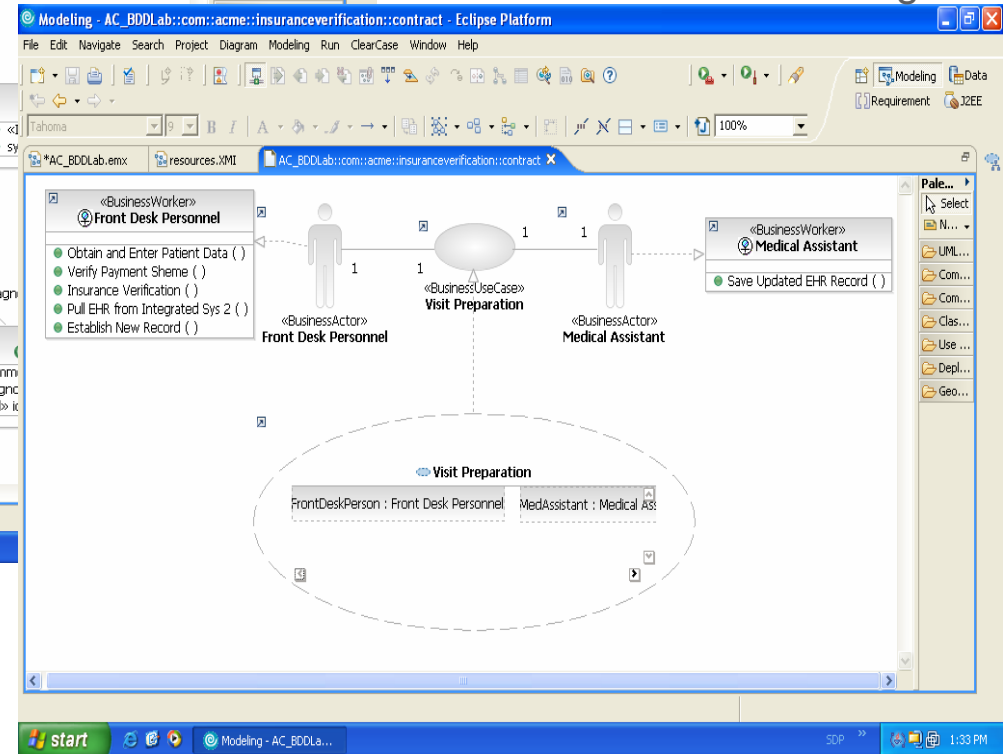
Map technical model, customer req'mnts & business use cases

The screenshot displays the IBM Rational Software Development Platform interface. The main window shows a UML Use Case diagram for 'Visit Preparation'. The diagram includes two actors: 'Front Desk Personnel' and 'Medical Assistant', both represented as stick figures. They are connected to a central use case 'Visit Preparation' (represented by an oval) with association lines and multiplicity '1'. Below the diagram, a 'Pale...' palette is visible with various UML elements. The interface also includes a 'Requirement Explorer' on the left, showing a tree structure of project elements like 'AmbulatoryCare_ReqPro', 'Business Goals', and 'Business Process_Use Case'. The bottom of the screen shows the Windows taskbar with the Start button and several open applications.

Transform process to UML for architectural design



Class diagram



Business use case diagram



Generated dynamic web page from system use case

The screenshot displays the IBM Rational Software Development Platform interface. The main window shows a JSP page titled "Get and Enter Patient Data." The page content is as follows:

```

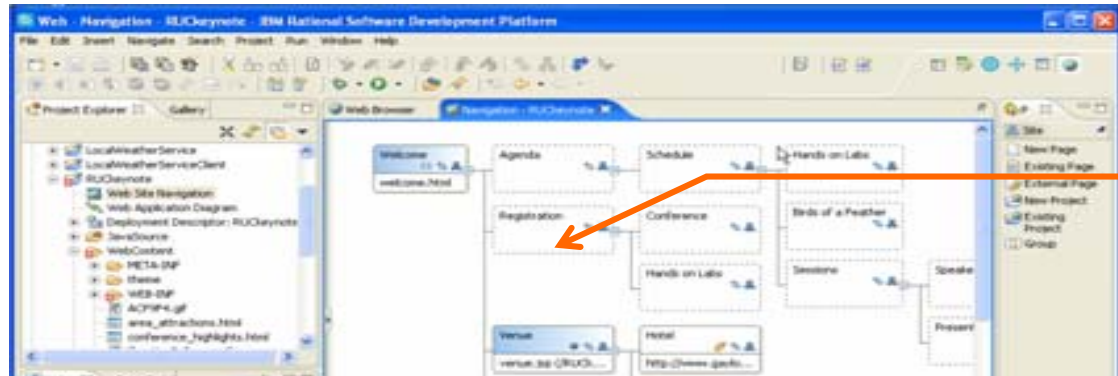

Get and Enter Patient Data.

First_Name:      <c:out value='${patient.f
Exist_in_System: <c:out value='${patient.f
Date_of_Birth:   <c:out value='${patient.f
Last_Name:       <c:out value='${patient.f
Payment_Scheme_Valid: <c:out value='${patient.f
Pre_scheduled:  <c:out value='${patient.f
Is_Insurance_Valid: <c:out value='${patient.f
Gendar:         <c:out value='${patient.f
Has_Insurance:  <c:out value='${patient.f
Patient_Id:     <c:out value='${patient.f
Patient_Address: <c:out value='${patient.f

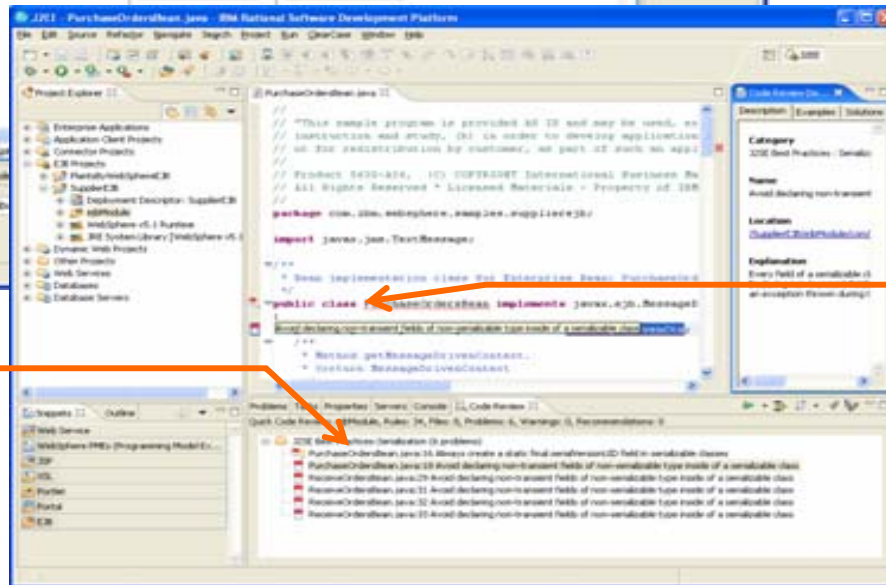

Submit
  
```

The interface also shows a Project Explorer on the left with a tree view of the project structure, including Session Beans, Entity Beans, and Dynamic Web Projects. The Properties window at the bottom shows the properties of the selected JSP page, such as "derived" (false) and "editable" (true).

Implement system and application using BDD environment

Developer implements application leveraging highly productive J2EE capabilities (JSF, SDO)

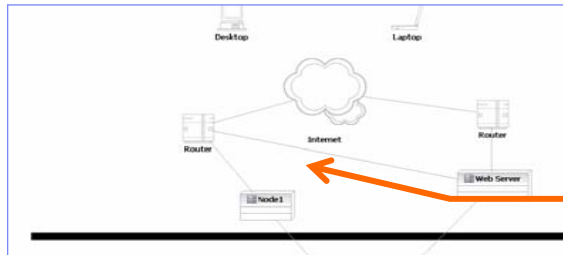
Developer leverages code analysis & unit testing to fix functional, performance, and security problems at the component level

Customer Benefit:
Build higher quality application in less time

IBM Rational Application Developer, WebSphere, Tivoli, Lotus, and DB2



Test system and application to validate functional requirements



Deployment Manager leverages operational model to provision the test lab

```
public void testBasic (Object[] args) {
    startApp("ClassesWebApp");
    // Browser: 85 Internet Explorer - Classes New Page
    Link_Exploresstorefront().click();
    // Browser: 85 Internet Explorer - Classes New Page
    Stage_Exploresstorefront().click();
    // Browser: 85 Internet Explorer - Classes Catalog Page
    Exam_getcatalogpage().click();
}
```



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

The screenshot shows the IBM Rational Manual Tester interface. On the left, a tree view lists test cases for 'Sell Fund', including steps like 'Launch Browser', 'Enter Address http://', 'Logon For Trading', and 'Verify Transaction in'. The main window displays a browser window with the URL 'http://www.ibm.com' and a security alert. On the right, a 'Reusable Statements' pane lists actions like 'Launch Browser', 'Enter Address http://', 'Logon For Trading', 'Navigate to Trading', 'Sell Mutual Fund', and 'Verify Transaction in'.

IBM Rational Functional Tester
IBM Rational Manual Tester



Automatic regression testing for Web, J2EE & .Net applications



Customer Benefit

- Minimize test maintenance with scripts resilient to application changes
- Wizard enhanced automation to speed test creation for the new user
- Powerful scripting language and IDE for the professional tester
- Supports Team oriented parallel development

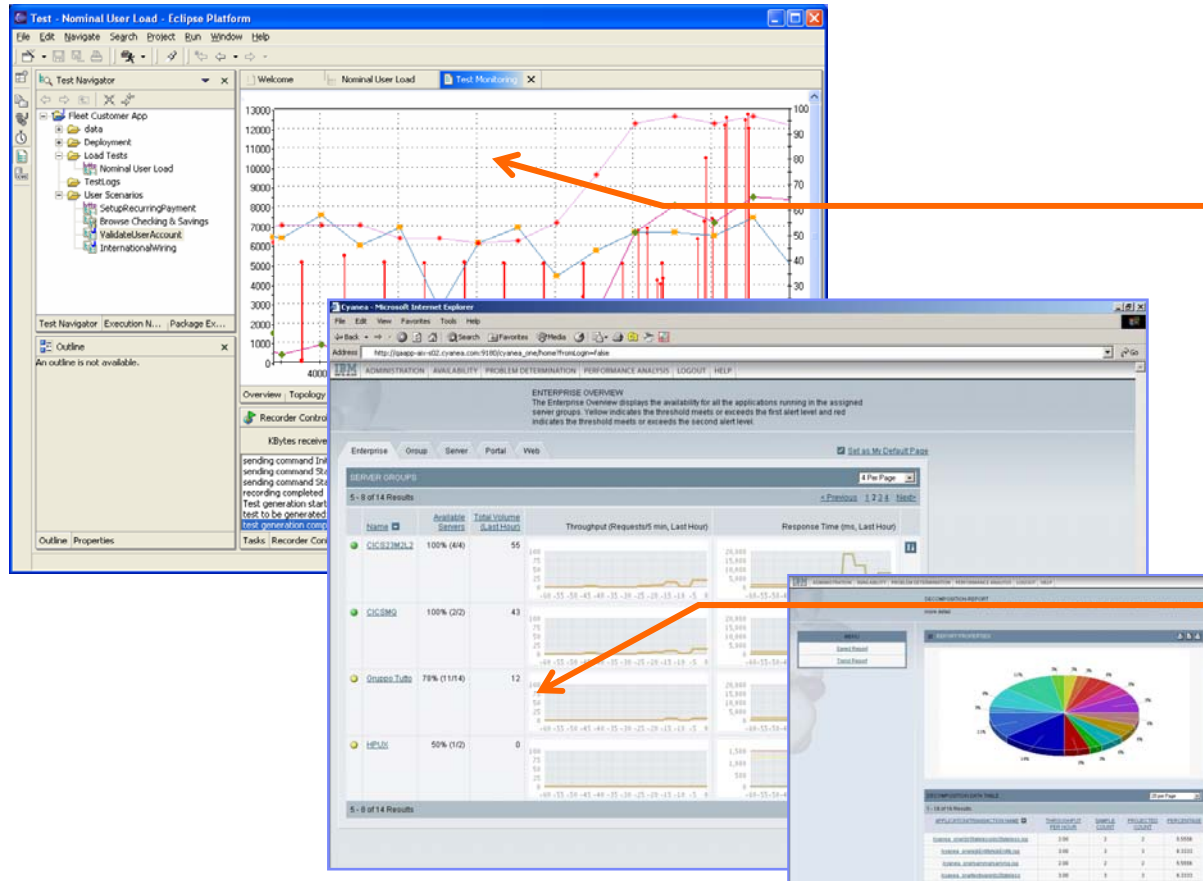
The screenshot shows a 'Place an Order' window with the following details:

- Item: Schubert (Sub-Total: \$18.99)
- Quantity: 1 (String Quartets Nos. 4 & 14, Related Items: \$0.00)
- Card Number: 1218 1014 0926 0600 (S&H: \$1.00)
- Card Type: Visa (Expiration Date: 02/05)
- Total: \$19.99

The 'Insert Data Driven Actions' dialog box contains the following table:

Role	Test Object	Command	Variable	Initial Value
	ItemText	setText	ItemText	Schubert
	_1899Text	setText	Album	String Quartets Nos. 4 & 14
	QuantityText	setText	QuantityText	1
	CardNumberIncludeTheSpa...	setText	CardNumber	1218 1014 0926 0600
	creditCombo	setText	creditCombo	Visa
	ExpirationDateText	setText	ExpirationDate	02/05
	NameText	setText	NameText	D. Bryson
	StreetText	setText	StreetText	307Calder St
	CityStateZipText	setText	CityStateZipText	Vancouver, BC
	PhoneText	setText	PhoneText	604-280-8326

Deploy - plan capacity & ensuring service level Compliance



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 WebSphere Studio Application Monitor
IBM Rational Performance Tester



Monitor service levels with centralized view of performance

The screenshot displays the IBM Tivoli Monitoring for Transaction Performance console. At the top, an 'Event Viewer' window shows a list of events with columns for Time Received, Class, Hostname, Severity, Status, and Message. Below this, the main console interface includes a navigation pane on the left with sections like 'My Work', 'Configuration', 'Reports', and 'System Administration'. The central area features a bar chart titled 'Transaction: STI_PBY thru_QoS' showing performance metrics over time. The chart has a legend with categories: No Violations (green), Availability Violation (red), Threshold Violation (yellow), and several instances of 'http://40.ibm.com:85/PlantsByWebSj' (various shades of blue and grey). Below the chart are date and time selection controls for Start Time and Stop Time.

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

Centralized view into network, systems, middleware and application performance

RETURN

IBM Tivoli Enterprise Console
IBM Tivoli Monitoring for Transaction Performance





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Mainframe Slides

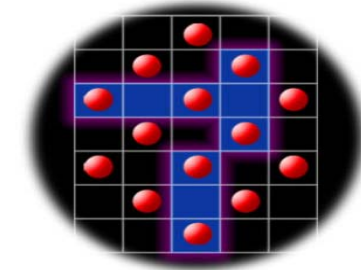


Developing for the zSeries

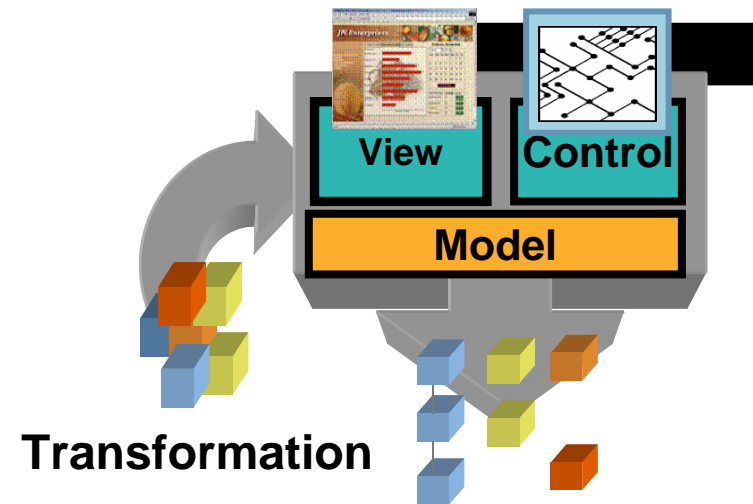
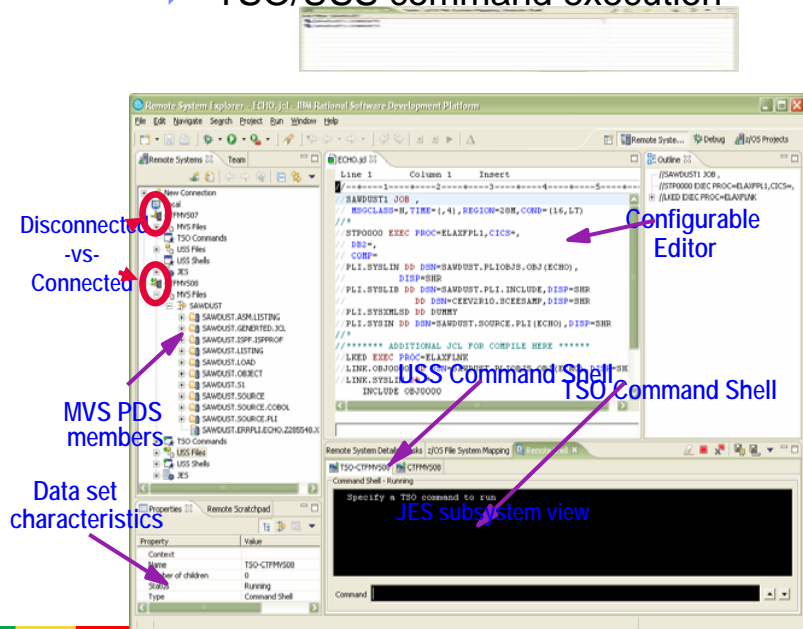
- Development tools for zSeries applications remains a strategic investment area for IBM. Therefore, we are focusing on:
 - ▶ Improving and adding tools focused on increasing productivity
 - ▶ Integrating these tools with the rest of the IBM SDP
 - ▶ Ensuring these tools track and exploit the latest advancements in technology and middleware (e.g. SOA) without requiring your staff to become technology experts
- We offer 3 options:
 1. Host-based text editors and tools for COBOL & PL/I (e.g. ISPF)
 2. Eclipse-based WYSIWYG, visual and text editors and tools for COBOL & PL/I (e.g. WDz)
 3. Eclipse-based WYSIWYG, visual, declarative and text editors and tools for our MDD EGL language (e.g. WDz + EGL COBOL option)

zOS Application Development tools

- Interactive, workstation-based environment
 - ▶ Faster development with less errors
 - ▶ Work offline or online
 - ▶ Local/workstation project
- Edit/compile/debug on the workstation
 - ▶ Remote or Local
 - ▶ Language sensitive editors for COBOL, PL/I, ASM, JCL
 - ▶ BMS Map development
- Interactive access to zOS
 - ▶ Job generation, submission, and monitoring
 - ▶ TSO/USS command execution

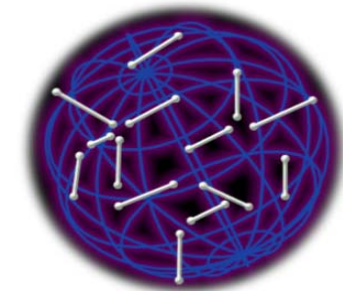


Traditional applications and COBOL/PL/I Services

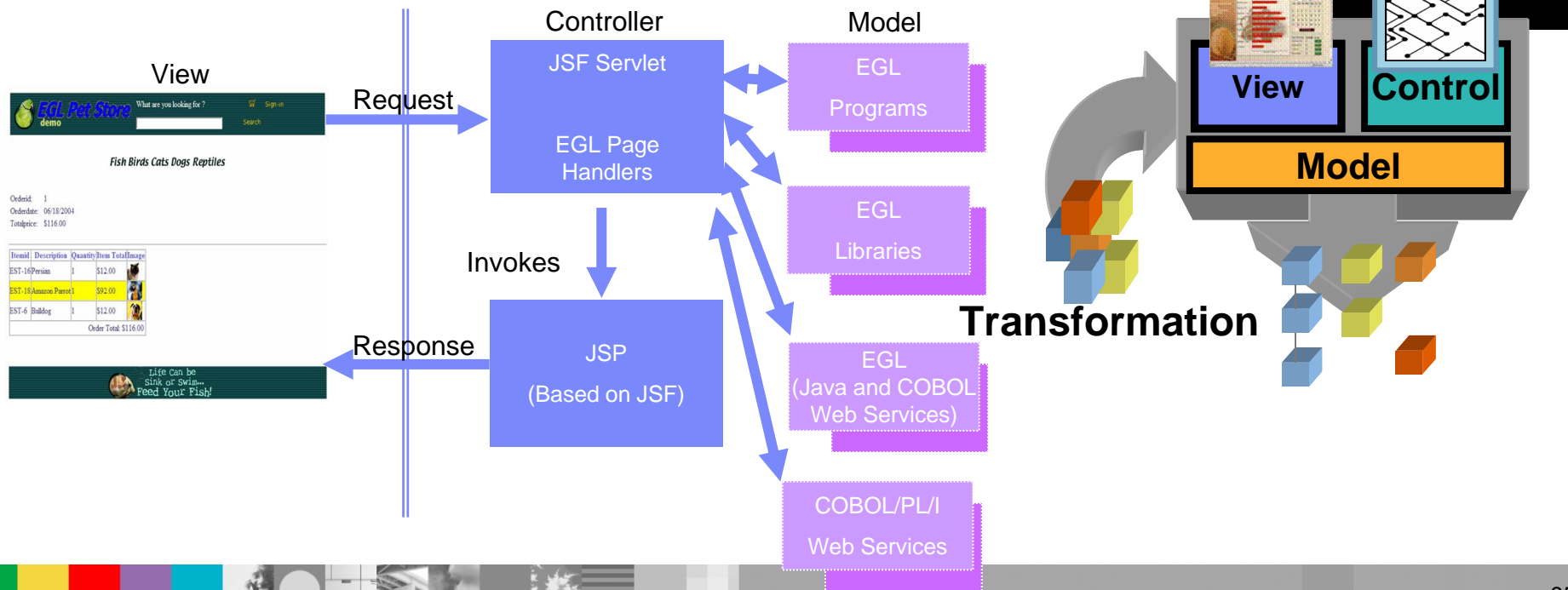


Web Development tools

- Interactive, Web development
 - ▶ Static and Dynamic Web development; XML
- Java Development
 - ▶ Java and J2EE development
 - ▶ Java Server Faces or Struts
- EGL 4GL Java/Web development
 - ▶ Generate to language of Choice
 - ▶ Tight integration to JSF

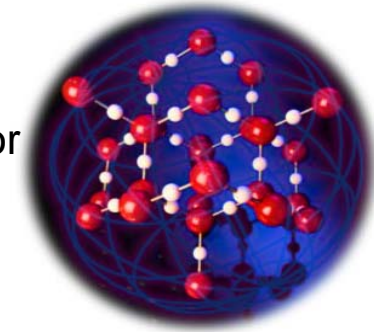


Web applications and services

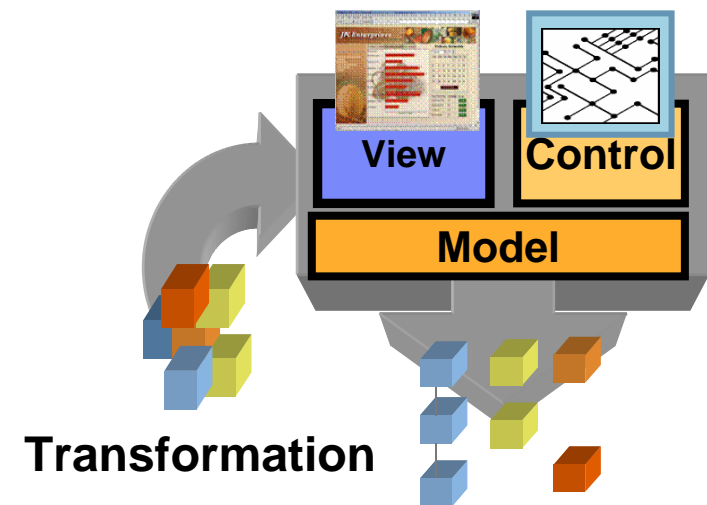
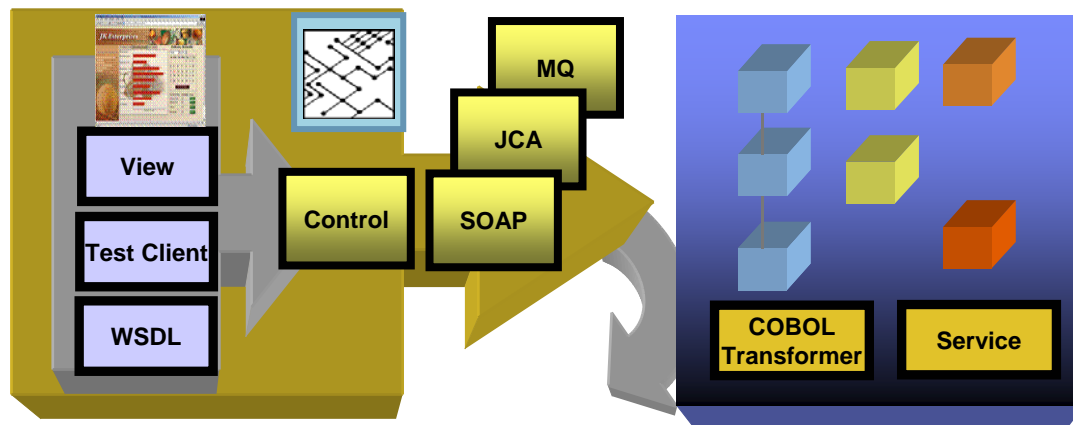


zOS *Mixed Workload* Development tools

- Transition of Traditional environments to Web and Mixed Workload or Composite applications
- SOA / SOAP / XML / Enablement
- JCA Support
- Service Flow Modeler
- HATS
- Enterprise Generation Language (EGL) / JSF
 - ▶ COBOL/CICS generation
 - ▶ Java generation



On Demand



Benefits of Rational SDP for zSeries Lifecycle Development

- **Comprehensive end-to-end development environment**
 - ▶ Single development environment
 - provides integration of process, tools, infrastructure and assets
- **Supports more runtimes, developers, and tooling**
 - ▶ WebSphere Application Server, CICS, IMS, z/OS batch
 - ▶ Web, Java, and Enterprise Developers
 - ▶ Java, J2EE, Web, XML, COBOL, PL1, EGL, and Web services
- **Higher-quality applications in a fraction of the time**
 - ▶ Language sensitive editors
 - ▶ Integrated WebSphere Server test environment
 - ▶ Integrated deployment automation tools
 - ▶ Simplifies development process
 - ▶ Provides consistent development environment
 - ▶ Save CPU (example – work offline)
 - ▶ Better interface, no need for TSO
 - ▶ Reduces learning curve for new Development Resources