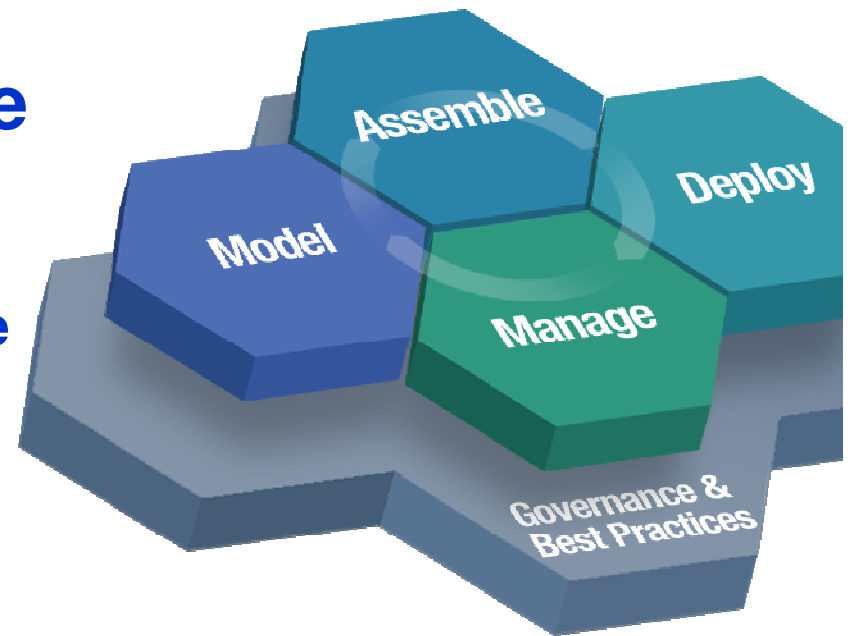


## Service Oriented Architecture

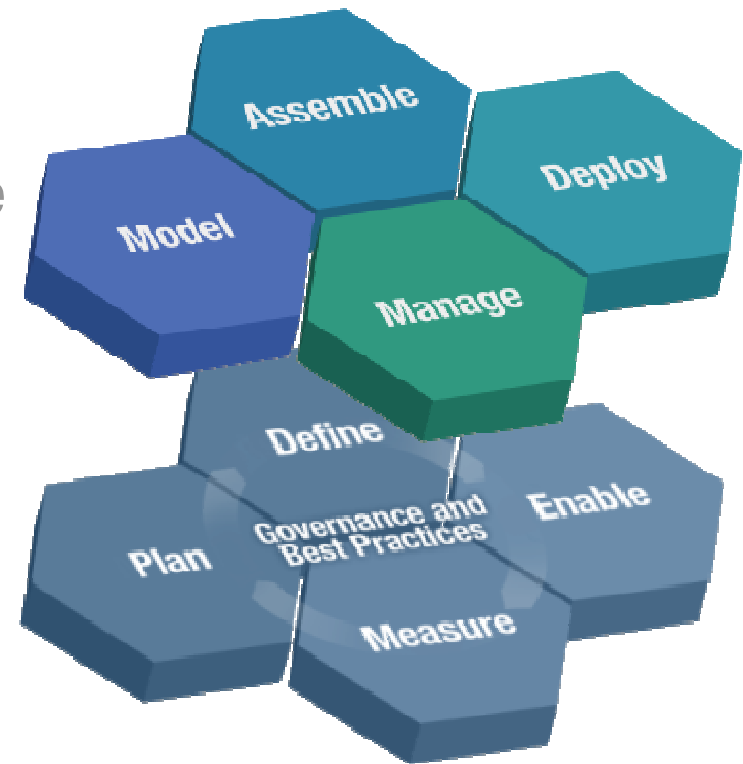
Realizzare la SOA a livello Enterprise:  
progetto, implementazione e governance

**Antonio Santillo**  
**SOA IT Architect**  
**[antonio\\_santillo@it.ibm.com](mailto:antonio_santillo@it.ibm.com)**



## Agenda

- **SOA: cos'è e perché**
- L'ambiente operativo
- Business Process Management e ciclo di vita della SOA
- Il governo della SOA
- Come partire

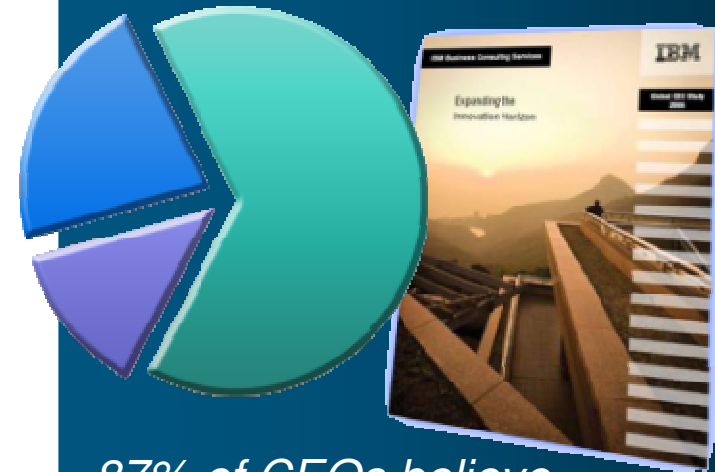




## Innovation that Matters To CEOs

### *Top Innovation Priorities:*

- Extend the ability to collaborate inside & outside
- Innovate business models & processes
- Leverage information for business optimization



*87% of CEOs believe fundamental **change** is required in next two-years to drive innovation*

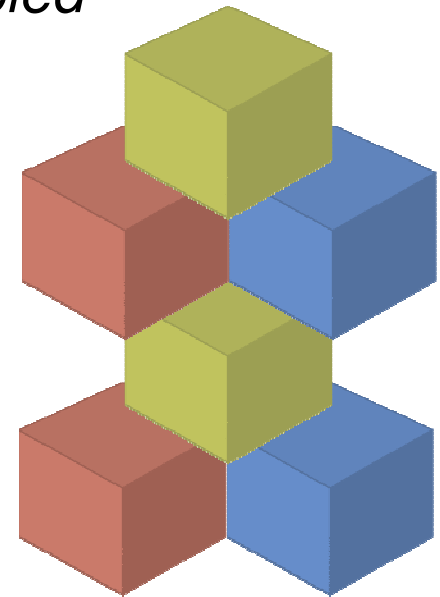
*Source: 2006 IBM Global CEO Survey*

*Innovation is all about change. SOA makes it easier to change.*

## What is a Service-Oriented Architecture (SOA)?

*“A system architecture in which business functions are built as components (**services**) that are loosely-coupled and well-defined to support interoperability, and to improve flexibility and re-use”*

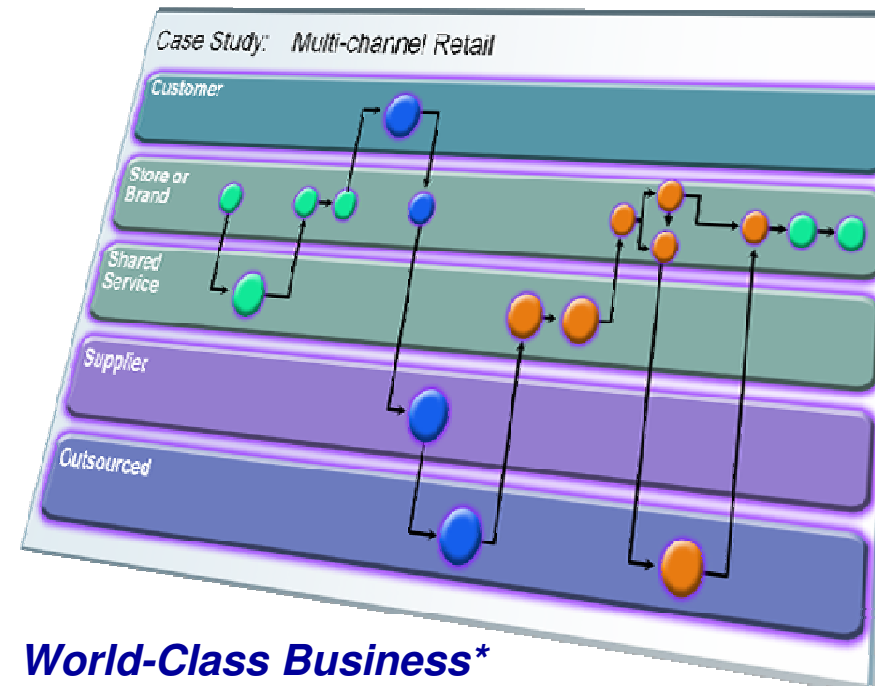
- ✓ Business functions are exposed as **services**
- ✓ A service has a **standardized interface**
- ✓ Services become **building blocks** that **can be reused** in developing other applications
- ✓ Development focus is on **application assembly** rather than on implementation details



# SOA is the right answer to flexibility and reuse needs

- **Globalized marketplace:** companies need ways to adapt more quickly
- **Cycle time shrinking:** changes in business processes becoming more frequent
- **Growth:** demands the flexibility to be more nimble than competitors
- **Cost reduction:** better use of the investments
- **Information:** more information available than ever before; looking for a way to make sense of this information regardless of its location, format, or type

## Traditional Business\*

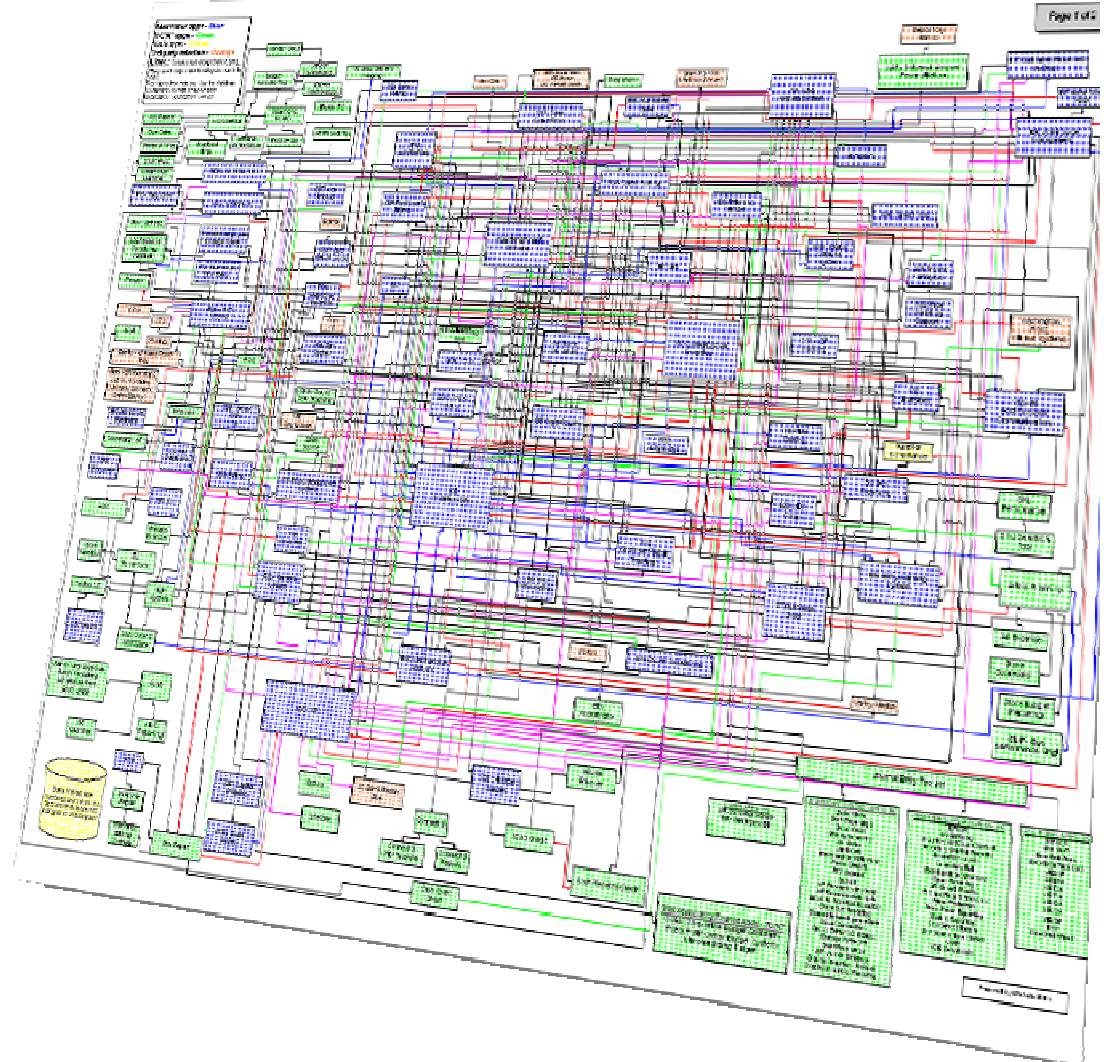


## World-Class Business\*

\*Source: CBDi

## What is preventing flexibility and reuse?

- Lack of standardization in business process
- Acquisition of redundant point applications to support single line of business
- Infrastructure built without a recognizable roadmap
- Linkages tend to be inflexible and very difficult, expensive, and time-consuming to change



## Why SOA now?

- **To keep pace with global competition:**
  - “We are taking apart each task and sending it ... to whomever can do it best, ... and then we are reassembling all the pieces”  
*from Thomas Friedman’s ‘The World is Flat’*
- **The standards and technology are finally in place, with broad industry support**
- **Availability of best practices for effective governance**
- **The necessary software to get started is available today**



# What differentiates SOA from claims like this in the past?

## Standards

- Broadly adopted Web services ensure well-defined interfaces.
- Before, proprietary standards limited interoperability

## Organizational Commitment

- Business and IT are united behind SOA (63% of projects today are driven by LOB)\*
- Before, communication channels & 'vocabulary' not in place

## Investment Protection

- Leveraging existing application assets, isolating changes impact
- Before, rip and replace

## Connections

- SOA services are linked dynamically and flexibly
- Before, service interactions were hard-coded and dependent on the application

## Degree of Focus

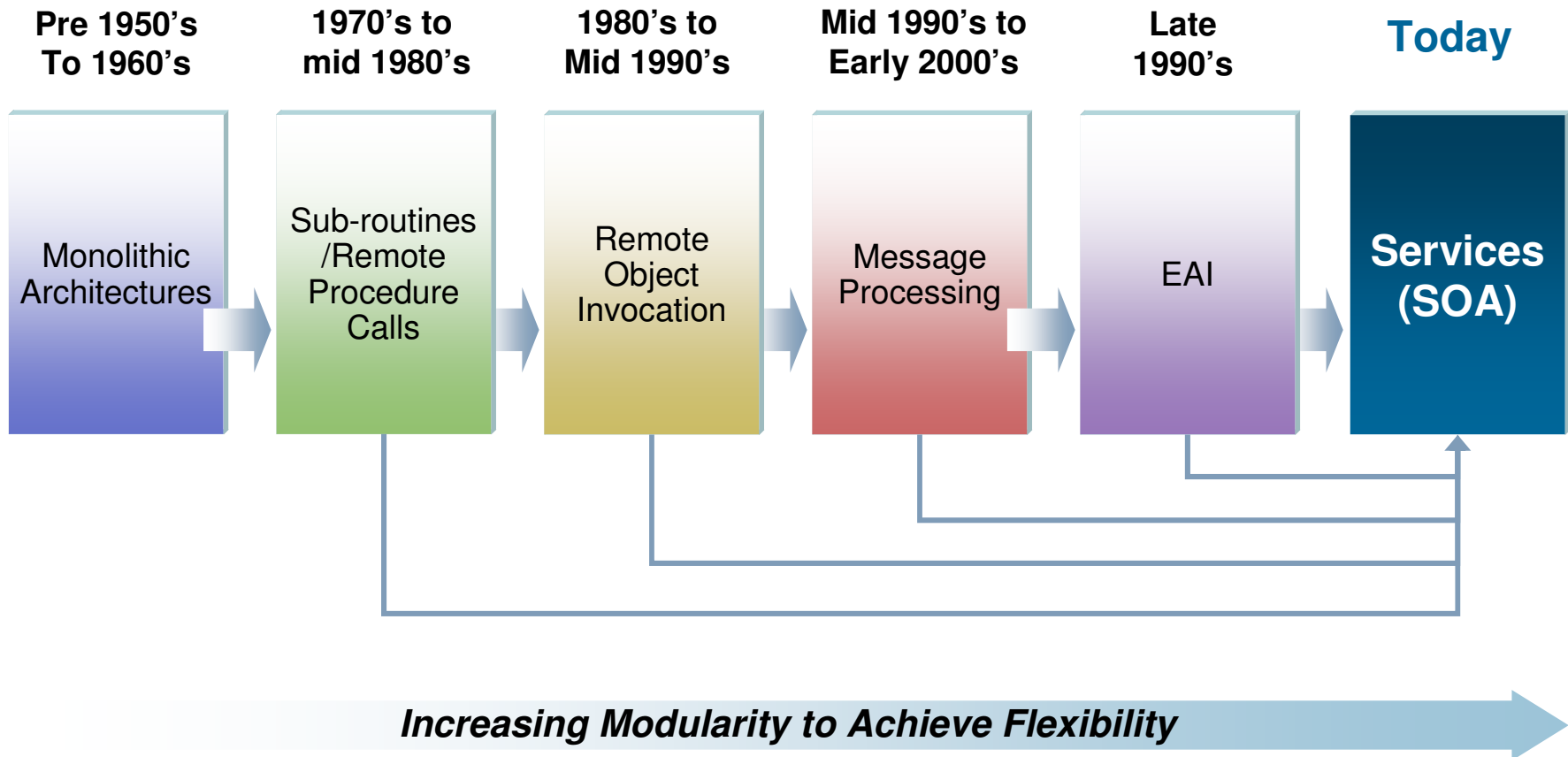
- SOA services focus on business-level activities & interactions
- Before, focus was on narrow, technical sub-tasks

## Level of Reuse

- SOA services can be extensively re-used to leverage existing IT assets
- Before, any reuse was within silo'ed applications

\*Source: Cutter Benchmark Survey

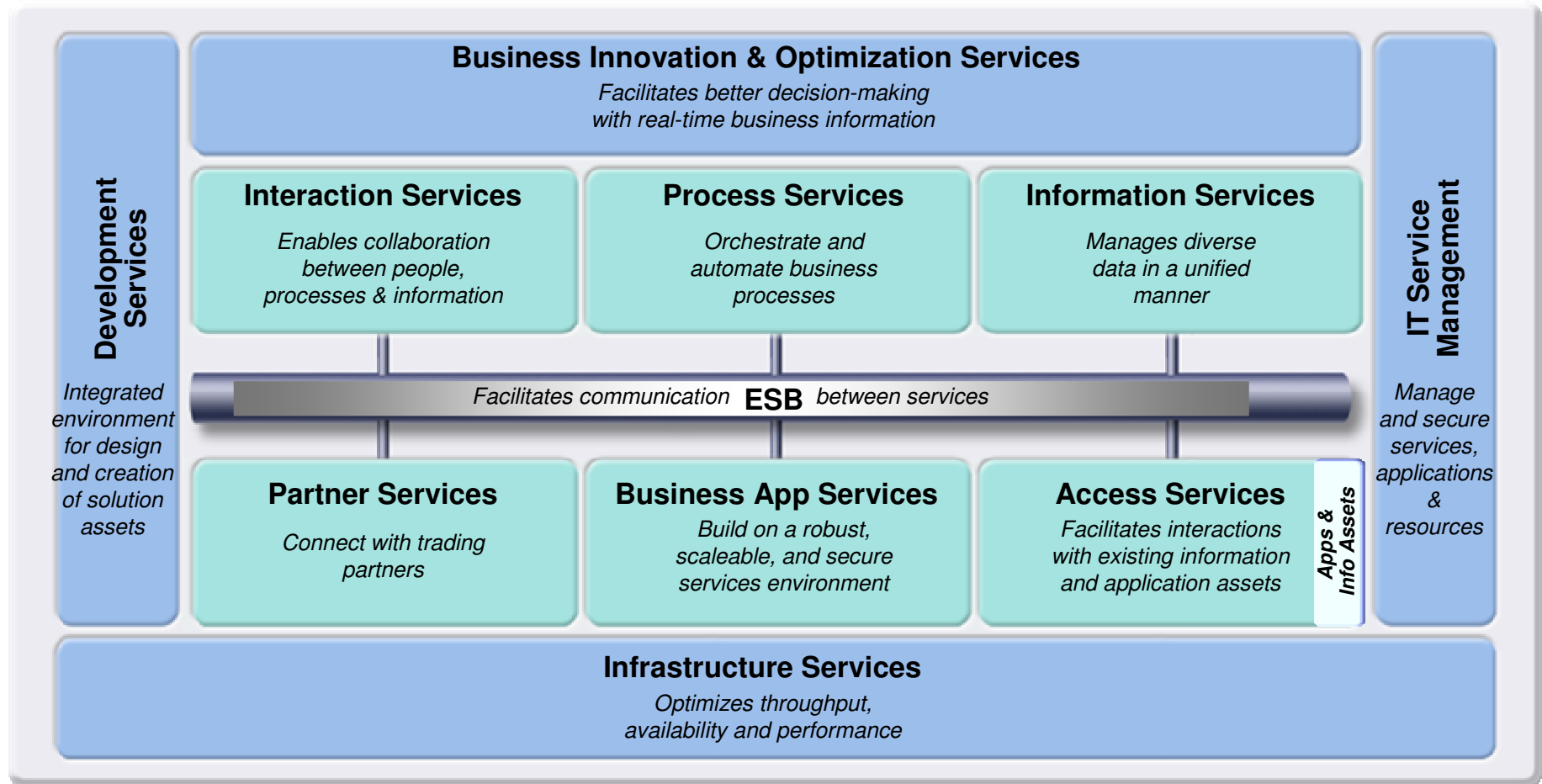
# IT's Architectural Evolution: Making IT More Responsive





# SOA Reference Architecture

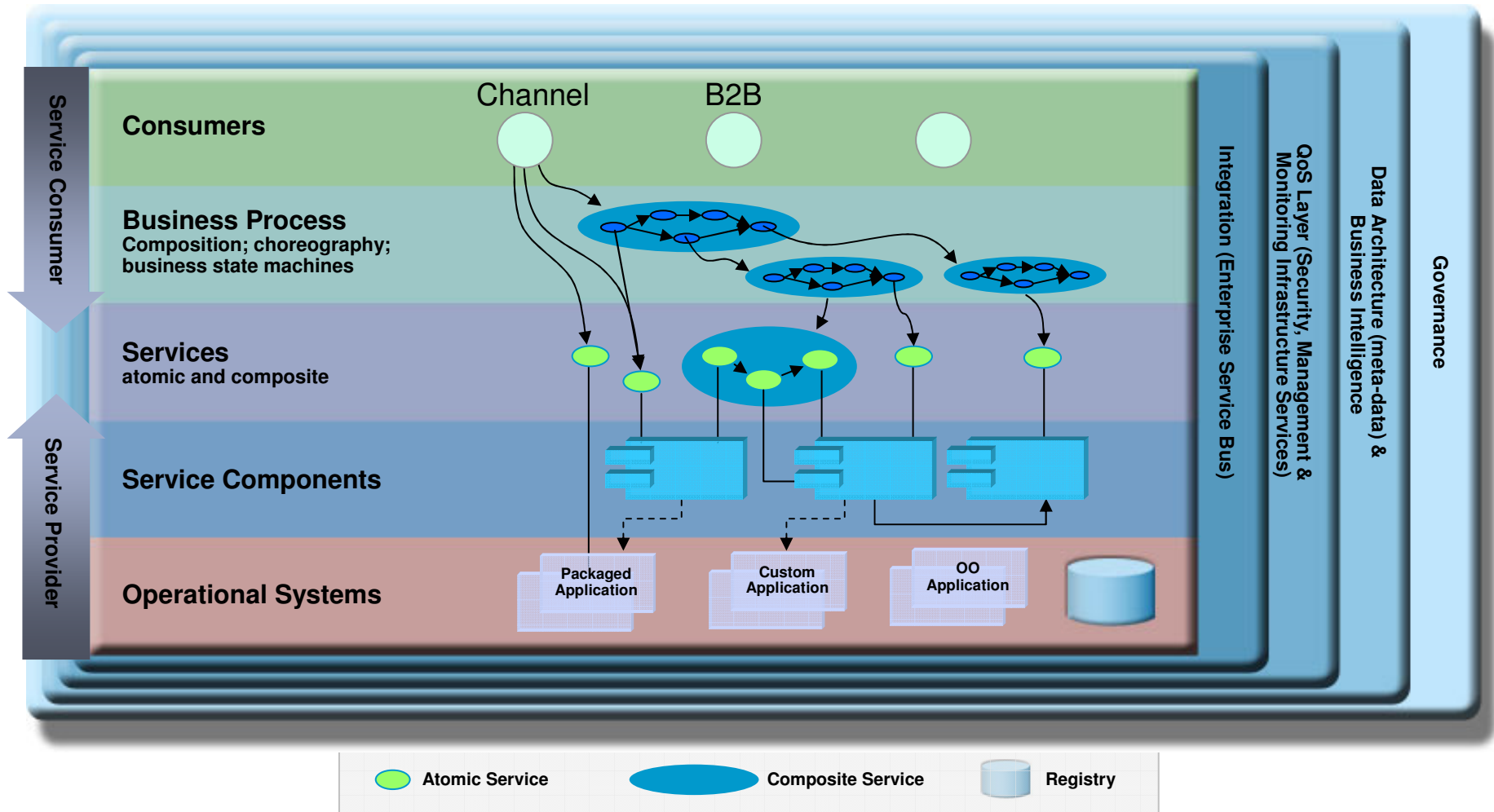
## Supporting the SOA Lifecycle



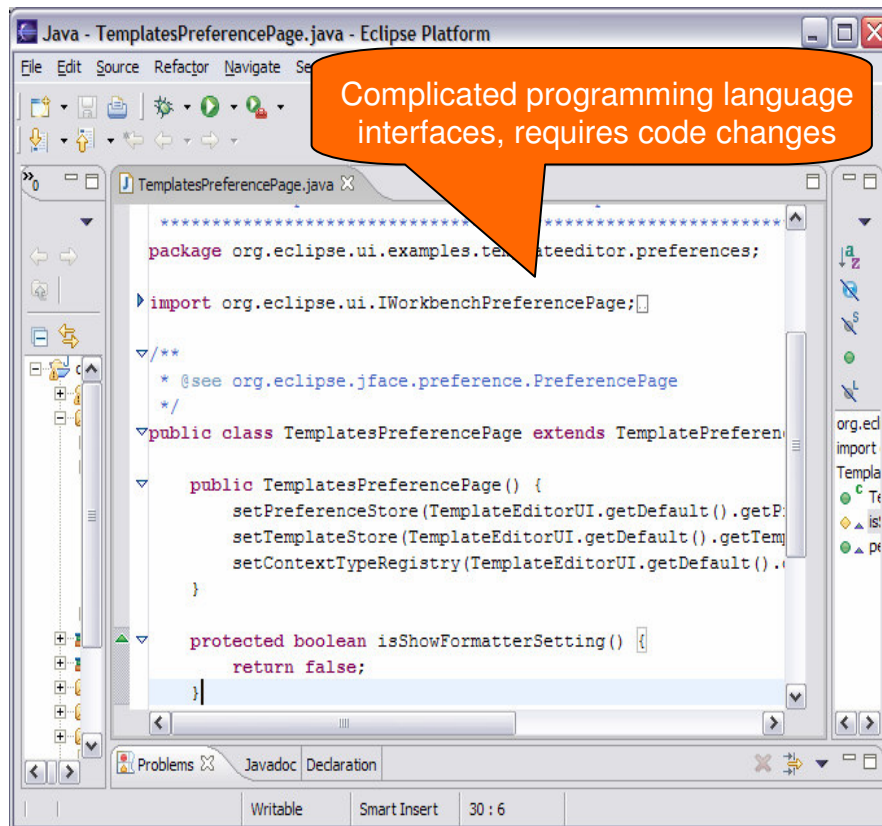


# SOA Solution Stack

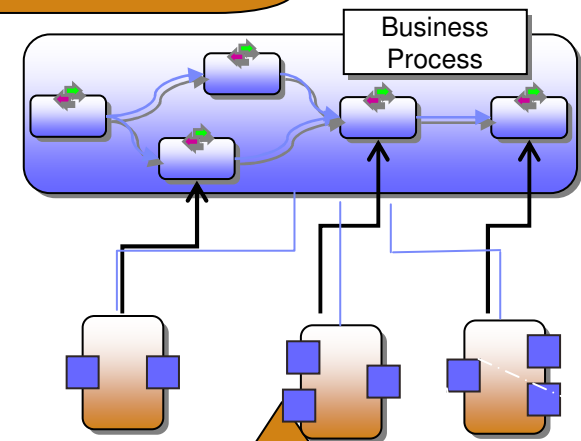
*Leveraging the SOA Reference Architecture to connect service consumers and service providers*



# Change in how you build applications ...



User friendly tools to change business and IT components

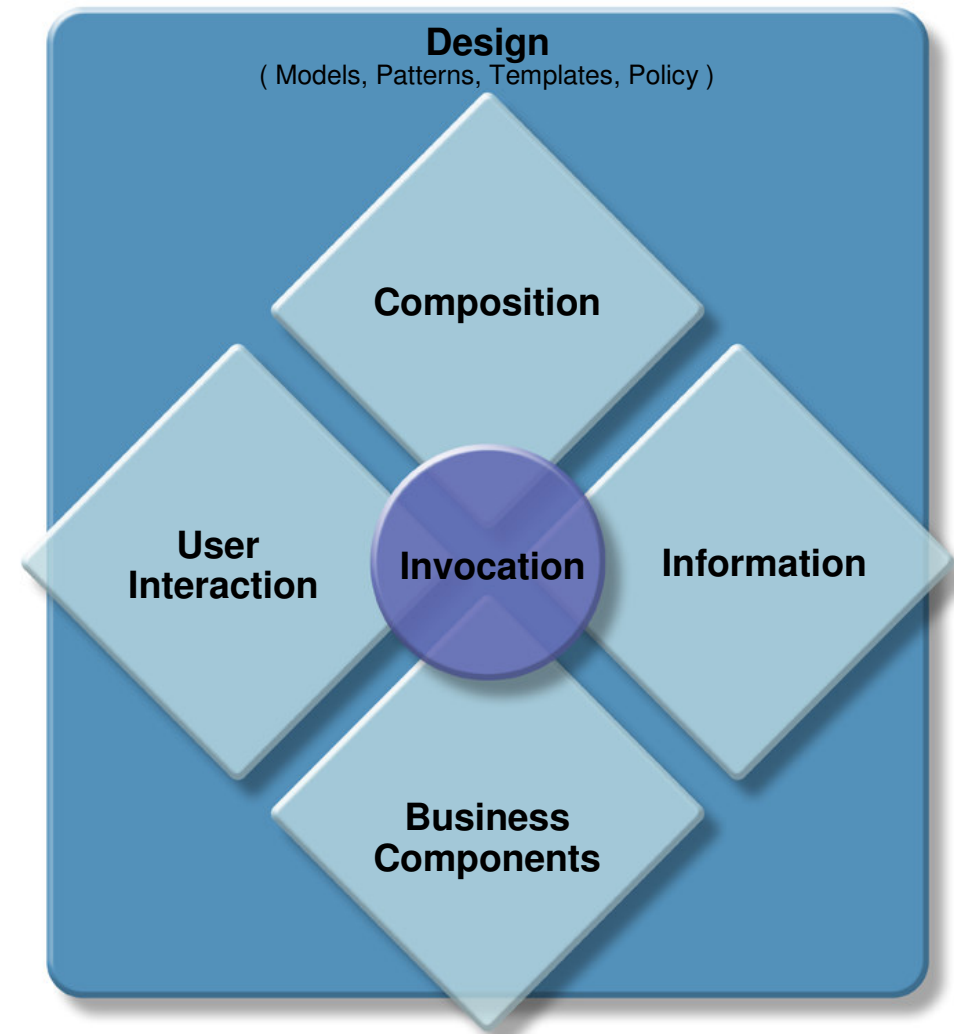


Business-friendly interface, allows business and IT to change independently

Service Interfaces based on standards like SDO, SCA, business objects

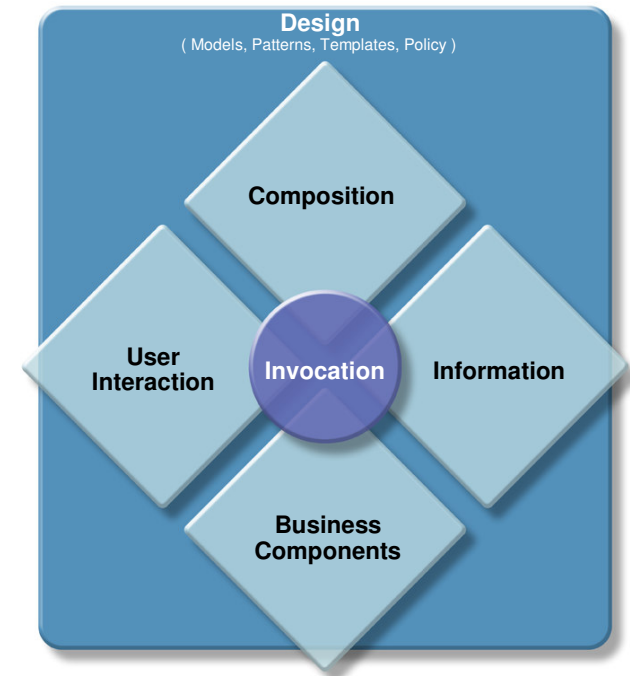
# SOA Programming Model Aspects

- **Design**
  - Focus on business design modeling, simplification, and role-based collaboration
  - Use of declarative policy to control execution behavior and relationships
- **User Interaction**
  - Dynamic support for people integration into the business design
- **Composition of Business-level Applications**
  - Wired assembly of services to form business-level applications, workflows, and business orchestration
- **Information**
  - Built-in access to service state, disconnected service-data exchange, information composition and transformation
- **Business Components**
  - Composable and reusable services
- **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

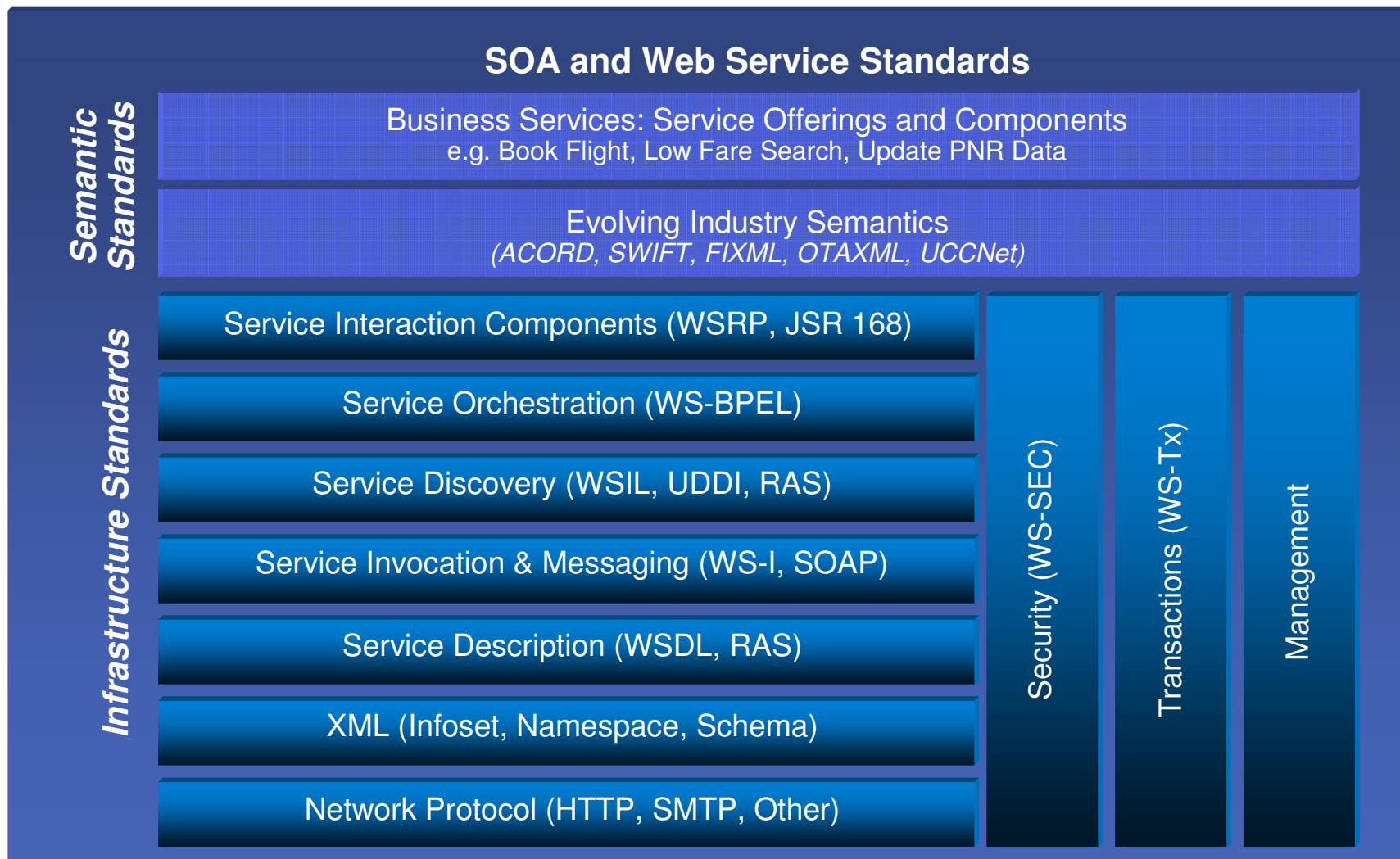


# SOA Programming Model Supported by Key Standards

- **JavaServer Faces**
  - Standard way to construct user interfaces for web applications, JSR 168 portlets, etc.
  - MVC based User Interaction Framework
- **Business Process Execution Language (WS-BPEL)**
  - Standard way to choreograph business processes
  - Standardization through OASIS
- **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
- **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/>

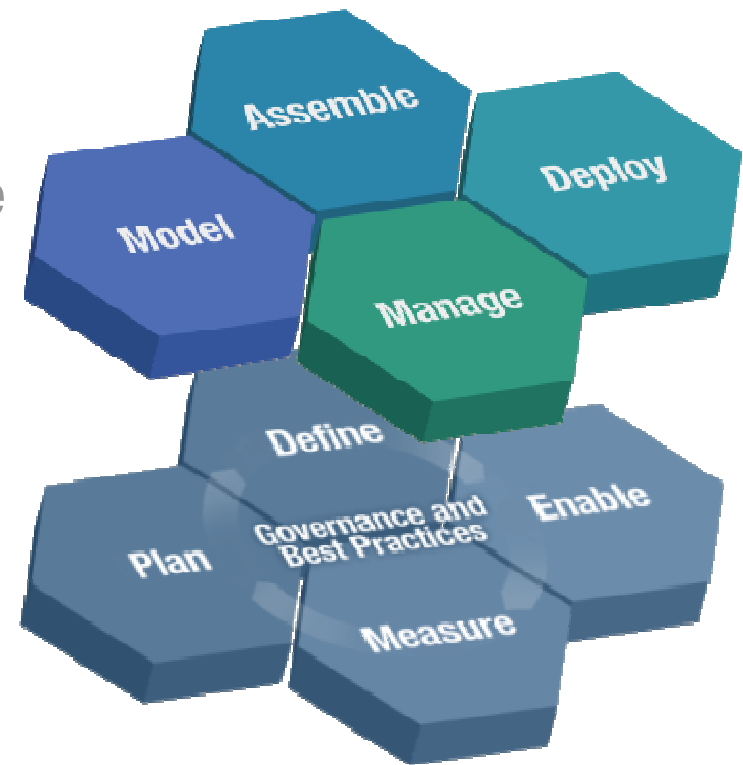


# Key Standards for SOA



## Agenda

- SOA: cos'è e perché
- **L'ambiente operativo**
- Business Process Management e ciclo di vita della SOA
- Il governo della SOA
- Come partire



# SOA Operating Environment

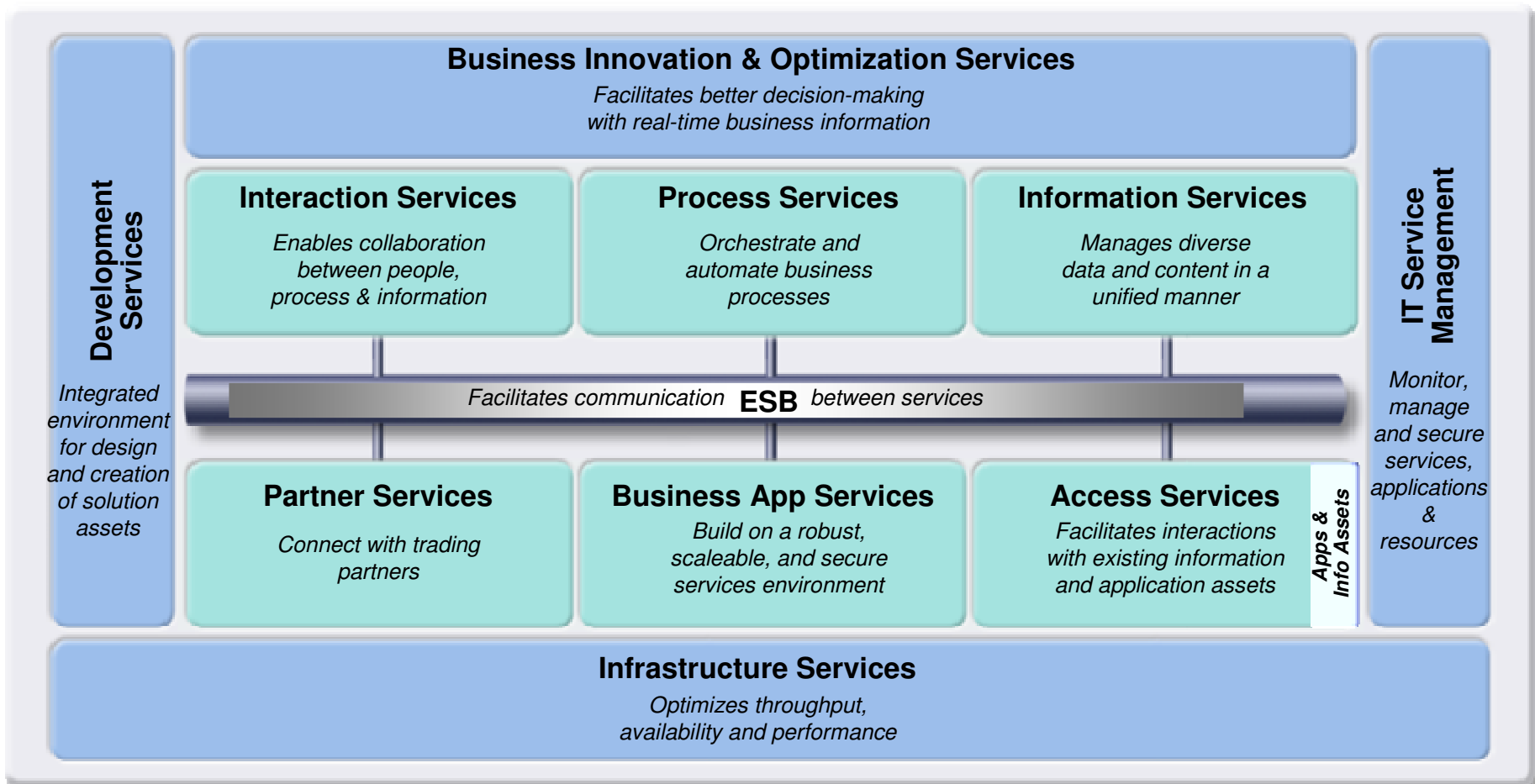
*Key principles to build a flexible and robust environment*

- 1** ▪ Separation of concerns
- 2** ▪ Loose coupling & flexibility
- 3** ▪ Composite Applications to enable the reuse of existing assets
- 4** ▪ SOA QoS considerations are same as traditional applications but may manifest differently in the infrastructure



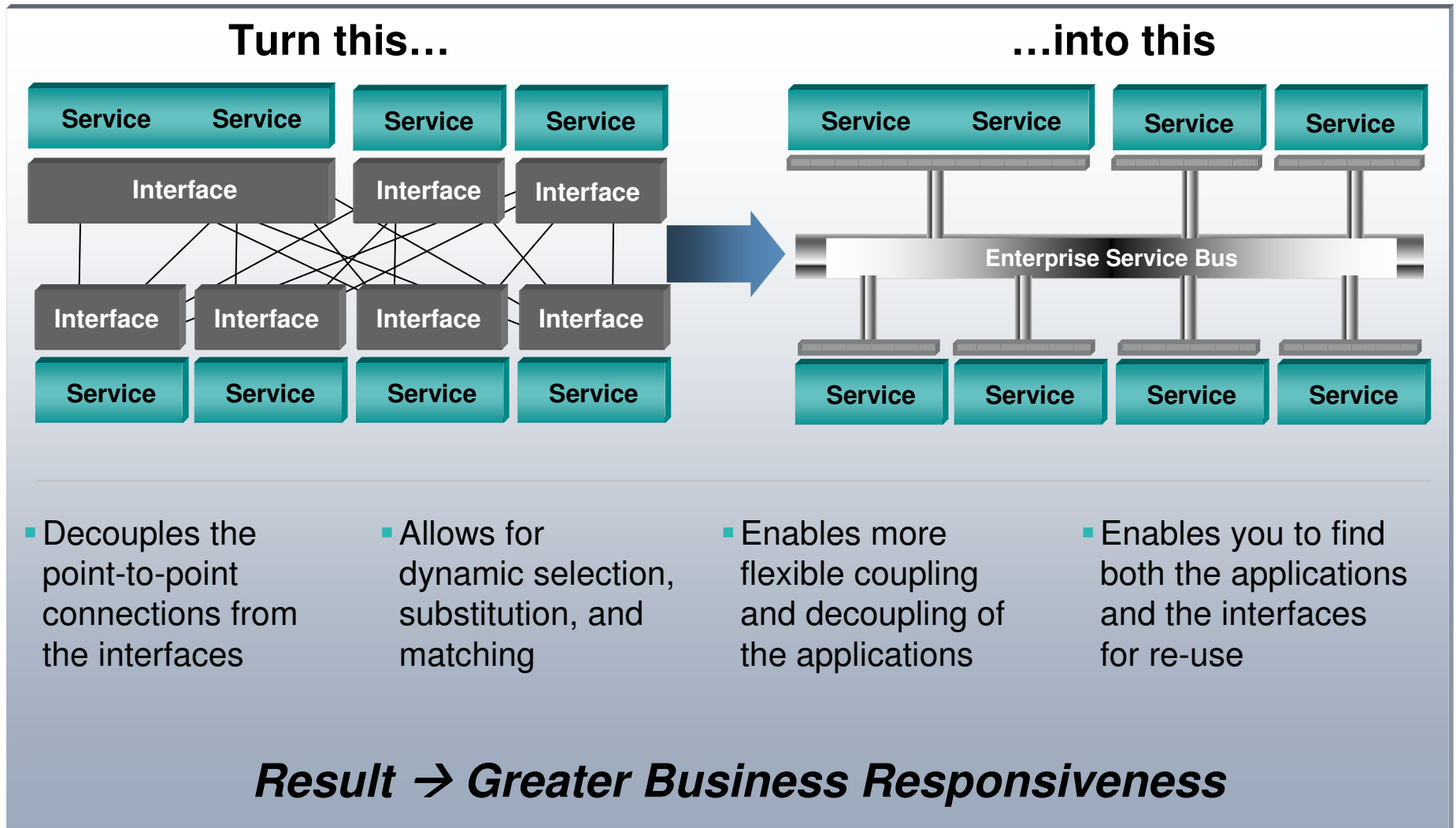
# 1 SOA Reference Architecture

## Supporting Separation of Concerns



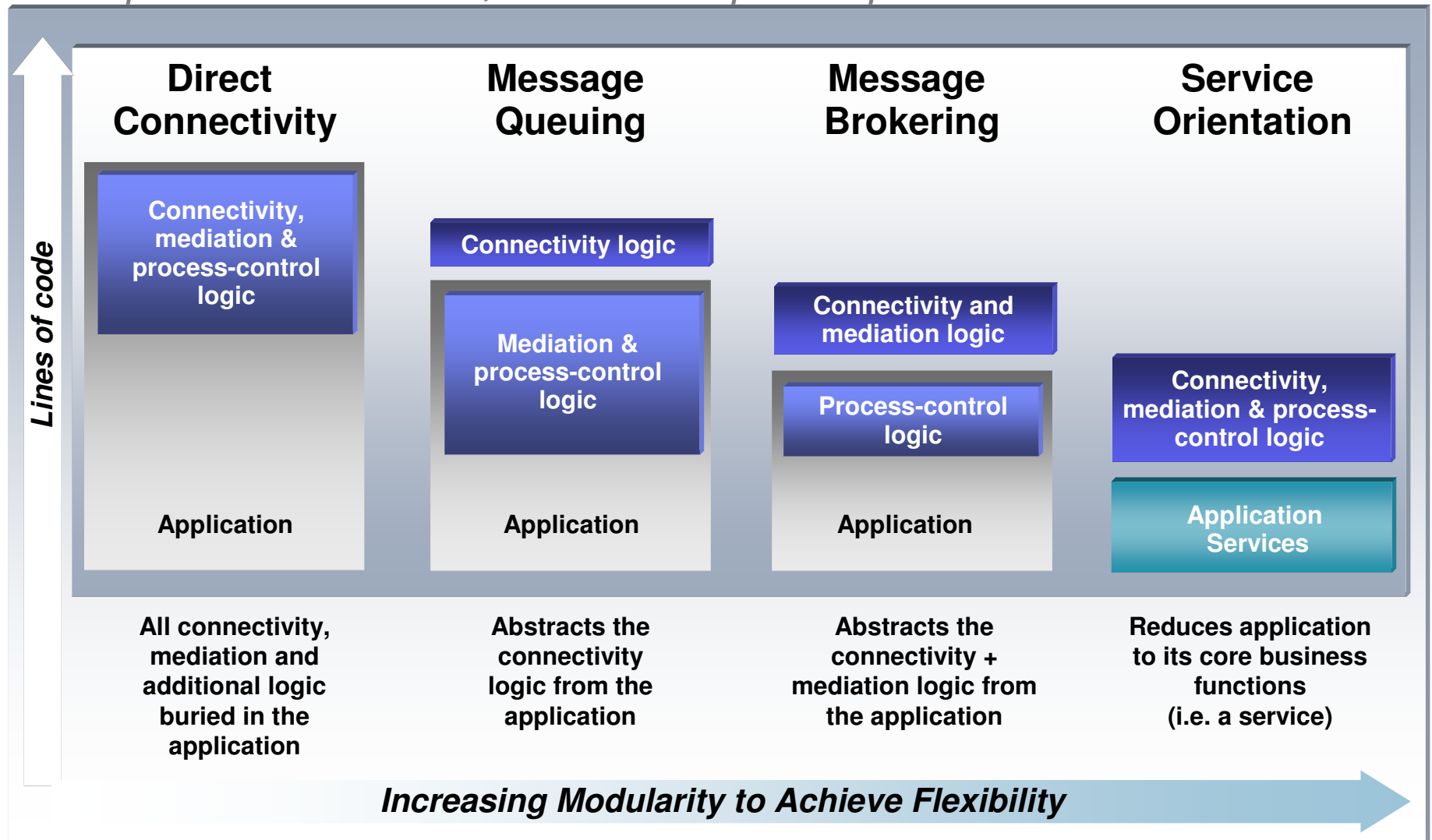


## 2 Loose Coupling: Increases Flexibility and Reuse



# SOA: The Next Step on the Connectivity Evolution

*Enterprise Service Bus, the first step to implement SOA*



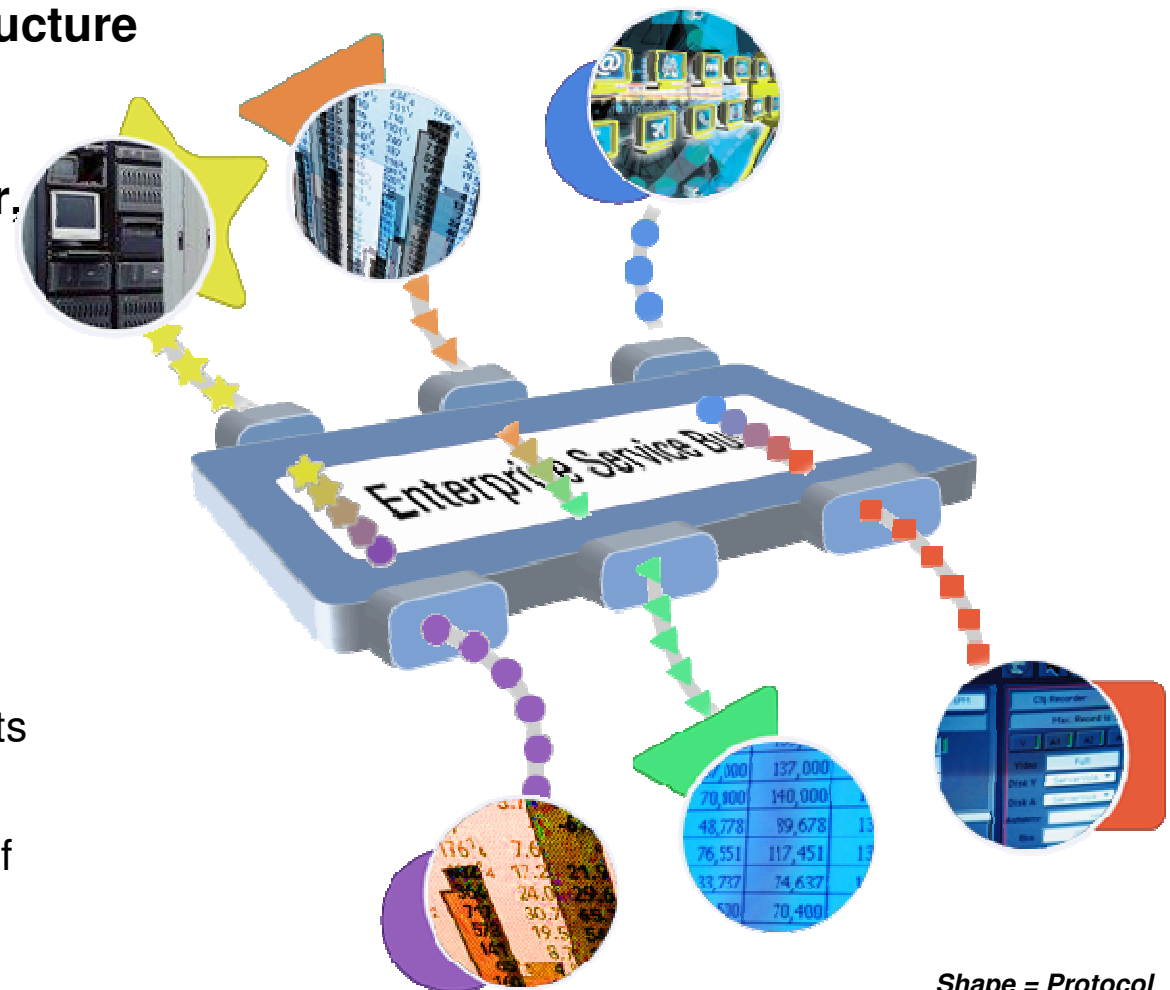
## What is an Enterprise Service Bus (ESB)?

A flexible connectivity infrastructure for integrating applications as services ...

.....which reduces the number, and complexity of interfaces.

An ESB:

- ▶ **VIRTUALIZES** the location and identity of participants
- ▶ **CONVERTS** between different transport protocols used by the participants
- ▶ **TRANSFORMS** message formats between participants
- ▶ **APPLIES** appropriate qualities of service for the given interaction
- ▶ **DISTRIBUTES** business event information to/from disparate sources



Shape = Protocol  
Color = Data type

# Enterprise Service Bus

*A logical architectural construct, central to the working of a SOA*

## Mediation Services

- Routing
- Transformation
- Enrichment

## Event Services

- Publish and Subscribe

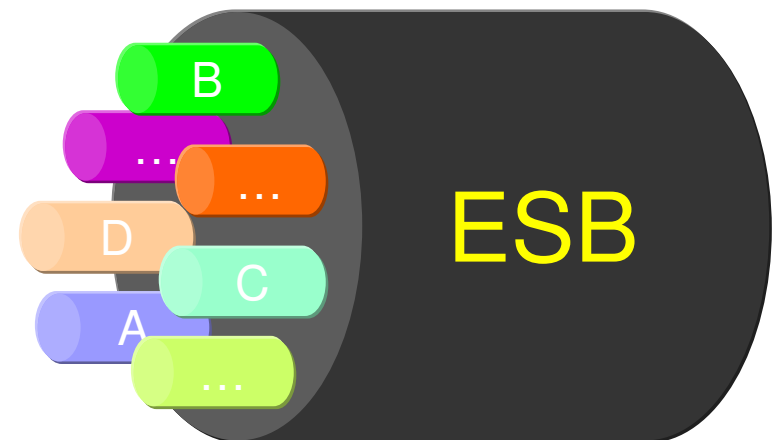
## Transport Services

- Synchronous/Asynchronous
- Persistent/Non-persistent
- Loosely-coupled/Tightly-coupled

## Standards Based

- HTTP/HTTPS with option for WS-ReliableMessaging
- JMS, JAX-RPC, SOAP
- WS-Security, WS-Policy, WS-Addressing

	For Application-Required ESB Properties ...	... Use ESB Instantiation
A	Synchronous Web service conduit	SOAP over HTTP
B	Reliable message service conduit	SOAP over JMS
C	Mediated, reliable messaging service conduit	Brokered JMS message
D	Intra-JVM conduit	RMI/IIOP
...	...	...



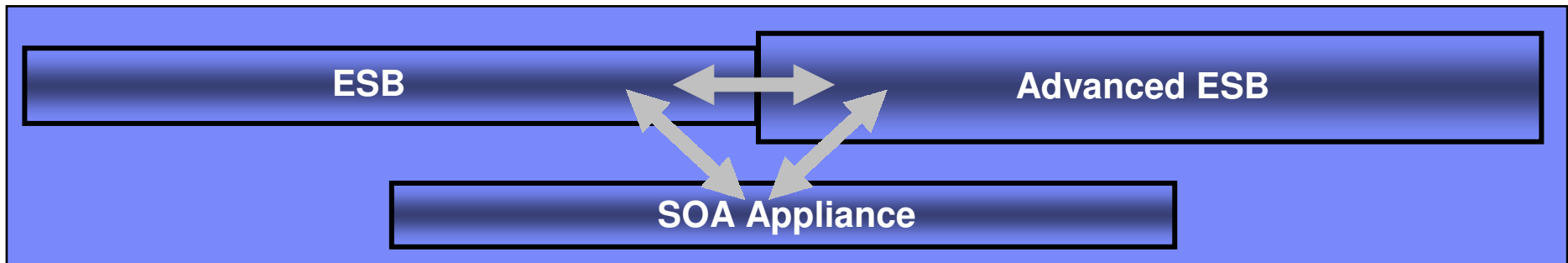
## ESB Portfolio

### ESB:

Provides Web Services connectivity and data transformation

### Advanced ESB:

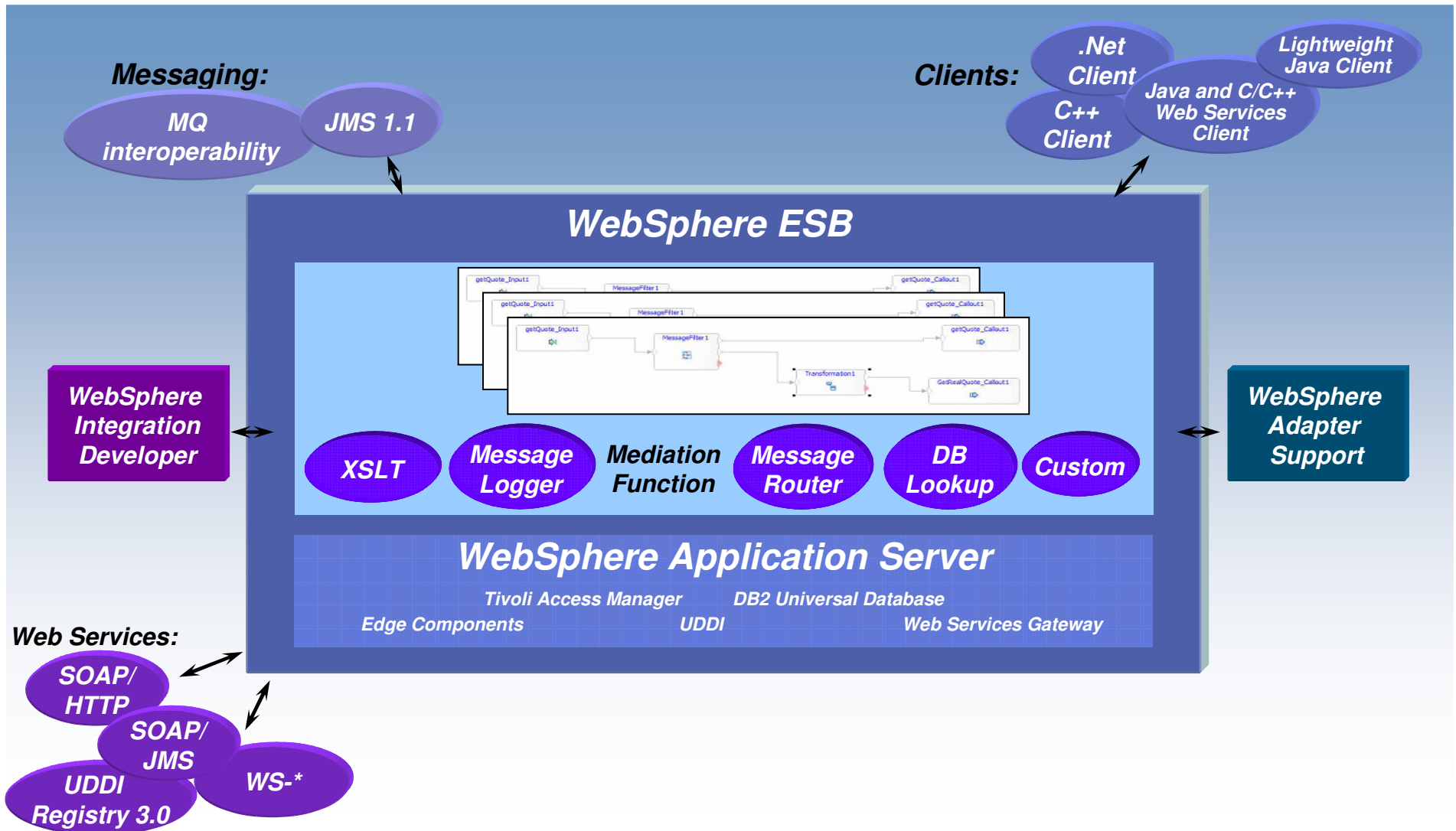
Provides universal connectivity and data transformation



### SOA Appliances:

Enhances security, simplifies and accelerates processing for the ESB

# WebSphere ESB

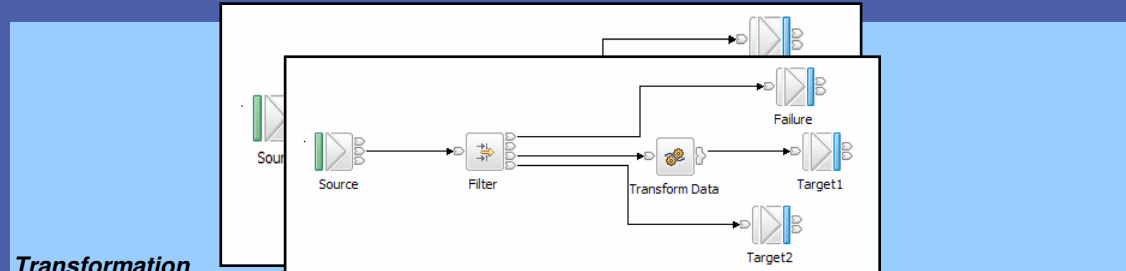


# WebSphere Advanced ESB

## Messaging:



## WebSphere Advanced ESB



WebSphere Adapter Support

Message Broker Toolkit

### Transformation

- XSL T
- ESQL
- Java Mapper
- Custom

### Routing

- Java/XPath Routing
- ESQL Routing
- Publish/Subscribe

### Mediation Function

- Database Delete
- Database Warehouse
- Timer Control
- CICS Access

### Message Aggregation

- Complex Event Processing
- WebSphere DataStage TX

## Web Services:

- SOAP/HTTP
- SOAP/JMS

JVM

# WebSphere DataPower SOA Appliances

## XML Accelerator XA35

*Wirespeed Appliance Purpose-Built for XML Acceleration*



- XML Parsing
- XML Schema Validation
- XML Transformation
- Schema, Stylesheet caching
- MultiStep processing
- XML Path Language (XPath)  
Content Based Routing
- Extensible Stylesheet Language  
Transformation (XSLT)

## XML Security Gateway XS40

*Wirespeed Appliance Purpose-Built for SOA Security*



### All XA35 functions, plus:

- XML and SOAP Firewall
- Data Validation
- Field Level XML Security
- WS-Security
- XML Web Services Access Control
- Integration with 3<sup>rd</sup> party security providers
- Web Services Management
- Service Virtualization

## Integration Appliance XI50

*Wirespeed Appliance Purpose-Built for Application Integration*



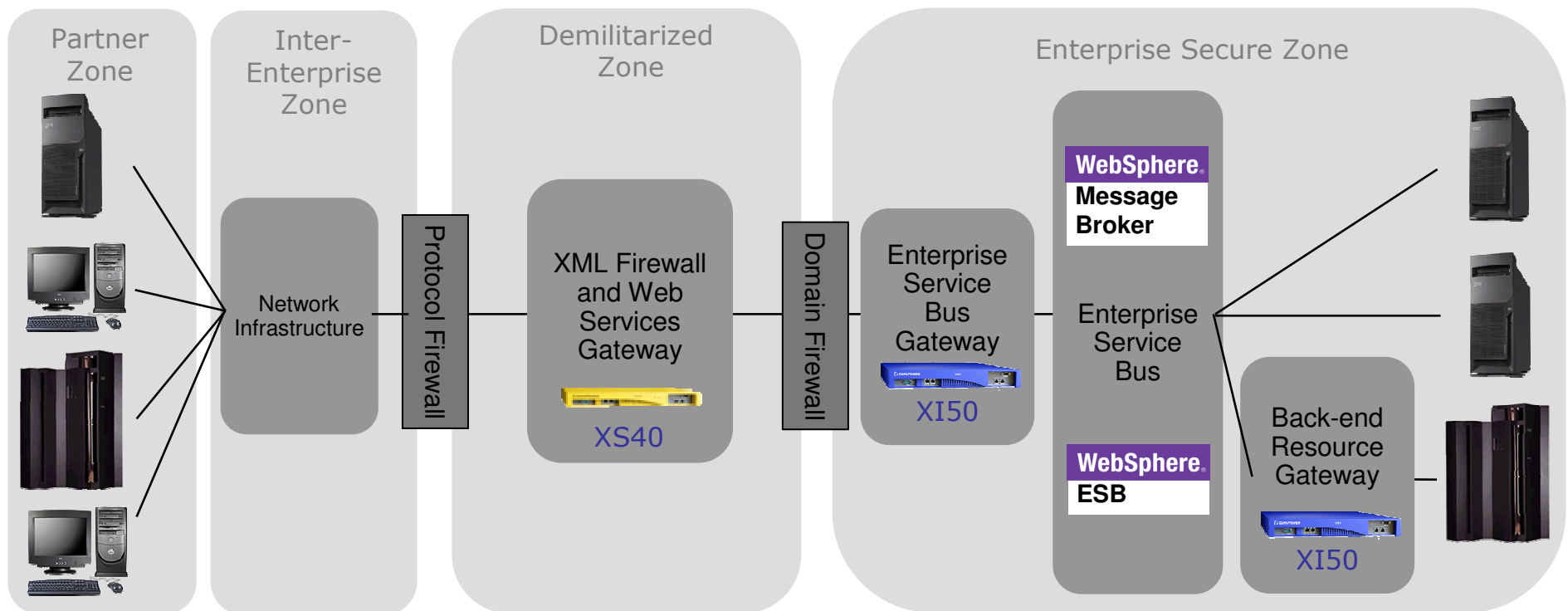
### All XS40 functions, plus:

- DataGlue: Any-to-Any Transformation Engine
  - Binary or flat text →XML
  - XML → binary or flat text
  - Binary ↔ binary
  - XML ↔XML
- Protocol Bridging (HTTP, MQ, FTP, etc)
- Message Enrichment, Message Augmentation



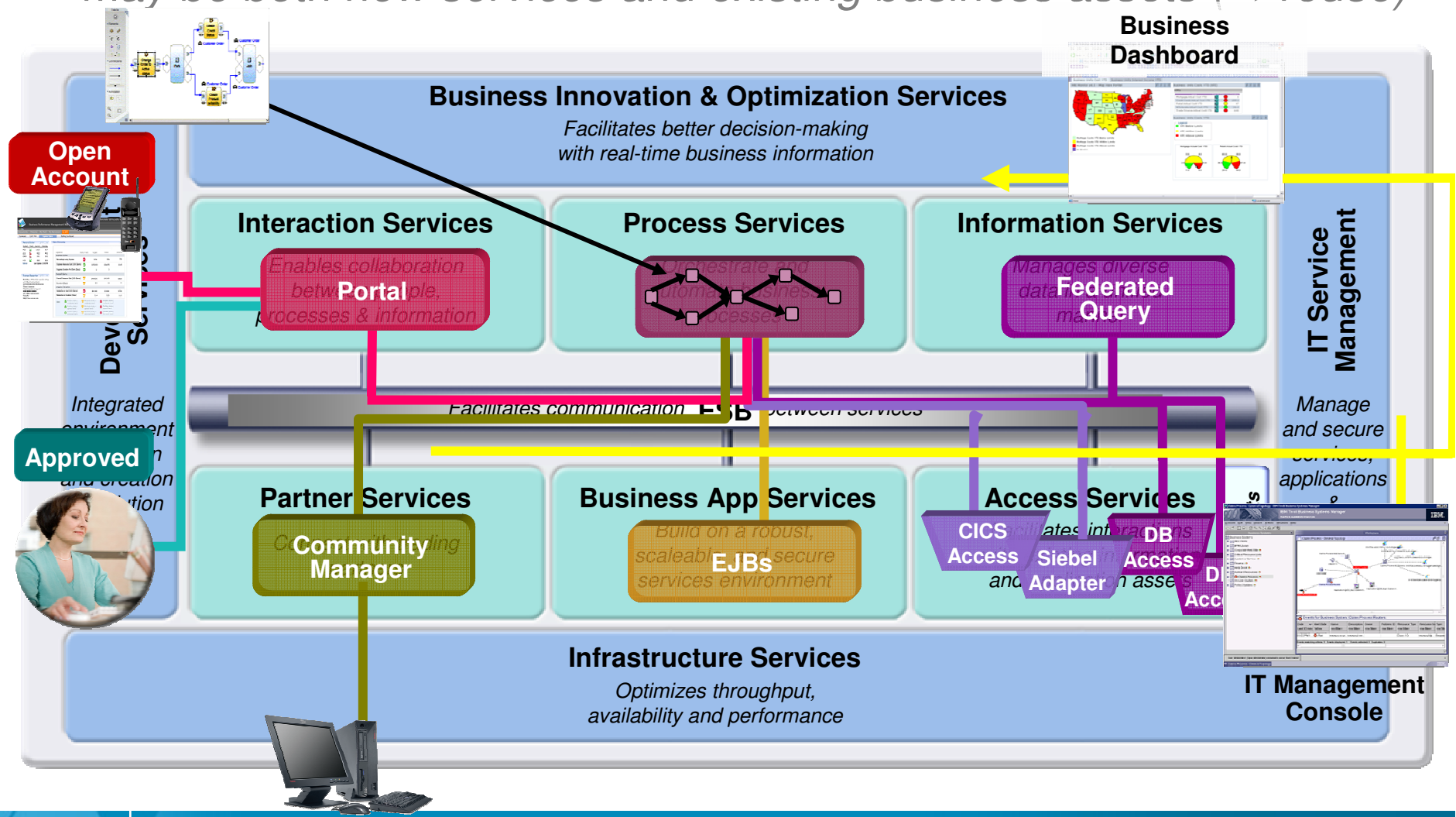
# WebSphere DataPower

Specialized hardware can simplify, secure, and accelerate an ESB implementation

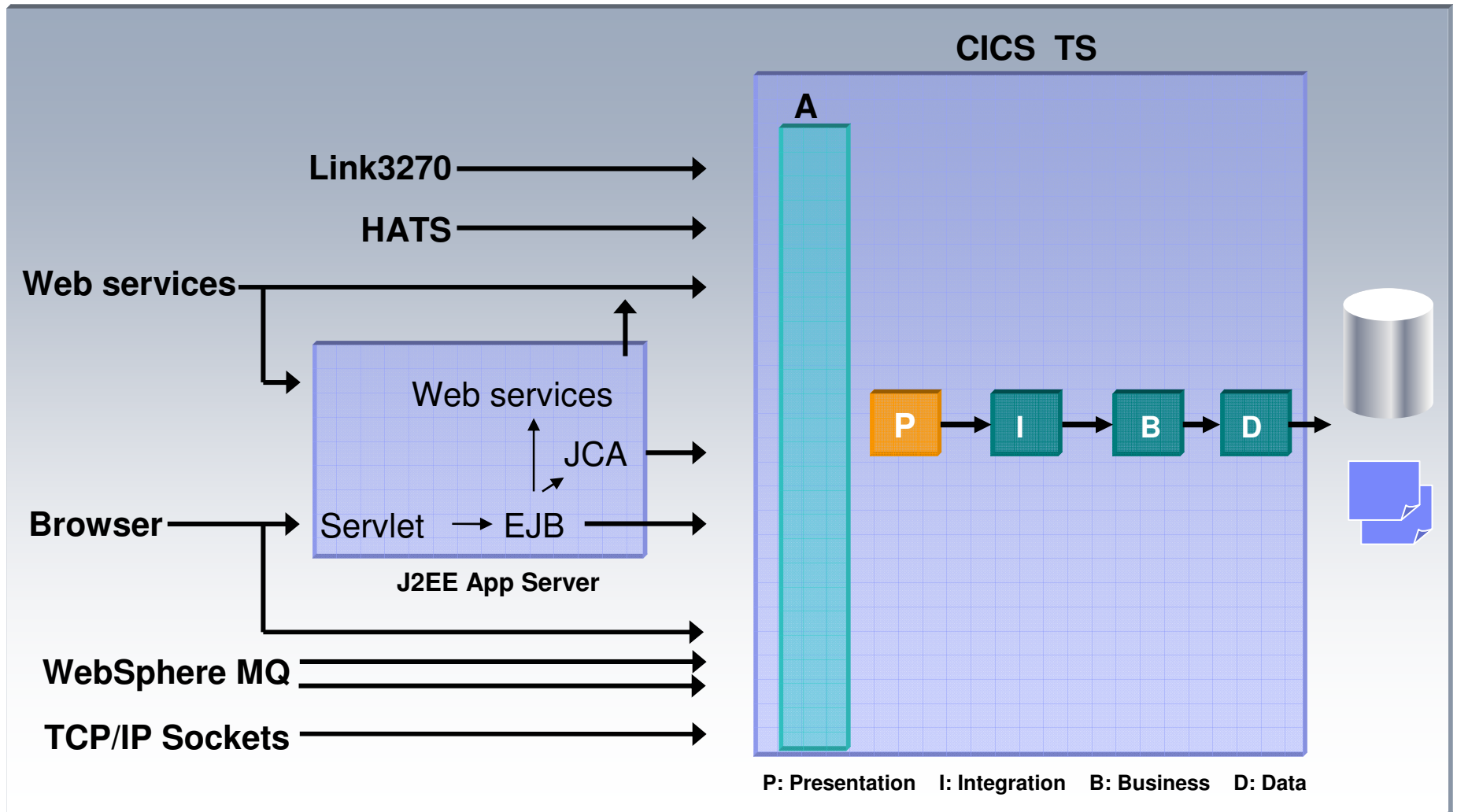


# 3 Composite Applications

Solutions built around processes combining multiple services, which may be both new services and existing business assets (=>reuse)

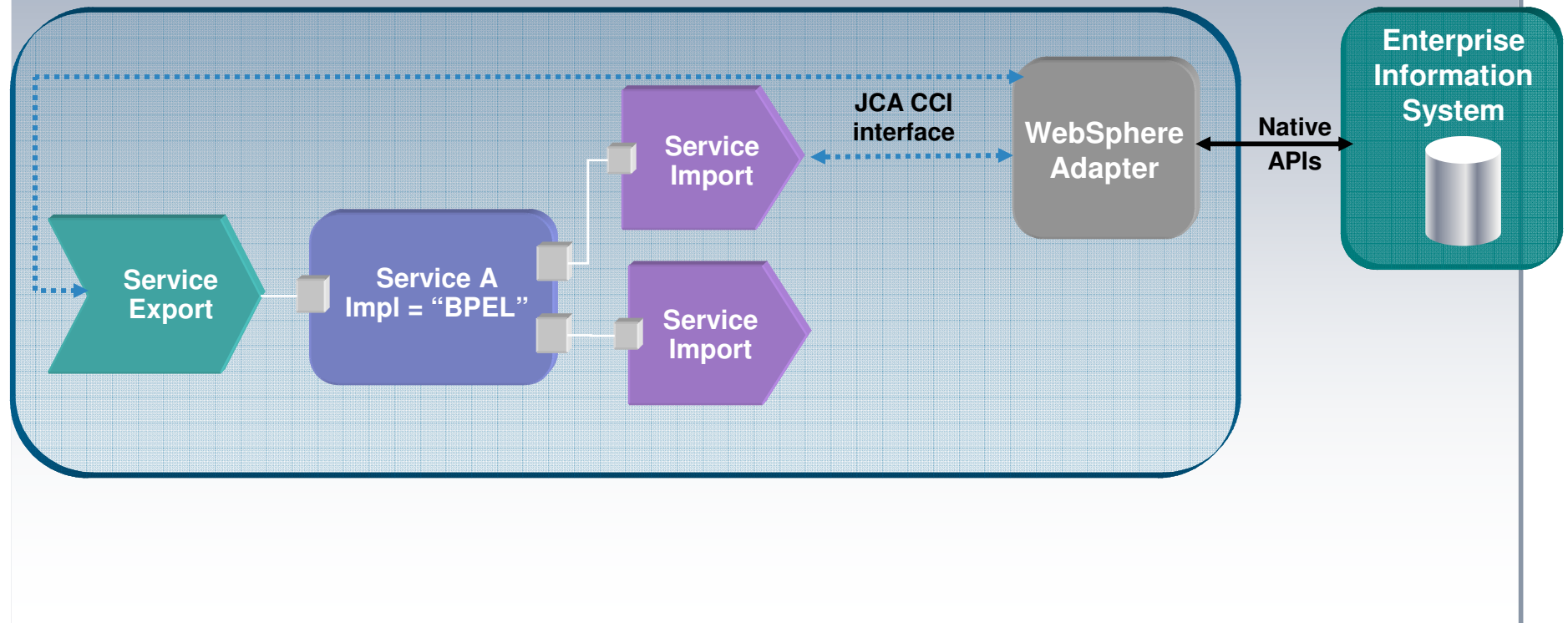


# Integrating with Mainframe Applications

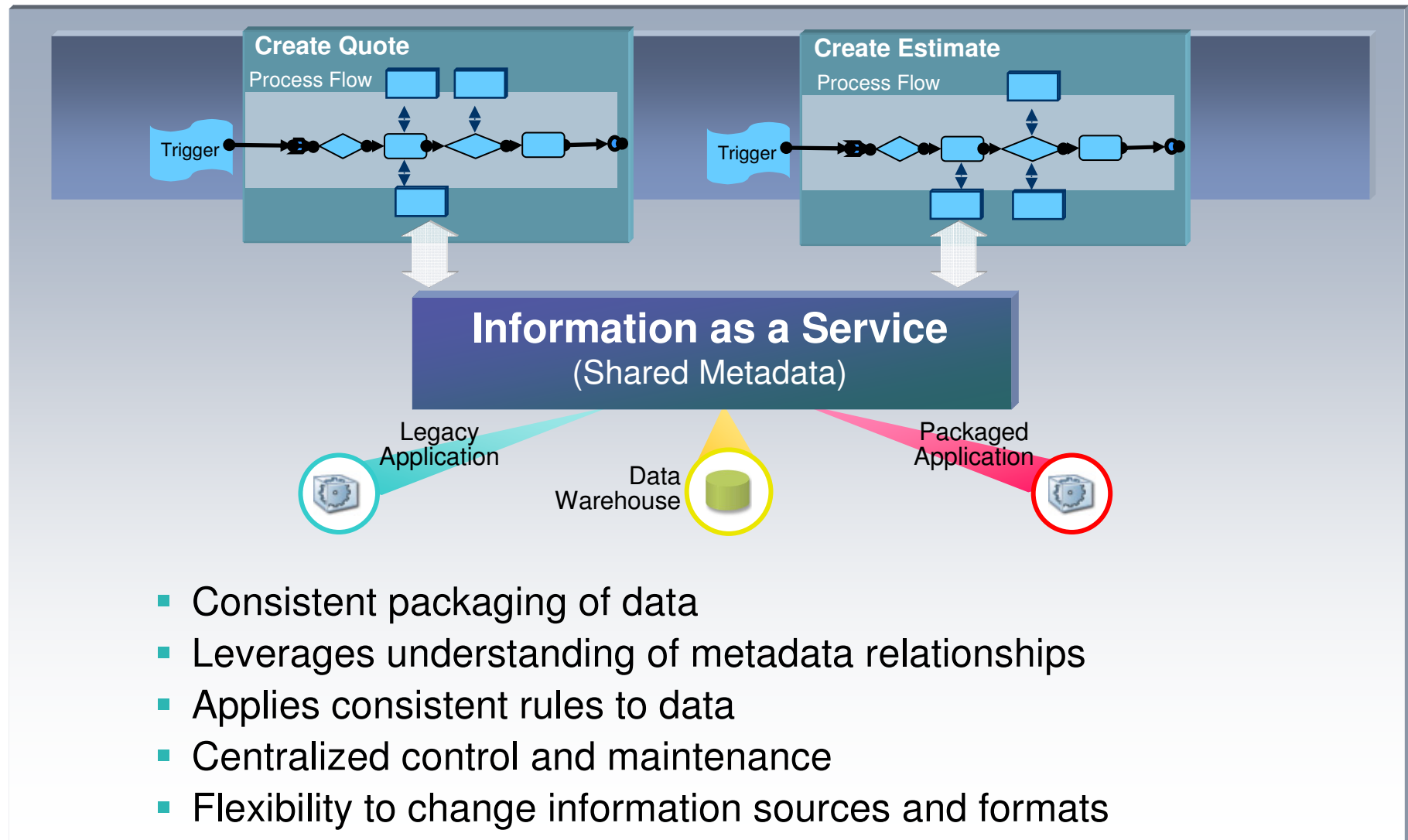


# Integrating with Assets in Distributed Applications

## JCA 1.5 Adapter Deployment Architecture

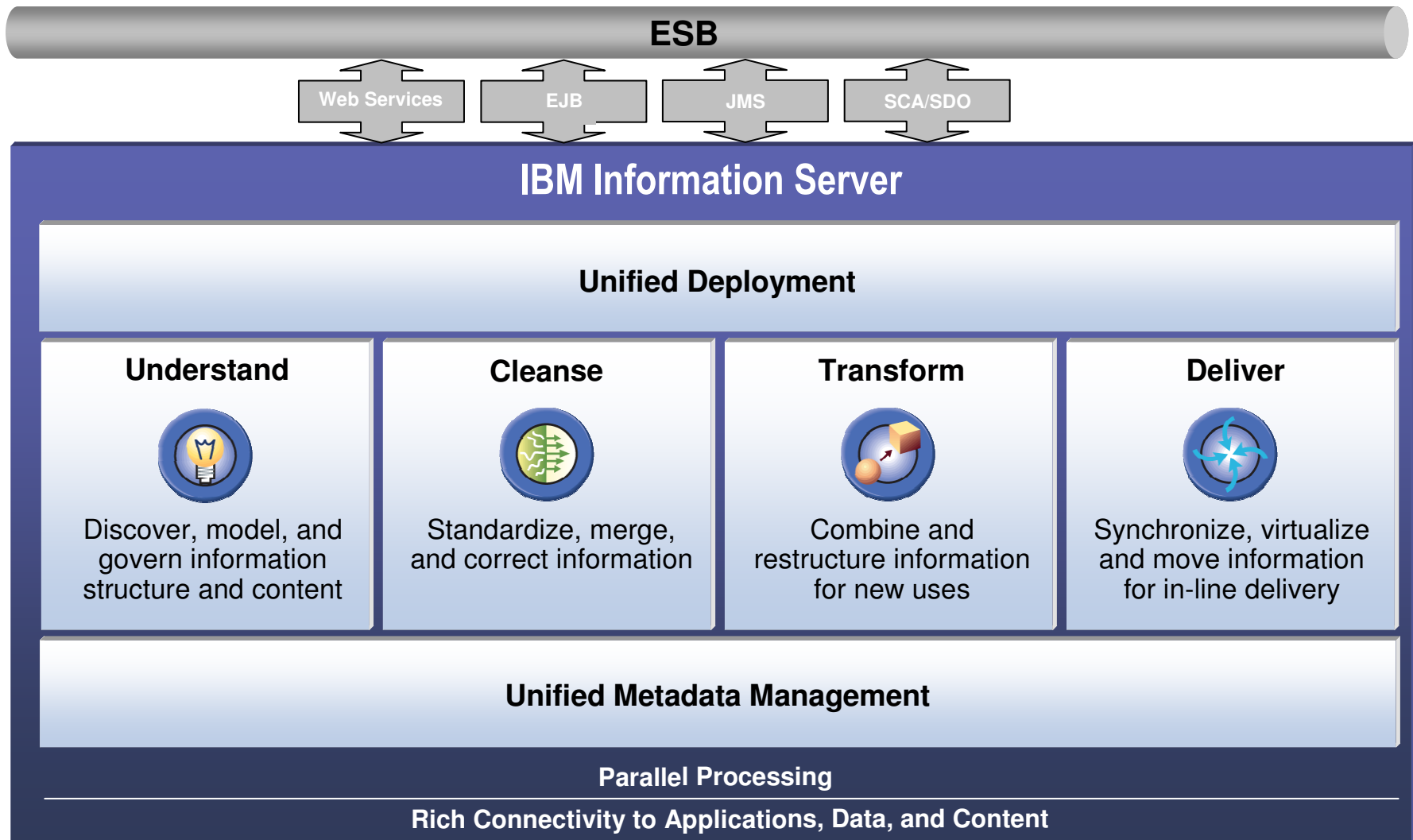


## Integrating with Information



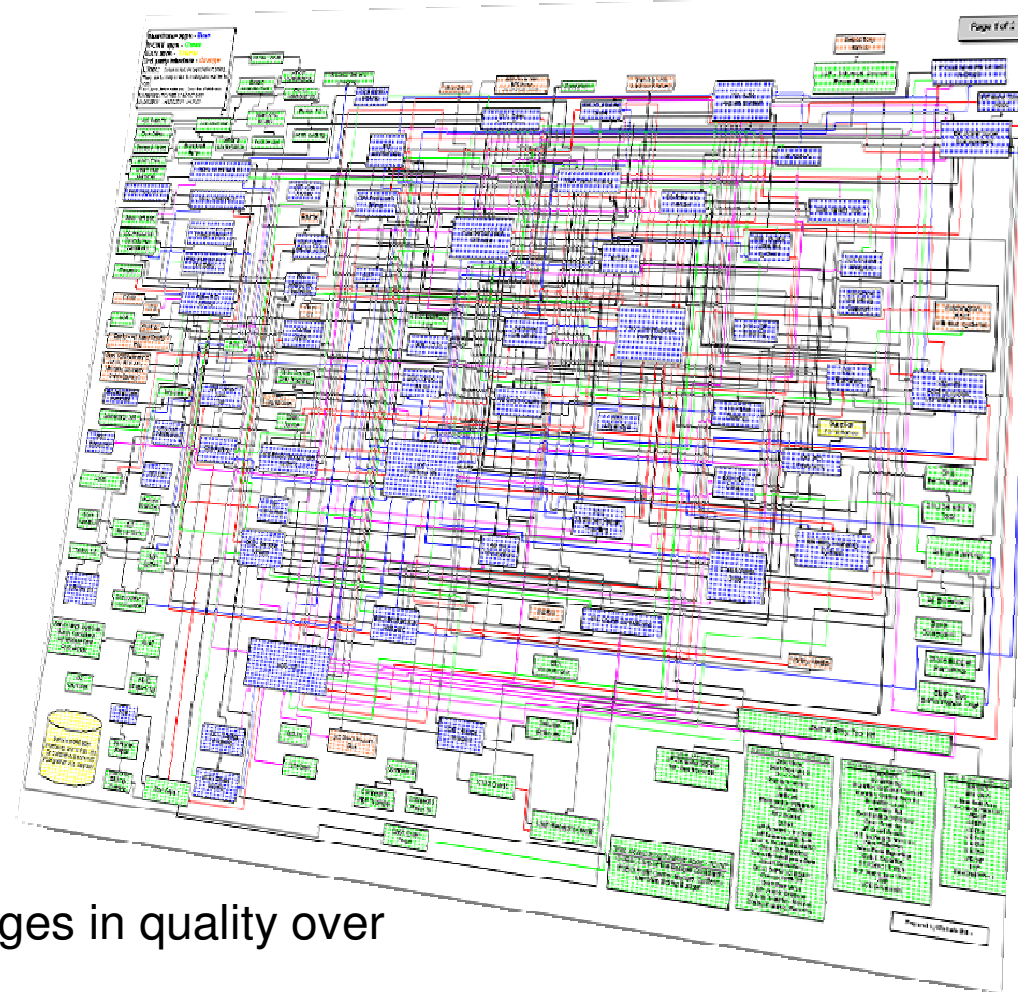
# The IBM Solution: IBM Information Server

*Delivering information you can trust*



## Why is it Important to Start with Understanding?

- What data sources are out there?
- How are they related to each other?
- What exactly is in the source data?
- How is it organized?
- What's the quality of the data?
- Is any data missing?
- Is any data duplicated?
- Is it fit for it's intended purpose?
- How do we monitor sources for changes in quality over time?





# Why Should I Care About Cleansing Information?

- **Lack of information standards**

- Different formats & structures across different systems

Kate A. Roberts 416 Columbus Ave #2, Boston, Mass 02116

Catherine Roberts Four sixteen Columbus APT2, Boston, MA 02116

Mrs. K. Roberts 416 Columbus Suite #2, Suffolk County 02116

- **Data surprises in individual fields**

- Data misplaced in the database

Name	Tax ID	Telephone
J Smith DBA Lime Cons.	228-02-1975	6173380300
Williams & Co. C/O Bill	025-37-1888	415-392-2000
1st Natl Provident	34-2671434	3380321
HP 15 State St.	508-466-1200	Orlando

- **Information buried in free-form fields**

WING ASSY DRILL 4 HOLE USE 5J868A HEXBOLT 1/4 INCH  
 WING ASSEMBY, USE 5J868-A HEX BOLT .25" - DRILL FOUR HOLES  
 USE 4 5J868A BOLTS (HEX .25) - DRILL HOLES FOR EA ON WING ASSEM  
 RUDER, TAP 6 WHOLES, SECURE W/KL2301 RIVETS (10 CM)

- **Data myopia**

- Lack of consistent identifiers inhibit a single view

19-84-103 RS232 Cable 6' M-F CandS

CS-89641 6 ft. Cable Male-F, RS232 #87951

C&SUCH6 Male/Female 25 PIN 6 Foot Cable

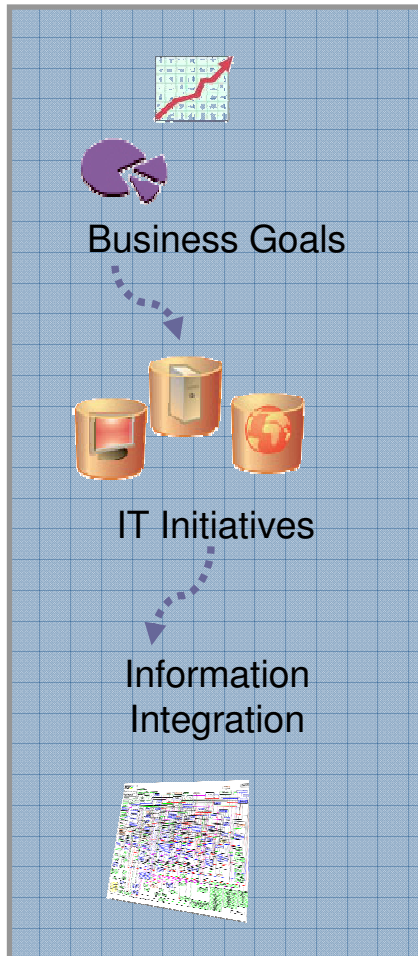
- **The redundancy nightmare**

- Duplicate records with a lack of standards

90328574	IBM	187 N.Pk. Str. Salem NH 01456
90328575	I.B.M. Inc.	187 N.Pk. St. Salem NH 01456
90238495	Int. Bus. Machines	187 No. Park St Salem NH 04156
90233479	International Bus. M.	187 Park Ave Salem NH 04156
90233489	Inter-Nation Consults	15 Main Street Andover MA 02341
90345672	I.B. Manufacturing	Park Blvd. Bostno MA 04106



## Why Does Transformation Matter?



- Business Driver: Single View of Corporate Data
- Projects Related to Information Infrastructure
  - Application integration
  - Platform migration
  - On-demand transformation and correction
  - Application re-engineering and migration (ERP to CRM)
- Decision Support (BI, DW, Data Marts)
  - Opportunity (discover new revenue sources)
  - Control (Fraud detection, inventory)
  - Regulatory compliance -SOX, BASEL, Money Laundering
  - Portals
  - Balanced scorecard dashboards, BAM

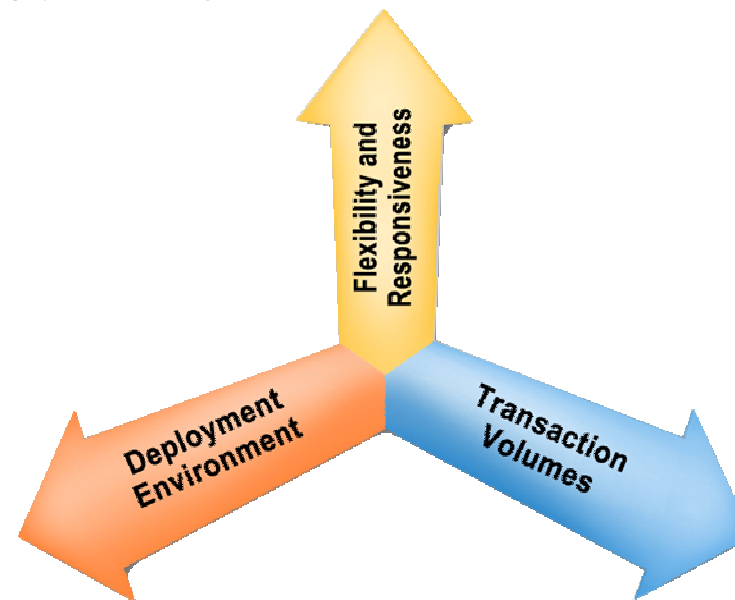
## Why Do Delivery Services Matter?

- They improve data accessibility and consistency
  - Enable improved self-service operations
- They reduce information latency
  - Provide real-time visibility into operational information
- They address a wide range of usage requirements:
  - Providing virtualized views across multiple data sources
  - Synchronizing information across two or more systems
  - Consolidating information from multiple sources in a new system
  - Making changes in one system available to other systems

## 4 Quality of Service Considerations

### Dynamic Operations

- Adapt to business changes automatically
- Performance goals for differing workloads
- Apply IT intelligence to reduce the need for manual intervention



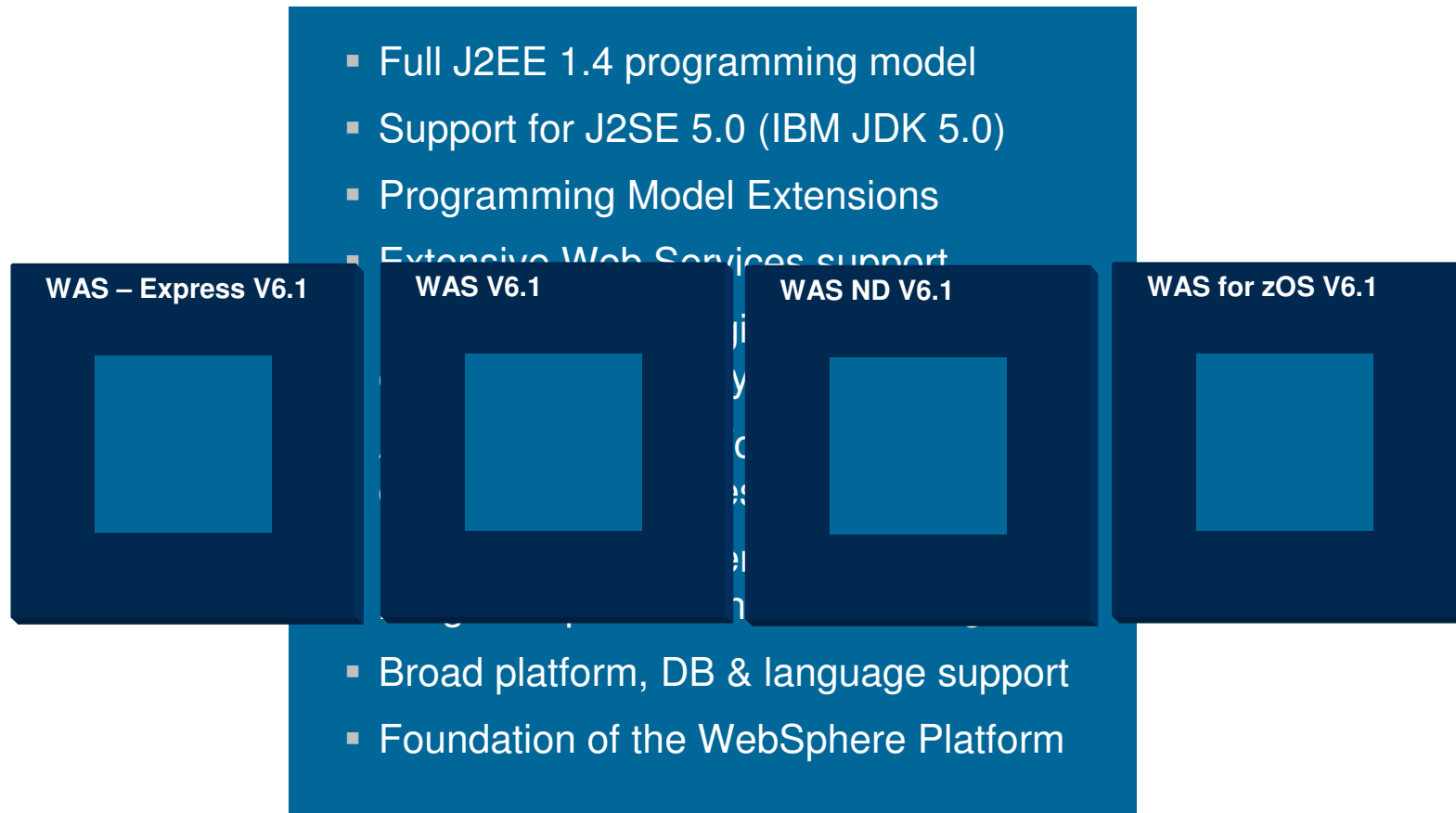
### Extended Manageability

- At-a-glance system assessments for health and vitality

### High Performance Computing

- Optimize your transactions for improved performance and availability

# WAS Common Programming Model



## WAS Common Programming Model

- Unpredictable volumes  
... .. workload
- Beginning to grow
- Application needs to run on bigger, more powerful machines, and platforms  
... .. increase the  
... .. proximity to enterprise  
... .. more sophisticated environments

WAS for zOS V6.1

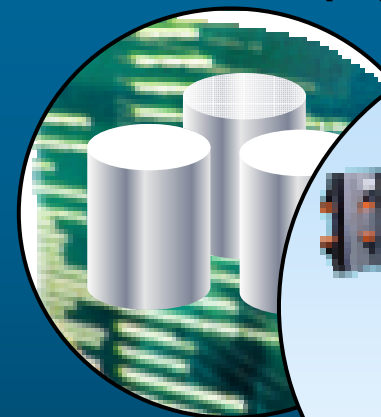
**Application is portable with no changes, providing the flexibility to grow applications without the cost of re-architecting, reprogramming, and migrating to different technology bases.**

# Virtualization Services help you manage complex application workloads

## Value of infrastructure virtualization

- Improve TCO through higher utilization of resources
- Increase flexibility by dynamically responding to workload changes
- Enhance business performance by achieving service level goals

## Logical/abstraction view of physical resources



*Information virtualization*



*Workload virtualization*

***Infrastructure Virtualization capabilities that help you Match Available Resources to Workload Demands***

## WebSphere Extended Deployment Infrastructure Virtualization

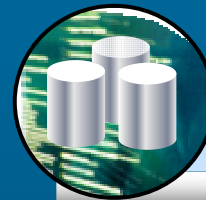
- WebSphere Extended Deployment implements two **Infrastructure Virtualization** techniques that can be used separately or together to improve application service levels (Quality of Service/QoS)



### *Workload Virtualization*

#### **Service Workload Management**

- Service Level Management
- Application Edition Management
- Health Management



### *Information Virtualization*

#### **Distributed Caching & Partitioning**

- Distributed Transactional Caching
- Asymmetric Clustering using Application Partitioning



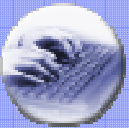
# Workload Virtualization

*Enables application services to share a common pool of heterogeneous resources, while optimizing service level attainment*

## Service Workload Management



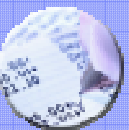
Policy creation



Assess risk



File a claim



Billing



Account management

**Application Services**

### Service Level Management

- Resource are pooled
- Workloads are prioritized using service policies
- Workloads are intelligently routed
- Application resources are dynamically adjusted
- Long-running workloads are scheduled and balanced with transactional workloads
- Application performance is monitored using visualization

### Application Edition Management

- Interruption-free deployment of new application versions
- Intelligent routing to application versions in production

### Health Management

- Mitigates against common server health problems before production outages occur








**Application Resources**

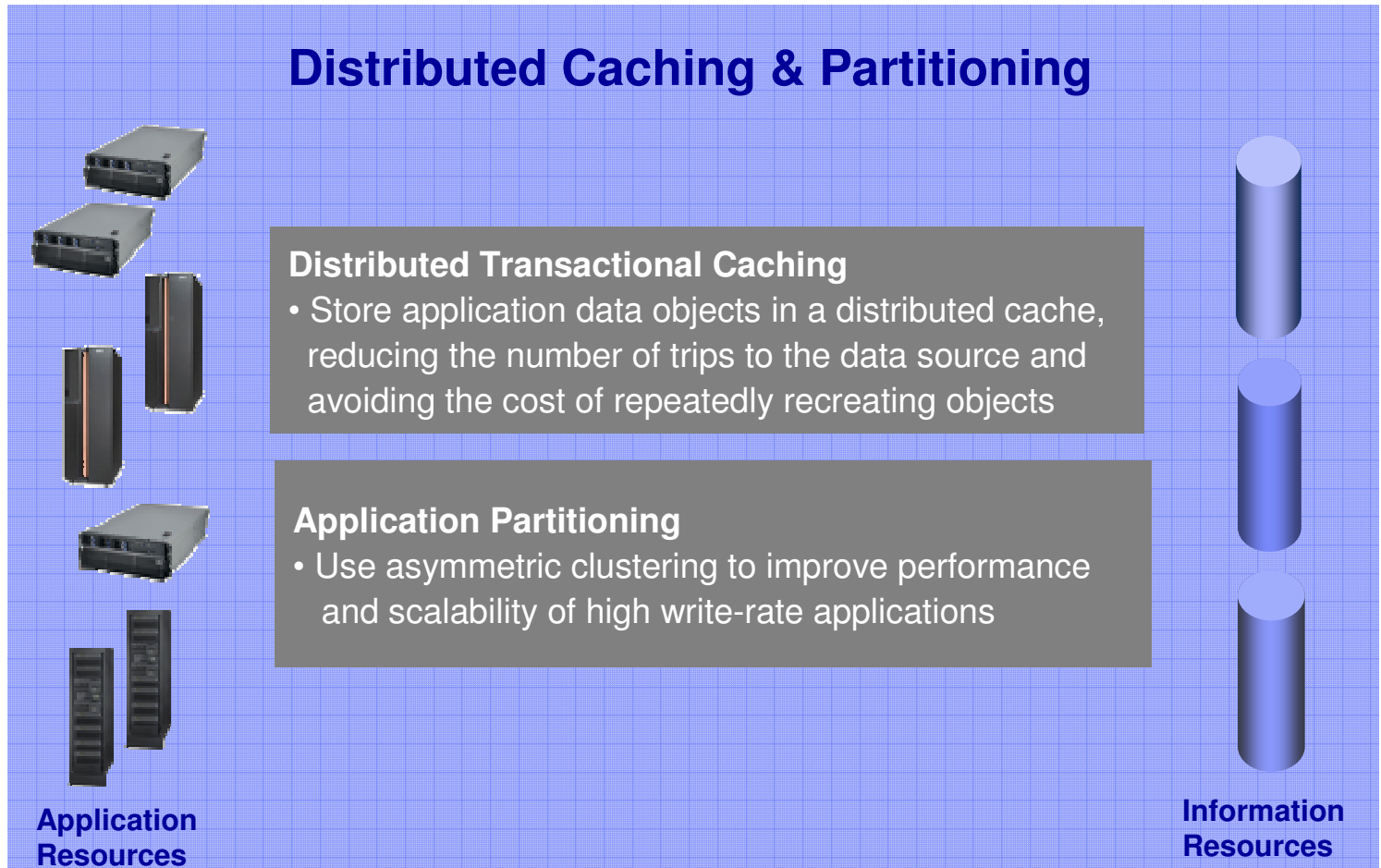


**Information Resources**

# Information Virtualization

*Improves the interaction between application services and underlying data sources, dramatically increasing application performance and scalability*

-  Policy creation
  -  Assess risk
  -  File a claim
  -  Billing
  -  Account management
- Application Services**



# WebSphere Extended Deployment

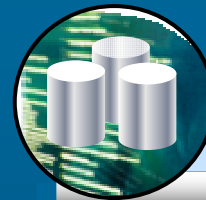
*Ready with infrastructure virtualization capabilities to help you match available resources to workload demands*



## Workload Virtualization

### Benefits

- Predictably and consistently meet service level objectives (SLAs)
- Use server resources more effectively
- Quickly adapt to changing application workload demands
- Reduce deployment complexity
- Increase operational stability



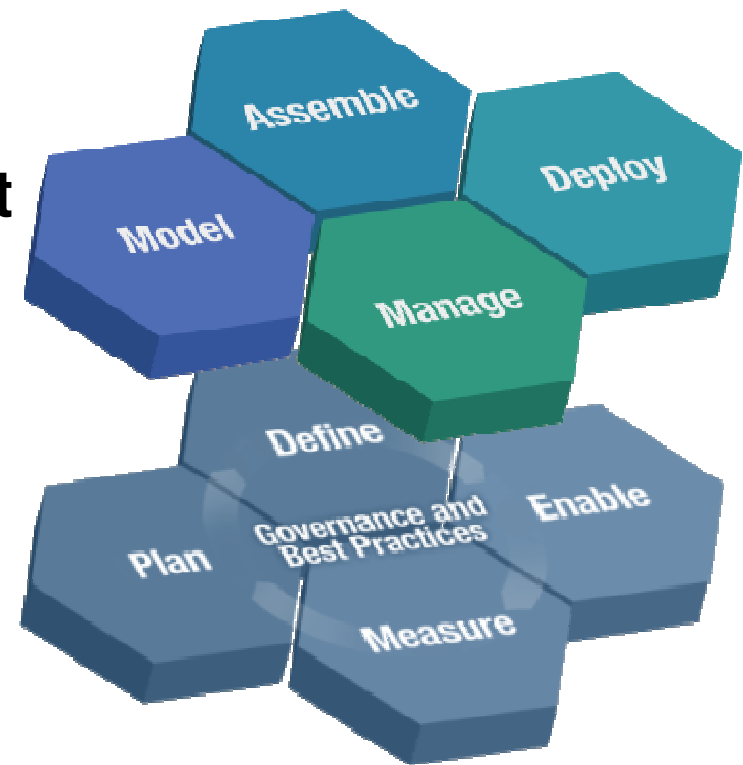
## Information Virtualization

### Benefits

- Relieve load on backend data store
- Improve application throughput and response times
- Achieve near-linear scalability
- Improve developer productivity
- Reduce need for constant application tuning

## Agenda

- SOA: cos'è e perché
- L'ambiente operativo
- **Business Process Management e ciclo di vita della SOA**
- Il governo della SOA
- Come partire



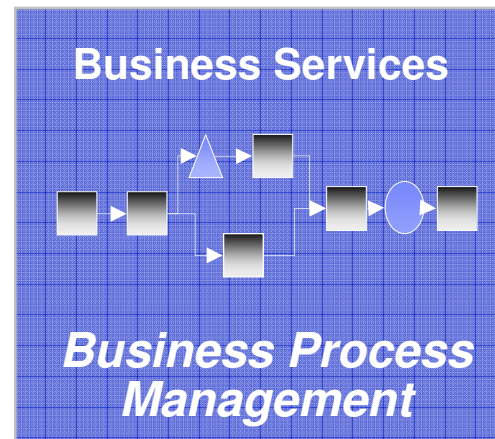
# Business Process Management Enabled by SOA

*Differentiated value through a combination of software and expertise*

## What is....

### *Business Process Management?*

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



### *...Business Process Management **Enabled by SOA?***

*...A discipline enhanced by a flexible IT architecture to simplify the creation and decomposition of services to facilitate business innovation*

### **Expertise that delivers BPM**

- Process Knowledge
- Industry Methods and Models
- Business consulting expertise

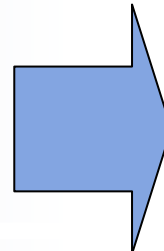
### **Software that Enables BPM**

- Business Services
- Tools, Rules, Servers, Repositories
- Business Dashboards, Forms

## The most common problems\* customers face... ... lessons learned

- **Select right process, right technology**

- Investments on integration and process improvements across the enterprise are not yielding the desired business result

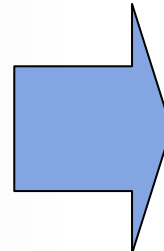


- **Manage Change effectively**

- by modeling and analyzing existing or new processes based on business requirements

- **Flexible Infrastructure enables Process change**

- Businesses are not able to make changes to keep pace with competition, changing market conditions and global threats

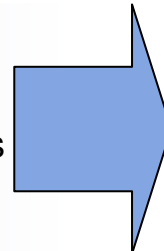


- **Respond quickly**

- with processes based on a flexible infrastructure

- **Manage change for Continuous Improvement**

- Businesses are not able to make decisions and changes due lack of visibility over its operations.



- **Enhance business efficiency**

- by analyzing activity to ensure processes meet objectives.

\*Insights gathered from customer engagements and customer surveys

# Business challenge: Select Right Process, Right Technology

- **Common Mistakes**

- Lack of consistent and ad-hoc approach to business problem
- Lack of business and process models causes business context to be lost
- Lack of technology, repository and tools to re-use business and IT artifacts

- **Recommendations**

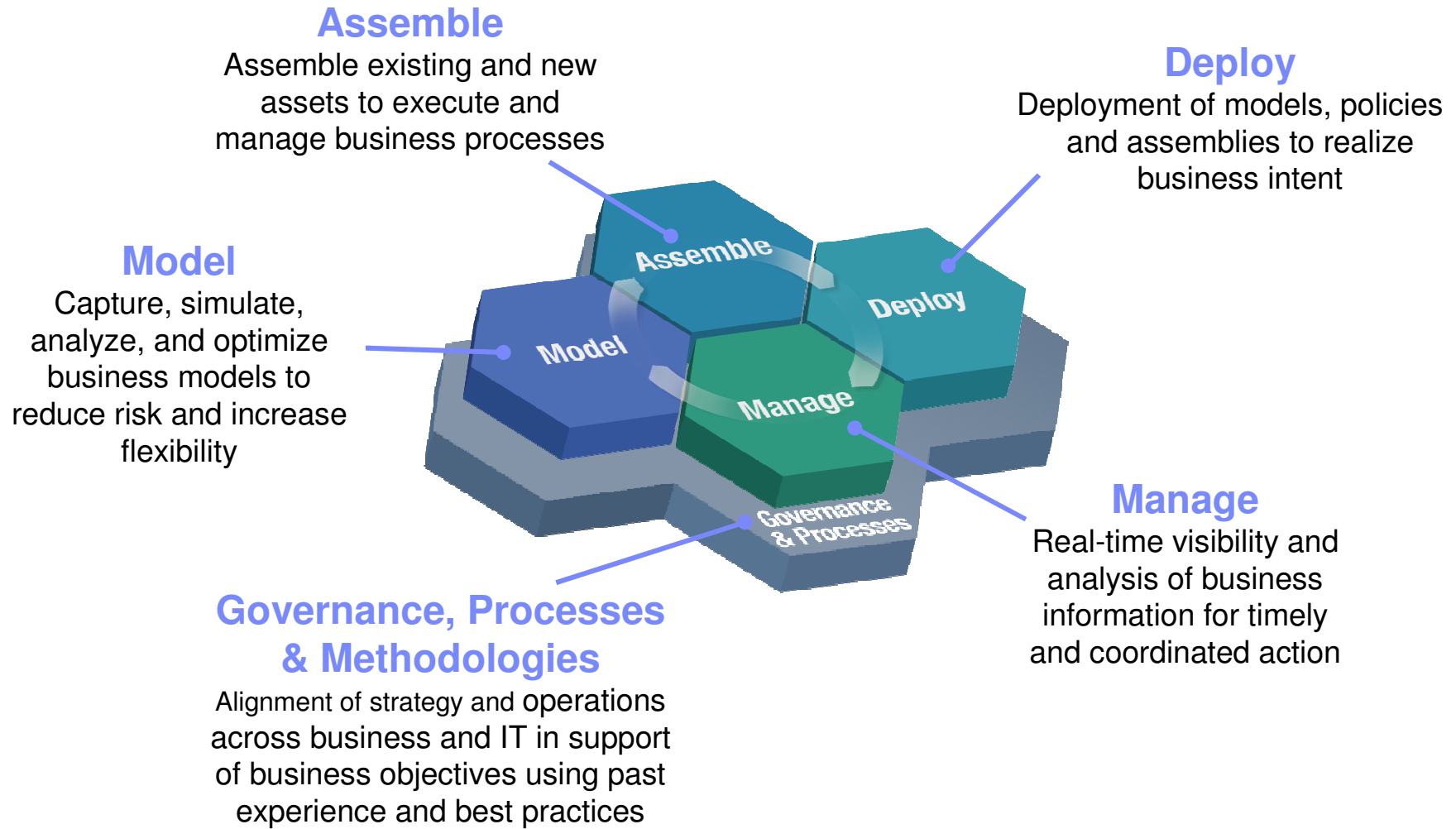
- Take a tops down implementation approach leveraging *BPM enabled by SOA development lifecycle*

- **BPM enabled by SOA Development Lifecycle**

- 4 Phase Lifecycle - Model, Assemble, Deploy and Manage
- Comprehensive SOA technologies for service creation, re-use, flexibility in accessing different IT assets supporting the above lifecycle



# Development life cycle for BPM enabled by SOA



# Model – Capture, Simulate, Analyze & Hand-off to Implementation



## Graphically Model Processes

- Define: Goal, Scope, Perspective, Audience, Level-of-detail, Content
- Introduce naming conventions for all process objects (costs, time, resources, decision points, actions, etc)
- Agree on a maximum number of process levels (3-4) and number of activities per process diagram (15-20)

## Simulate and Analyze

- Simulate execution with statistical analysis tools
- Run "what if" scenarios to predict outcomes
- Identify bottlenecks and workload imbalances
- Isolate projects that will generate the greatest returns

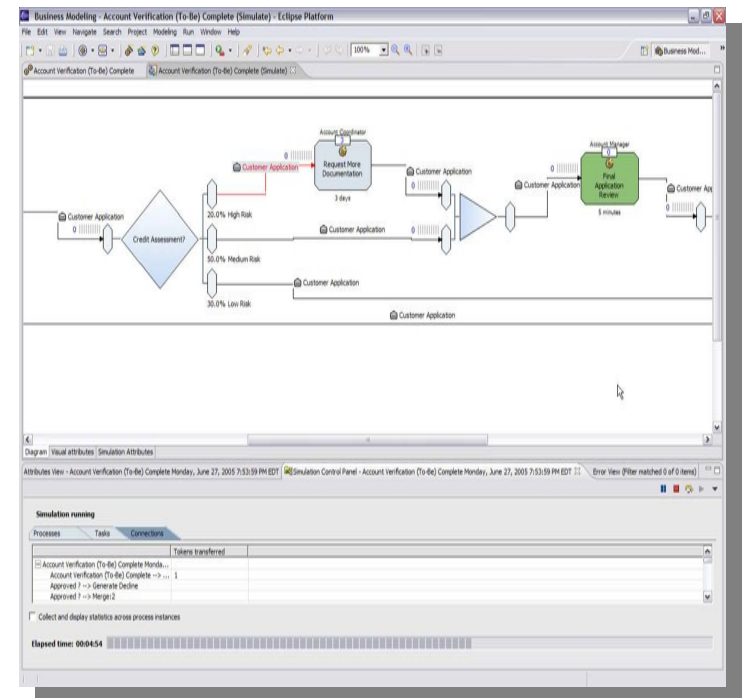
## Hand off to Implementation

- Export business and data models for use in IT deployment
- Direct export of models to IT such as WS-BPEL for execution, XSD for data definitions, WSDL for services interfacing, UML for IT architect refinement

# WebSphere Business Modeler – current features



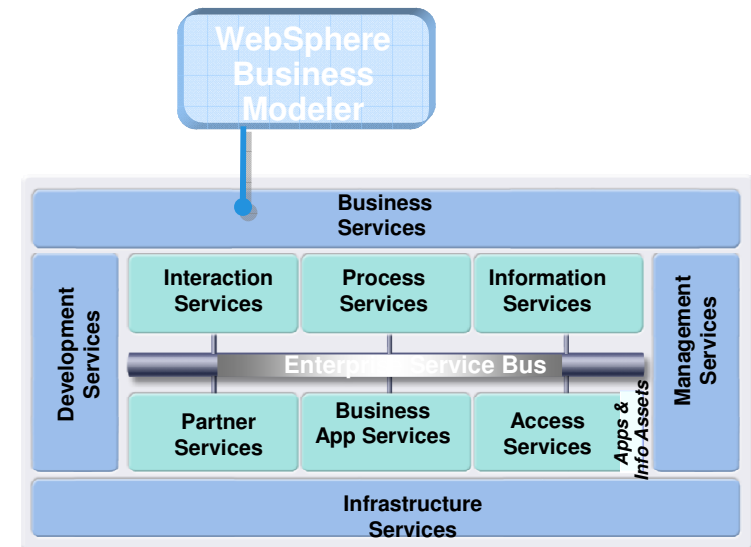
- Enable business users to graphically model business processes
- Model everything you need to design and "sand-box" your business process – costs, times, and resources
- Simulate execution of the business process with detailed statistical analysis tools
- Predict business operations by running “what if” scenarios
- Import existing process pictures done in Visio
- Define Metrics, KPIs, Counters for your process
- Export business and data models for use in IT deployment
- Publish business processes to the Web for information sharing
- Allow people to work as a team on business processes



## WebSphere Business Modeler – what is coming!



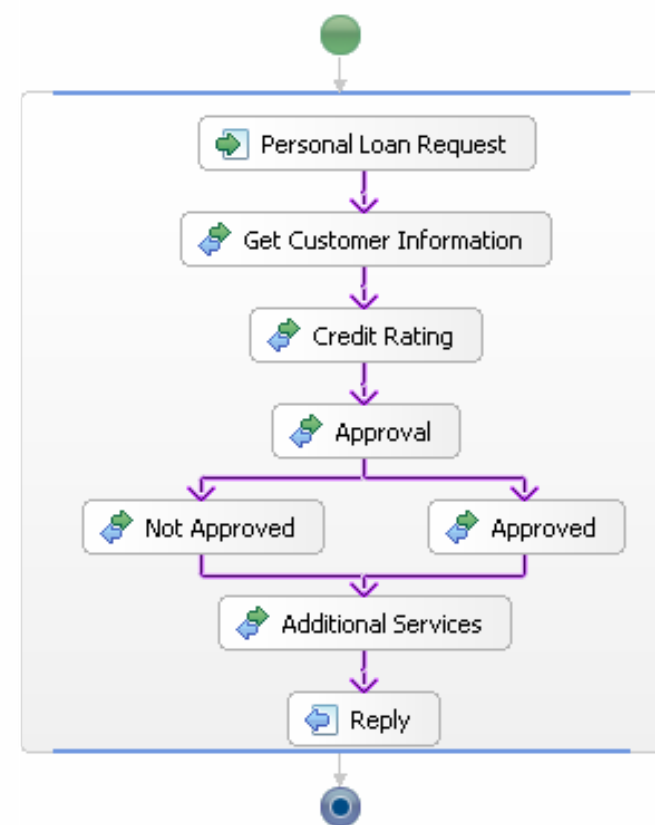
- Enhanced SOA lifecycle artifact management and re-use
  - Simplifies maintainability by enabling reuse of existing artifacts
  - Ability to import and maintain fidelity of WSDLs and XSDs
- Improved business analysis report outputs
  - Export of reports in standard XML format
  - Allows reports to be published to the web or third party reporting tools
- New and updated analysis reporting
  - Allows business analysts greater flexibility through higher level of aggregation of analysis data
  - Additional report customization capabilities (logos, footers, sorting, etc.)
- Increased Business analyst productivity
  - Enhanced simulation input validation with improved troubleshooting capabilities
  - Improve the time it takes to go from modeling to simulation
- Improved interoperability between modeling and monitoring
  - Linkage of any business process model to Key Performance Indicators regardless of where deployed





## Assemble the solution using tools that help ...

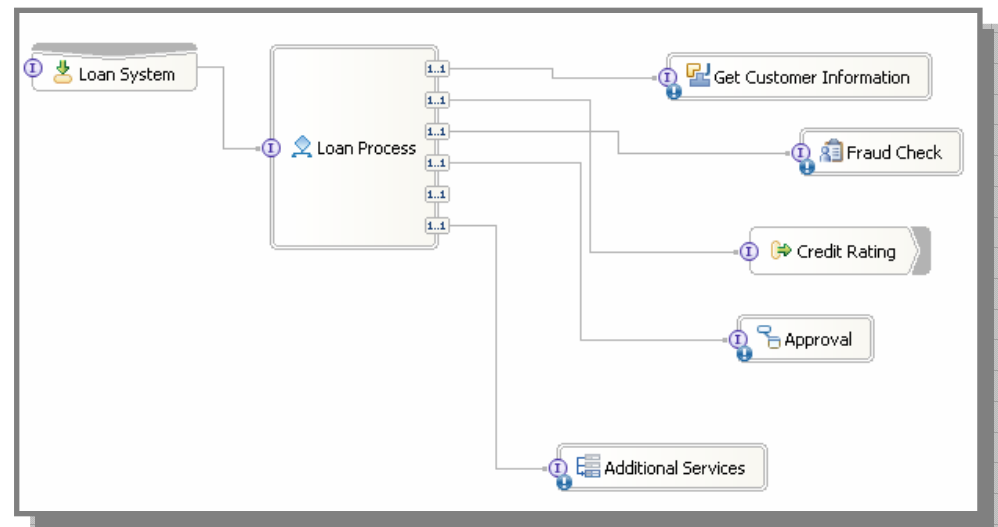
- Assemble business and IT components
  - Single architecture that supports multiple roles
  - Simplifying and speeding development
- Import and work with business process models directly from the business analyst
  - WS-BPEL for execution; XSD for data definitions
  - WSDL for services interfacing
  - UML for architecture / design
- Define all types of processes in a single way
  - Full workflow support
  - Built-in human task support
  - State Machines for event-based business processes
- Maximize re-use
  - Leverage existing services; develop for future reuse





## WebSphere Integration Developer – current features

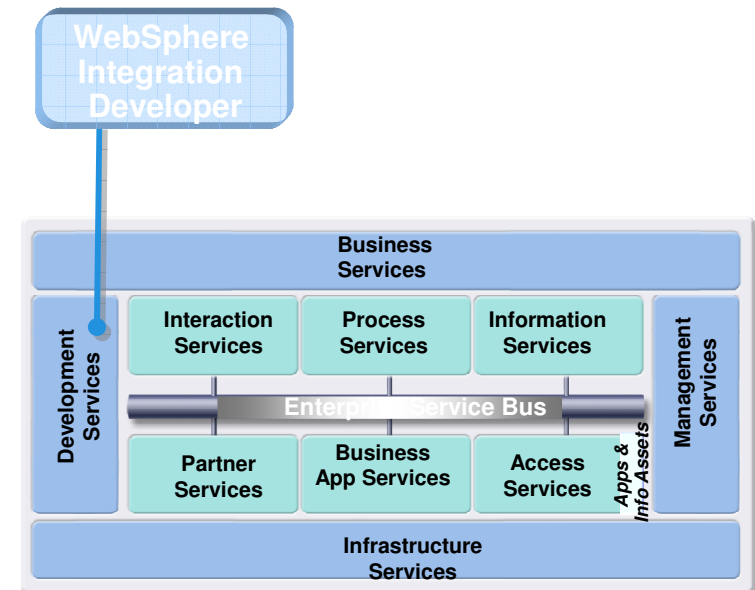
- Complete toolbox for composite application building
  - An Assembly Editor for overall solution assembly
  - All the tools you need for building solution components
    - BPEL Editor
    - Human Tasks
    - Business State Machines
    - Business Rules
    - Activity Editor
    - Map Editor
- One, easy to learn end user interface based on Eclipse
- Architected for reuse and flexibility
  - Simplified component interfaces
  - Plug-and-play solution components





## WebSphere Integration Developer – what is coming!

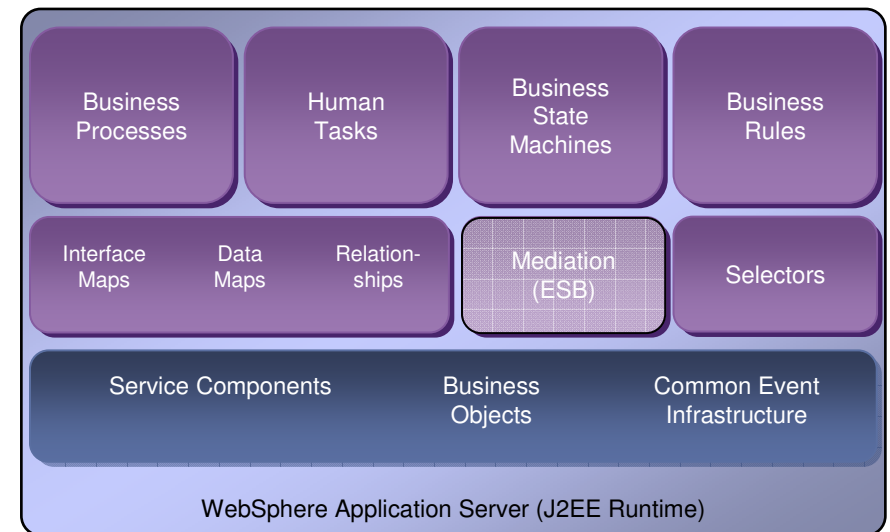
- Increased developer productivity from ease of use enhancements
  - New wizard for generating web clients quickly and easily
  - Re-factoring ensures object updates are cascaded consistently
- Enhanced business-driven development capabilities
  - Integration with WebSphere Business Monitor enables visibility to runtime processes
  - Improved generation of WSDL and BPEL for processes generated from WebSphere Business Modeler models
  - WSDL / XSD handling enhancements
- Cross-product integration
  - Information Server and SQL support thru BPEL
  - WebSphere Service Registry and Repository support
- Performance and quality of service improvements
  - Startup time and edit/deploy/test/edit cycle time improvements
  - Smaller in memory and on disk footprint



## Deploy for execution to...



- A Process Server
  - Integrated runtime for all SOA based process automation
  - Runtime engine for all the components defined in Assemble (Assemblies, BPEL, State Machines, Business Rules...)
  - Fully leverage the breadth and capability of IBM WebSphere Application Server
  - Reliable, scalable, secure
- Integrated ESB For Range And Reach
  - Provides seamless access to all available services
  - Adapters provide the service on-ramp for existing applications
  - B2B to interoperate with your extended partner network



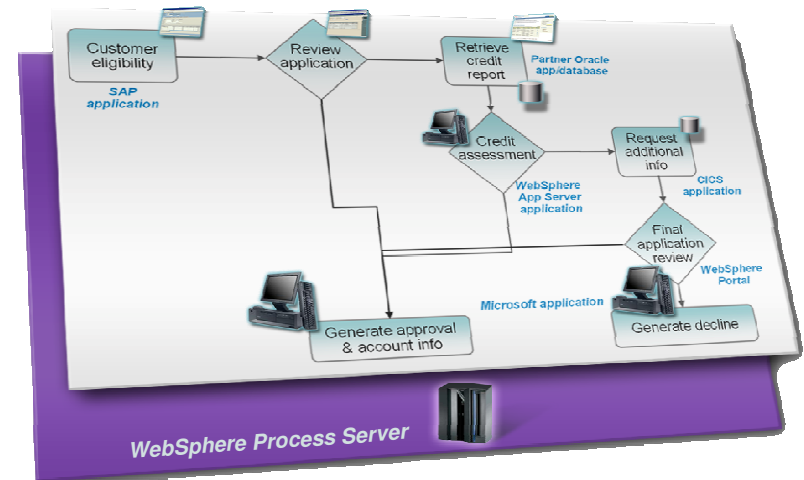


# WebSphere Process Server – current features

## *Comprehensive Business Flexibility*

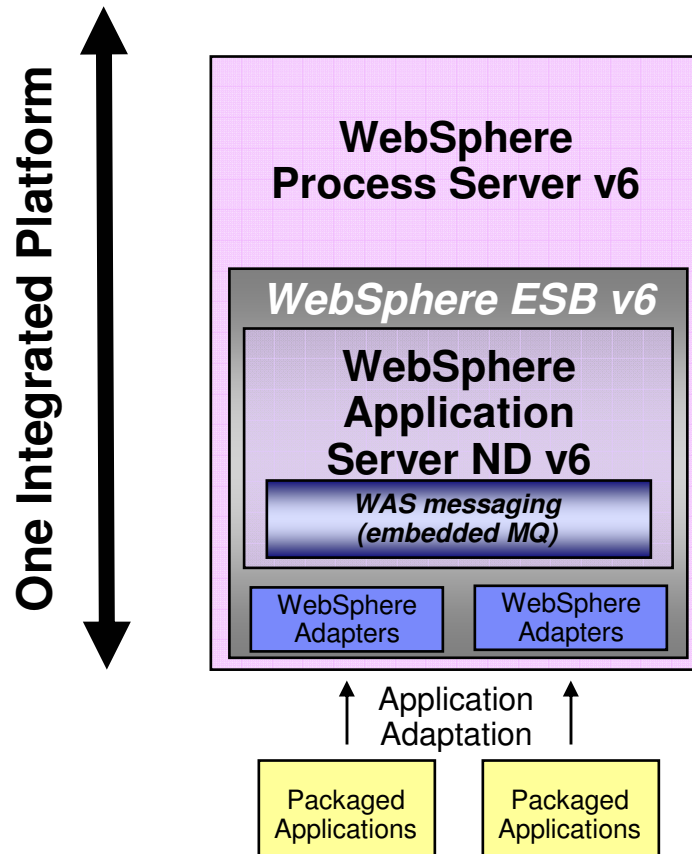


- Rapidly change process behavior to keep pace with business requirements
  - Build processes without knowing where the information is coming from (late binding of services)
  - Business rules control the execution sequence of the process and can change dynamically
- Support all aspects of process integration
  - Process choreography and state machines
  - Rules for flexible decision making
  - Object Mapping and ESB message transformation
  - Cross-referencing between common business objects
  - Event infrastructure for monitoring
  - Staff support and human task management for workflow
  - Selectors to dynamically invoke services
- Service Components and Business Objects
  - Build processes without knowledge of existing applications
  - Simplifying and accelerating, providing flexibility and reuse
- Adapters provide the service on-ramp for existing applications
- Fully leverage the breadth and capability of IBM WebSphere Application Server
  - Reliable, scaleable, secure
- Integrated ESB
  - Flexible connectivity infrastructure for Web services and Java Messaging Service (JMS)



# The integrated WebSphere SOA Platform ...

*Putting the Pieces Together*



- **Services Orchestration**  
BPEL, Human Workflow, Business Rules, State Machines, Dynamic Process Execution
- **Services Connectivity & Mediation**  
XML Mediation, WSDL, SCA, Dynamic Service Endpoints, JCA Adapter Hosting
- **Services Creation & Hosting**  
J2EE, JMS, HTTP, WS-\*, UDDI, CEI, Common Security/Clustering.

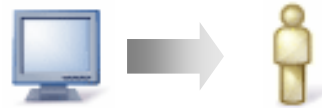


## Human-based Web services for standard WS-BPEL processes

- Many business processes involve people
  - Human-centric processes automate interactions between people, and supporting applications.
  - Integration-centric processes automate interactions between applications; humans handle exceptions.

- ✓ Stand-alone Human Task Manager Component
- ✓ Defined as a service
- ✓ Participates in standard WS-BPEL processes

### Machine to Human



- Component creates a work item for Human interaction (e.g. WS-BPEL)

### Human to Machine

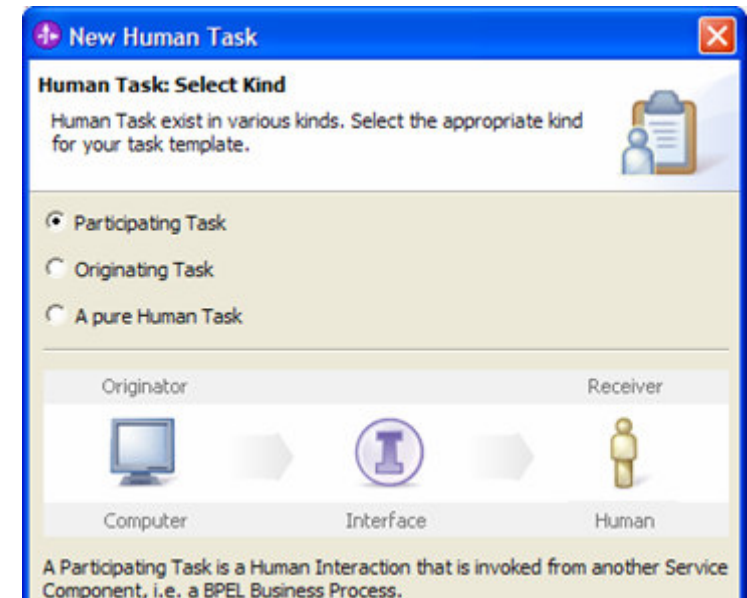


- Human interaction invokes a Component (e.g. WS-BPEL)

### Human to Human



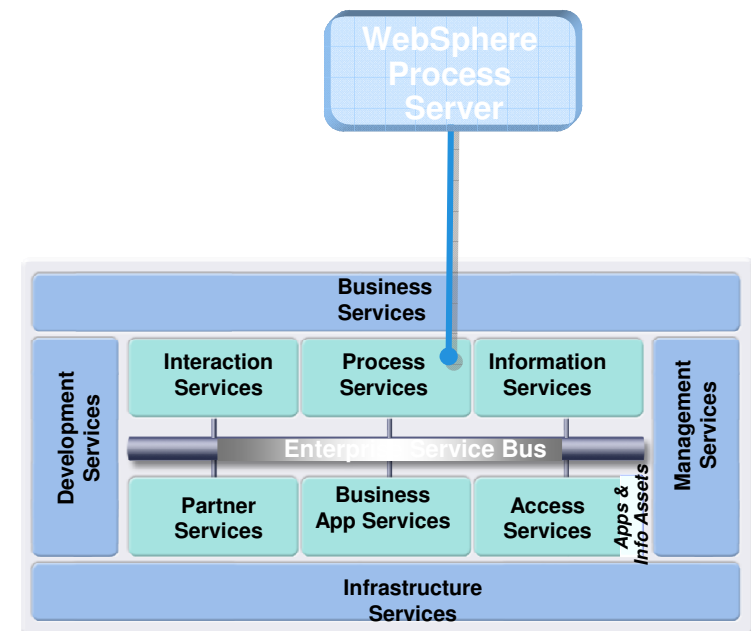
- Human interaction invokes a Component which creates a work item for another Human



## WebSphere Process Server – what is coming!

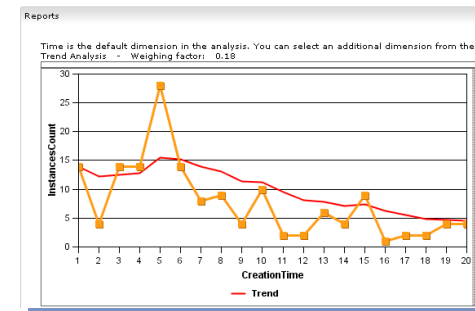


- Enhanced human-centric BPM capabilities
  - Graphical process view
  - Group work
  - Ad hoc follow-up tasks and sub-tasks
  - Remote client support
  - Web Service interface for tasks
- New dynamicity features, including administration configuration of endpoints and mediations, as well as dynamic endpoint selection
- Cross-product integration
  - WebSphere Service Registry and Repository integration
  - Information Server and SQL support thru BPEL
  - Additional WebSphere MQ SCA binding and new MQ JMS support
- Event sequencing ensures that business events are processed in the order received
- Enhancements to relationships, state machines, business rules and mappings



## Manage the solution...

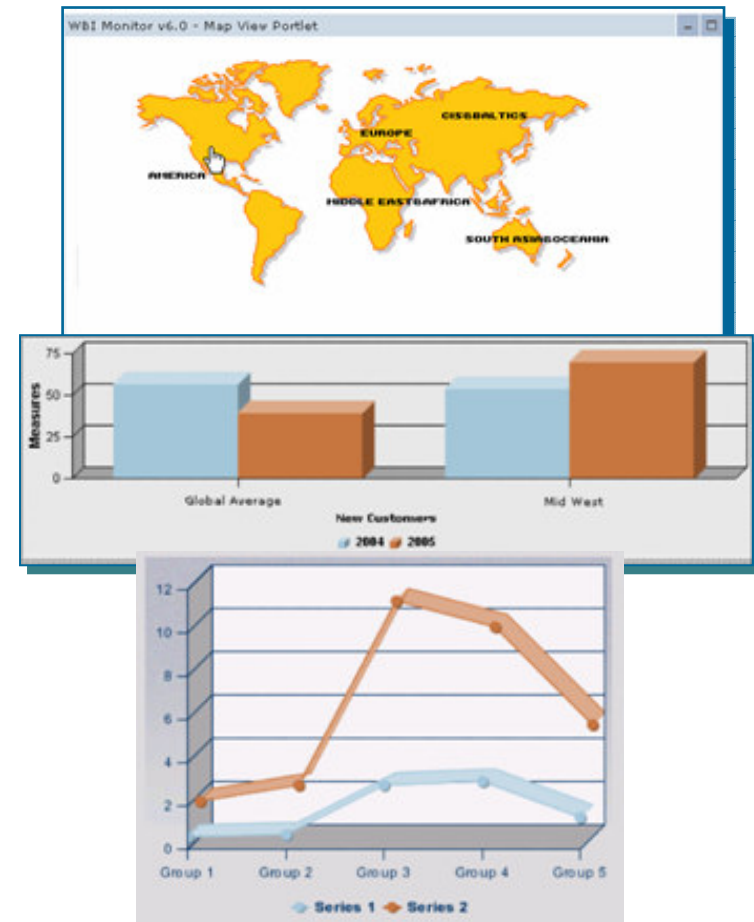
- Assemble dashboards from different views
  - Views include Monitor, Report, Dimensional, KPI, Scorecard, Gauge, Alert, and Organizational
  - Combine standard and custom portlets to meet various business needs
- Enable business event triggers and notifications via email, pager, SMS messages
  - Intervene based on business events and trends as they emerge by redirecting workload or changing process flows based on real needs
- Generate preprogrammed responses
  - Automatic corrective action based on pre-defined business triggers leveraging BPEL process and Web Service
- Analyze business metrics over time to identify trends
  - Discover previously hidden patterns using dimensional analysis
  - Use analytics and business intelligence technologies
  - Populate a business performance warehouse



## WebSphere Business Monitor – current features

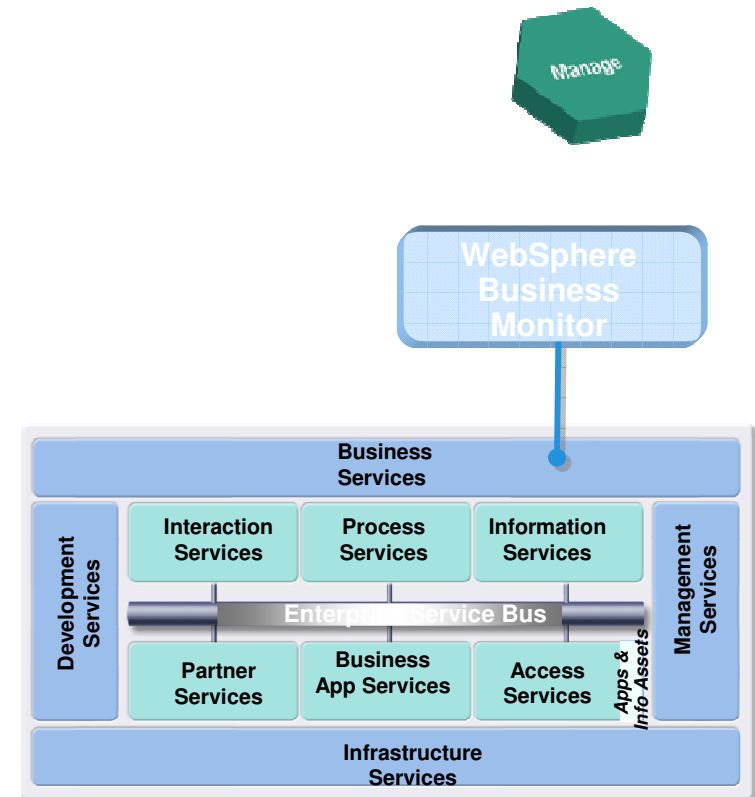


- View and modify your business in real time
  - Management dashboards and reporting capabilities, including trending
  - Utilize tools to define or customize dashboards
  - Set KPI's based upon Key Performance Objectives
- Ability to intervene in deployed processes
  - Utilize Action Manager to initiate real-time response as performance data is received
- Supports continuous process improvement
  - Ability to export data to WebSphere Business Modeler for analysis and process improvement
  - Re-run modeling simulations based on real data captured



## WebSphere Business Monitor – what is coming!

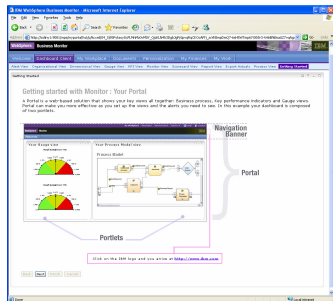
- Business Activity Monitoring capability
  - Increased scope of activities and applications that can be monitored
  - Ability to monitor any system that emits CBE events
  - New toolkit to create custom event emitters
- Monitoring Extensibility
  - Extend monitoring to end-to-end processes regardless of deployment
  - Extend monitoring models to include input from WebSphere Business Modeler, WebSphere Integration Developer and custom
- Improved administration and testing environment
  - New unit test environment
  - Guided administration
  - Command Line Interfaces
- Improved performance and scalability with support for WAS ND
- Updated dashboards and dashboard frameworks
  - Enhanced KPI management dashboard
  - Custom dashboard toolkit



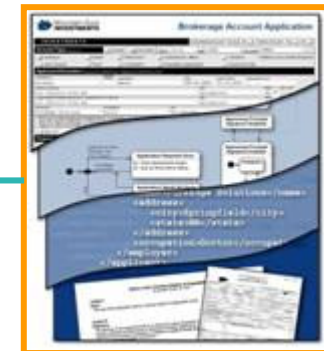
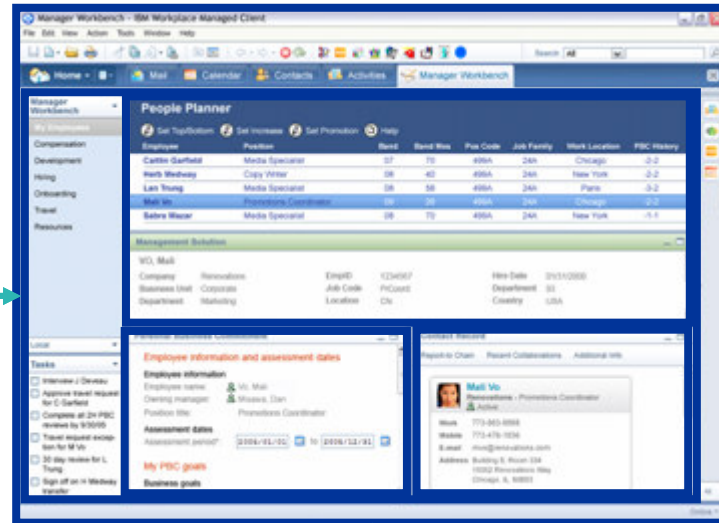


# Integrate multiple sources of information using Portal Server

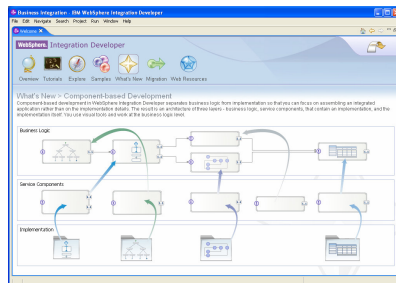
Components can be built with a variety of tools, and developer skills. Components can be built independently for assembly (composite).



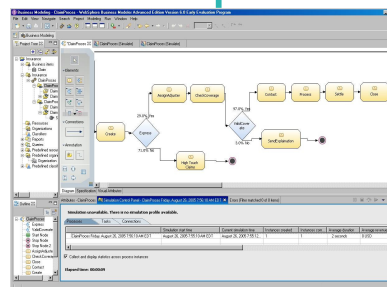
**Monitors**



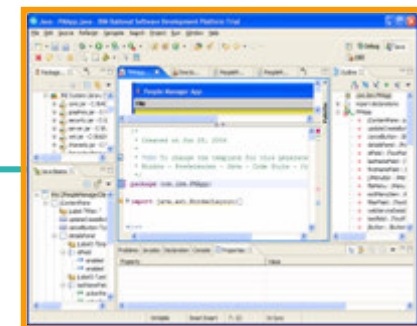
**E-form built with Workplace Forms Designer**



**ESB**

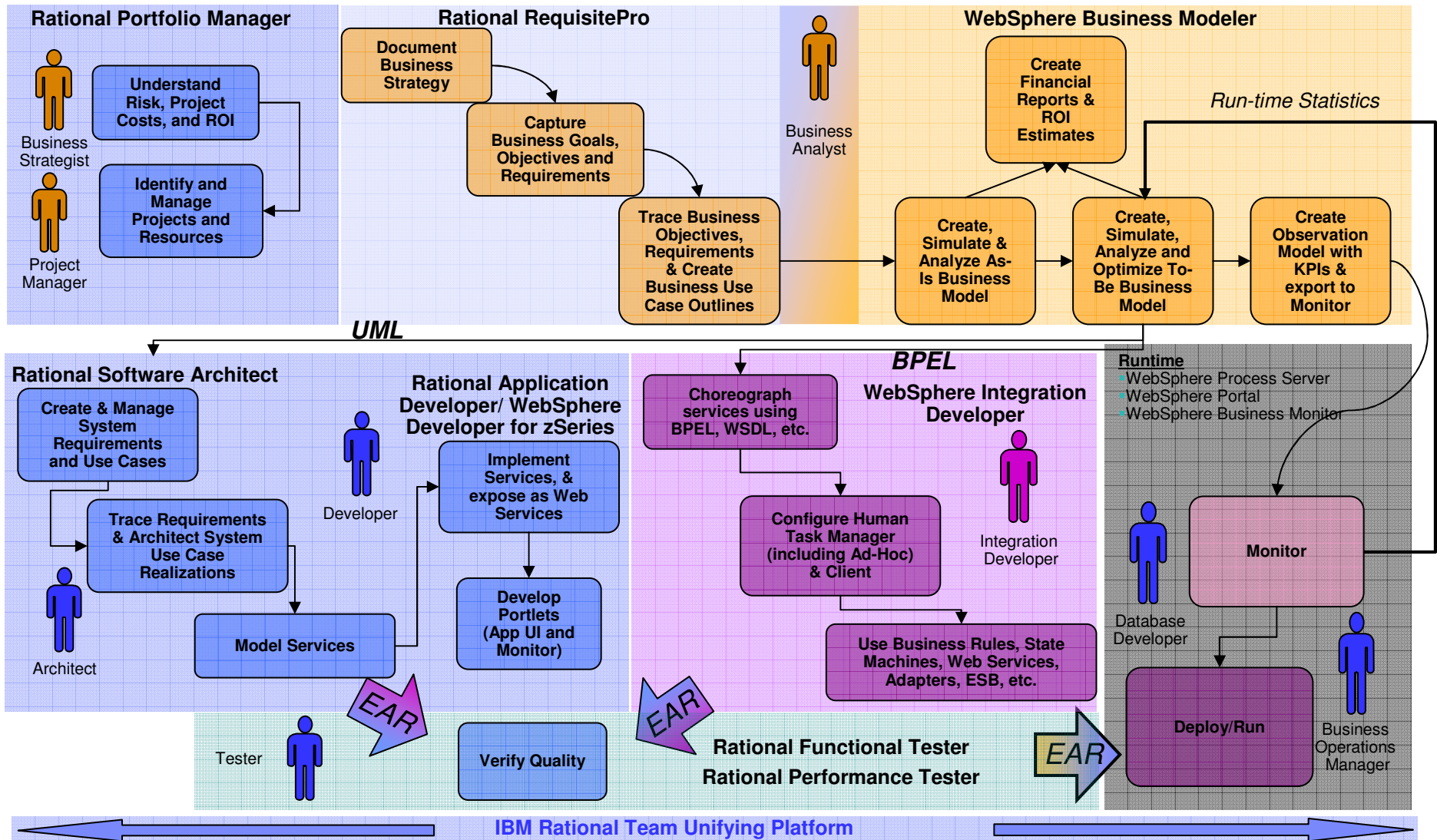


**Process Server**

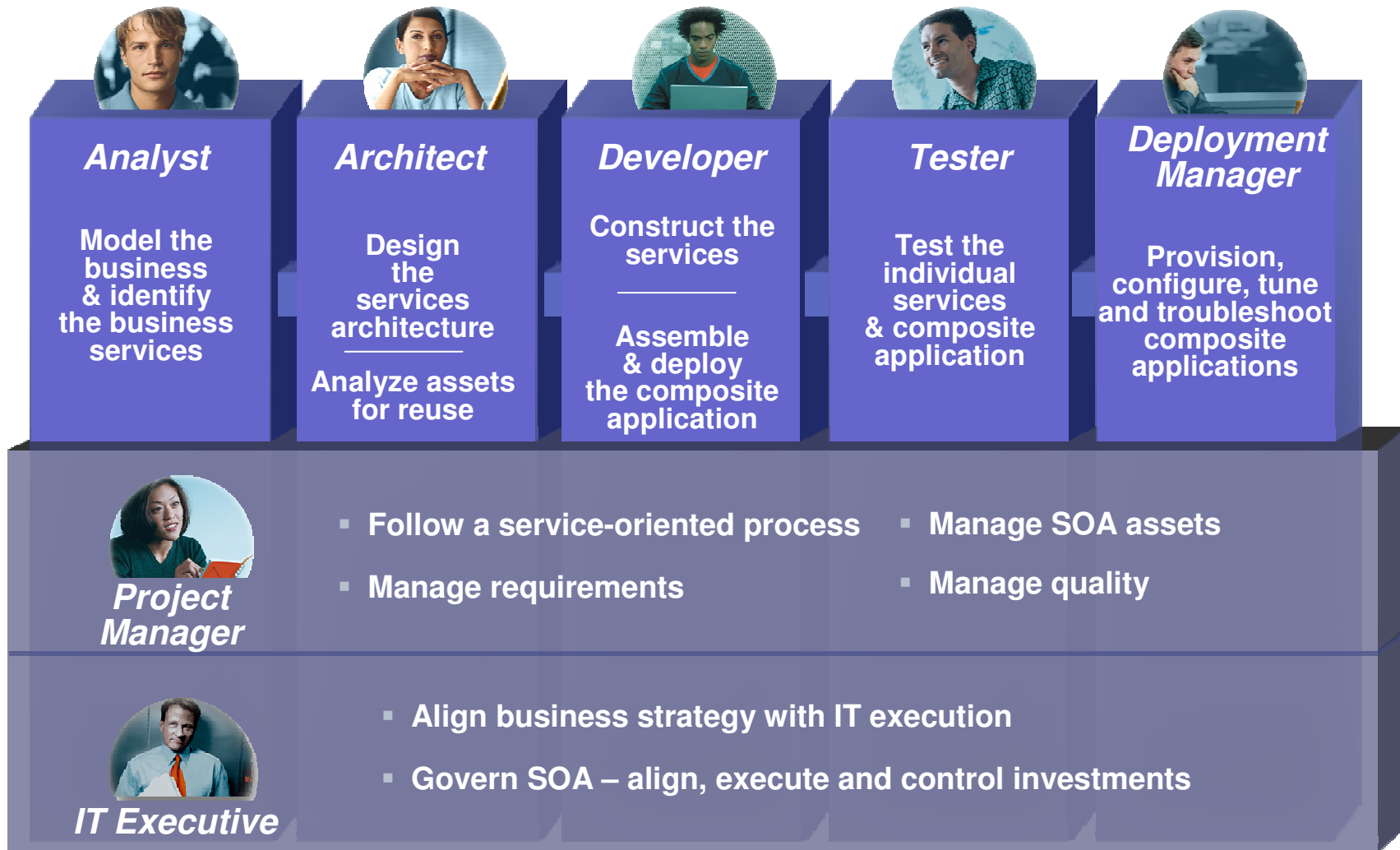


**External sources**

# Business Driven Development Vision

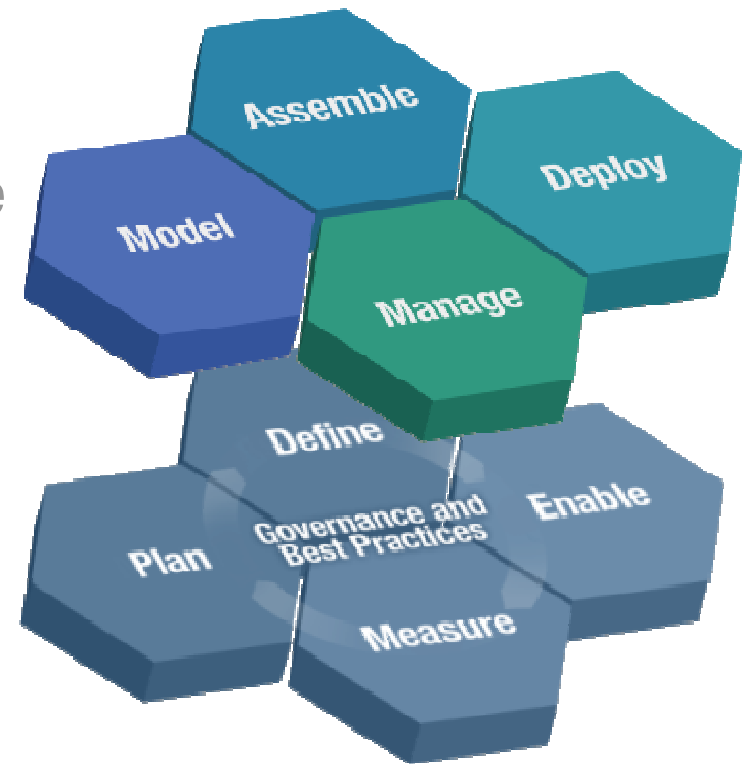


# The IBM Software Development Platform



## Agenda

- SOA: cos'è e perché
- L'ambiente operativo
- Business Process Management e ciclo di vita della SOA
- **Il governo della SOA**
- Come partire



## Why Governance

- ***If men were angels, no government would be necessary. If angels were to govern men, neither external nor internal controls would be necessary. In framing a government which is to be administered by men over men, the great difficulty lies in this: you must first enable the government to control the governed; and in the next place oblige it to control itself.***

*James Madison*

- Given that angels don't build IT systems, you really need good IT Governance
- Service-Oriented Architecture exposes this need in a profound way



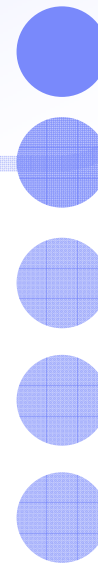
## What is governance?

**Establishing** chains of responsibility, authority and communication to **empower** people (decision rights)

**Establishing** measurement, policy and control mechanisms to **enable** people to carry out their roles and responsibilities

### Governance vs. Management

Governance determines **who is responsible** for making the decisions  
Management is the process of **making and implementing** the decisions



## What is SOA Governance?

### What is IT governance?

Establishing decision making rights associated with IT

Establishing mechanisms and policies used to measure and control the way IT decisions are made and carried out

### What is SOA governance?

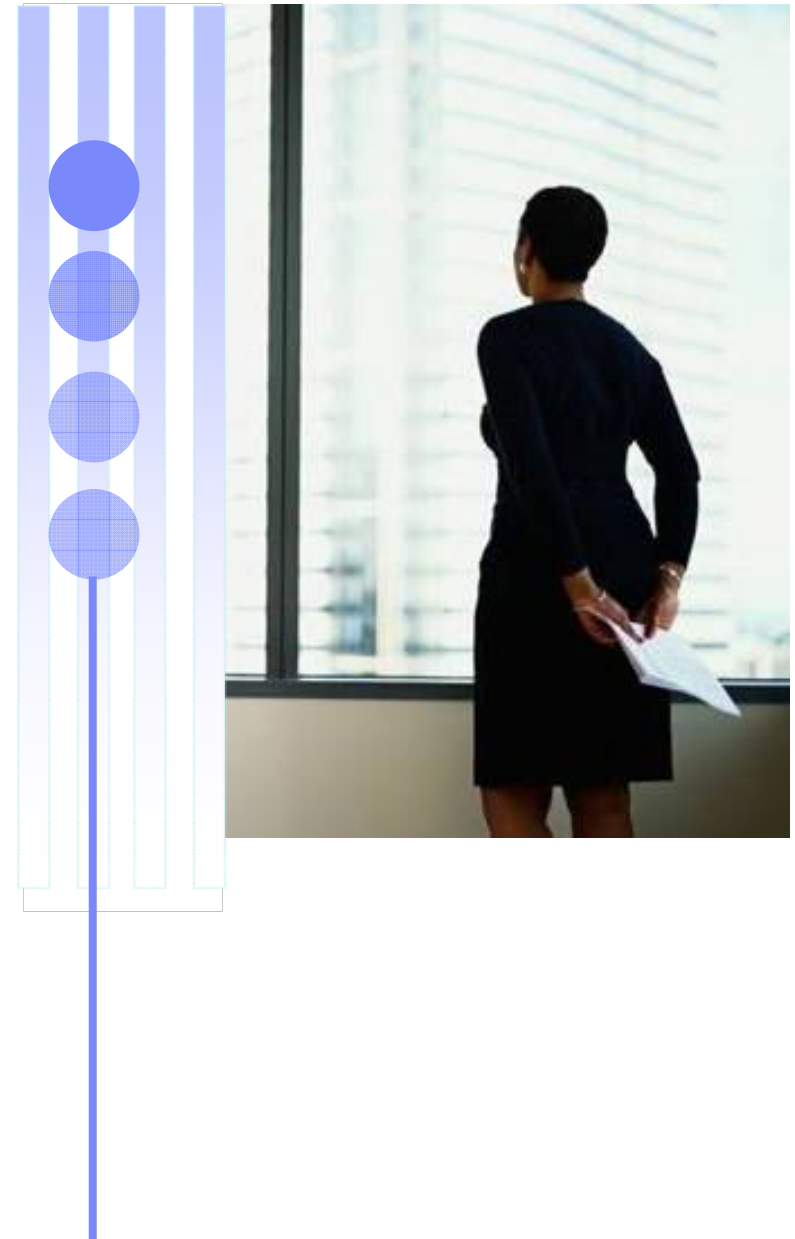
Extension of IT governance focused on the **lifecycle of services** to ensure the business value of SOA



*SOA Governance is a catalyst for improving overall IT governance*

## Why SOA Governance matters

- Realize business benefits of SOA
  - Business process flexibility
  - Improved time to market
- Mitigate business risk and regain control
  - Maintaining quality of service
  - Ensuring consistency of service
- Improved team effectiveness
  - Measuring the right things
  - Communicating clearly between business and IT





## What happens without governance ...

This could be



Applicati

**In 2006, lack of working governance mechanisms in midsize-to-large (greater than 50 services) post-pilot SOA projects will be the most common reason for project failure (0.8 probability).**

*Management Update: Predicts 2006: The Strategic Impact of SOA Broadens*, Gartner, Inc., Jess Thompson, Yefim V. Natis, Massimo Pezzini, Paolo Malinverno, November 23, 2005



ces

... and this would waste SOA benefits

## SOA Governance challenges

- Establishing decision rights
- Defining high value business services
- Managing the lifecycle of assets
- Measuring effectiveness



Note: Based on real experience of IBM on SOA projects

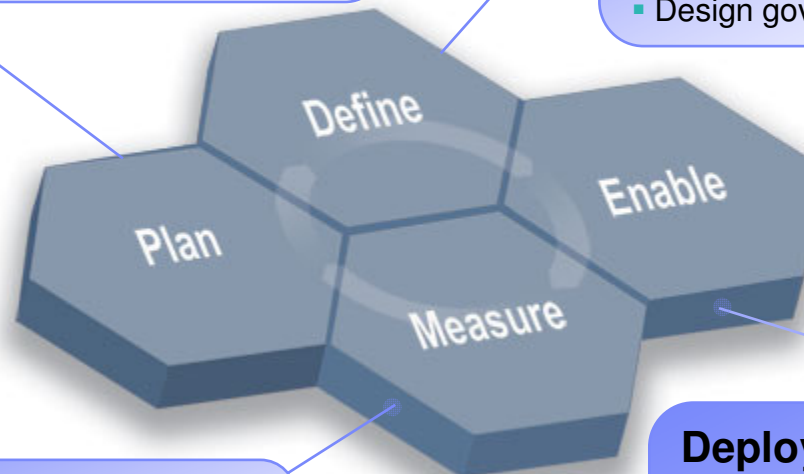
# SOA Governance Lifecycle

## 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



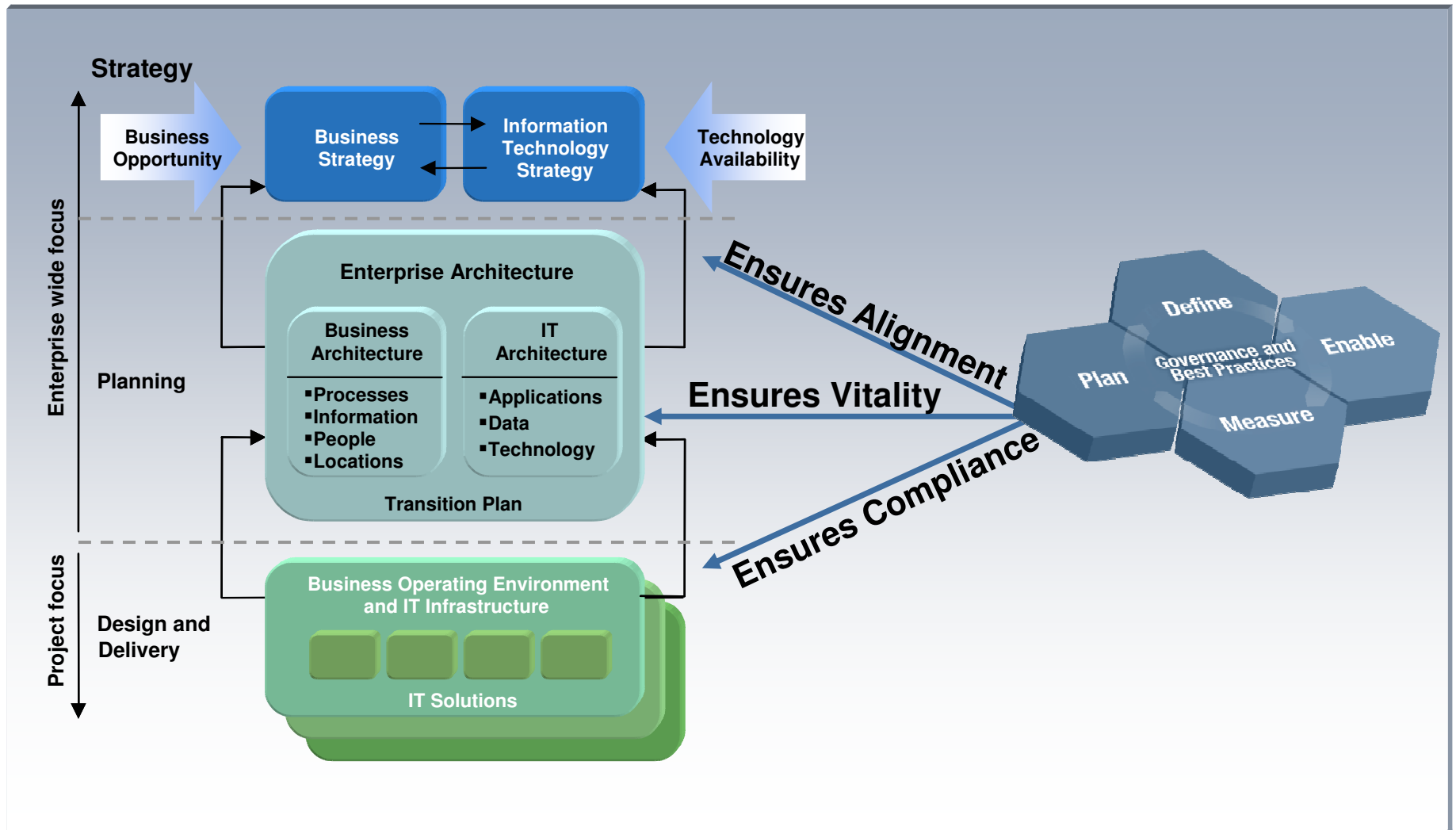
## Monitor and Manage the Governance Processes

- 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

# Key processes of a governance framework

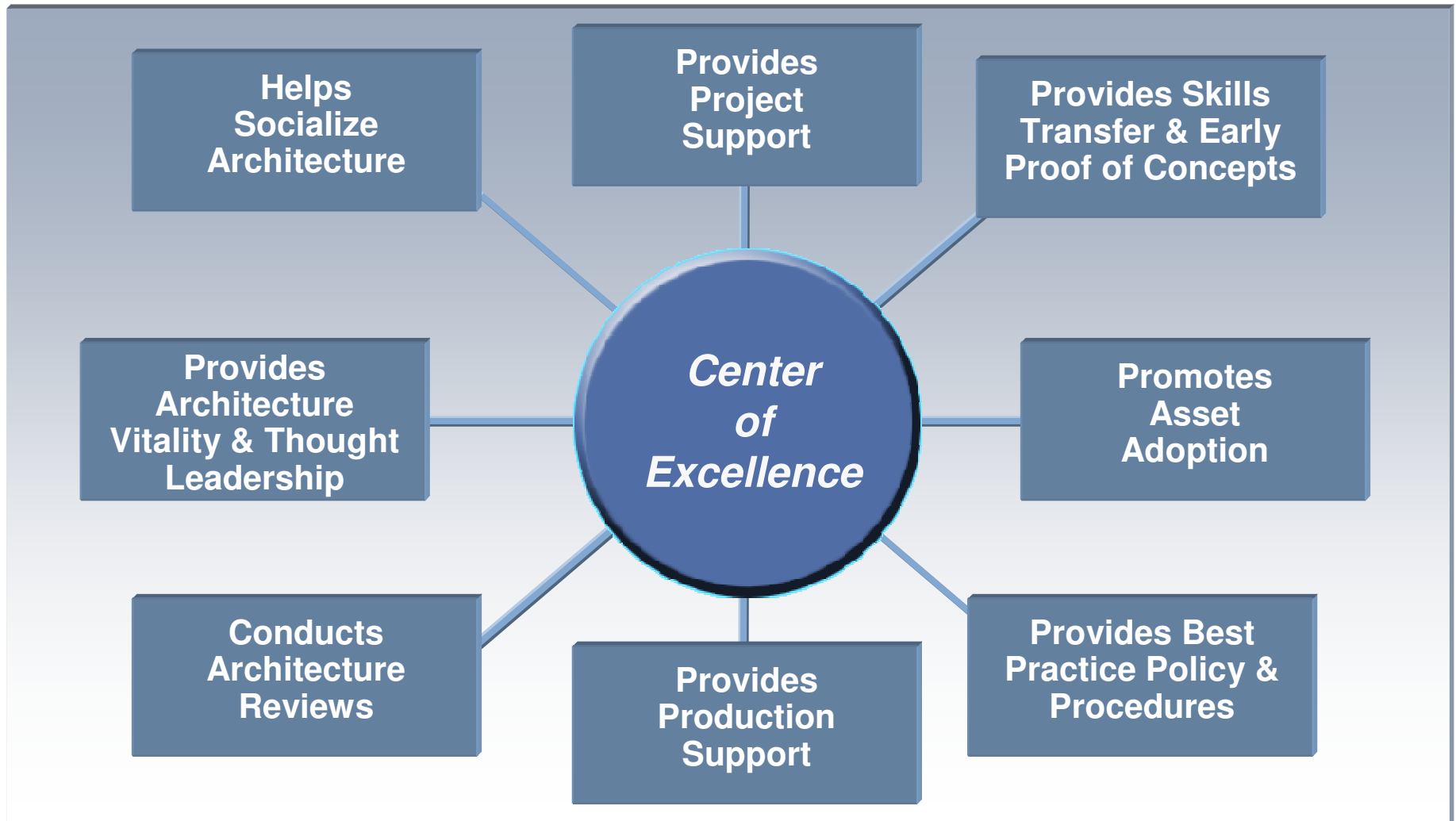


## SOA Governance Pre-Requisites

- Engagement and Active Participation from Business Stakeholders
- Alignment of the SOA Value Proposition with Business Goals and Objectives
- Commitment to and Realization that Governance is Essential to Realizing the SOA's Value
- Defined, Communicated and Accepted SOA Vision
- Existing IT Governance and Decision Making Framework (Highly Desirable)
- Support and Commitment from Executive Management

# SOA Center of Excellence (COE)

*A Proven Organizational Model for Governance and Management*





# Common Organizational SOA Governance Roles and Responsibilities

<b>Executive Leadership &amp; Funding Sources</b>	<ul style="list-style-type: none"><li>▪ The <b>Executive Sponsor</b> is the principle stakeholder and the champion of the SOA CoE organization</li><li>▪ The <b>Executive Steering Committee</b> provides strategy and initial funding and resolves final disputes and funding issues</li></ul>
<b>Business Flexibility Directives</b>	<ul style="list-style-type: none"><li>▪ <b>Business Process Owners</b> understand and maintain certain processes with all its business and IT implications</li><li>▪ <b>The Business Unit Committees</b> are the functional business competencies stakeholders that have to be involved in the SOA Governance process, because SOA is business driven</li></ul>
<b>IT Resources and Architecture</b>	<ul style="list-style-type: none"><li>▪ The <b>Architectural Review Board</b> is overseeing the whole IT. The SOA CoE might be a part of it or identical. Because similar work is done the relationship has to be defined</li><li>▪ The <b>Program Management Office</b> is organizing the different projects. SOA Governance effects then due to inspections and reviews</li></ul>
<b>Advice and Enablement</b>	<ul style="list-style-type: none"><li>▪ The <b>SOA CoE Board</b> deals with the management and the operations of the SOA CoE</li><li>▪ The <b>SOA CoE Advisory Group</b> is like a community of practice; they are the first line review to ensure enterprise wide compliance with reuse and business agility guiding principles</li></ul>

# UDDI alone is not sufficient to handle demands of SOA

## UDDI

*(Universal Description, Discovery and Integration)*

- Designed as “phonebook” for external WEB services
- Highly technical and not readily useable by end users
- Lacks metadata repository to help manage and govern service interactions
- Inflexible data model
- Only allows publish and find of WEB services
- Not widely adopted

## SOA needs:

- Meaningful classification of all types of services, not just web services
- Simple and intuitive user interface
- Service metadata repository to store relevant information about services to enrich SOA interaction
- Optimized service registry for runtime access and resolution, beyond publish and find
- Based on latest web services standards to foster wider adoption

### ▪ Emerging Web services management standards optimized for SOA

- WS – Resource Transfer
- WS – Event Notification
- WS – Metadata Exchange

### ▪ Driven by industry leaders

### ▪ Integrated with UDDI to work in harmony



Microsoft





# IBM Facilitates each step of the SOA governance process with capabilities and tools

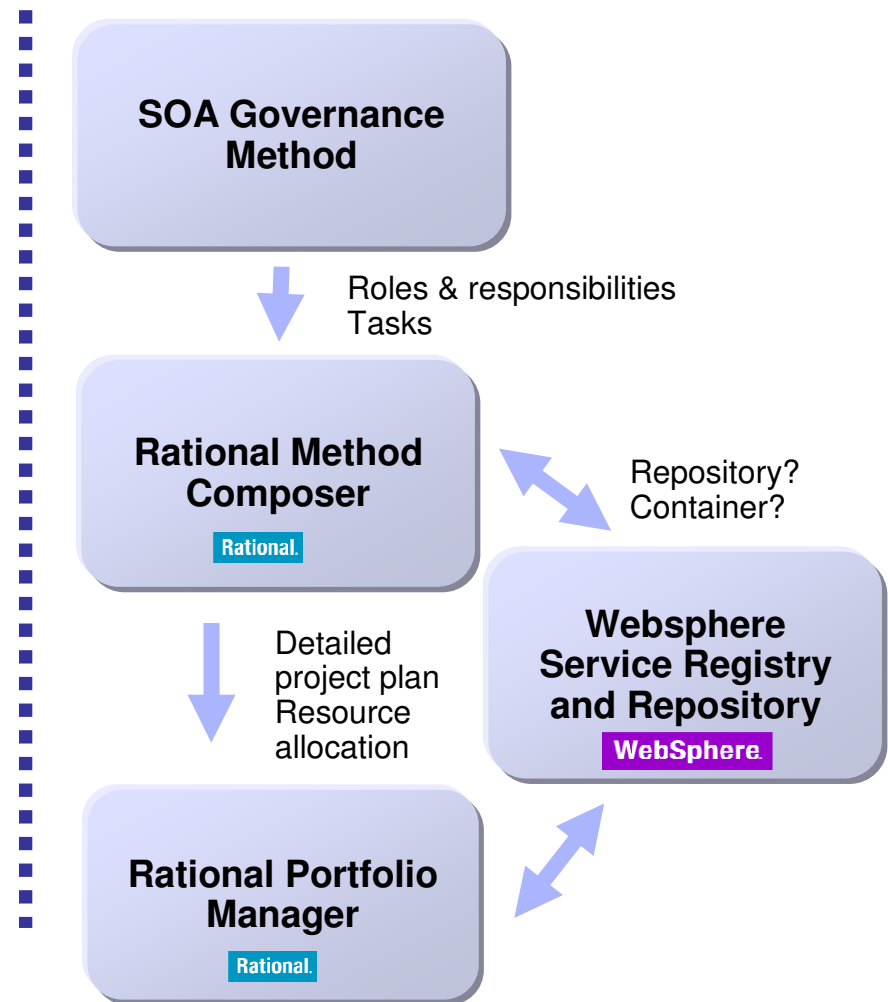
## SOA GOVERNANCE METHOD

defines roles and responsibilities, policies, measurements and controls mechanisms

## TOOLS AND TECHNOLOGIES

to document and automate the governance processes:

- Rational Method Composer: planning
- Rational Portfolio Manager: tracking
- WebSphere Service Registry: storing

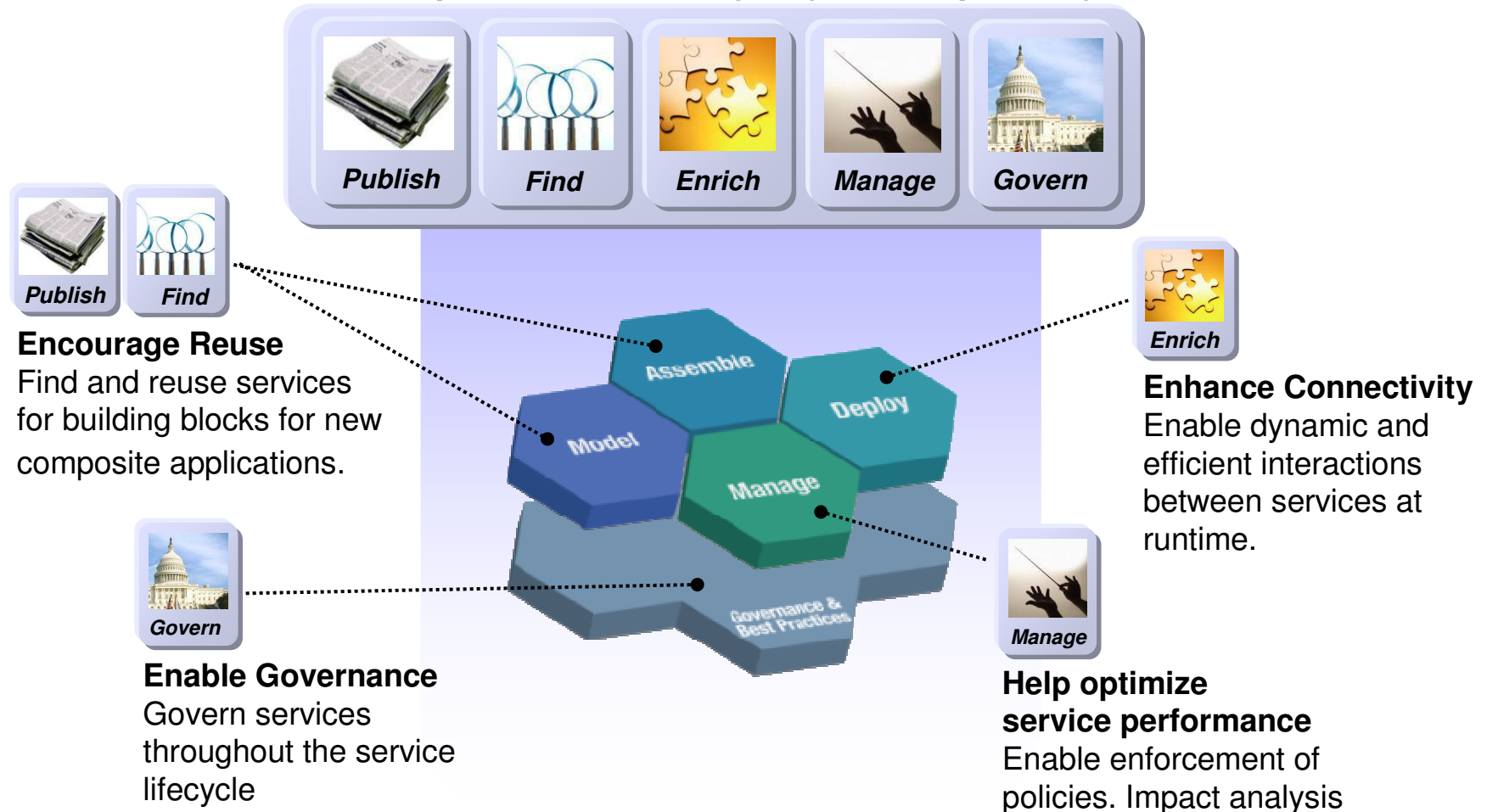


# The WebSphere Service Registry and Repository

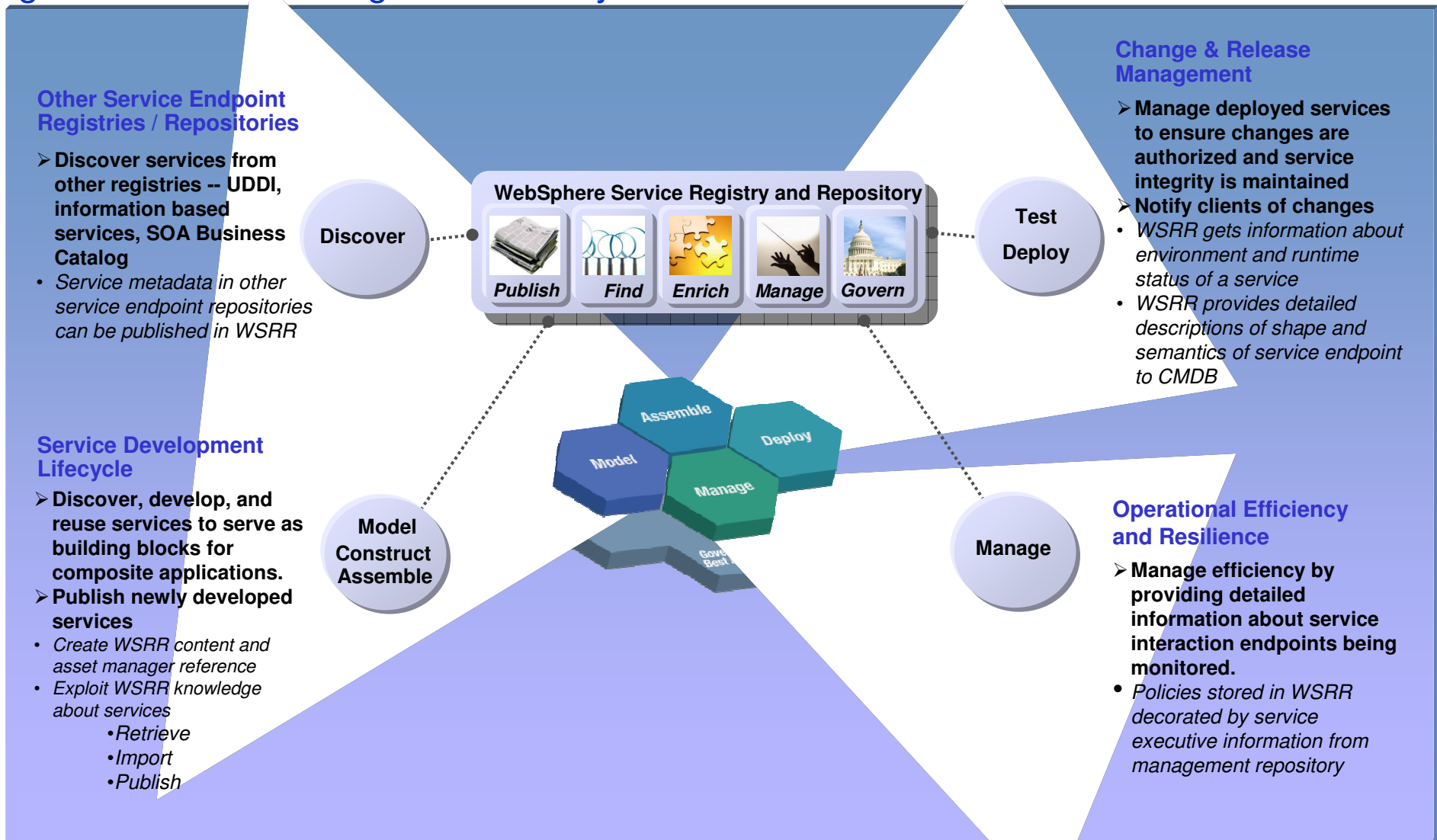
Value throughout the SOA lifecycle



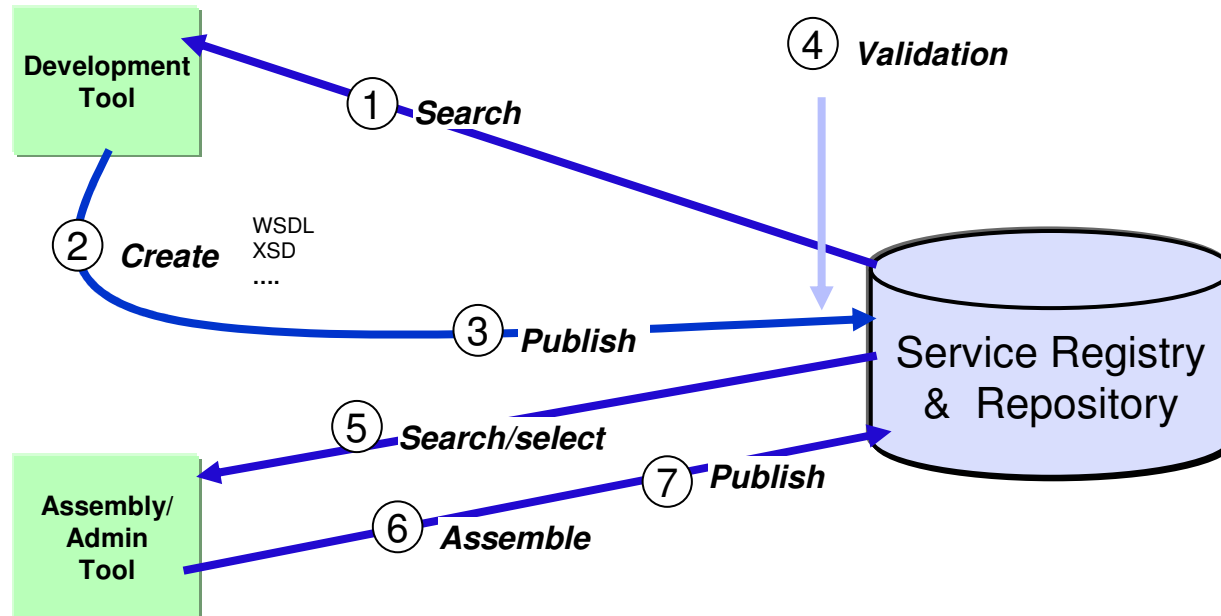
## WebSphere Service Registry and Repository



# The WebSphere Registry and Repository federates SOA repositories to manage and govern services throughout the lifecycle

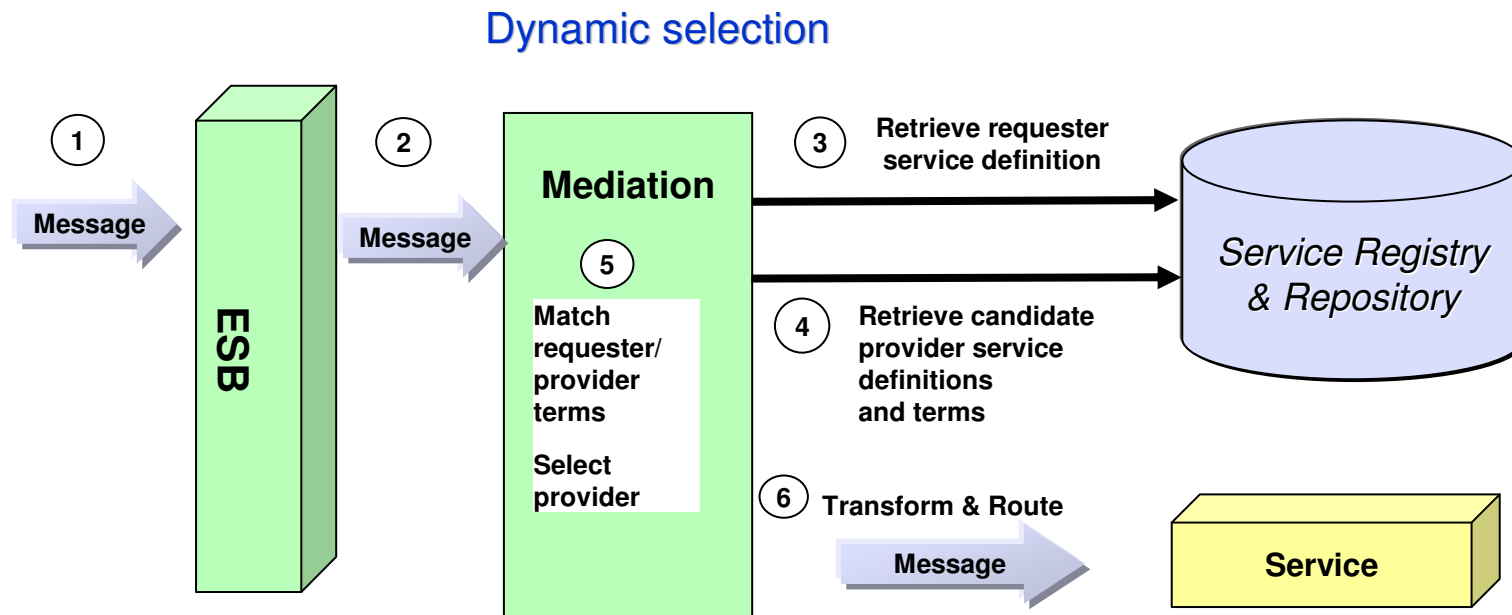


## WSRR - Publish and Find Interactions



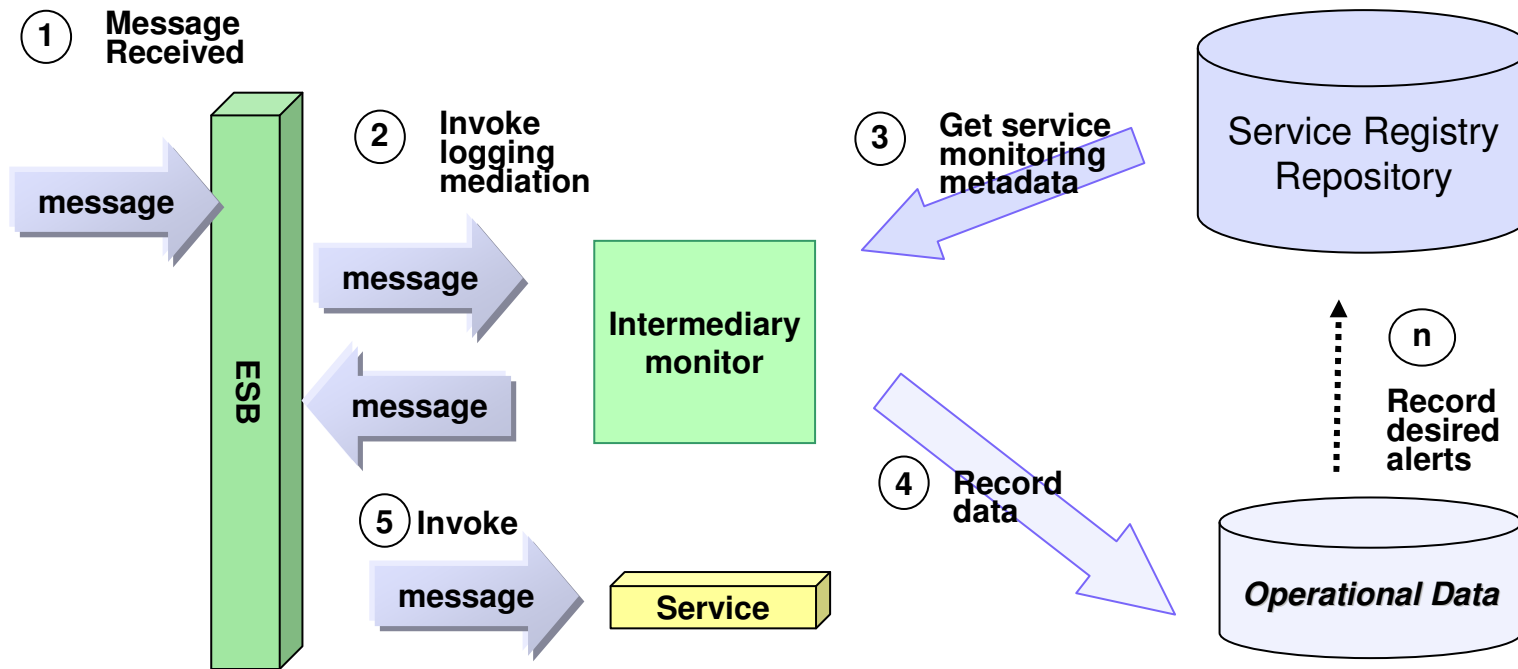
1. Search is performed for a service or mediation or policy to (re)use
2. Development tools are used to create a new service metadata artifact
3. The new service metadata artifact is published to WSRR
4. Validation and conformance policies are enforced
5. Search is performed for a service or mediation or policy to use and one is selected for use
6. The service is configured/wired and policy relationships are established
7. The assembled service is (re) published using the Service Explorer during deployment

# WSRR Runtime selection and invocation interactions



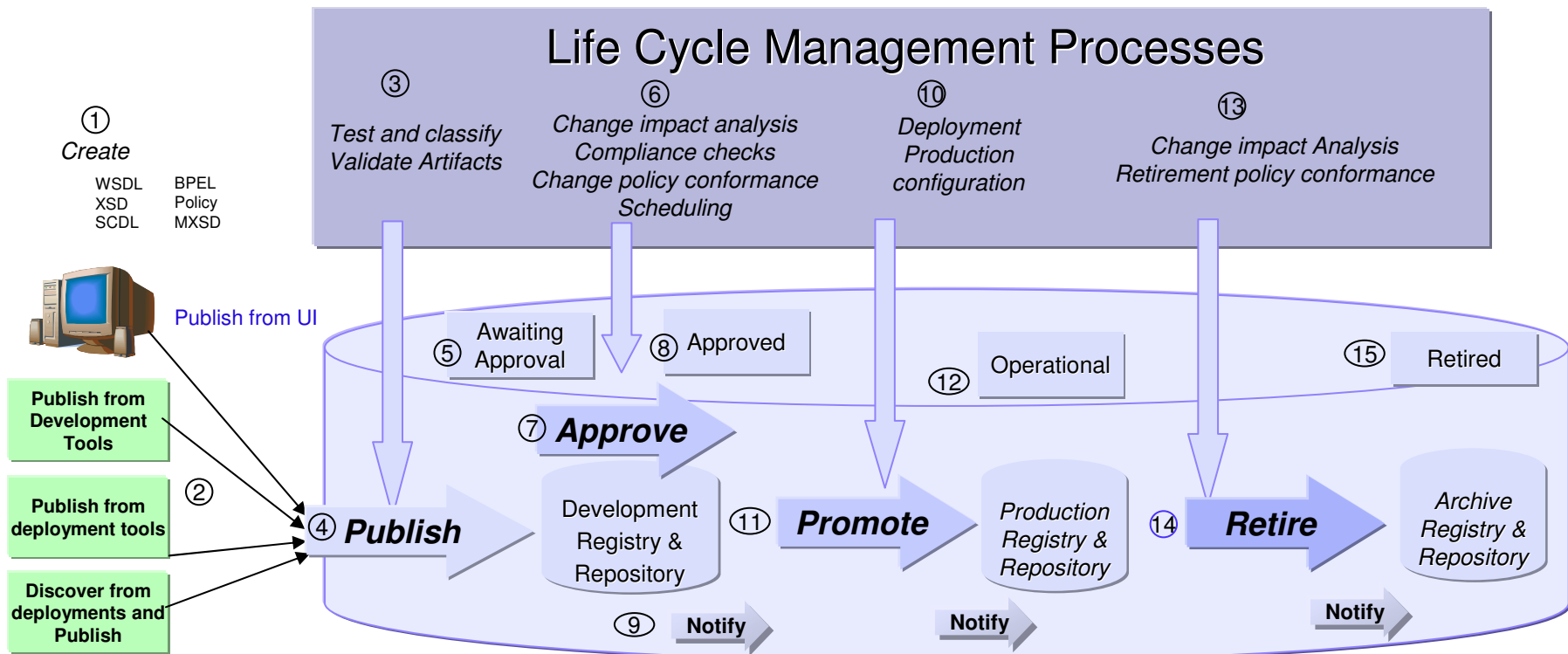
1. A Message is received by an ESB
2. The ESB invokes a selection mediation
3. The Mediation retrieves the service description for the requested operation from WSRR
4. The Mediation retrieves service descriptions for candidate providers
5. The Mediation executes its matching algorithm to identify the provider service that is the best fit
6. The inbound message is transformed and routed to the selected endpoint

# WSRR - Operational Monitoring Interactions



1. During service invocation a message is received by the ESB
2. The ESB routes the message to an intermediate logging mediation or agent
3. The monitor / mediation retrieves the monitoring policy for the message from WSRR
4. The monitor / mediation records the operational data about the running service
5. The ESB then continues with the invocation of the service.
- n. Asynchronously, performance and health alerts are generated based on operational data; desired summary alerts are recorded in WSRR

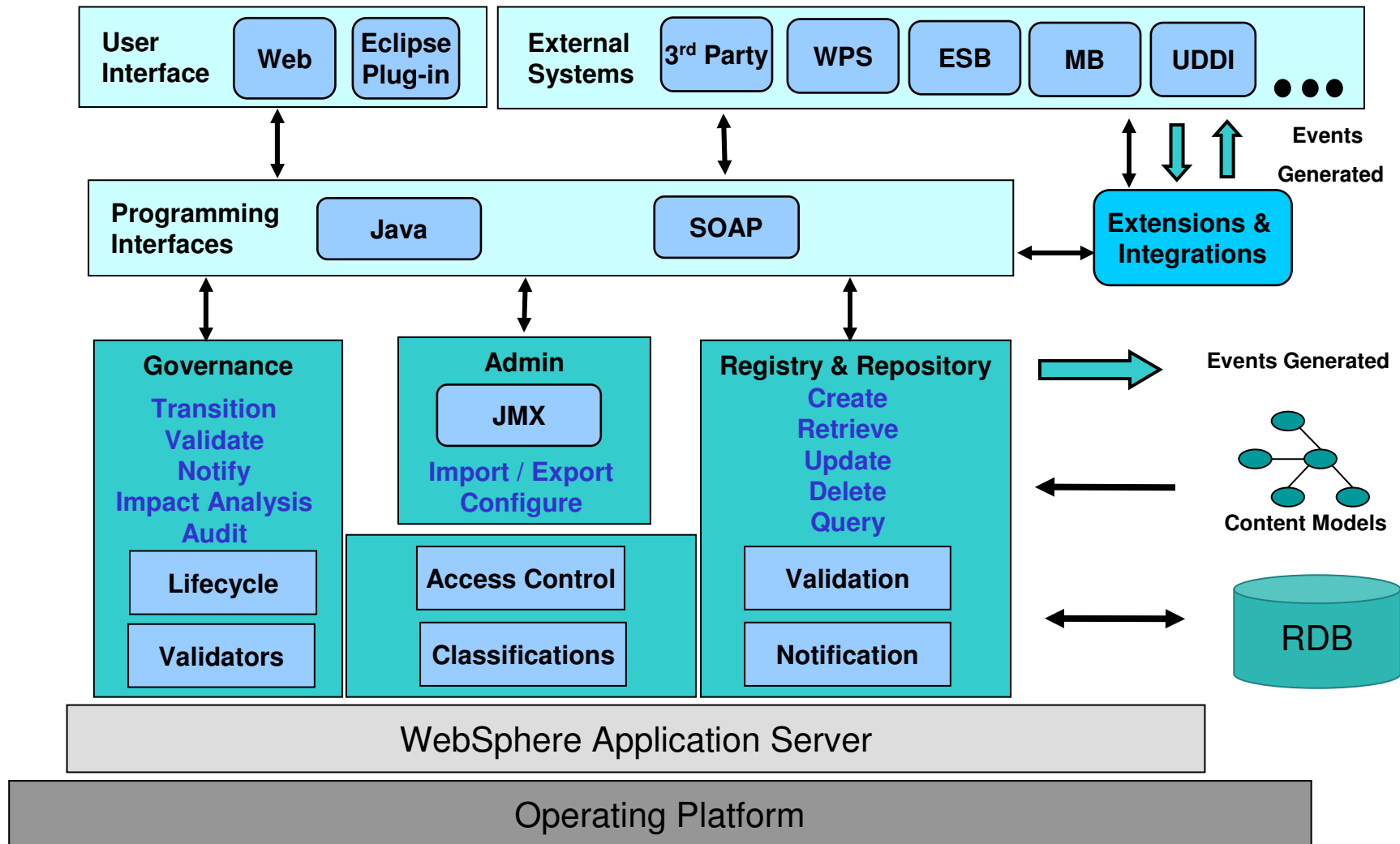
# WSRR - SOA Governance Interactions



- |  |   |  |   |
|--|---|--|---|
| <p>1. Service metadata artifacts are created</p> <p>2. Tools, utilities and users publish servicemetadata to WSRR</p> <p>3. LCM processes enforce testing, classifying and validation</p> <p>4. Service and metadata is Published</p> <p>5. Service is assigned a state of AWAITING APPROVAL</p> | <p>6. LCM processes drive impact analyses, compliance checks, change policy conformance and scheduling</p> <p>7. Service is approved</p> <p>8. Service is assigned a state of APPROVED</p> <p>9. Notifications are generated.</p> | <p>10. LCM processes drive: Deployment Production configuration</p> <p>11. Service is promoted to production environment</p> <p>12. Service is assigned an OPERATIONAL state.</p> <p>Notifications generated</p> | <p>13. LCM processes drive: impact of retiring retirement policy</p> <p>14. Service is retired</p> <p>15. Service is assigned a RETIRED state.</p> <p>Notifications generated</p> |
|--|---|--|---|



# WebSphere Service Registry & Repository Architecture





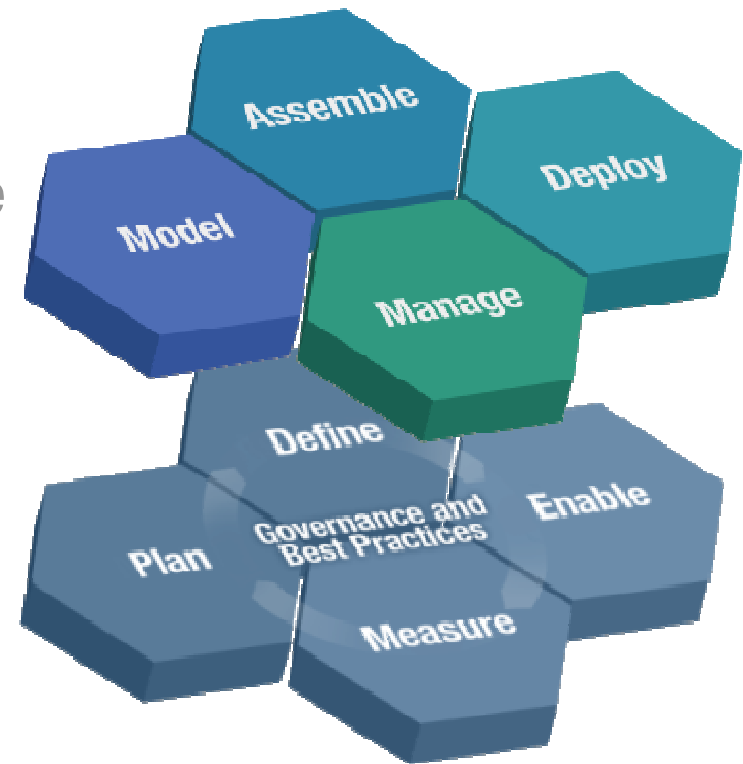
## Next steps

- Learn more about SOA Governance
  - [ibm.com/soa/gov](http://ibm.com/soa/gov)
- Download whitepaper
  - [www.ibm.com/developerworks/](http://www.ibm.com/developerworks/)
- Download RMC
- Identify aspect of governance for initial focus

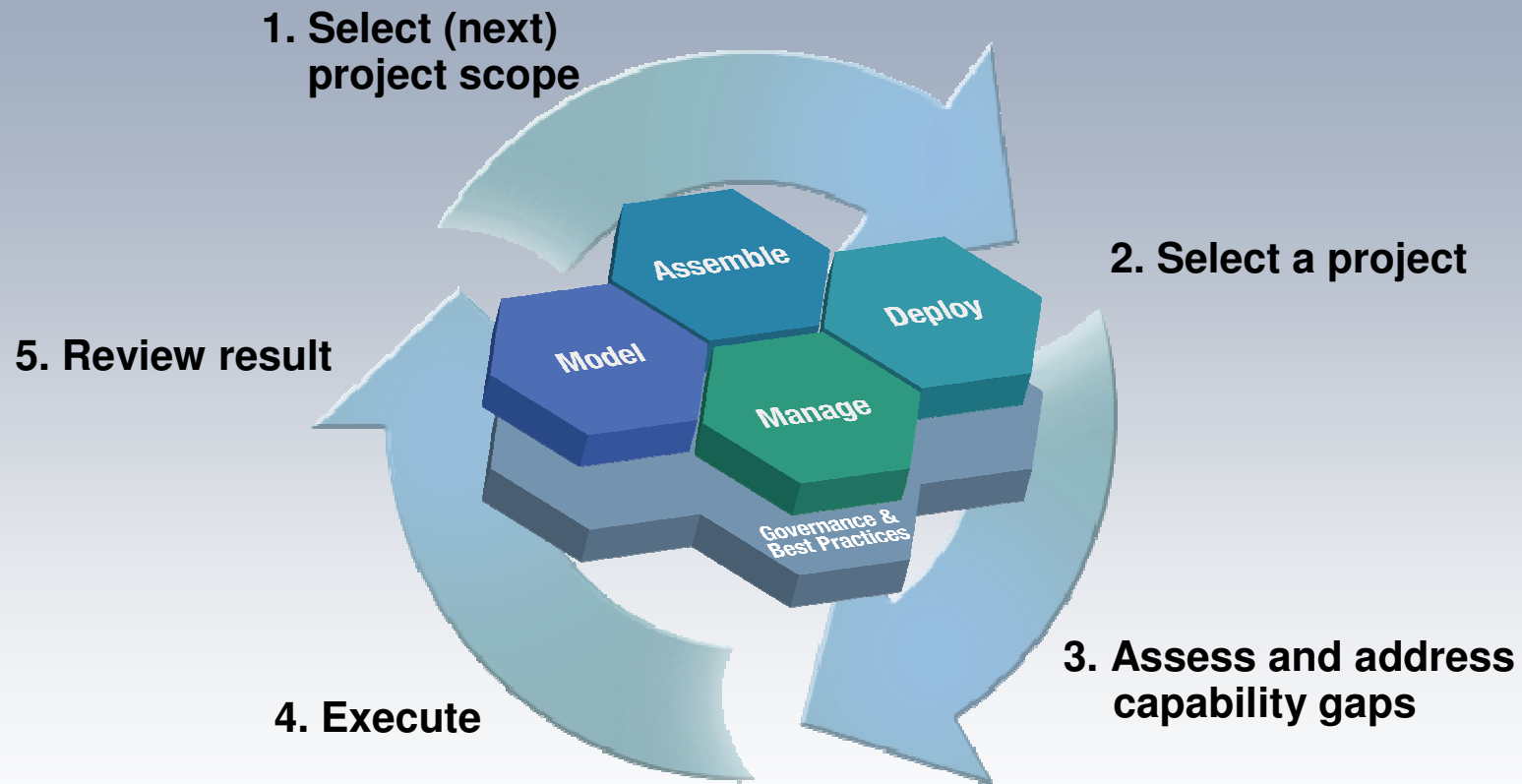


## Agenda

- SOA: cos'è e perché
- L'ambiente operativo
- Business Process Management e ciclo di vita della SOA
- Il governo della SOA
- **Come partire**



## SOA Adoption is Iterative and Incremental ...

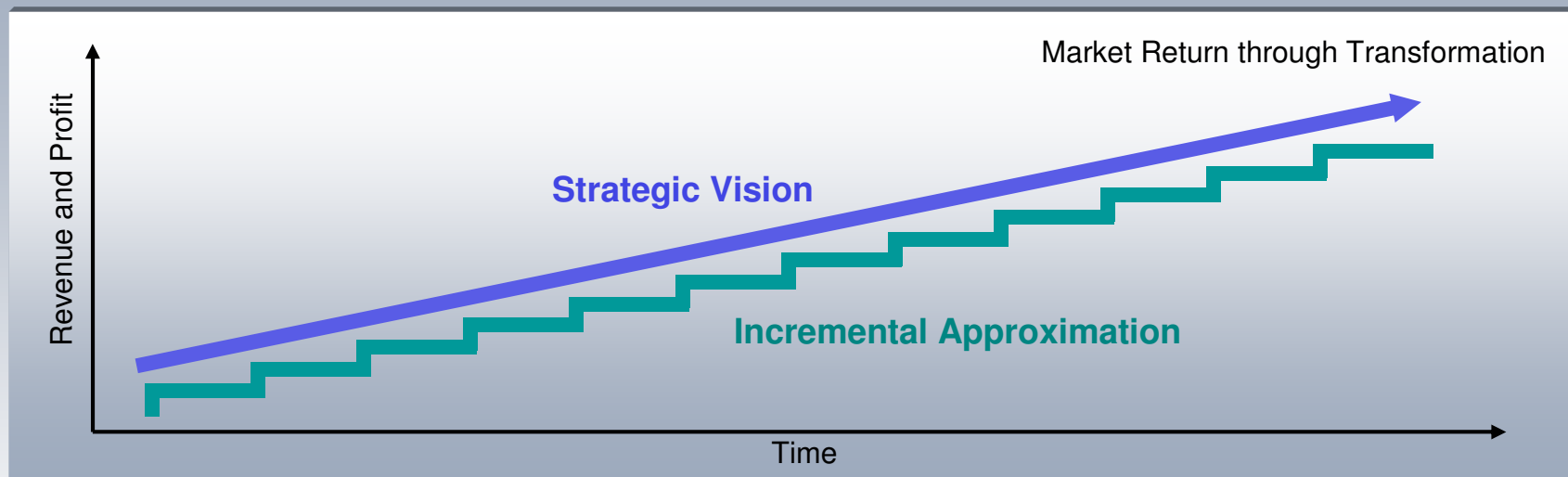


... with each project delivering immediate *and* long-term value

# SOA Adoption: Tactical and Strategic Action Combined

## SOA Goal

- Market return through transformation: quicker time to production, lower costs, competitive differentiation



## Two Primary Roadmap Perspectives

- **Strategic Vision**  
Business and IT statement of direction which can be used as a guideline for decision making, organizational buy-in, standards adoption
- **Project Plans**  
Implementation projects to meet immediate needs of the current business drivers

## Getting Started Requires Vision

- Assess your current maturity, across multiple dimensions
  - Business
  - Methodology
  - Technical
- Establish targets for where you want to be
- Document important goals and metrics for transitions across the maturity dimensions
- Recognize that aspects of the Vision may shift with experiences gained
  - Adopt regular checkpoints for Vision re-assessment

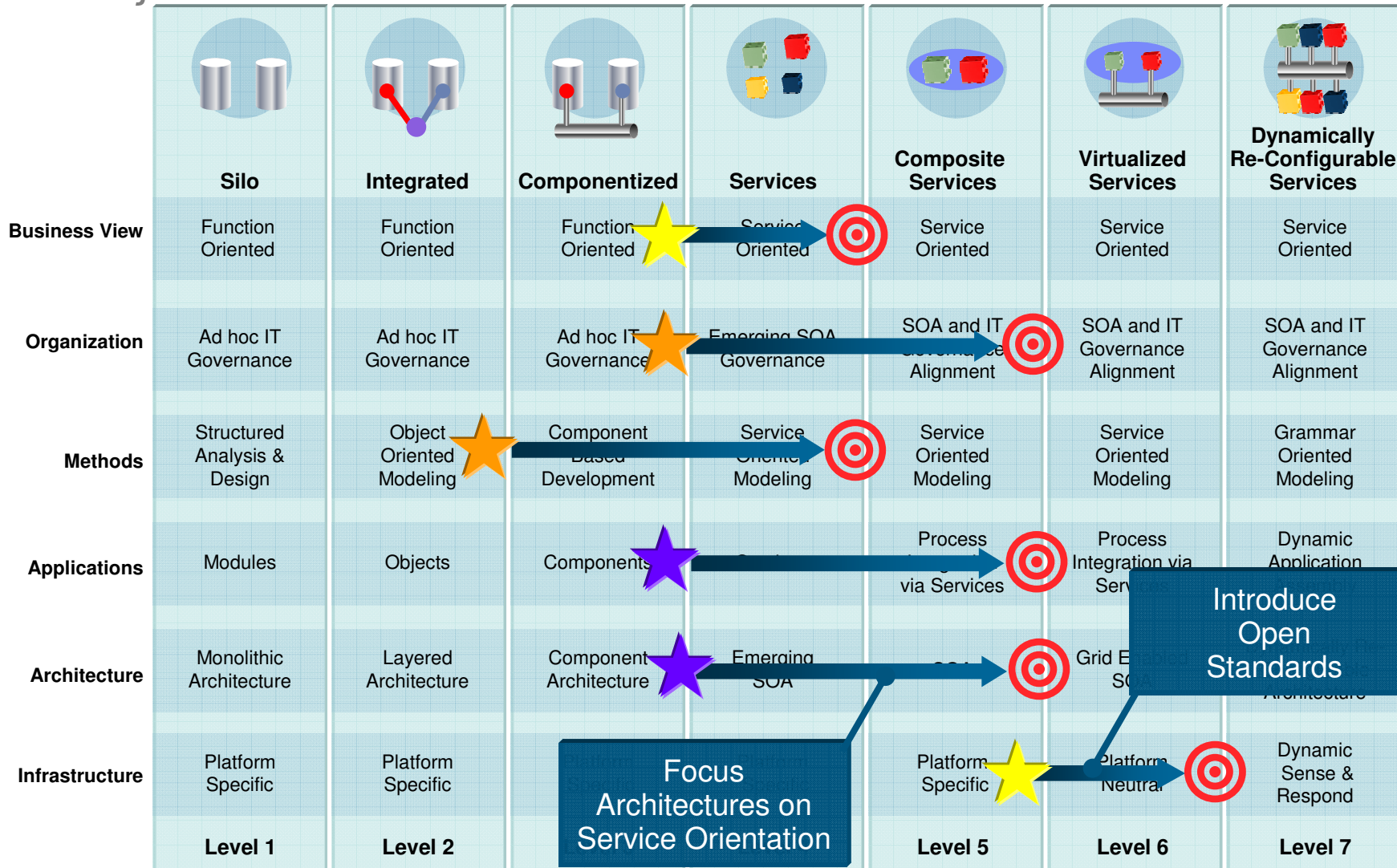
***IBM's Service Integration Maturity Model provides a guide for establishing a Vision***

# Service Integration Maturity Model (SIMM)

An objective assessment

★ = current level

🎯 = target level



# Selecting Projects

*Moving Incrementally Toward the Vision*

## *A pilot project for SOA should ...*

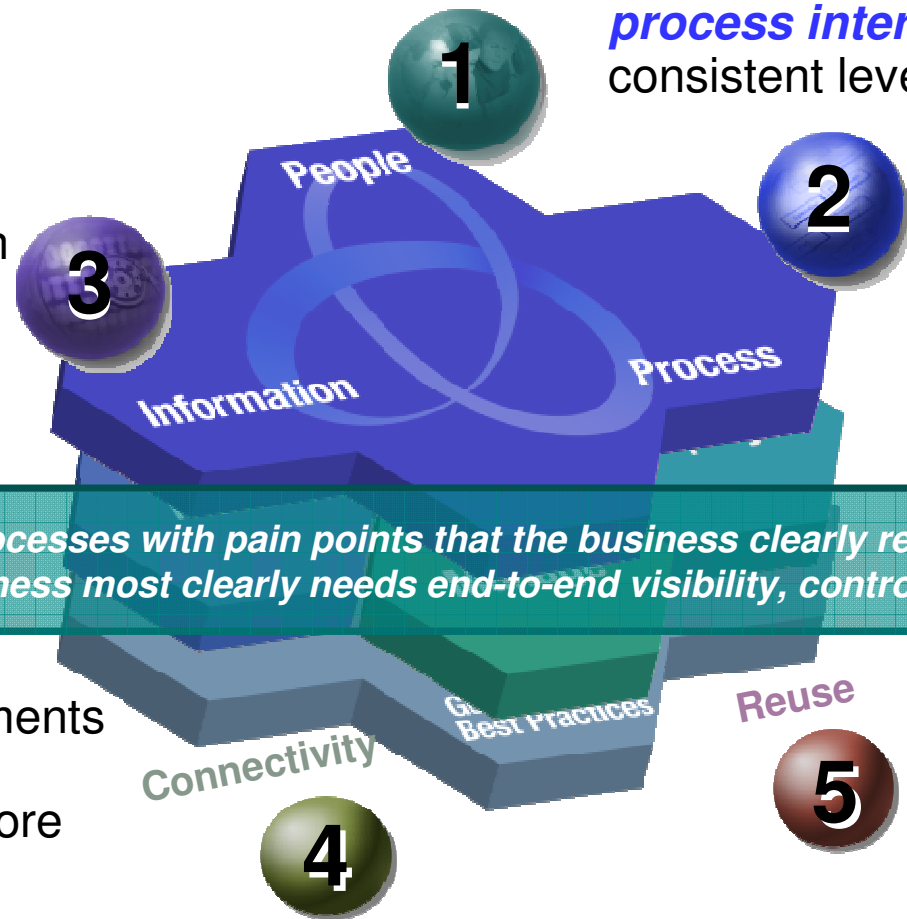
1. Address a well understood Business problem
2. Incorporate aspects of governance
3. Include Line-of-business objectives and IT objectives
4. Leverage SOA entry point patterns
5. Require an achievable stretch beyond current capabilities to address gaps (skills, processes etc.)
6. Be something you will put into production



# SOA Entry Points: to help customers starting

*Both Business Centric and IT Focused*

- Deliver trusted information in **business context** to enable innovation
- Enable **human and process interaction** with consistent levels of service
- Achieve greater efficiency and effectiveness with **business model innovation**
- Protect investments **exposing as services** the core existing assets
- Exploit **existing assets** to improve business agility



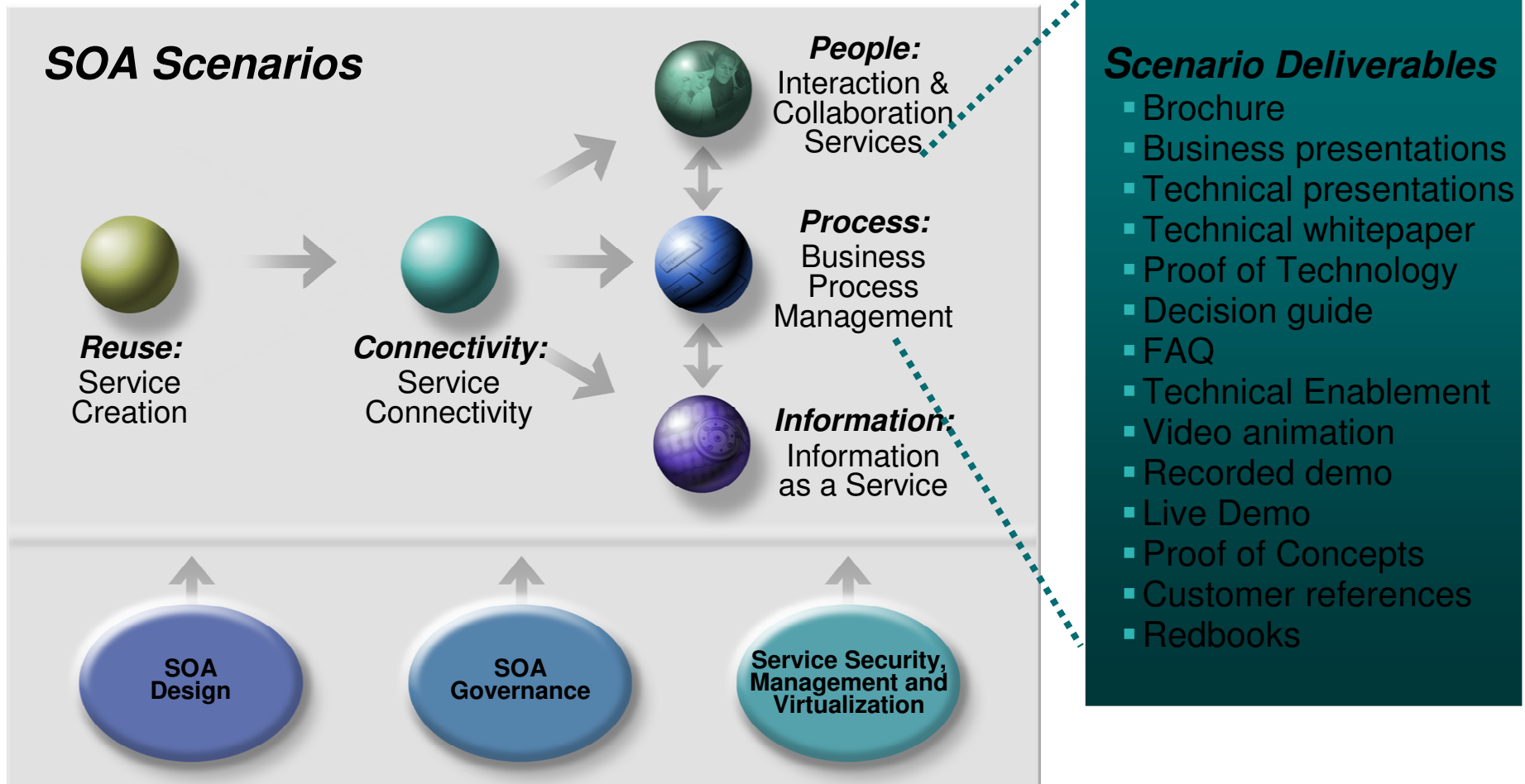
*“Pick business processes with pain points that the business clearly recognizes — processes for which the business most clearly needs end-to-end visibility, control, insight and flexibility”*





## Keeping it simple

SOA scenarios answer 'how to get started' with the SOA entry points

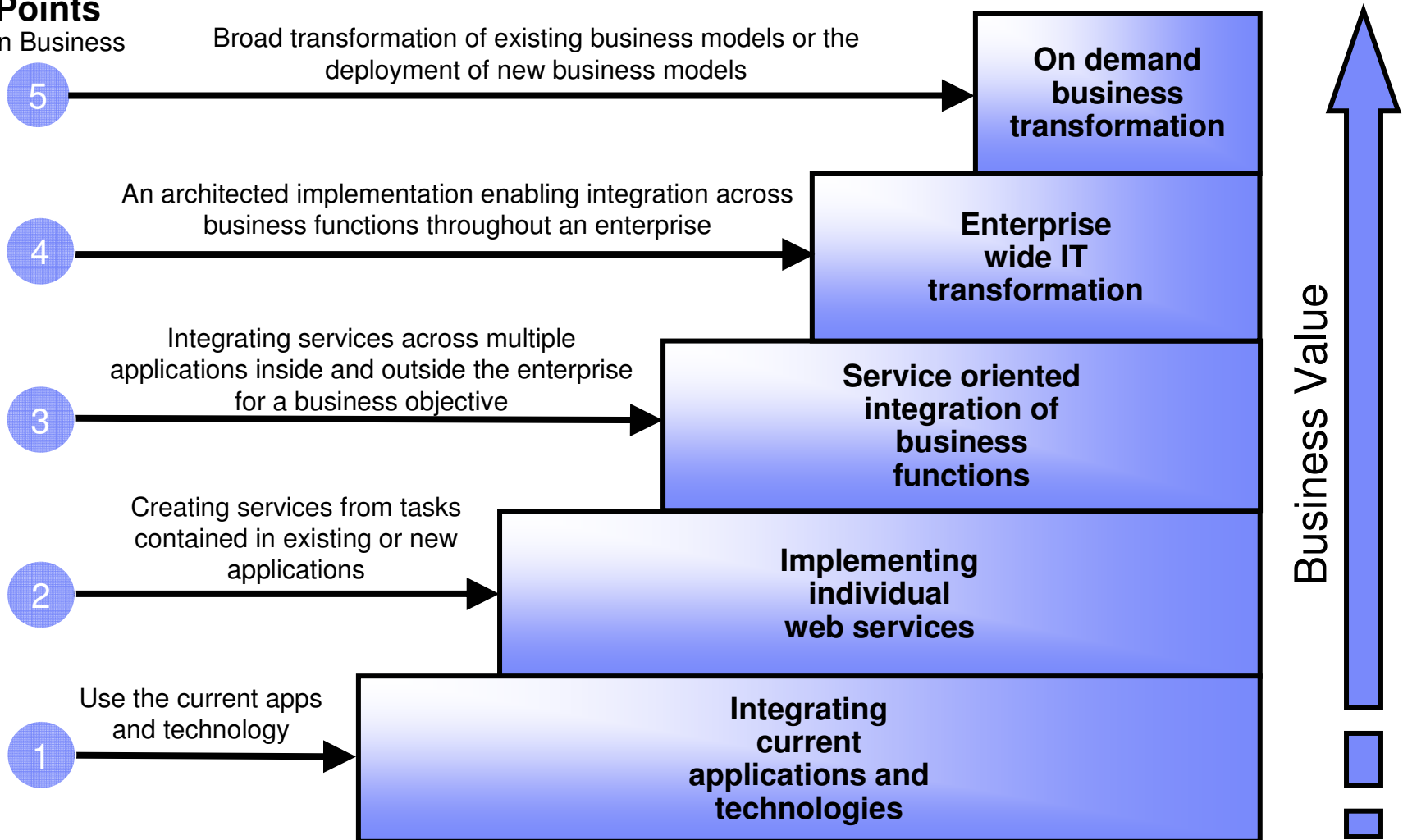


# Different paths to SOA adoption

## Strategic objectives

### Entry Points

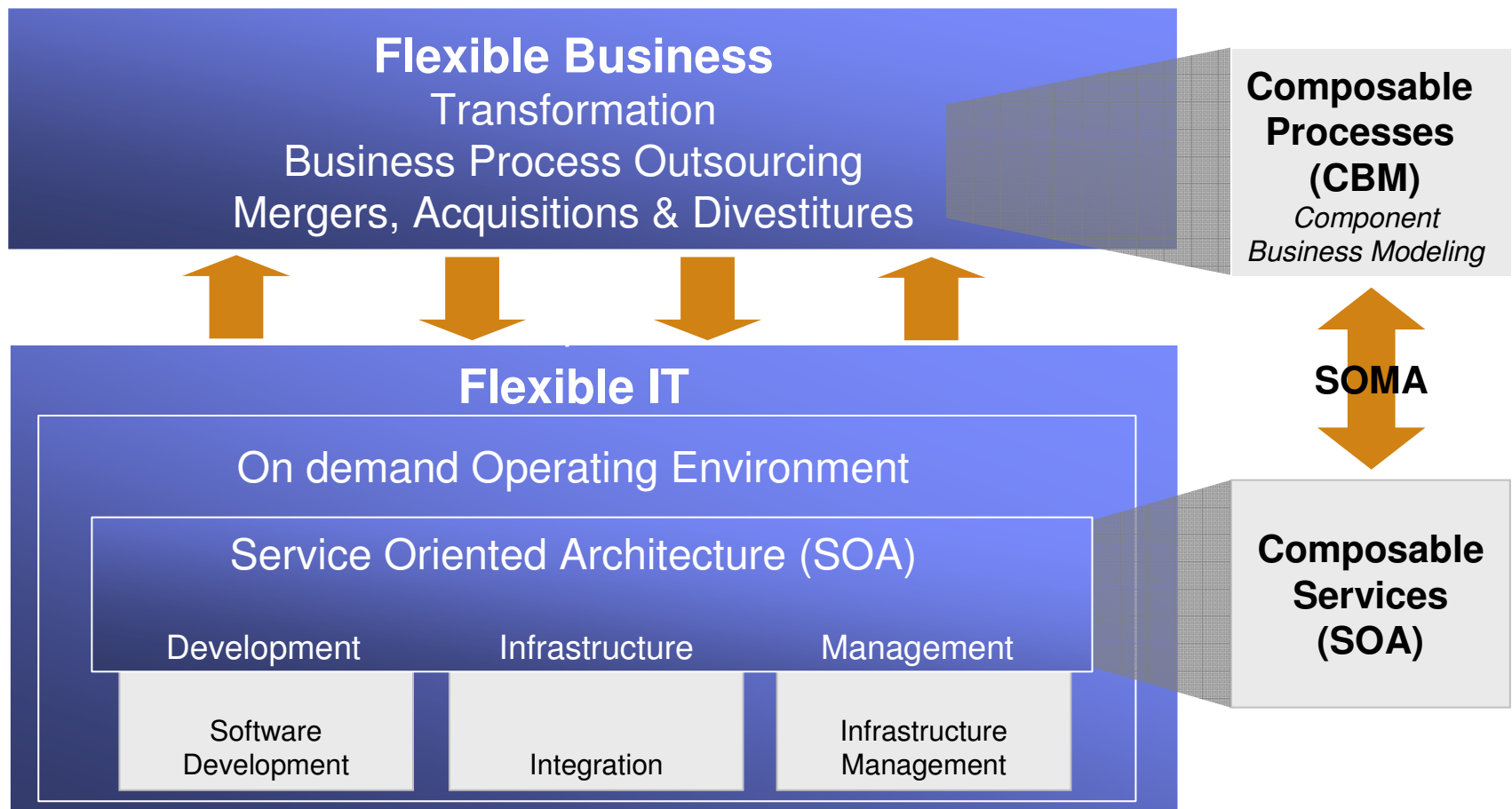
Based On Business  
Priorities



# Business driven SOA adoption

*The business asks to the IT to be more flexible*

*Both business and IT architectures must be componentized to deliver the requested flexibility*



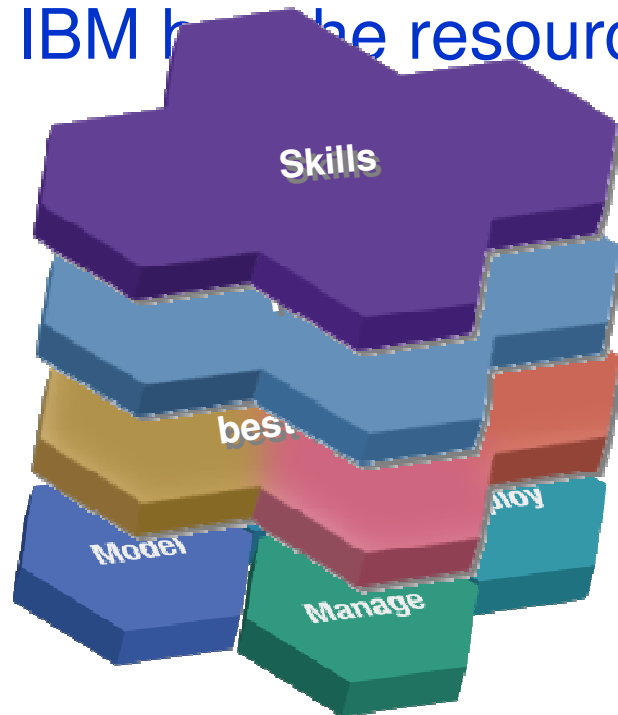
## IT driven SOA adoption

### *Suggested infrastructure actions*

1. Realize a unique Service Registry
2. Realize a bus to link applications (ESB for SOA)
3. Connect legacy applications (mainframe, ERP etc) to the SOA infrastructure
4. Address SOA policies and management capabilities at the business level service (not only at IT service level)
5. Connect Master Data Management and Business Intelligence to the SOA infrastructure
6. Manage security aspects related to the SOA infrastructure
7. Inspect the role of XML-Appliances attempting to optimize the whole IT infrastructure
8. Realize BPM/BPI to allow fast business changes, including process management and orchestration

Source: Aberdeen group 2005

# IBM has the resources available to help you succeed



## ***Expertise in aligning business and IT processes***

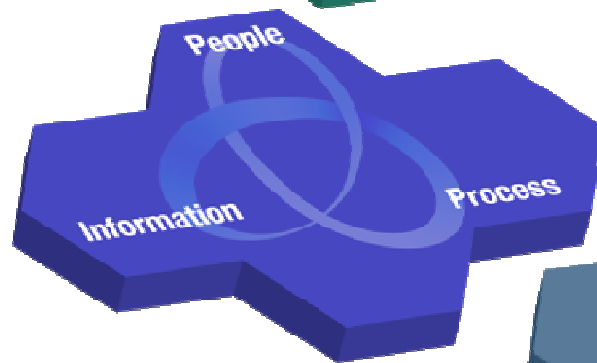
- ✓ 15,000 SOA consultants, architects and IT specialists
- ✓ IBM SOA role-based education roadmaps

## ***Thriving ecosystem of partners (ISVs, SIs, Resellers)***

- ✓ 2,500+ Business partners and solutions

## ***Extensive industry experience and best practices***

- ✓ Over 2900 customers worldwide
- ✓ 500 pre-built industry-specific data and process models
- ✓ Component Business Models for banking and Information FrameWork (banking business and data models)



## ***Unmatched breadth and depth of products***

- ✓ Over \$1B/year invested in SOA
- ✓ Commitment to open standards

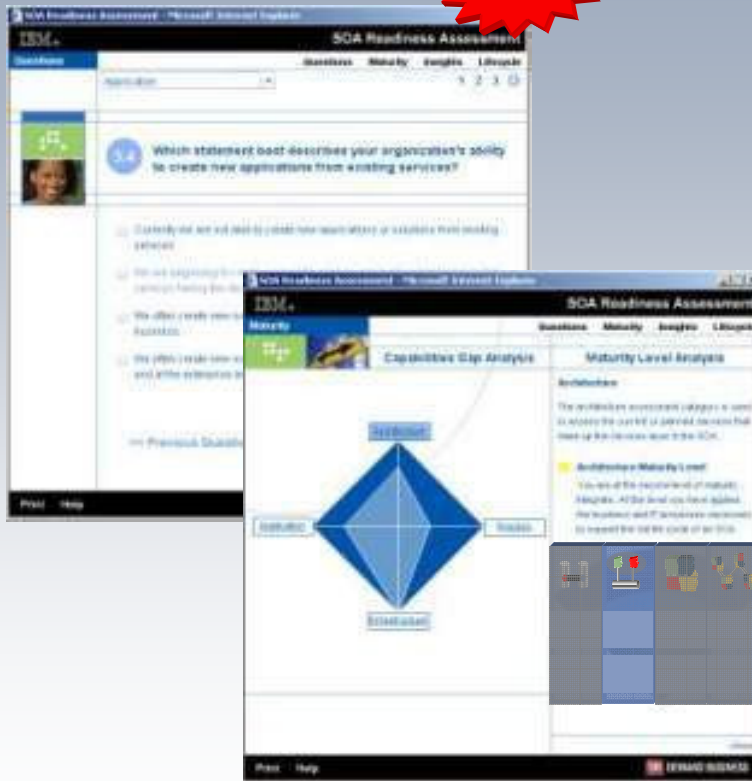


***Best practices***  
services to drive the effective use of  
and reduce the risk and cost of compliance

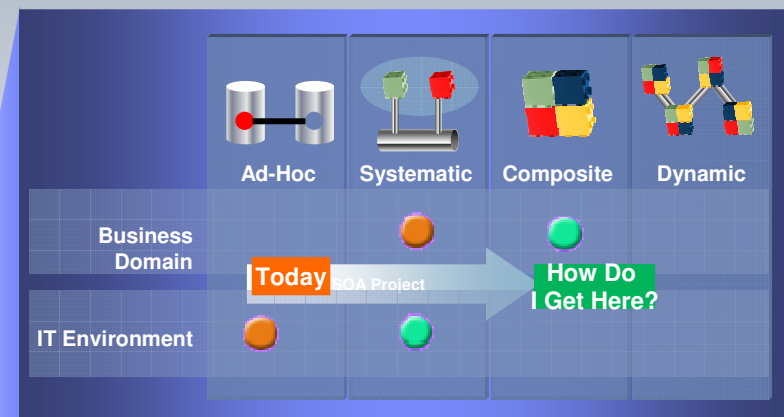
# Get Started Now!

SOA Assessment Tool Online or On-site

**Free!**



Receive actionable recommendations customized to your level of SOA maturity



Find out at [ibm.com/soa](http://ibm.com/soa)  
or contact [soa@us.ibm.com](mailto:soa@us.ibm.com)

# Conduct an IBM SOA Workshop

*IBM Architects & Subject Matter Experts to Help Your Project Selection*

## Line-of-business led SOA Workshop

- Evaluate enterprise architectures SOA readiness
- Analyze governance maturity
- Provide SOA-based solution adoption roadmap

## IT-led SOA Workshop

- Skill development and governance
- Integration architecture workshop
- Actionable next steps



## developerWorks – SOA and Web Services zone

- developerWorks is IBM's award-winning resource for developers and customers taking the next step to a service-oriented architecture.

Get up to speed quickly with valuable SOA resources:

### developerWorks:

- ✓ #1 Rated Vendor Developer Program (IDC)
- ✓ 2nd largest developer community in industry
- ✓ 31 industry awards



### Skill-building

- ▶ Attend online presentations in the “**SOA technical webcast series**”
- ▶ Fast-track your skills through **tutorials** such as “SOA Certification” designed for beginner to advanced developers
- ▶ Download the “**IBM enterprise architect kit for SOA**” and learn how to align your business needs with IT



### Community resources

- ▶ Discussion **forums** for knowledge-sharing with peers & technical experts
- ▶ Read **blogs** by industry experts including Bobby Wolf & Sandy Carter.
- ▶ Subscribe to the developerWorks **newsletter** and get the latest news delivered to your email



### Technical resources

- ▶ Stay informed of SOA developments through **technical articles**
- ▶ Download and evaluate **trial IBM Software**
- ▶ Tune into the latest technical **podcasts**, including the “Making SOA Real with IBM WebSphere” series, and “This week on dW”

[www.ibm.com/developerWorks/webservices](http://www.ibm.com/developerWorks/webservices)

# Business Services ecosystem highlights

*Industry specific assets and expertise from Business Partners and IBM*

- SOA Business Catalog ([ibm.com/soa/soabusinesscatalog](http://ibm.com/soa/soabusinesscatalog))

- Contains SOA Specialty Partner and IBM content
- Promotes, facilitates, and enables the ecosystem
- Total Assets – 3110
  - Partners – 62%
  - IBM – 38%
- 12,000 Downloads

- Industry-specific business services

- Healthcare and Insurance available now
- Banking (payments) available 4Q

- Global Business Solution Center

- Capturing industry-specific best practices for global delivery

- Business Partner SOA Industry Solutions

New!

- "Ready for SOA" mark



Ready for

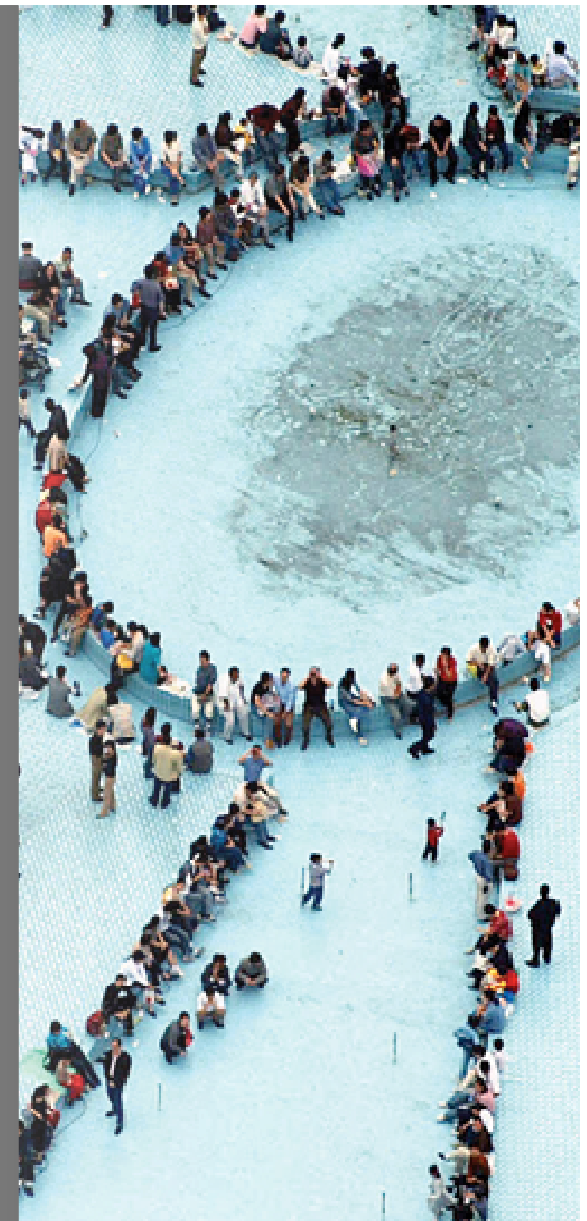
**IBM** | **SOA**

Specialty

## Take Action

- Join the IBM SOA Partner Community
  - Learn a better way to SOA with IBM
- Specialize
  - Build your SOA capabilities
- Take advantage of Specialty resources
  - Joint marketing resources
    - Press releases
    - Discounted advertising service
    - SOA Published case study
  - Close sales quickly
    - SOA sales specialists available

[ibm.com/partners/soa](http://ibm.com/partners/soa)



धन्यवाद

Hindi

多謝

Traditional  
Chinese

ขอบคุณ

Thai

Спасибо

Russian

Gracias

Spanish

Obrigado

Brazilian  
Portuguese

Grazie

Italian

شكراً

Arabic

*Thank You*

English

多谢

Simplified  
Chinese

Danke

German

Merci

French

நன்றி

Tamil

ありがとうございました

Japanese

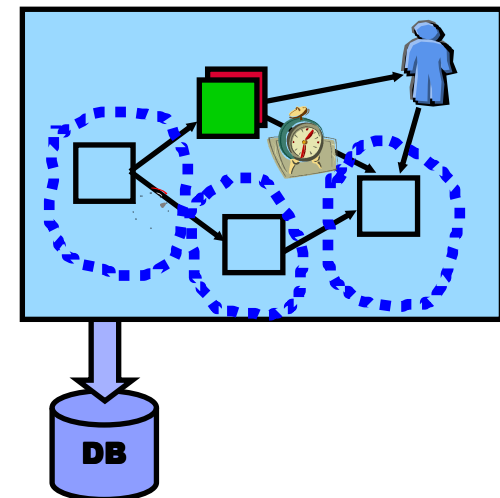
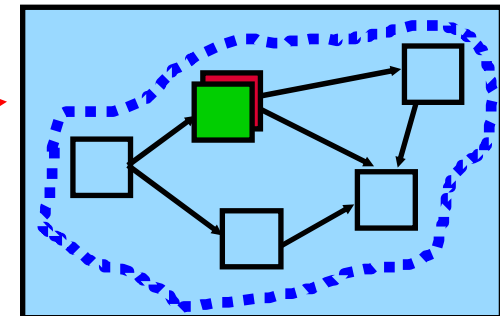
감사합니다

Korean

# Backup slides

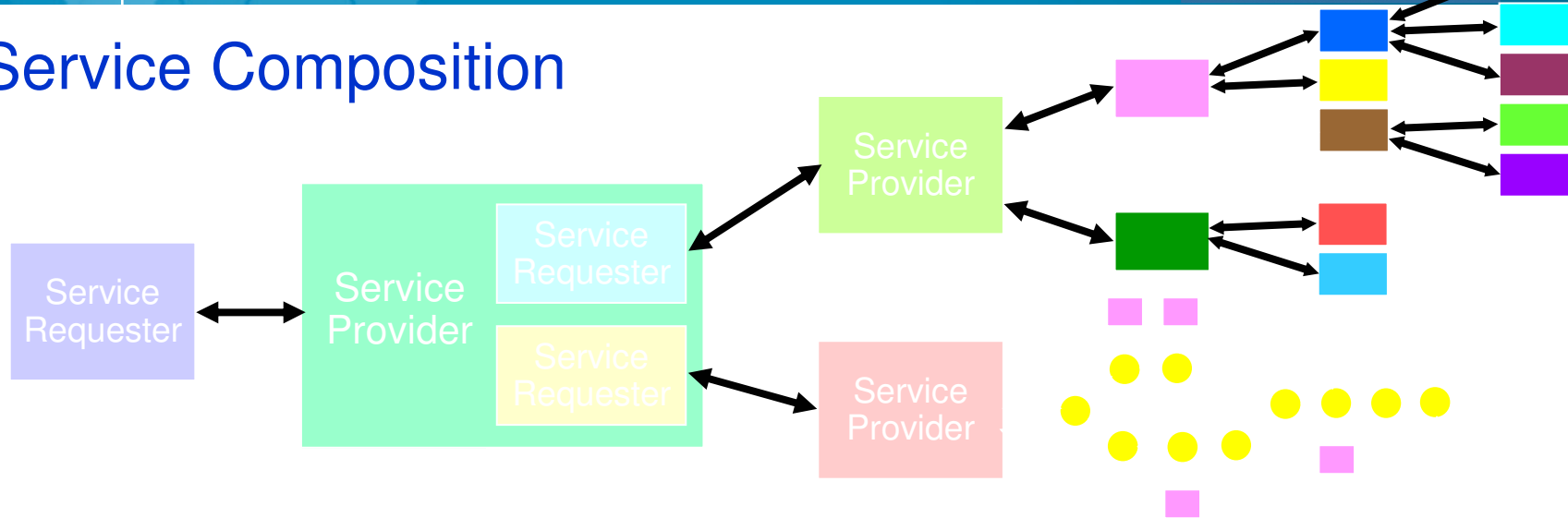
# What is a Process?

- Process is a directed graph of Activity Nodes that represents a single business activity
- There are two types of Processes
  - Short-running (Microflow)
    - Basic Process Choreography
    - Non-interruptible
    - Not persistent
    - Single transaction per Process (Single unit of work)
    - High throughput
  - Long-running
    - Advanced Process Choreography: supports all types of activities including those not supported in microflows, e.g. human interaction and asynchronous invocations
    - Interruptible
    - Persistent (state stored persistently)
    - Transacted execution
    - Requires compensation





# Service Composition

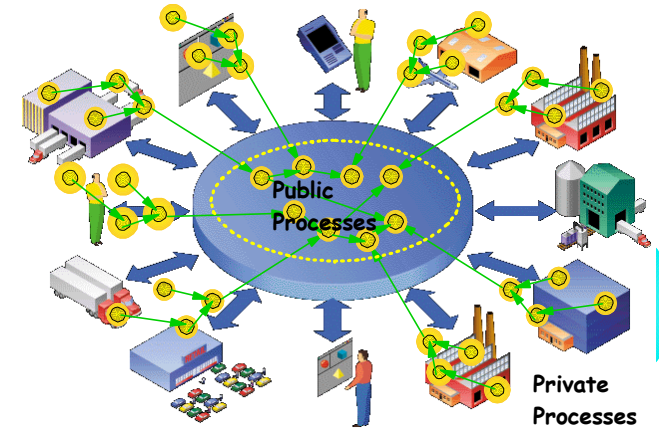


- A Service Provider might also be a Service Requester. It might have logic to drive several Service Requesters to define a new, coarser-grained Service. This is called *Service Composition*.
- The Service Requester may not know that the Service it uses is actually built out of other Services, so Service Composition can be recursive. As long as the composite Service provides the required quality of service, we don't care.
- Java might be used for simple composition, but for arbitrarily complex business processes, BPEL might be a better approach.



## Service Choreography

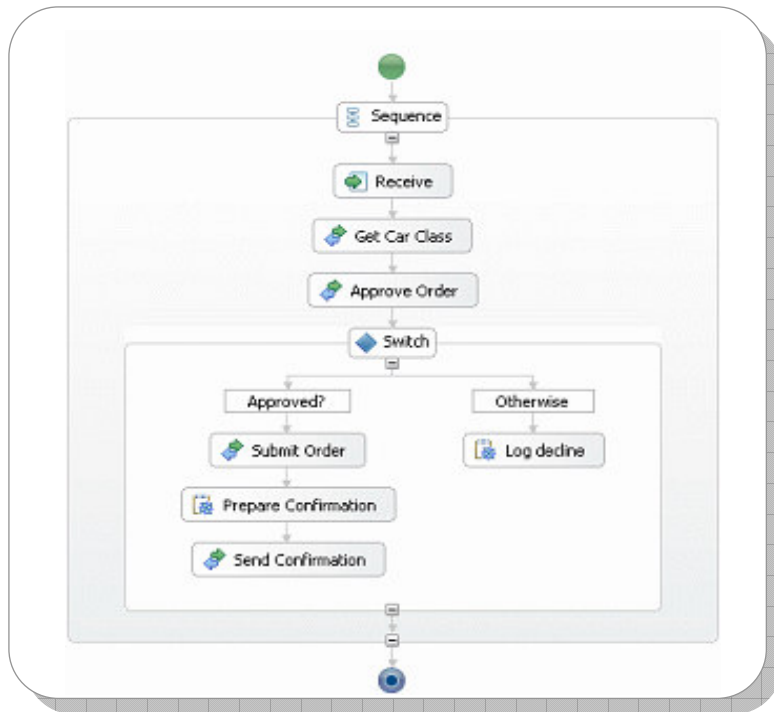
- Business Processes are a set of activities
- that are carried out in a particular sequence
- to support a business activity.
- Services can be choreographed to implement
- a Business Process as a new Service
  - A step or activity in a business process can invoke a Service
  - The resulting business process itself becomes a Service like any others – it can be described in WSDL, invoked with SOAP, etc
  - We can compose new Services out of a Business Process driving, using BPEL, Java, or any other language
- BPEL (Business Process Execution Language) is a specification to describe a portable XML representation of such business processes
  - OASIS-open.org has formed a Technical Committee to create a standard based on BPEL, and the work is in progress.
  - Products from IBM, Microsoft and others currently support the proposed BPEL spec
- BPEL provides:
  - Processes that combine applications and people
  - Transactionality, fault handling, compensation
  - Manipulation of process data



# Two Styles of Service Choreography

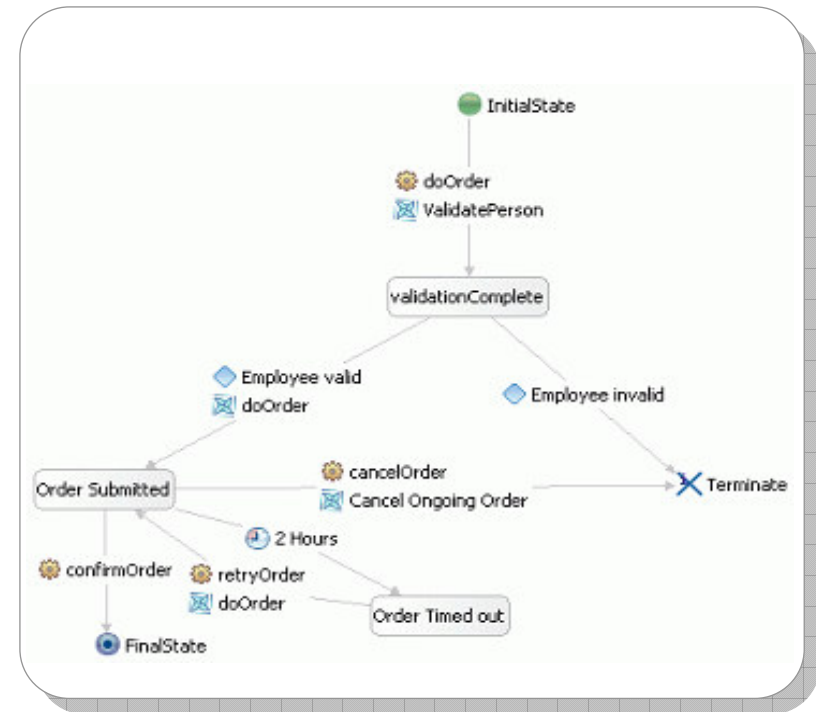
- Business Processes

- Traditional Business Processes
- Full spectrum of BPEL available
- Focus on activities



- Business State Machines

- Used for event-driven Business scenarios
- Supports arbitrary cycles
- Focus on business states

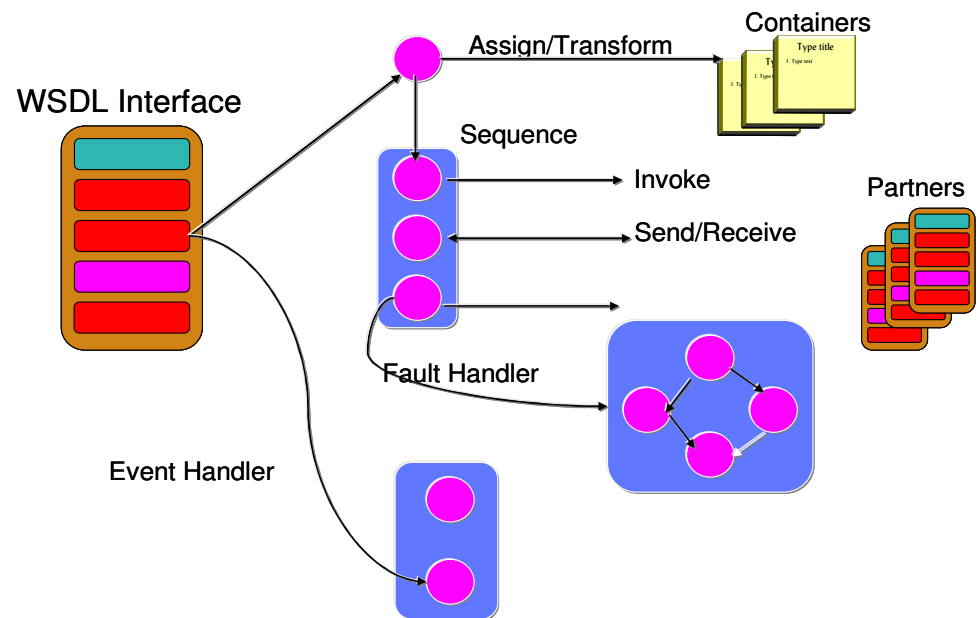


# Process Integration – BPEL4WS

*BPEL is a XML “Schema” for defining business processes that implement a WSDL Interface*

## Core Concepts

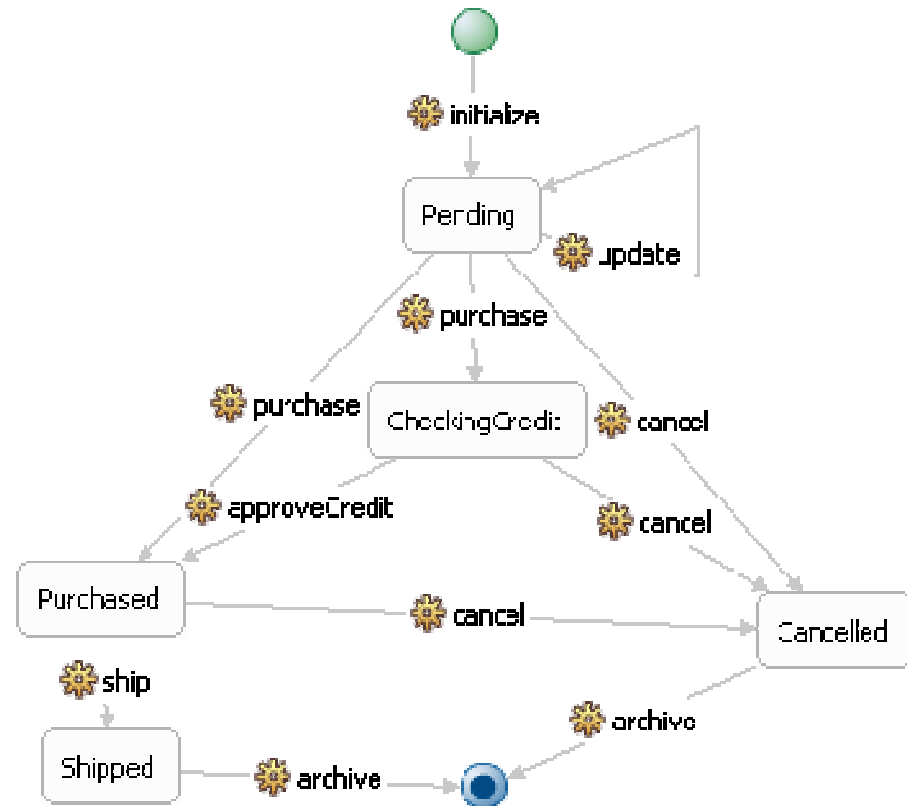
- Activity
  - Simple Types: Invoke, Receive
  - Compound Types: “Flow,” Sequence
- Container (Business Object) that is input/output of Activity
- Partner definitions (WSDLs that I call or call me)
- Exceptions, Fault Handlers and Compensation, Event Handlers
- Java Snippets



## Support for Compensation

# Business State Machines

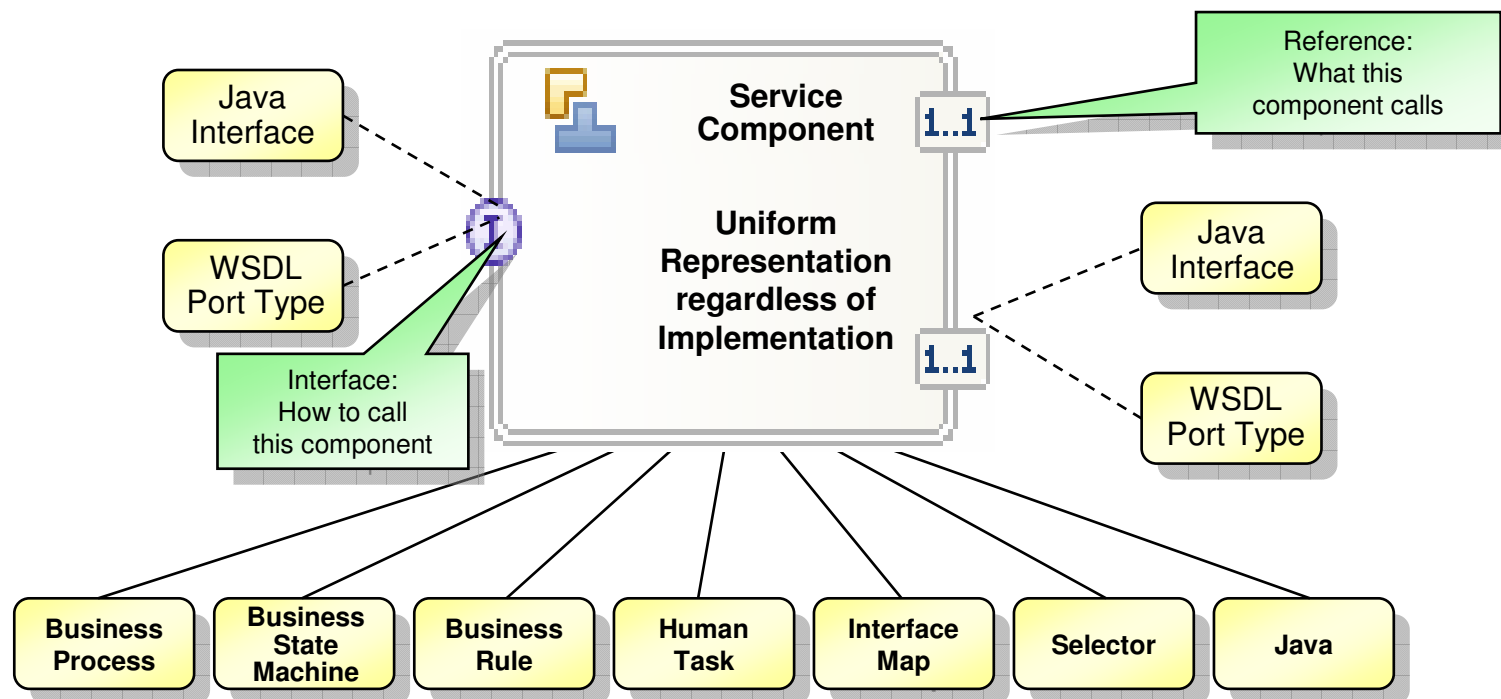
- An efficient way to model certain processes
- States and state transitions frame the process
- Logic embedded in the transitions
- Based on UML 2.0 State Machine



# Service Components

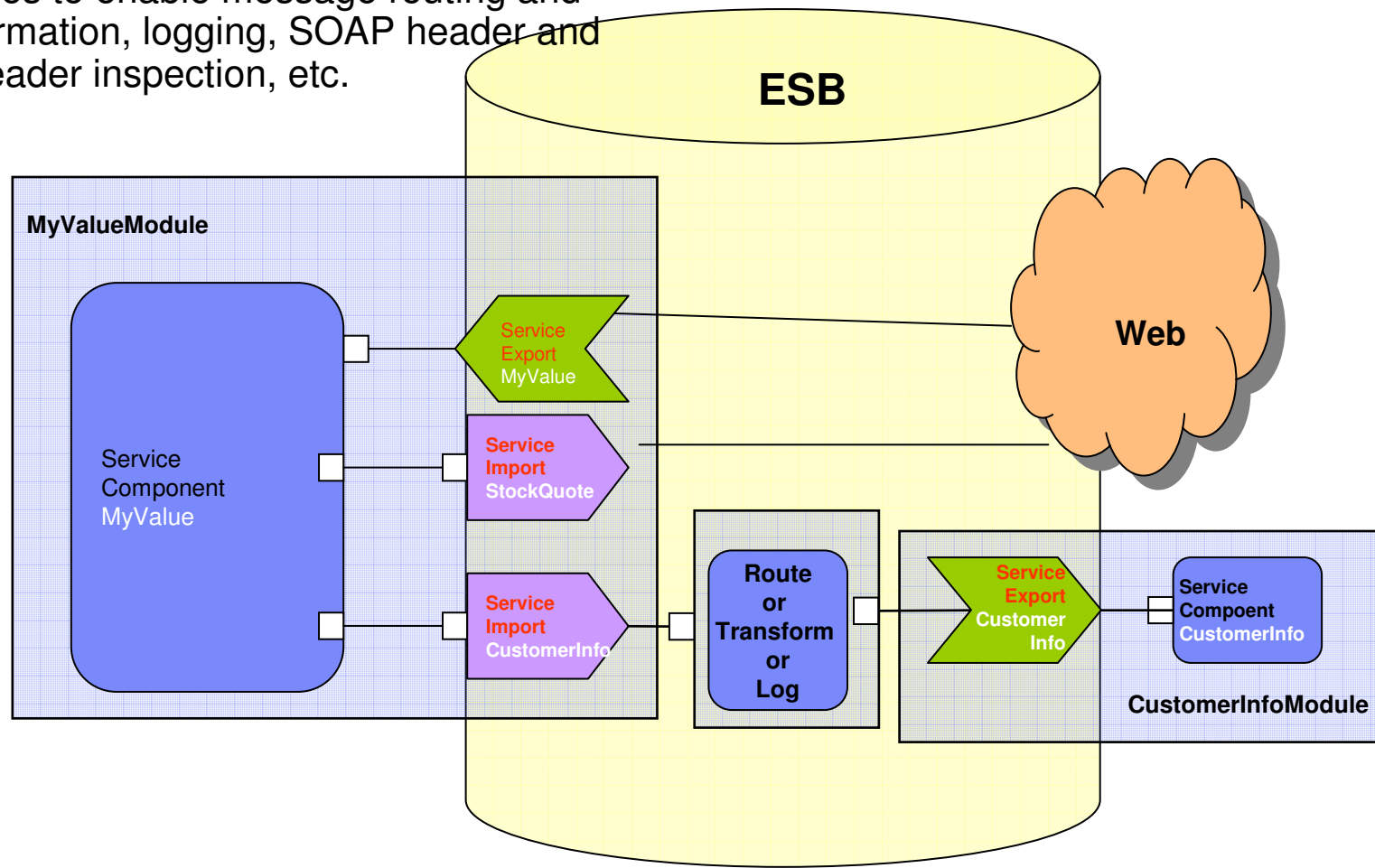
## *Normalizing Invocation complexity*

- All solution artifacts defined through Service Component Architecture (SCA) and appear as reusable Service Components
- Service Components are wired together to form deployable solutions
- Business Objects are the data flowing between Service Components



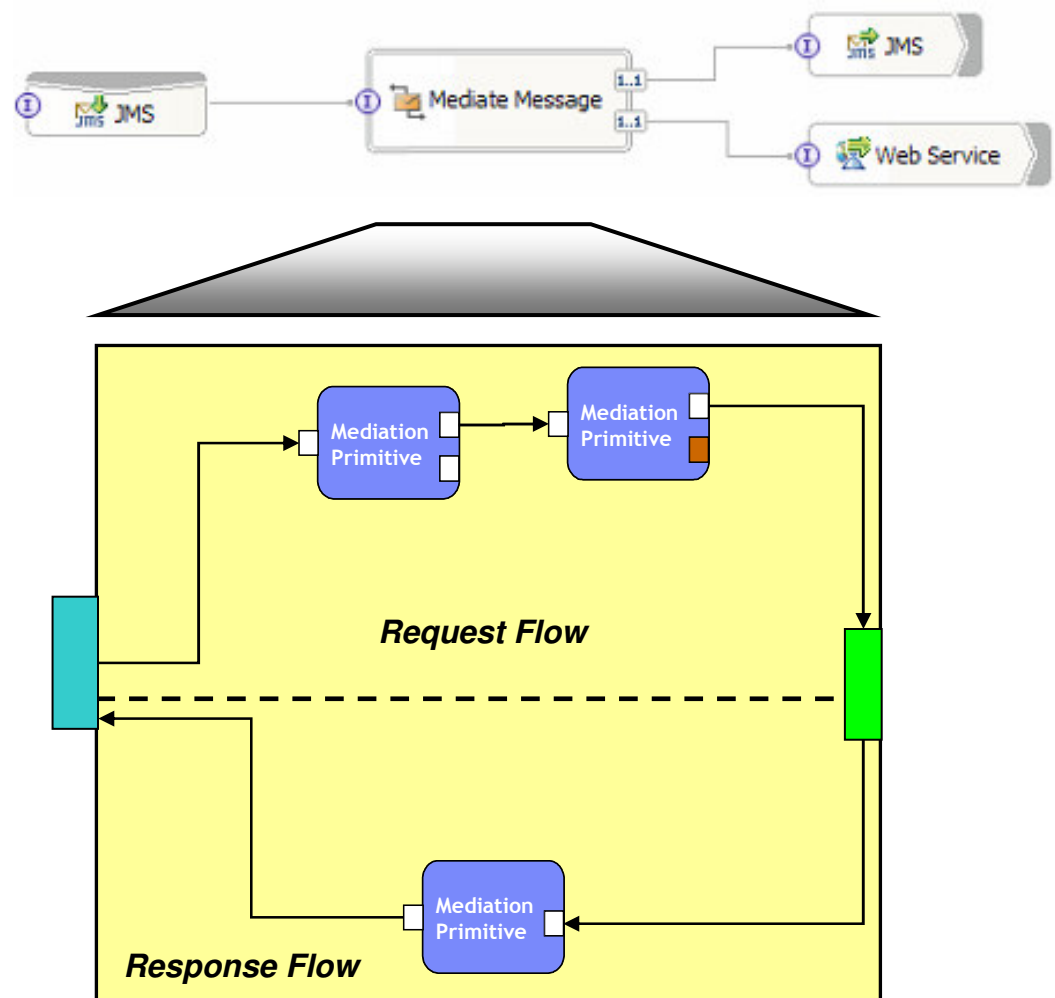
# Service Components and the ESB

- Authoring and Admin/Config tools
- Primitives to enable message routing and transformation, logging, SOAP header and JMS header inspection, etc.



# ESB Mediation Component

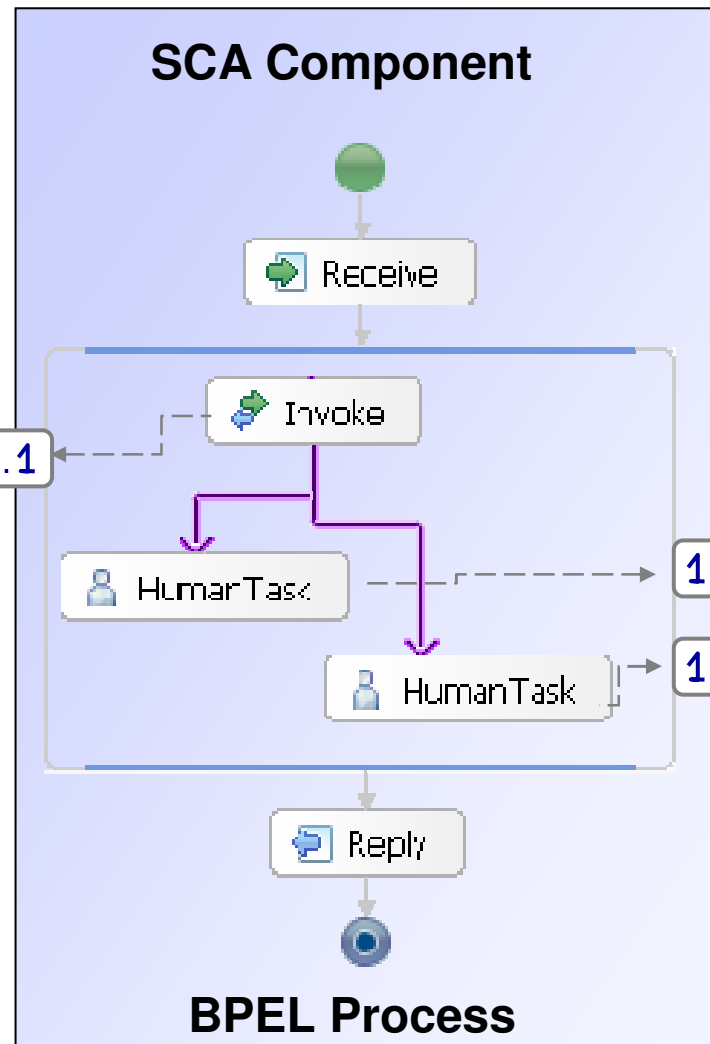
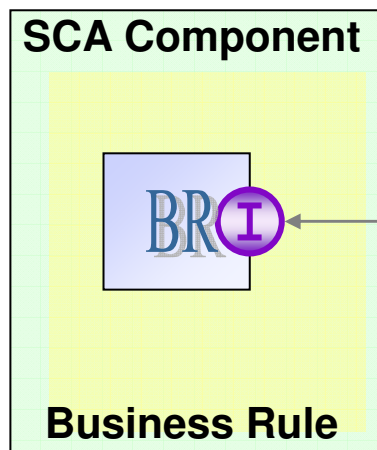
- Provide the implementation of mediation “logic”
  - “flows” that operate on messages/events as they are processed by the system
  - Operate on both one-way and request-response interactions
- Pre-supplied primitives allow flows to be visually composed
  - XSLT transformation
  - Message logger
  - Message filter
  - Fail
  - Stop
  - Database lookup
  - Custom (Java) component
  - CEI emitter (Post GA)



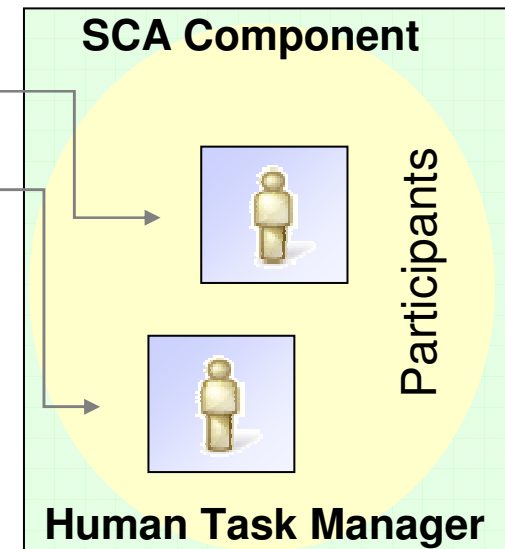


# Business Rules and Human Tasks Manager

- **Business Rules & Decision Tables dynamically determine process flow**
- Expose process decision points as business parameters

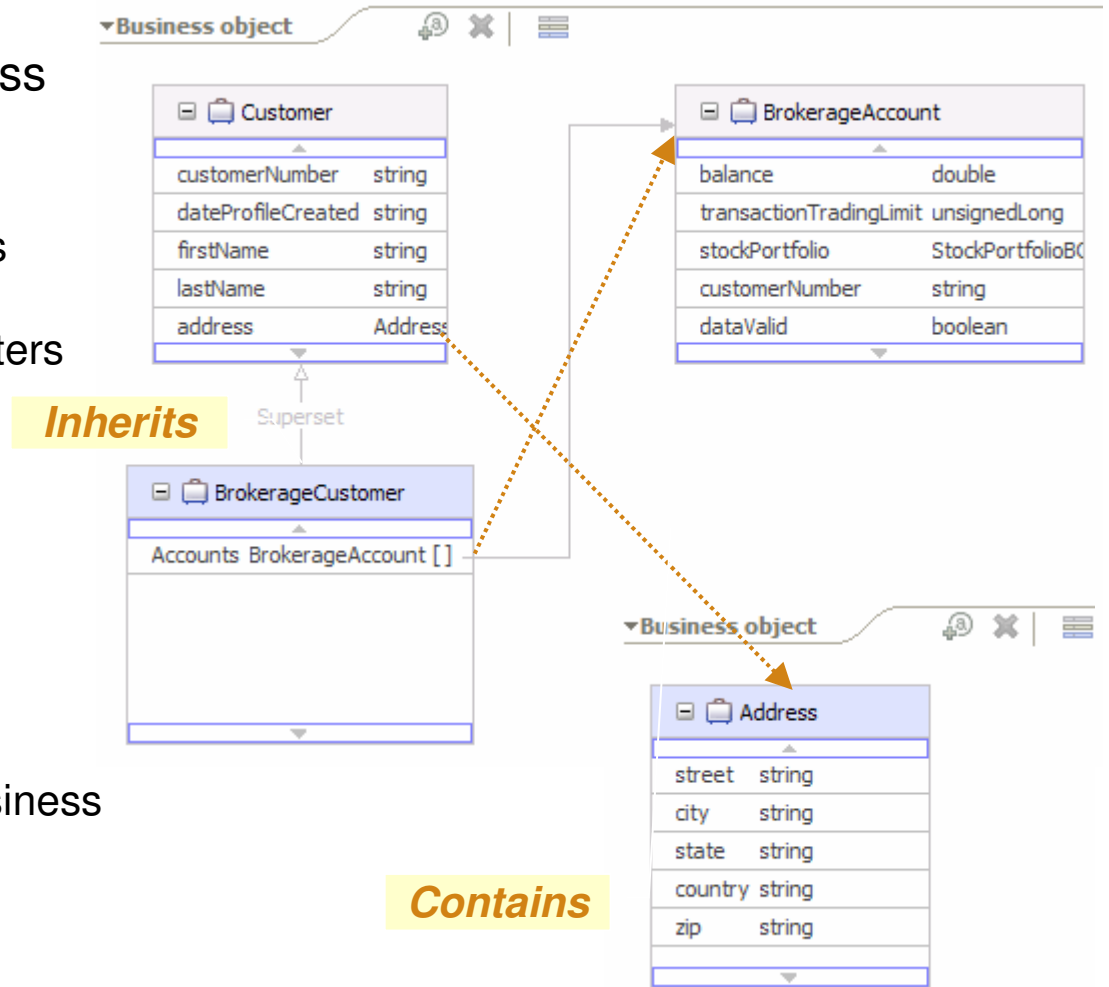


- **Human Task Manager resolves Staff resolution against an external directory**
- LDAP – uses LDAP registry
- User Registry – uses WebSphere Process Server security registry

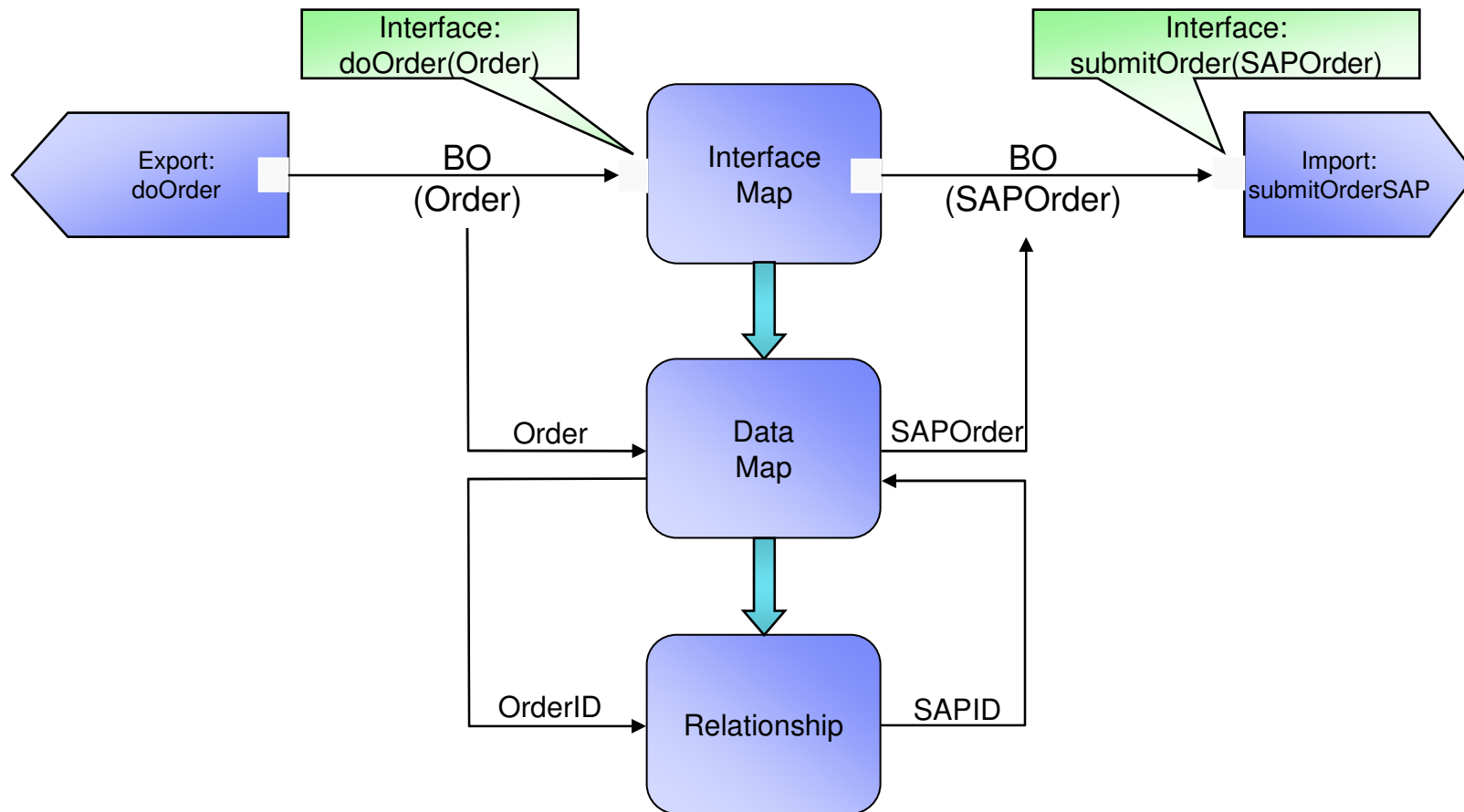


# Data Complexity isolated through Business Objects

- All data are described as Business Objects (BO)
  - Defined via XSD
  - Deployed as Service Data Objects (SDO)
  - Automatically generated via Adapters
- Inheritance
  - True Objects ~ specialize BO by inheriting from existing BO
- Nesting
  - A BO may contain other BOs
- Generic or Application Specific
  - Abstraction enables Common Business Object Model (CBOM)

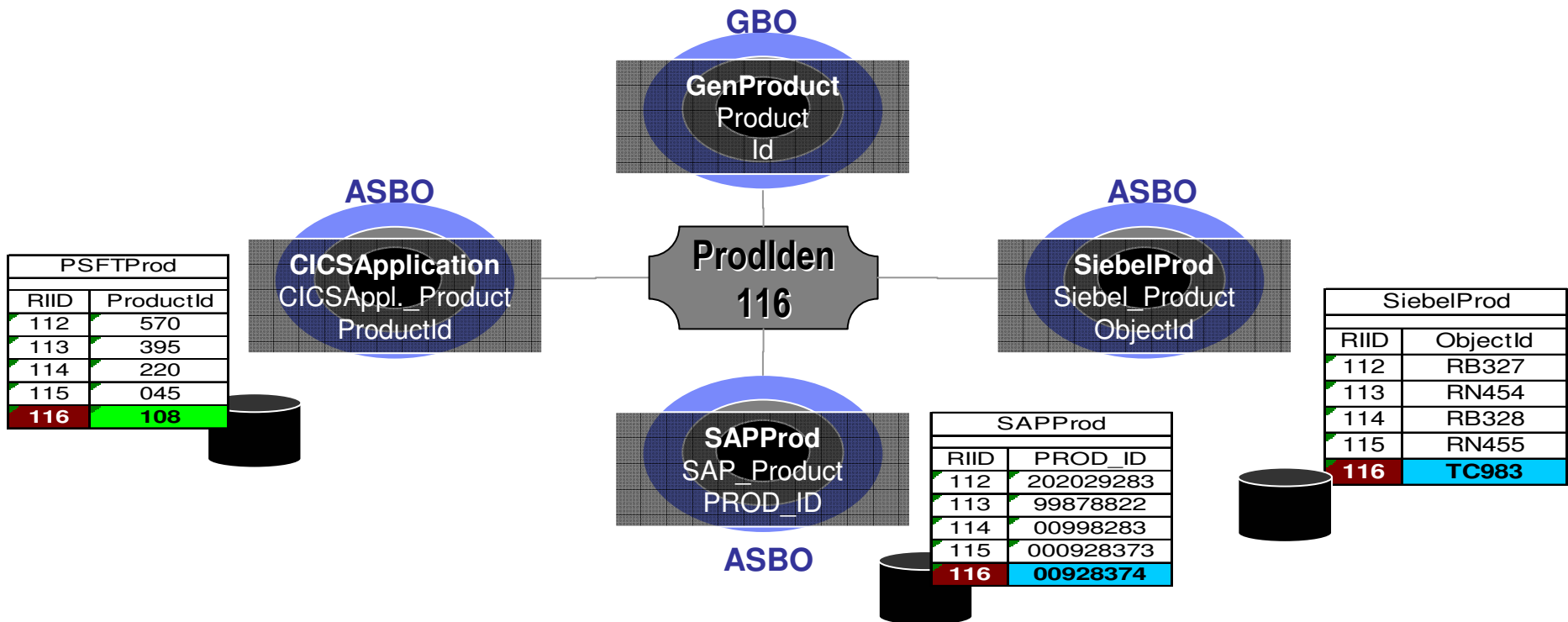


# Transformation Components



# Dynamic Relationships

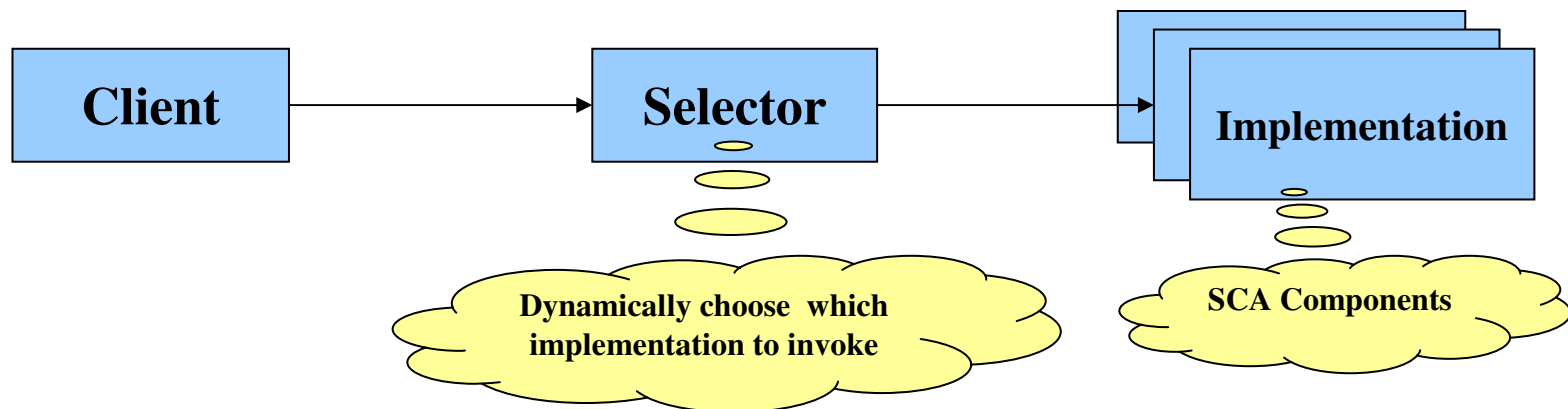
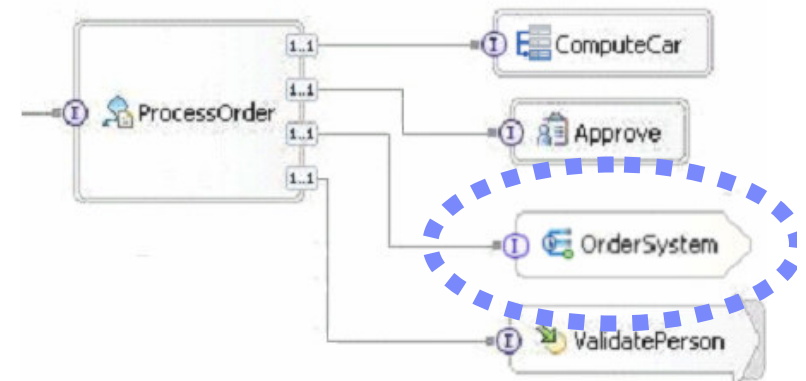
- Leverages the generic layer to relate attributes between business objects
  - Cross-referencing
  - Static (lookup)
- One-to-One, One-to-Many, Many-to-Many
- Callable in multiple contexts
- Generates database schema & stored procedure code



# Selectors - Dynamic Service Invocation

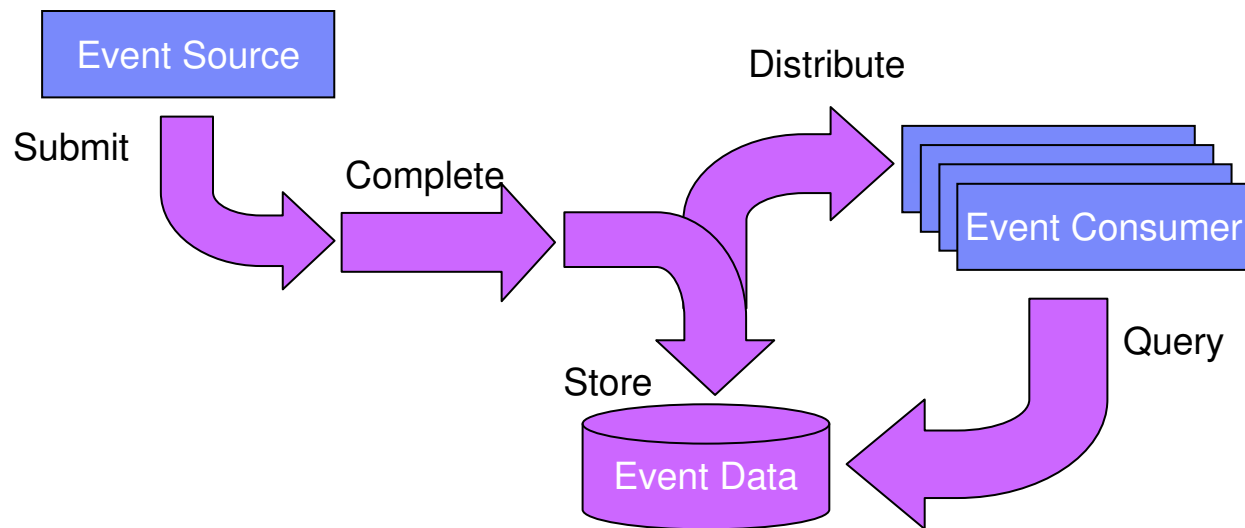
*Dynamically select which service to invoke*

- Target service: Any service component
  - Processes, rules, human tasks, applications, etc
- Selection criteria, e.g. scheduling rules
  - Call a human task during business hours, and a business rule during off-shift hours
  - Other selection rules
- Web-based interface for dynamic updates to the selection criteria and target services which may not even have existed at deploy time!



## Standard way to Describe, Distribute and Correlate Management Events

- Provides for consistent representation of management events
  - Based on Common Base Event (CBE) which is a proposed standard
    - Describes how events are created, structured, stored, routed and retrieved
- Strategic technology in use across IBM Software Group
  - Tivoli, WebSphere, DB2, etc...
- Exposes API to allow anyone to write or consume CBEs



## WS-I.org: to provide interoperability



- WS-I.org announced Feb 6, 2002
  - Industry initiative for Web services
  - Open to any organization committed to Web services
  - Promote and accelerate adoption, deployment of Web Services
- Drive seamless interoperability of Web service implementations
  - Across platforms, applications, and programming languages
  - Promote a common, clear definition for Web services
  - Promote customer adoption & deployment
- Integrate specifications from standards bodies by
  - creating "profiles" based on specifications and standards
  - Implementation guidance and tools for customers building and deploying Web services
- Basic Profile 1.0 published August 2003
  - how to build interoperable apps using SOAP, WSDL, UDDI