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IBM WebSphere Infrastructure for SOA & ESB

University of Toronto

SOA Overview

SOA Development Concepts

Glen McDougall,
IBM Canada Ltd.

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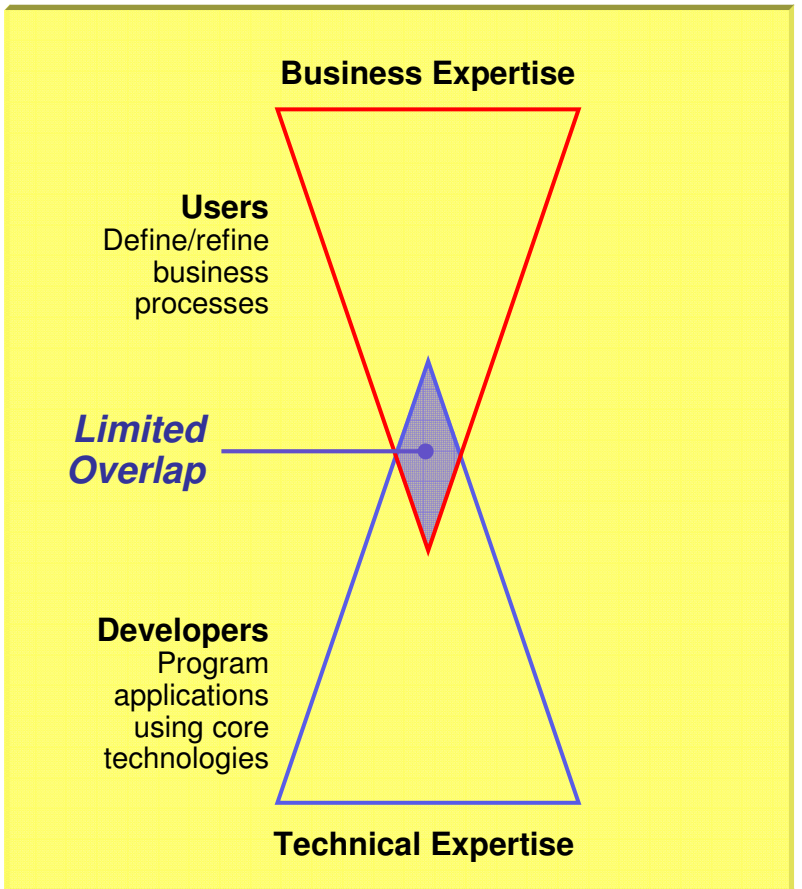
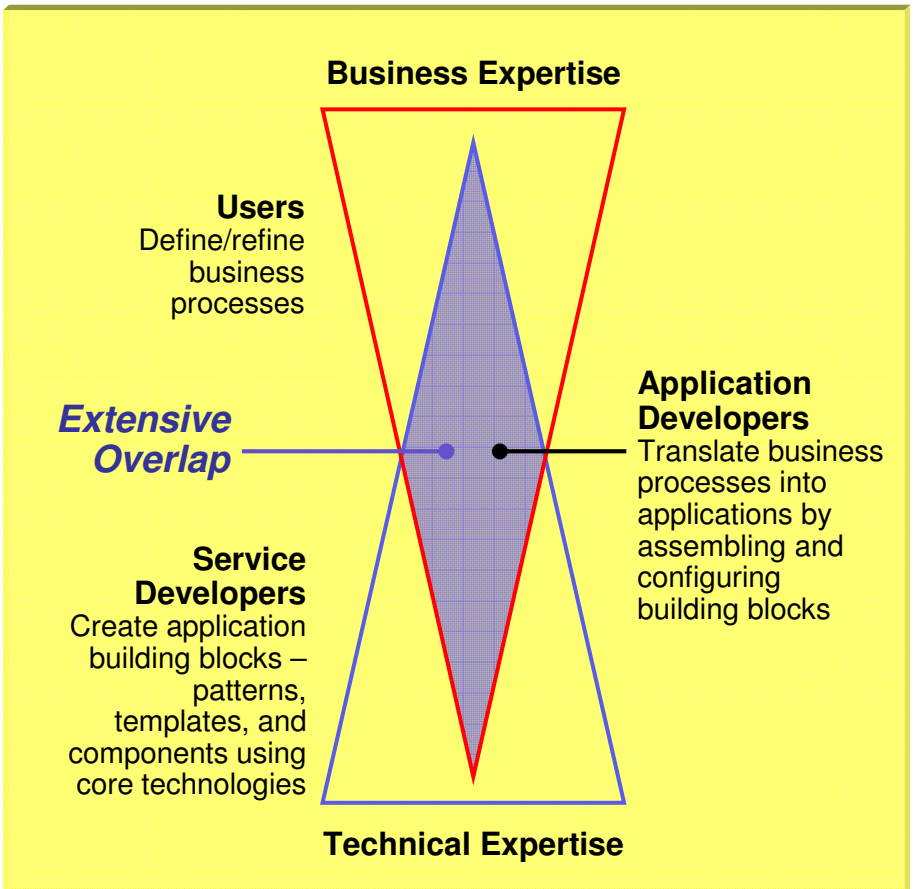
A New Programming Model

Supporting the SOA Abstraction Layering

Traditional Software Development

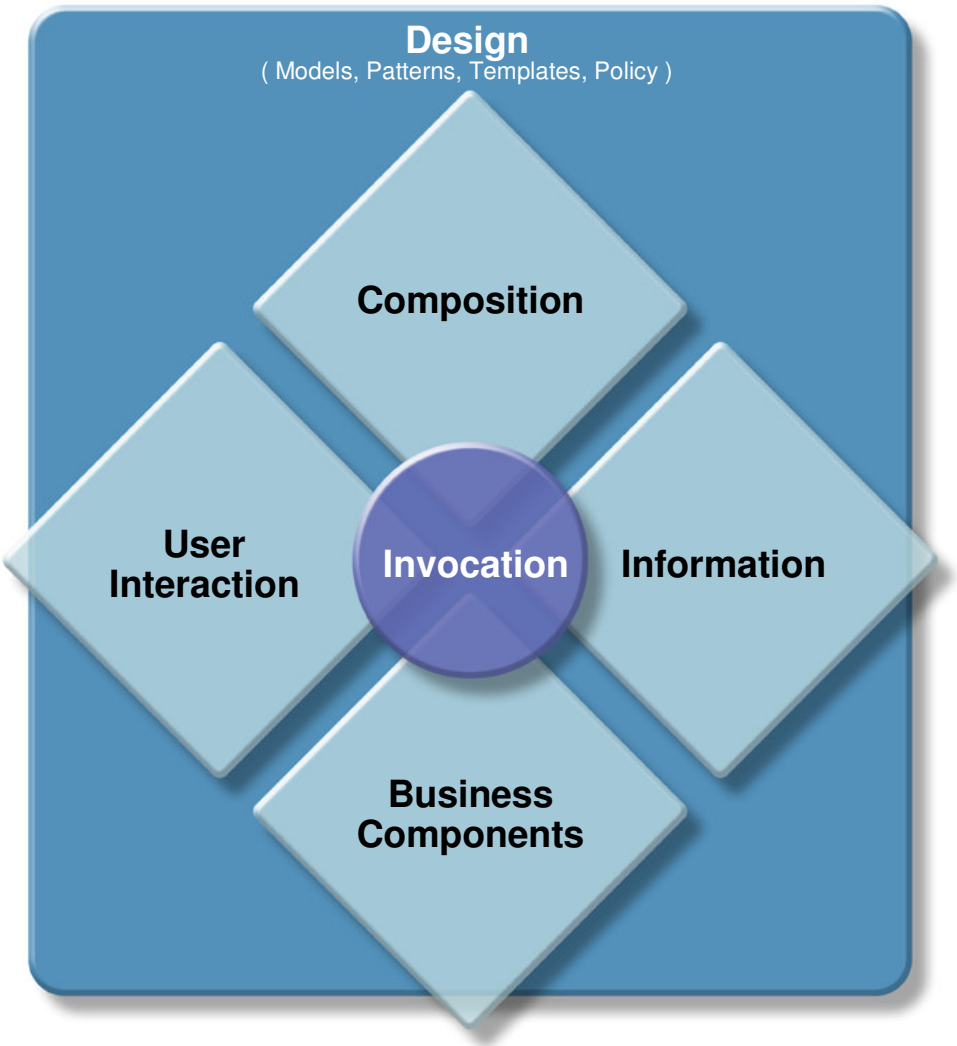


Service-Oriented Development



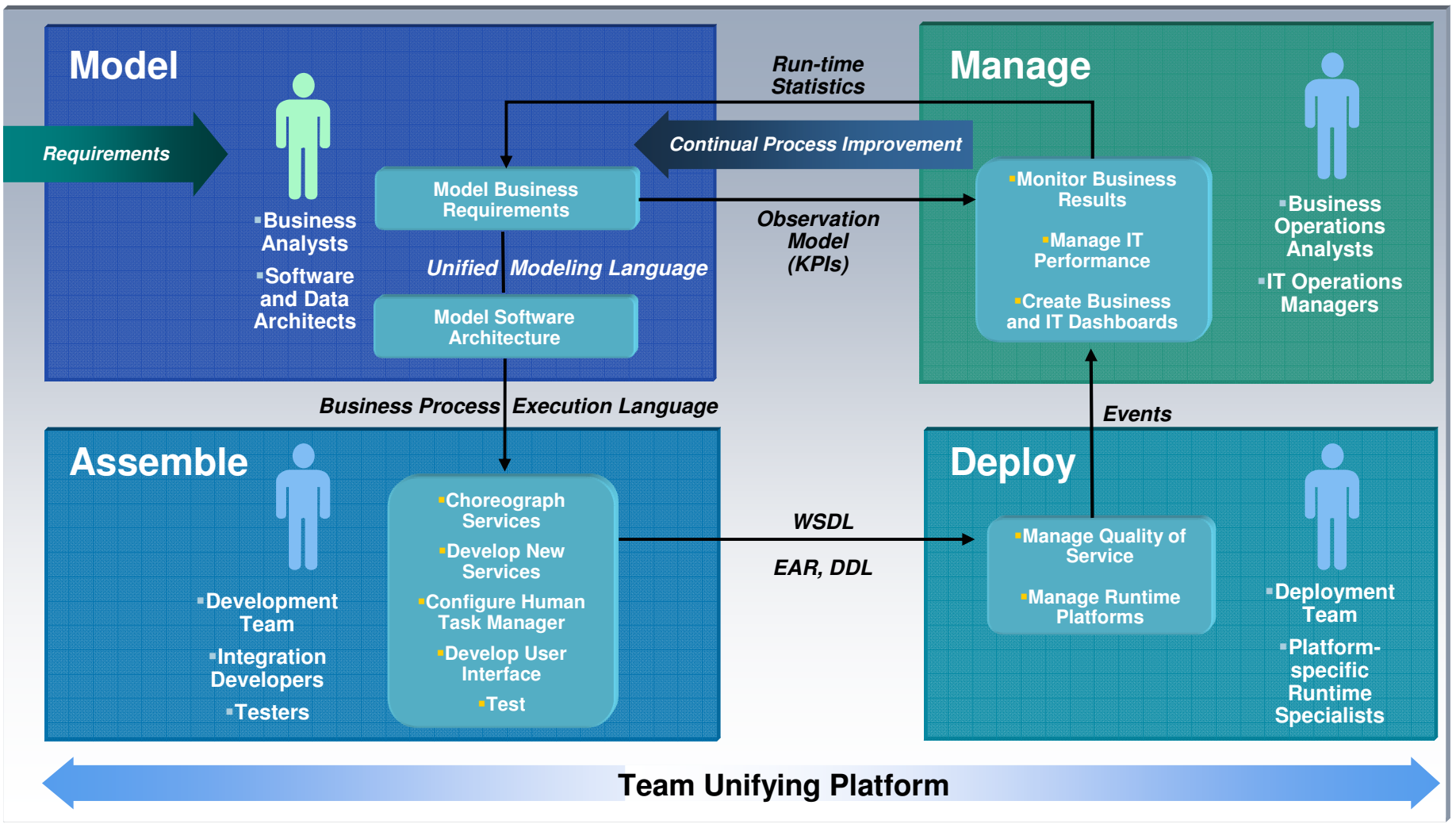
SOA Programming Model Aspects

- **Design**
  - Focus on business design modeling, simplification, and role-based collaboration
  - Use of declarative policy to control execution behavior and relationships
- **Invocation**
  - Loosely-coupled call-style and event-driven interconnection of services with built-in support for topology transparency, mediation, and brokering featuring standards-based interoperability
- **User Interaction**
  - Dynamic support for people integration into the business design
- **Composition of Business-level 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

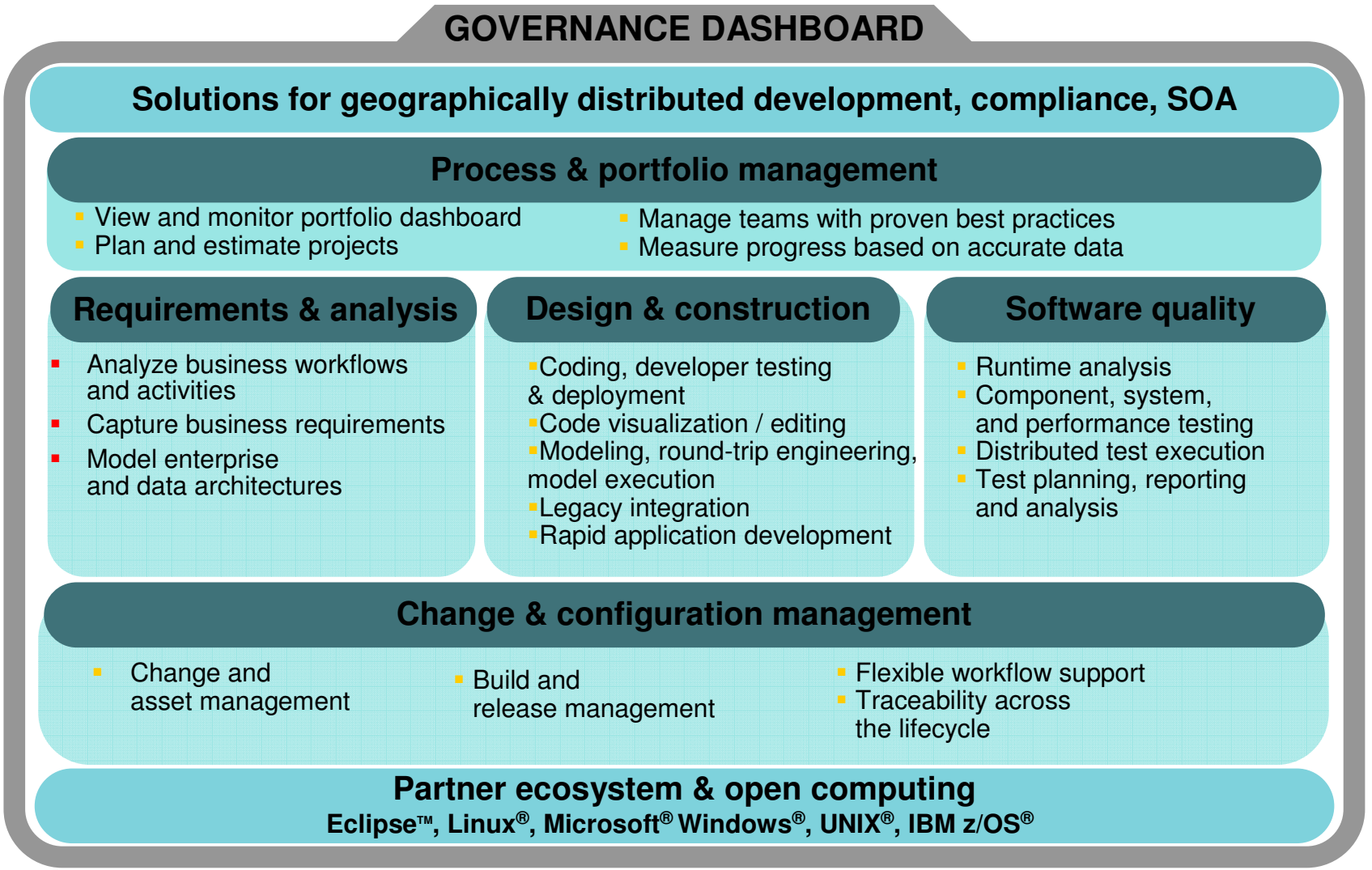


Business Driven Development

An Iterative, Business-focused Development Process



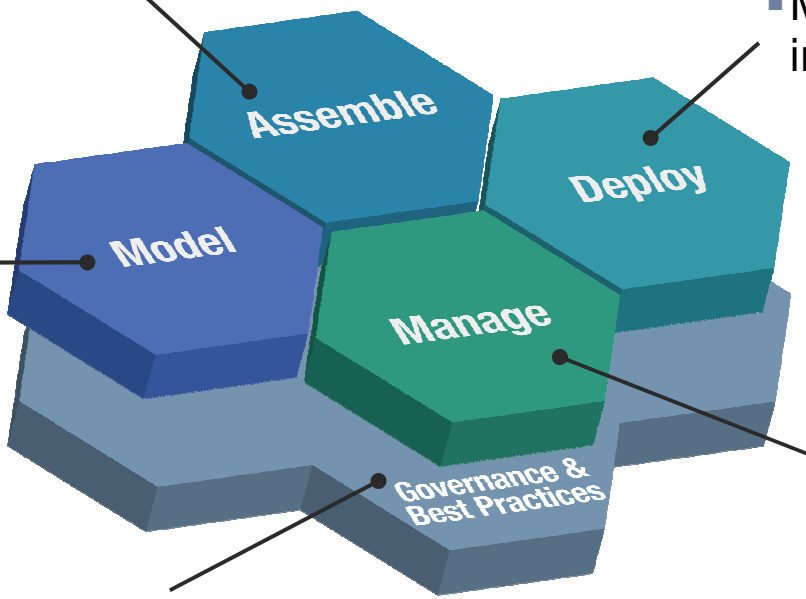
IBM Rational Software Development Capabilities



The SOA Lifecycle

- Discover
- Construct & Test
- Compose

- Integrate people
- Integrate processes
- Manage and integrate information



- Gather requirements
- Model & Simulate
- Design

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

- Financial transparency
- Business/IT alignment
- Process control

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SOA Overview

SOA Entry Points & SOA Scenarios

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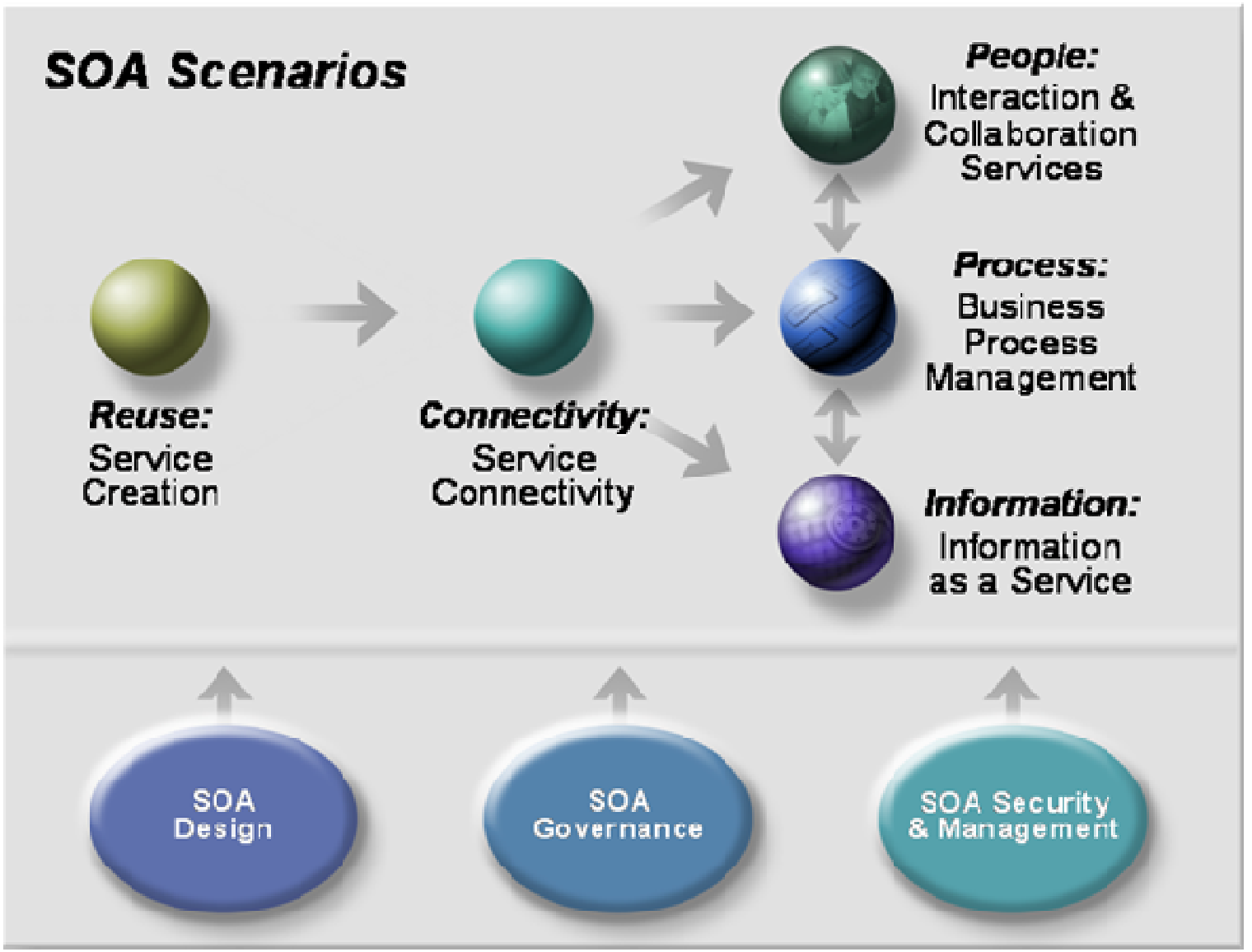
SOA Entry Points -Help Customers Get Started

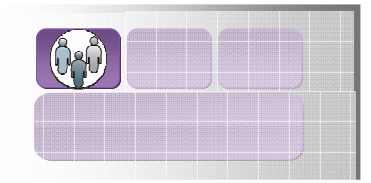
Both Business Centric and IT Focused

	What is it?	Value
People	Deliver role-based interaction and collaboration through services	Improved productivity and flexibility by enabling targeted user interactions for improved business operations and collaboration
Process	Achieve business process innovation through treating tasks as modular services	Greater innovation and flexibility through faster deployment and modification of business processes
Information	Provide trusted information in business context by treating it as a service	Better business operations, more informed decisions and reduced risk with information delivered in-line and in-context
Reuse	Service-enable existing assets and fill portfolio gaps with new reusable services	Lower risk and faster time to market by leveraging proven, time-tested functionality
Connectivity	Connect systems, users, and business channels based on open standards	Reduced maintenance costs and greater reliability and consistency through flexible, any-to-any linkages

SOA Scenarios -'How to get started' with the SOA Entry Points



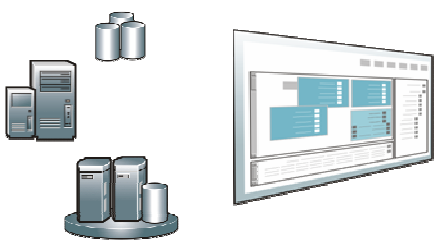
People Integration



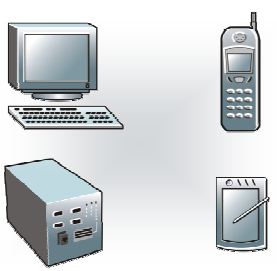
Interact with information, applications and business processes at any time from anywhere

Customer Challenges	Customer Benefits
▪ Systems and applications users need are not all integrated nor easy to use ▪ Mobile workers do not have access to information and applications they require in the field ▪ Customer service centers costs are high because time is spent on routine tasks, rather than value add inquiries	▪ Easy interaction with multiple processes and applications from a single access point ▪ Secure mobile access to business applications and information ▪ Automation of routine call center functions while improving customer experience and convenience

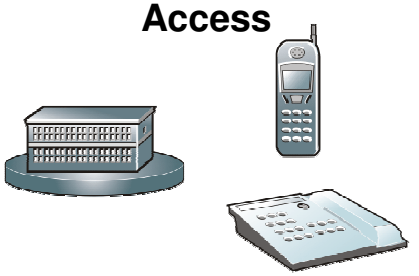
Enterprise Portal



Mobile Access



Voice\Conversational Access



Interaction Services

Critical Success Factors & Products

- Single point of interaction with single sign on
- Role-based task management
- Advanced Personalization
- Accelerated deployment
- Web content management
- Integrated workflow and collaboration
- Secure-rich mobile device access

5 Reuse

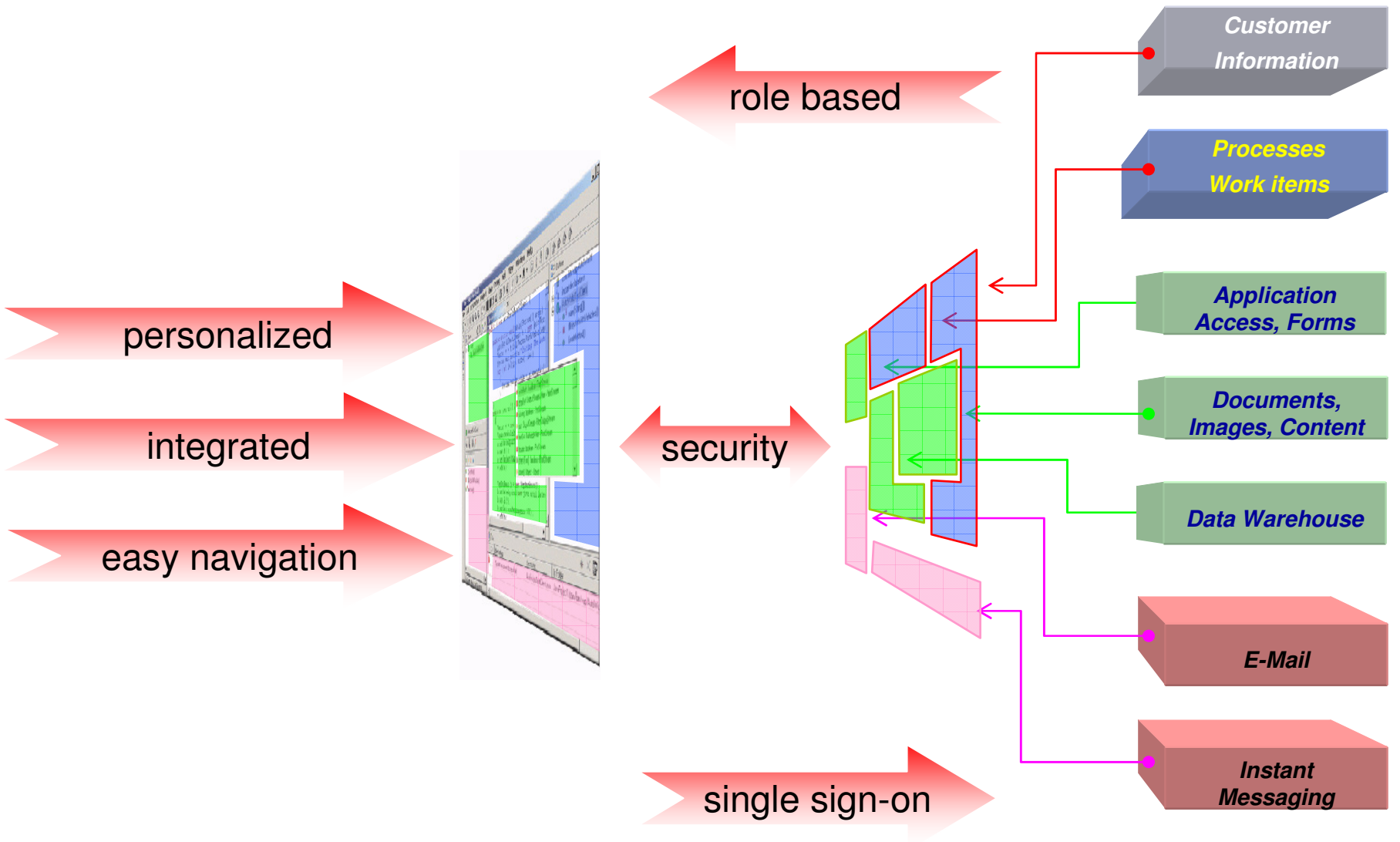
Key Products

WebSphere Portal

Portlet Factory

Everyplace

Portal Server Concepts



Portal "Integration at the Glass" for Human interfaces

Delivery:

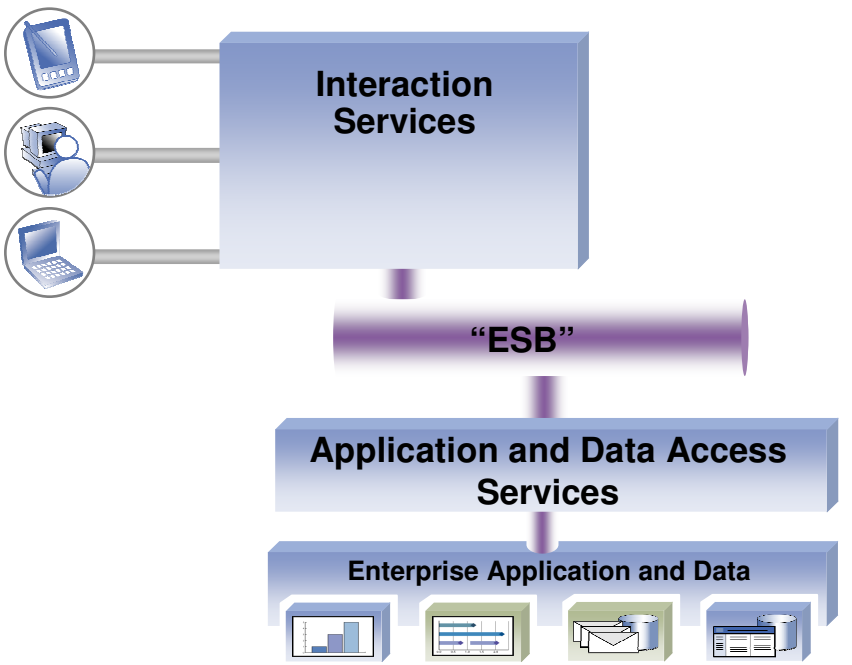
- Page Aggregation
- Markup Transcoding
- Language Translation
- Multi-device Support
- Internationalization

Experience:

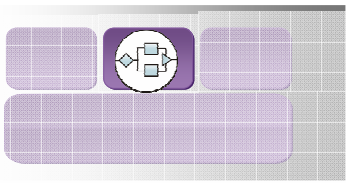
- User-Centric Services
- User Object
- Self-Service – Customization, Registration, Profile
- Personalization
- Authentication
- Authorization
- Single Sign-On
- Collaboration

Resource Services:

- Pages
- Themes & Skins
- Principles
- Entitlements
- Persistence
- Portlets



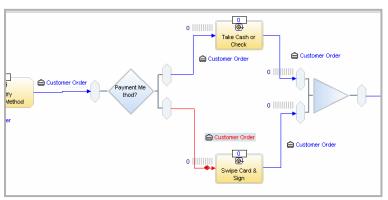
Process Integration



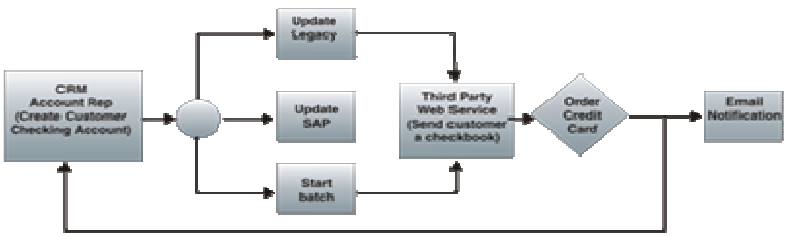
Optimize and integrate business processes to keep them in line with strategic goals

Customer Challenges	Customer Benefits
▪ Inability to streamline business processes, meet regulations, at low cost. ▪ Need to integrate people and applications in the business process ▪ Unable to monitor, control & continuously improve business operations	▪ Model, simulate and optimize business processes ▪ Choreograph process activities across the organization ▪ Monitor and manage process performance

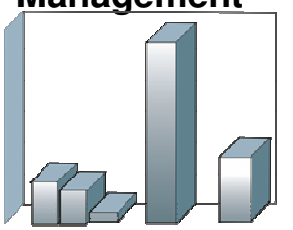
Process Modeling and Simulation



Process Automation



BAM & Process Management



Process Services

Critical Success Factors and Products

- Business Level Modeling And Simulation
- Accelerated Solution Assembly
- Single Platform For All Types Of Business Process
- Business Process Monitoring And Optimization

2 Process

Key Products

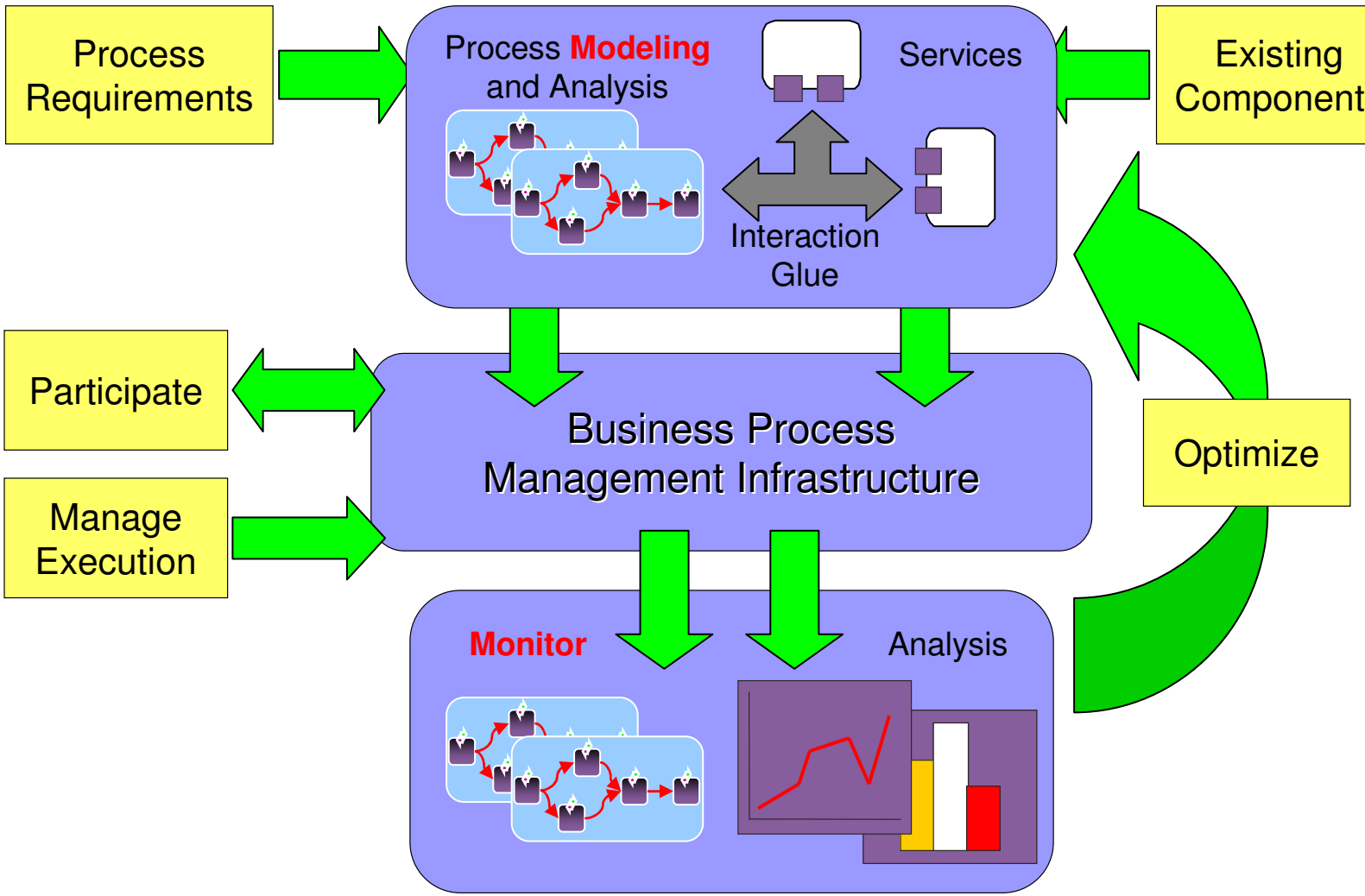
WebSphere Business Modeler

WebSphere Integration Developer

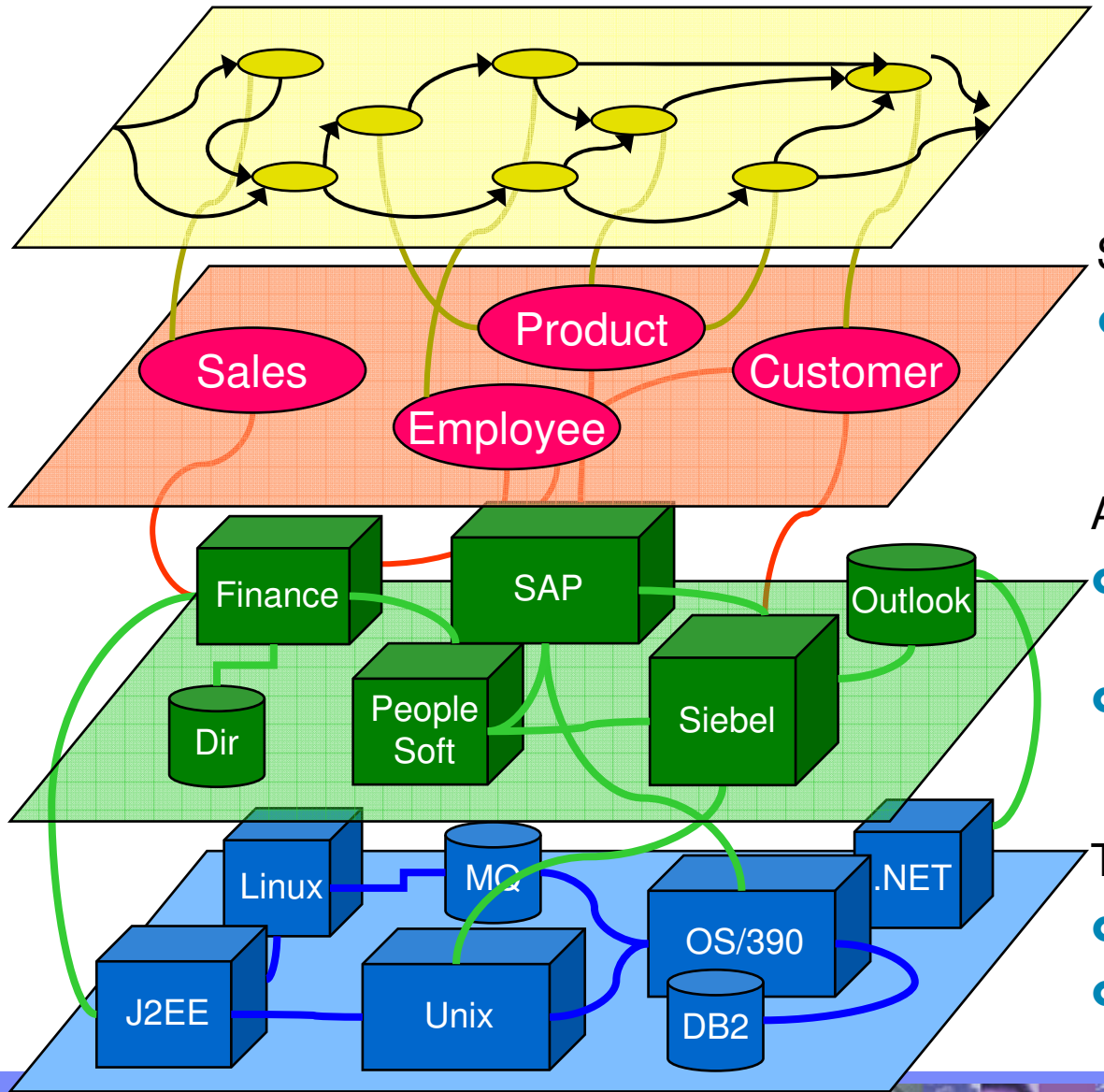
WebSphere Process Server

WebSphere Business Monitor

Business Modeling and Monitoring Solution



Moving to Services-Oriented Solutions



Business Process Layer

- *Cross Functional End-to-end Sales Order Process*

Service Layer

- *How do you connect sales to customers?*

Application Layer

- Applications, Components, Software
- *How do you connect SAP to Siebel?*

Technology Layer

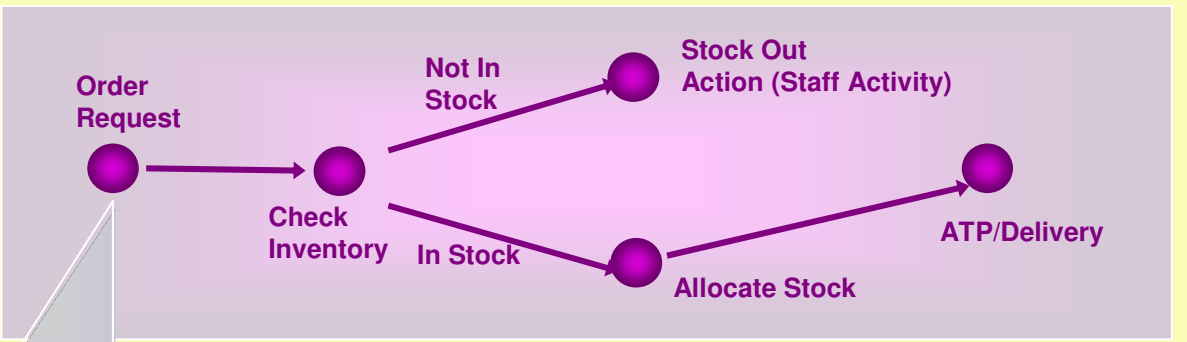
- Hardware, Network
- *How do you connect J2EE to .NET?*

Source: CBDi Forum, http://www.cbdiforum.com

SOA in Practice

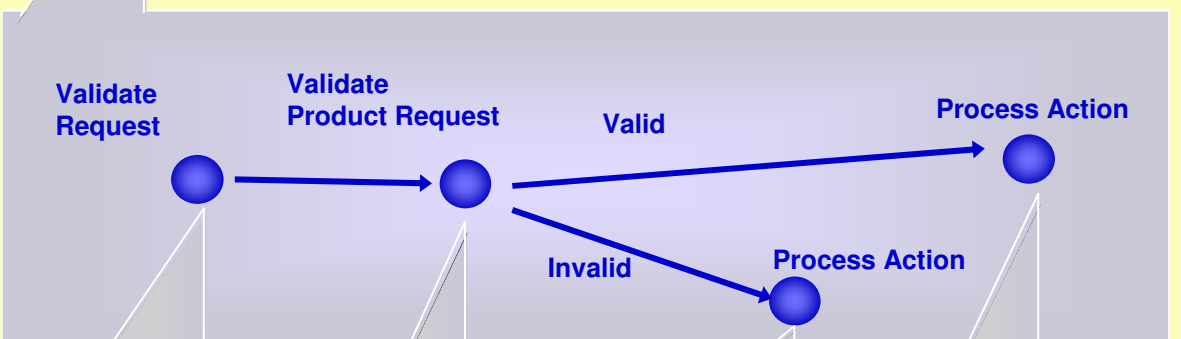
Business Process

- may be long running
- multiple valid process states
- alternative workflows for non-normal conds and/or compensation for exception management



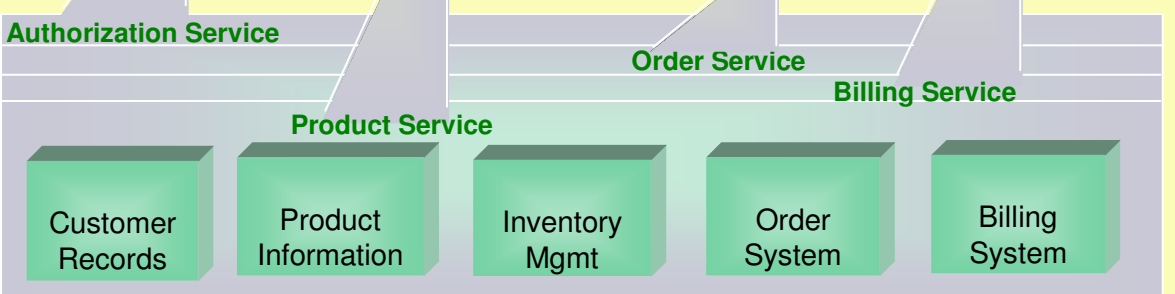
Business Transaction

- short term, non-interactive
- one change of business state or STP
- consumes one or more function service
- targeted level of service reuse
- loose coupling very important
- may require compensating transactions



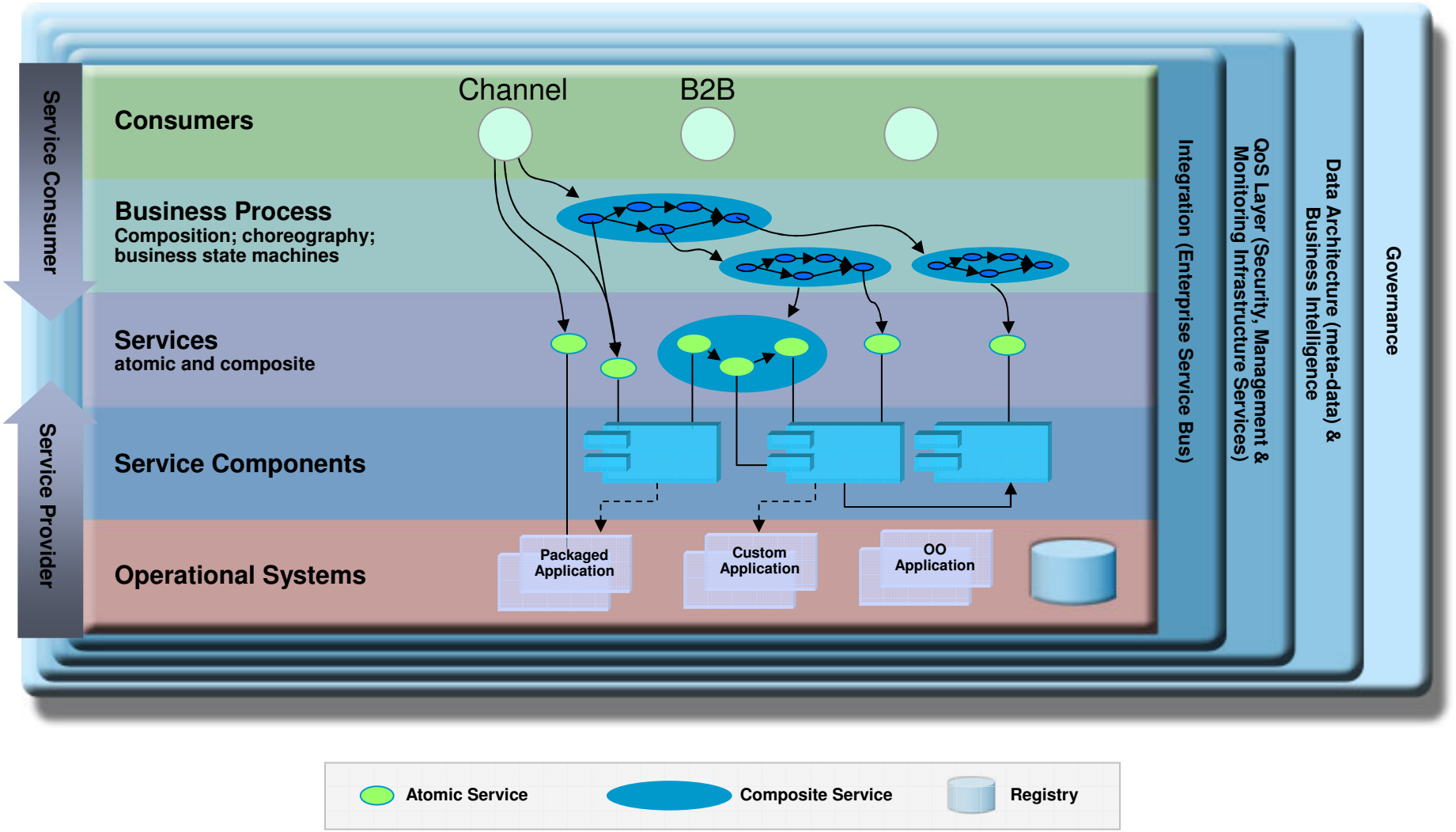
Function Service

- collaborations to implement a single FS
- collaborating apps encapsulated via FS(s)



SOA Solution Layering

Leveraging the SOA Reference Architecture



Business Monitoring Concepts

Achieve Real-time Visibility into Processes

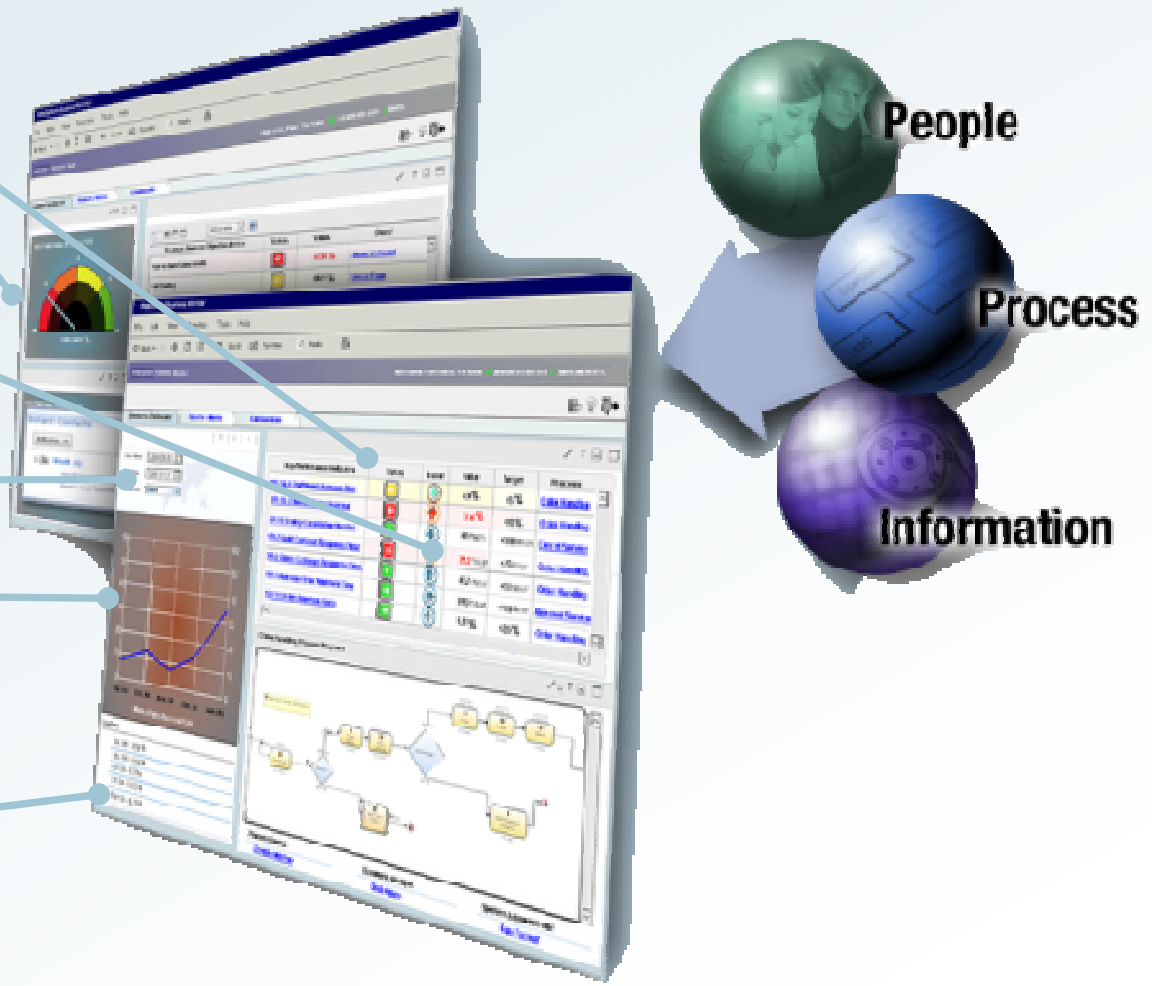
Scorecards
Key Performance Indicators for business units

Collaboration
Work with teams to resolve situations

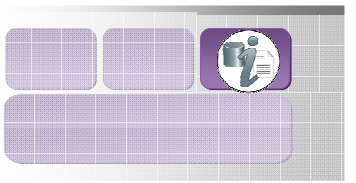
Business Alerts
Notification of situations that require response

Reports & Analyses
Understanding trends by combining real-time performance and historical information

External Information
Information affecting performance



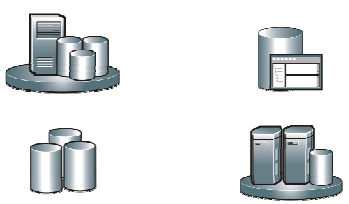
Information Integration



Access and manage information that is scattered throughout the enterprise and across the value chain

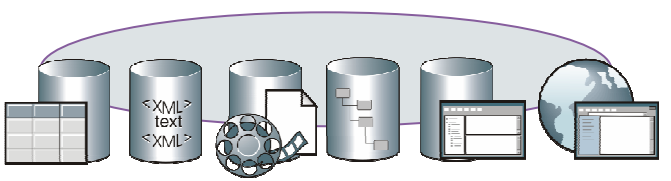
Customer Challenges	Customer Benefits
▪ Both structured and unstructured information are spread across one or more enterprises in a variety of databases, packaged applications, master files, mainframes, etc. ▪ Information gathering and review processes to coordinate multiple channels leveraging multiple customer touch points are lengthy ▪ Business processes to access and manage product information span departments and/or enterprises	▪ Manage and synchronize product reference information across the enterprise ▪ Centralize structured and unstructured information from disparate sources for easy access and use by users such as merchandisers ▪ Create a consistent, unified view of diverse data and content

Global Data Synchronization

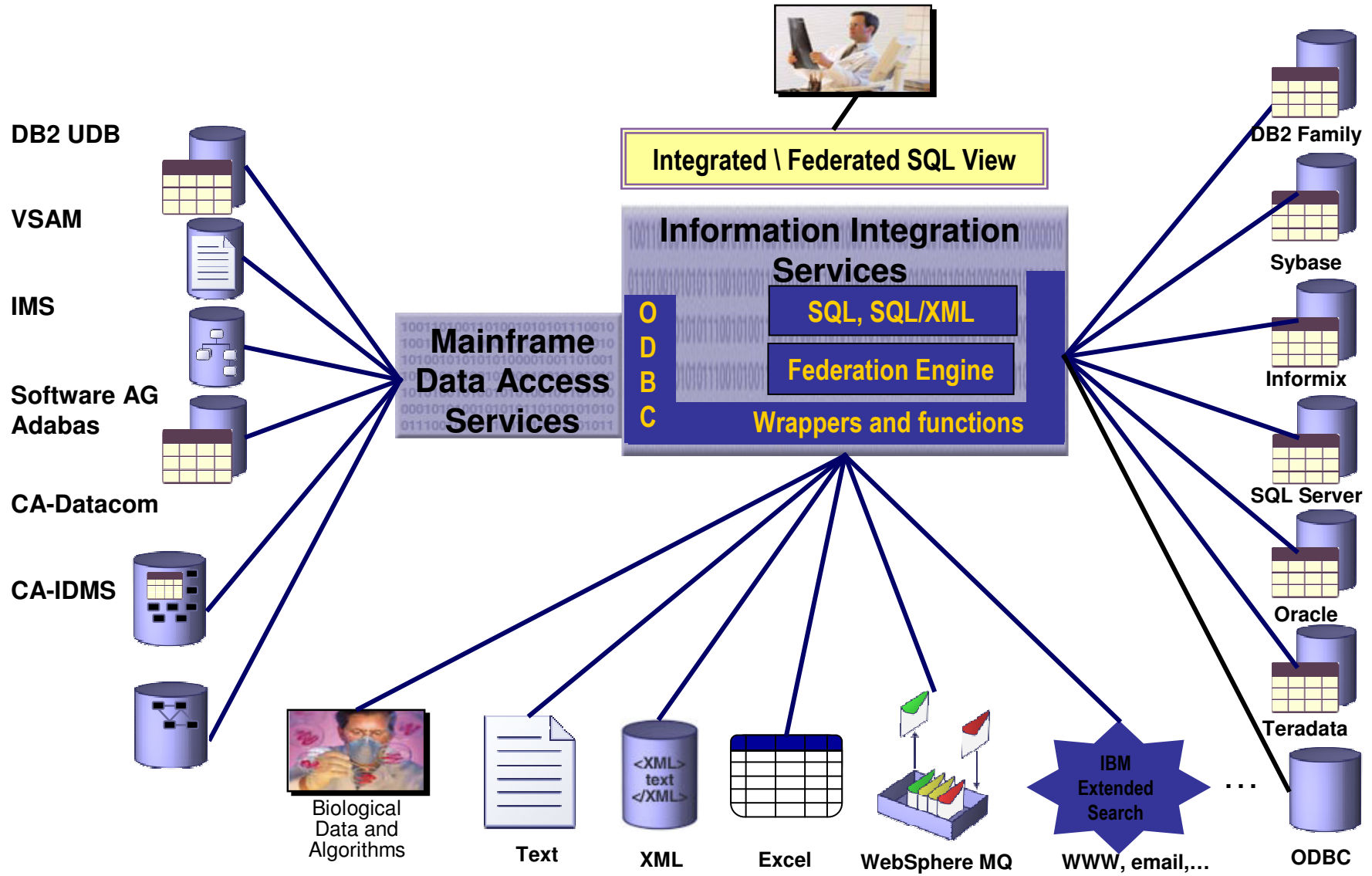


Multi-channel Commerce

Heterogeneous Information Integration



Information Integration Data Access Services

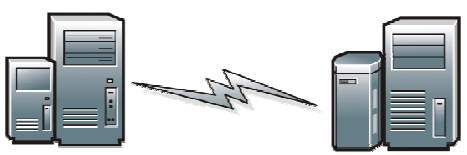


Application Integration

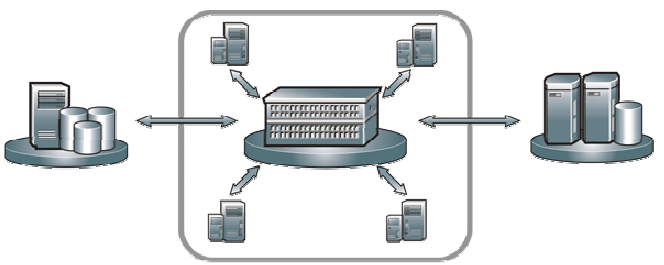
Assure reliable and flexible information flow between diverse applications and organizations

Customer Challenges	Customer Benefits
▪ Applications are not integrated in a flexible and reliable method across the enterprise, reducing business responsiveness ▪ Differences between many internal and partner applications must be managed ▪ Maintaining point to point or custom written integration interfaces is cost and time prohibitive	▪ Reliably and seamlessly exchange data between multiple applications ▪ Manage differences between multiple applications and business partners ▪ Adopt an enterprise wide, flexible, service oriented approach to integration

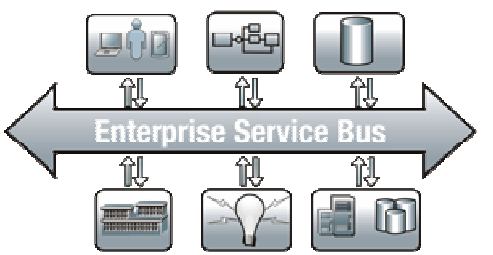
Application Connectivity



Application and Partner Mediation



Enterprise Integration Backbone

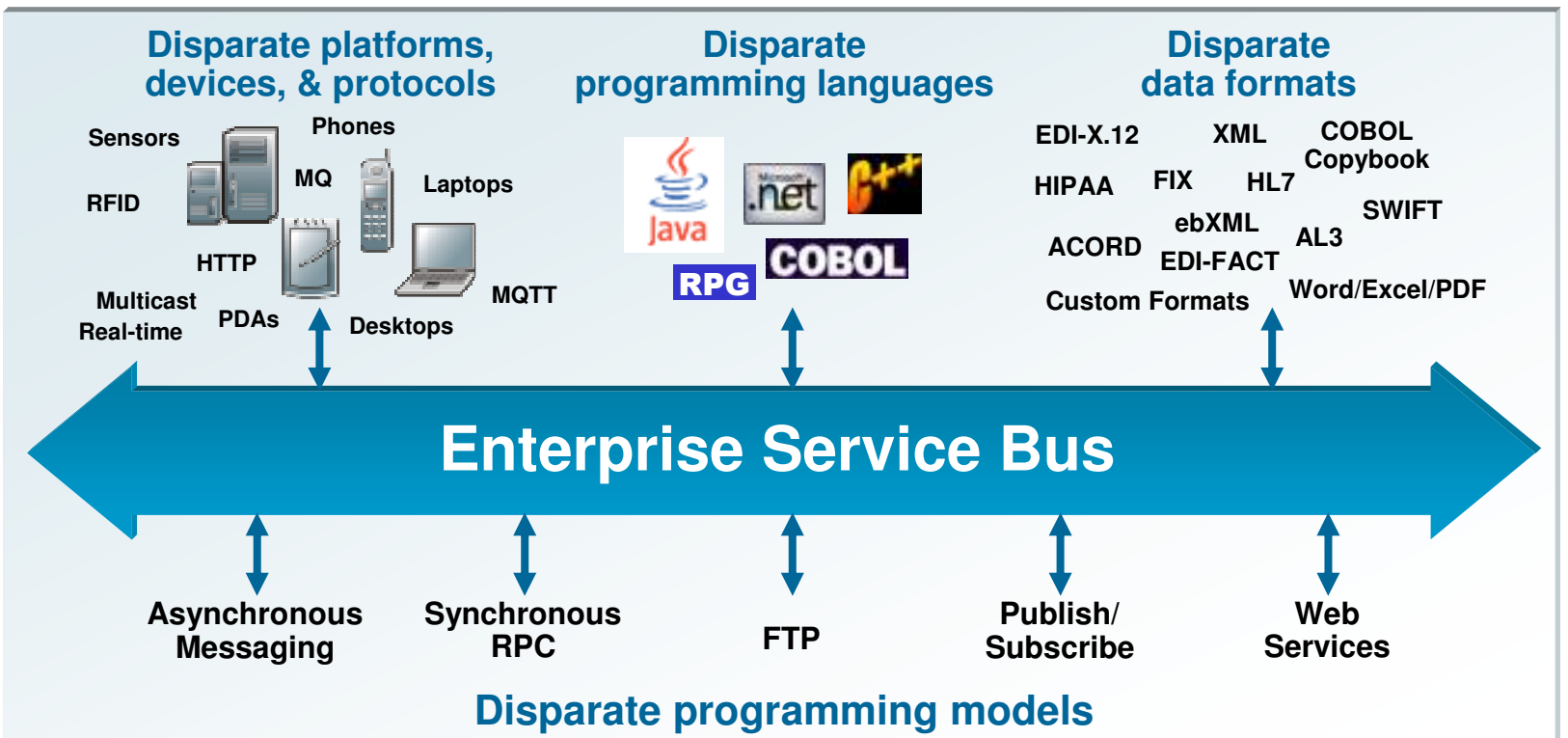


Ability to Connect All Assets

A "federated" connectivity architecture enabling applications running

- **on *different platforms, devices, and protocols***
- **or which are written in *different programming languages***
- **or which use *different data representations***
- **or which communicate using *different programming models***

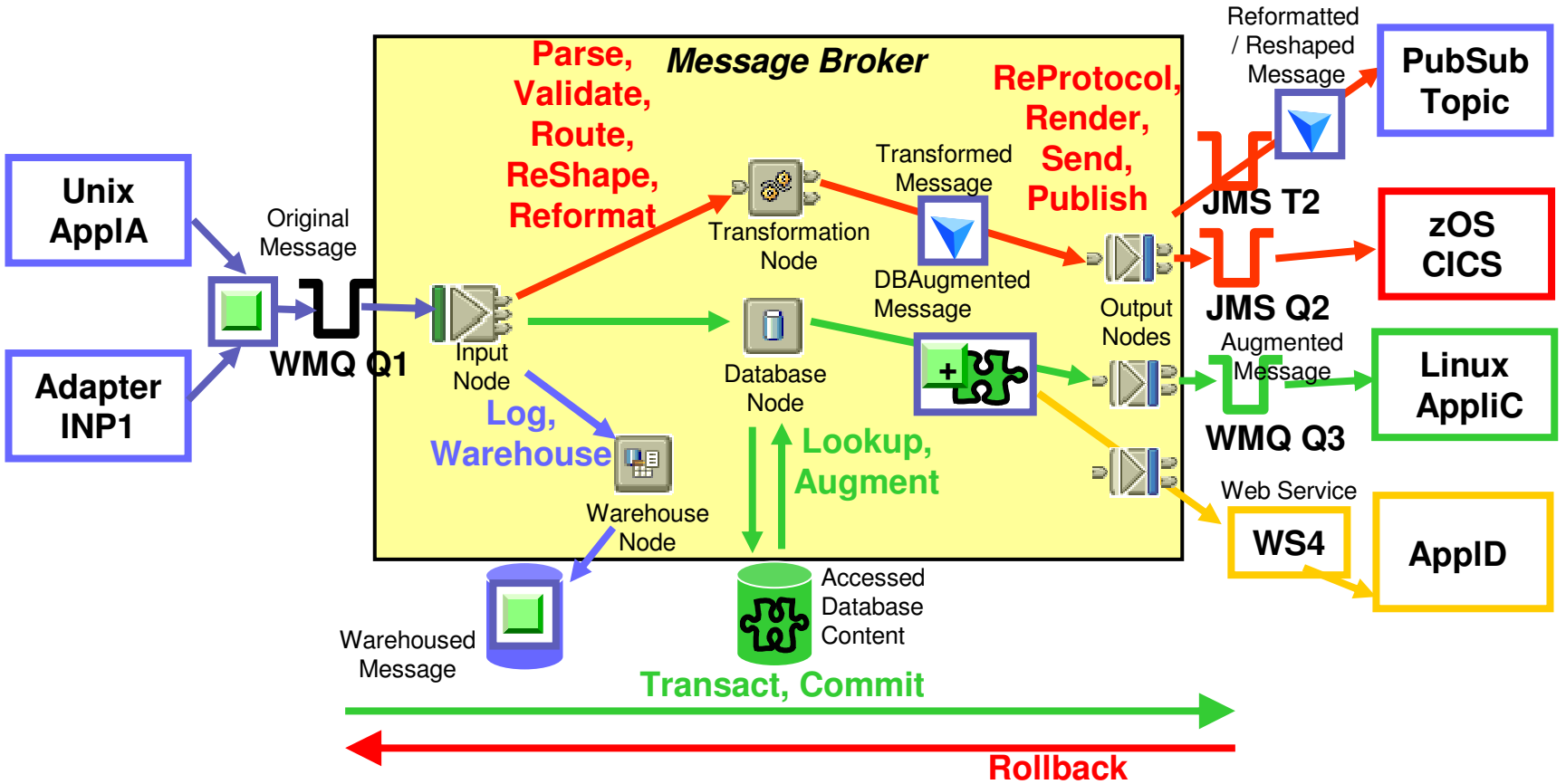
to talk to any point *with no disruption to existing applications or interfaces*



Click here to return

WebSphere Message Broker …

… Delivers the right message in the right format



Asynchronous Messaging Fundamentals

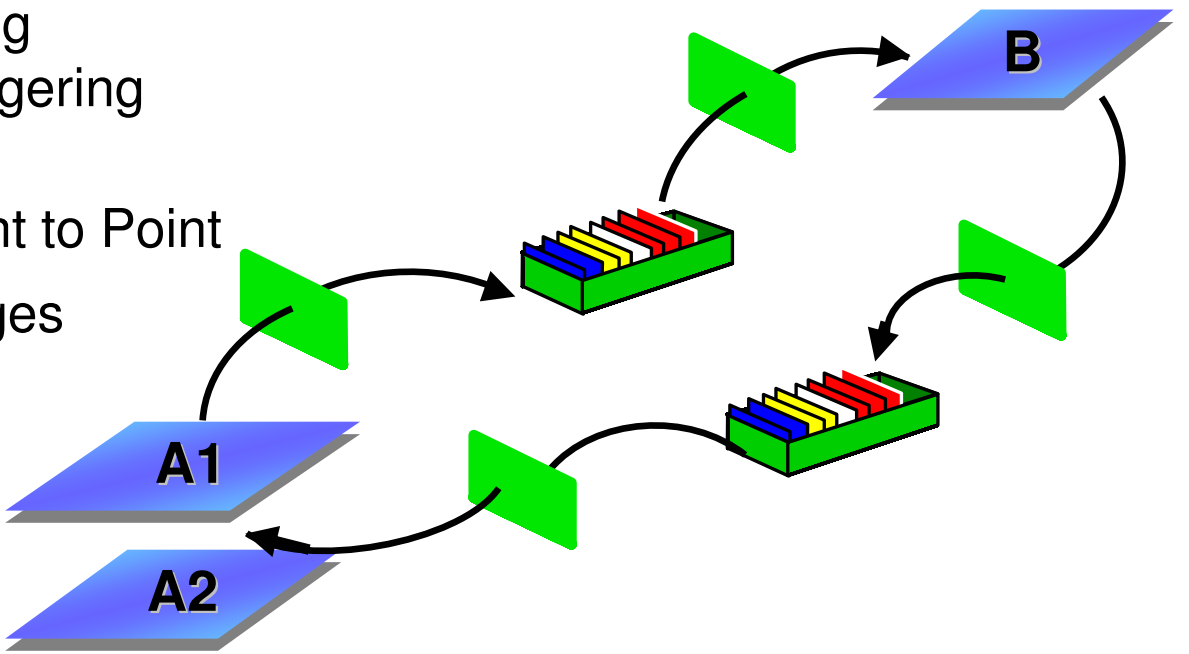
- Easy to use message centric interface
- Network independent
- Faster application development

- Exactly Once, Transactional

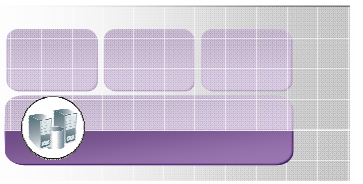
- Asynchronous messaging
- Pacing, Parallelism, Triggering

- Publish\Subscribe or Point to Point
- Clustering, Large Messages

- Mobile, PDAs



Application Infrastructure



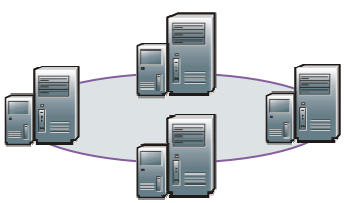
Build, deploy, integrate and enhance new and existing applications

Customer Challenges	Customer Benefits
▪ High turnover and training costs due to antiquated applications ▪ Unable to extend the business logic in legacy applications into new applications being developed ▪ Unable to meet customer and competitive demands on infrastructure performance, scalability, and manageability	▪ Quickly web-enable green-screen applications ▪ Adapt legacy applications for use in new java environments ▪ Deliver operational efficiency and enterprise Quality of Services (QoS) for a mixed-workload infrastructure

Modernizing the User Interface

Extending Legacy Applications into Web Infrastructure

Building a Robust, Scalable, Secure, Application Infrastructure

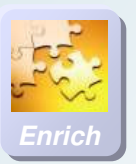


SOA Service Registry\Repository cross-lifecycle Concepts

Service Registry and Repository

Encourage Reuse

- Publish newly developed services and services metadata
- Find services and services metadata
- Integrate with other registries



Enrich Connectivity

- Enable dynamic and efficient interactions between services at runtime

Enable Governance

- Help enforce policies
- Enable impact analysis
- Allow classification by lifecycle stage
- Provide for role based access
- Notify users of changes
- Federate with service management repositories

Services Registry & Repository

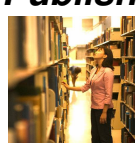
Businesses want a robust connectivity infrastructure…
…to simplify connectivity, support services orientation, reduce costs and risk

Features

- Publish and find services
- Publish and find services capabilities
- Publish and find service lifecycle stage
- Publish and find service interactions
- Publish and find service dependencies and redundancies

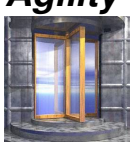
Benefits

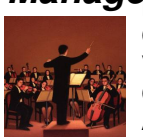
- Reduce time to market via assembly of services
- Reduce cost via reuse
- Reduce risk by using hardened and understood services
- Improves consistent policy adoption, visibility, reliability

Publish

Describe
Populate
Configure
Classify
Organize

Find

Discover
Search
Retrieve

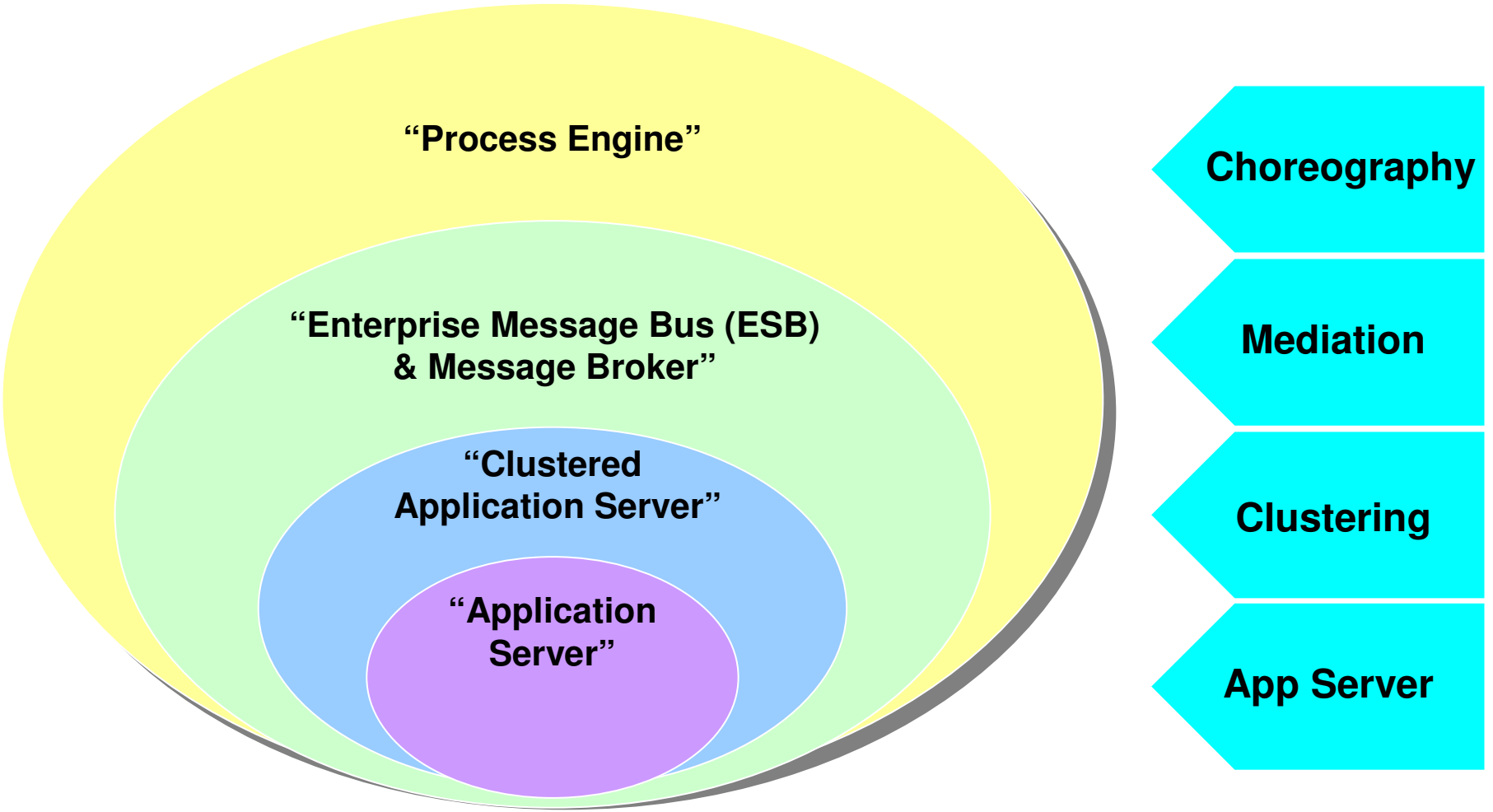
Agility

Identify
Notify
Secure
Access
Runtime

Manage

Policies
Change
Version
Classify
Analyze
Promote

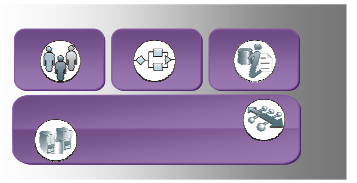
Govern

Approve
Retire
Validate
Conform

How Application Server, ESB, and Process Engine fit together



Accelerators

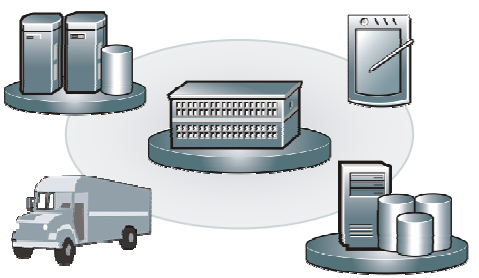


Pre-built capabilities and solution expertise to speed WebSphere implementations

Customer Challenges	Customer Benefits
▪ Lack of experience / expertise leading to greater project risk, time and cost ▪ Inefficient, disparate processes without re-usable components ▪ Rising development costs with each new business functionality request	▪ Pre-built capabilities reduce deployment time, effort and costs ▪ Proven technology, architecture and best practices to decrease project risk ▪ Buy vs. Build: out of the box capabilities save 7-10 times over customer built

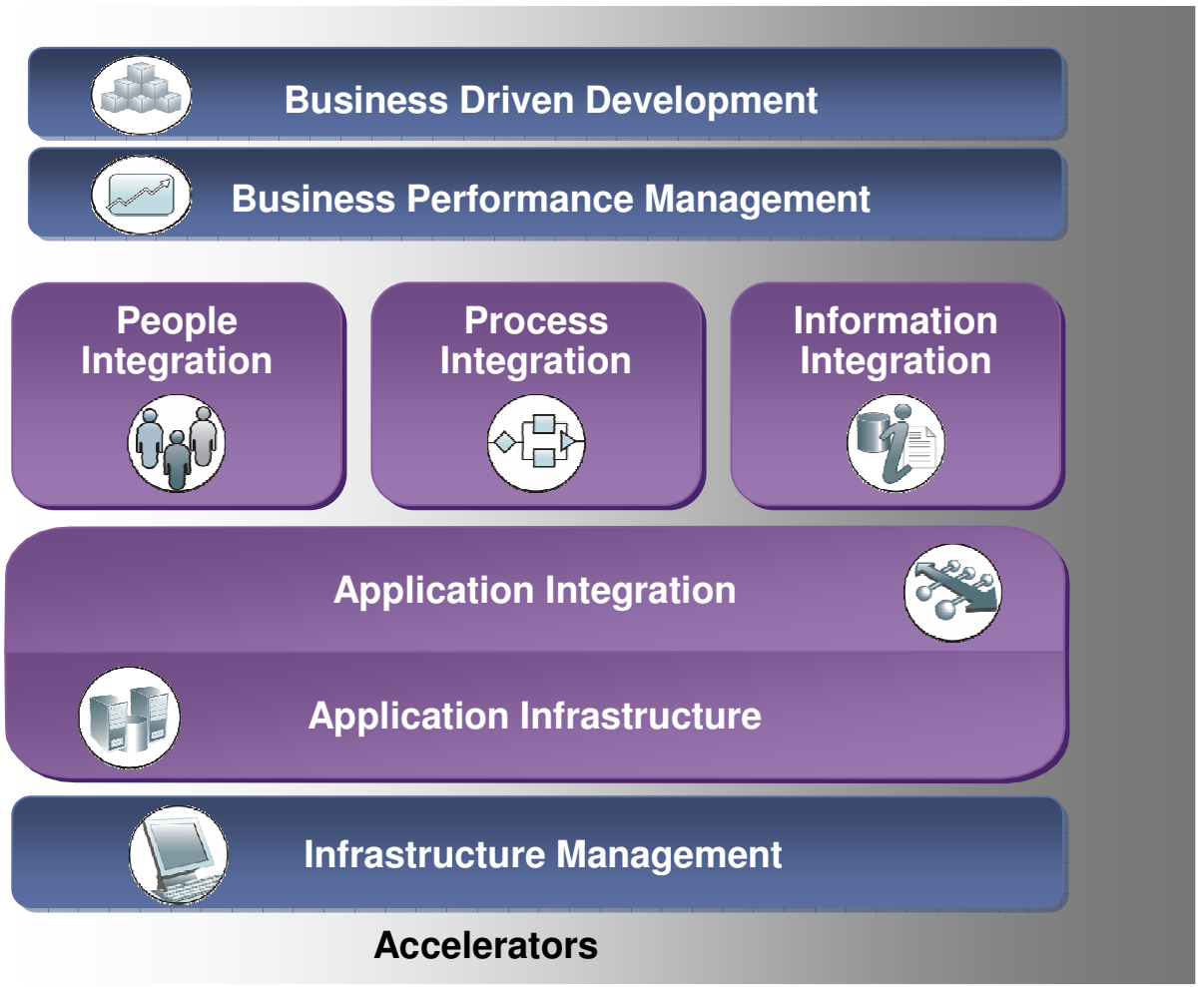
Pre-Built
Sell-Side Processes

Pre-Built
Supply Chain Integration



Pre-Built
Industry Specific Middleware

Robust Integration & Infrastructure Capabilities Connected in an Open, Flexible Manner



Modular product portfolio built on open standards

Functionally rich, adopted incrementally

Simple to develop, deploy and manage

Integrated role-based tools for development & administration

*…utilizing **common** install, administration, security and programming model*

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SOA Overview

SOA Benefits & Summary

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Business Value of a Service-Oriented Architecture

Flexibility

- Develop flexible business models enabled by increased granularity of business processes (“services”)
- Support an On-Demand business for globalization, outsourcing, mergers

Speed

- Combine and reuse pre-built service components for rapid application development and deployment in response to market change

Efficiency

- Integrate historically separate systems, facilitate mergers and acquisitions of enterprises
- Reduce cycle times and costs for external business partners by moving from manual to automated transactions

Services & Info

- Offer new services & information to customers without having to worry about the underlying IT infrastructure

Revenue

- Create new routes to market, new value from existing systems, growth

Cost 

- Eliminate duplicate systems, build once and leverage
- Reusable assets cut costs

Risk 

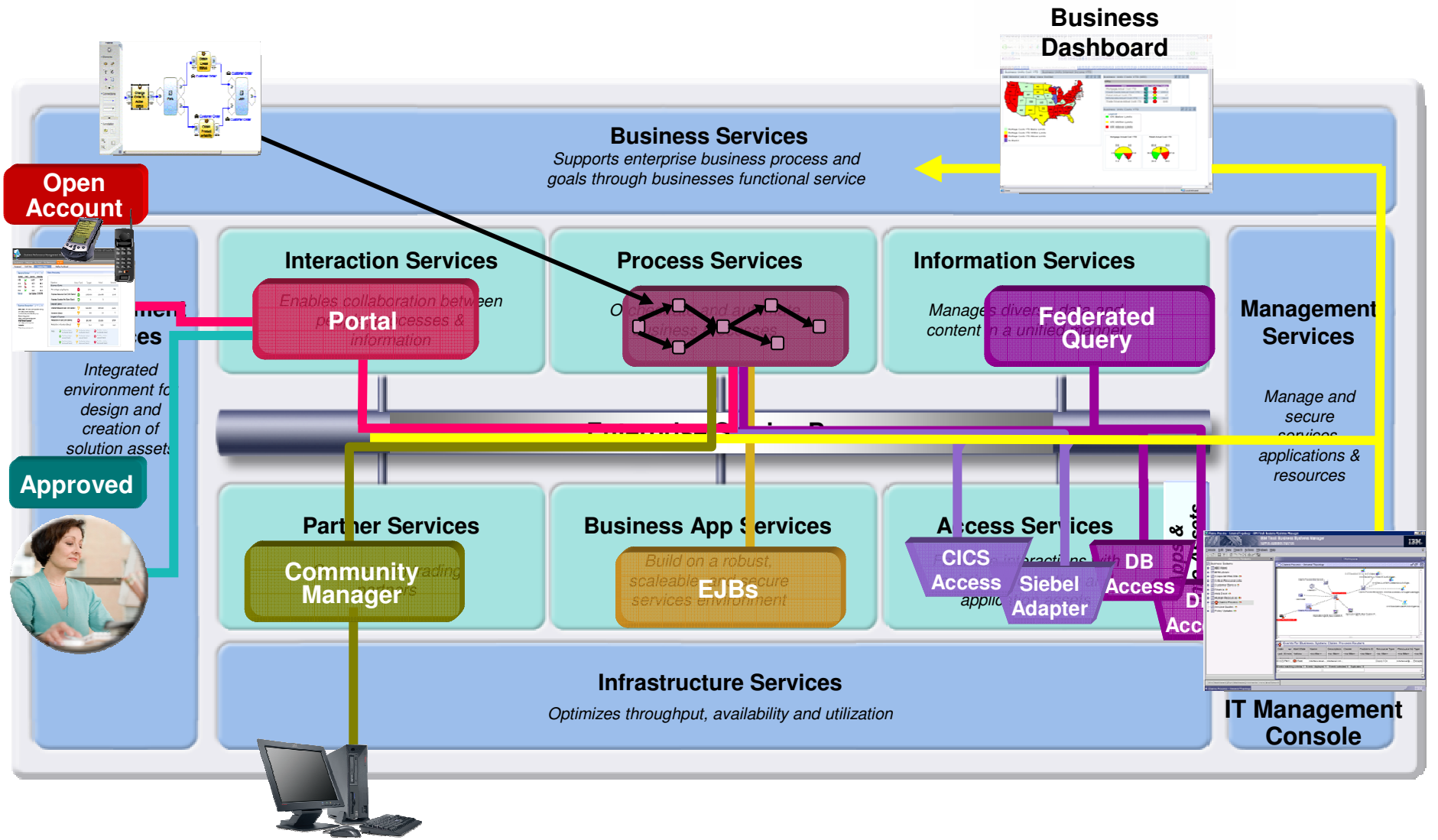
- Improve visibility into business operations

SOA Middleware Solution -Expected Business & IT Benefits

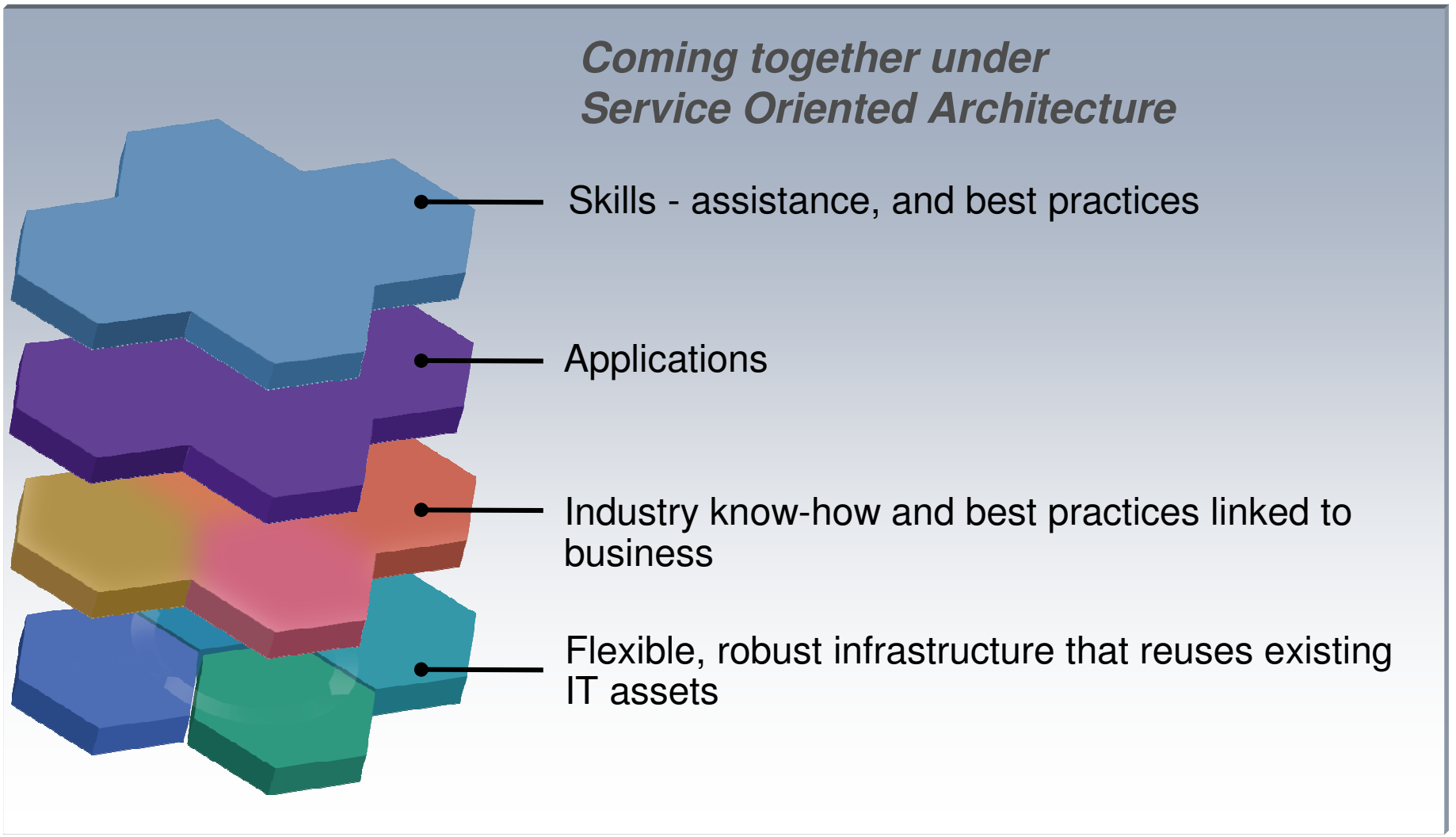
- Standardized\Componentized SOA Integration Architecture with One SOA Service interface to access backend applications or shared data
- A “Flexible, Extendable, Technology-Agnostic, Future-Proof” IT Infrastructure
- Open Standards:
  - J2EE, XML, Web Services (SOAP, WSDL), Mainframe & Legacy Transports
- Improved Agility, Responsiveness, and “On-Demand” Business Efficiencies
- Minimized Cycle-Times for Changes and Reduced Time to Value
- Higher Reuse through composite application creation
- Reduced Costs and Low Total Cost of Ownership
- Timely access to Processes, and High-Quality Data with fewer errors
- Improved Customer Service
- Enhanced Ease Of Use and Productivity
- Extended Application value
- Simpler & Stronger Security (LDAP-based)
- Higher System Availability, Scalability & Throughput, with Fast Response Time
- Robust Middleware from Proven Market Leader

Separation of Concerns

The SOA Reference Architecture in Action



What are the core elements that SOA brings together?



SOA Critical Success Factors

Process Services

- Business level modeling and simulation
- Accelerated solution assembly
- Single platform for all types of business processes
- Business process monitoring and optimization

Connectivity

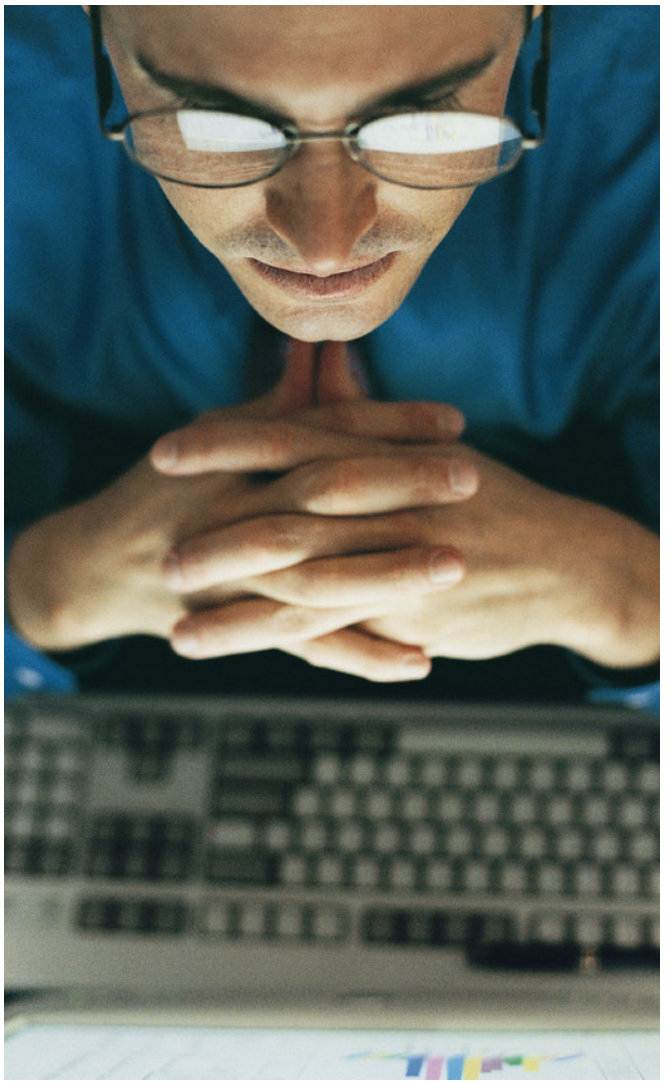
- Ability to connect all assets
- Universal transformation
- Scalability and performance
- Transactions
- 24 x 7 operations
- Complex event processing

Business App services

- Scalability and performance
- Availability
- Security
- Transactional coordination
- Enterprise view
- Manageability

SOA Summary

- Understand your business goals, drivers, and context
- Understand your current environment
  - Development, Runtime, and Management
- Establish a Roadmap
  - Find appropriate starting point
  - Determine the development and runtime requirements
    - *Leverage Separation of Concerns and the SOA Programming Model*
- Establish Governance
  - Appropriate for your company culture and environment



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APPENDIXEs

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Key Standards for SOA