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IBM WebSphere Infrastructure for SOA & ESB

University of Toronto

SOA Overview

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Agenda -SOA Overview –York U.

- Business Drivers and Technology Evolution
- SOA Concepts
- SOA Reference Architecture
- SOA Implementation Roadmap
- SOA Governance
- SOA Development Concepts
- SOA Entry Points & SOA Scenarios
- SOA Benefits & Summary
- Appendix





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SOA Overview

Business Drivers & Technology Evolution

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What's on the minds of 450 of the world's leading CEOs & CIOs?



CEO needs

- **Revenue** growth with **Cost** containment
- Key competency: **Responsiveness**
- Critical success factor: enable effectiveness of **People** and **Processes**

Source: CEO Study of 456 WW CEOs, IBM Corp. 2004

CIO challenges

- **Aligning** IT and business goals to grow **Revenue** and contain **Costs**
- Building responsiveness and **Agility** into the organization through IT
- How can IT help enable **People** and teams to be more effective

Source: Operating Environment Market Drivers Study, IBM Corp. 2004



Consistent Business imperatives

Flexibility



... to Grow Faster

- Bekins increased revenue by \$75M through **integration** with business **partners** to serve a new market
- PineBank increased customer traffic by 300% and revenues by \$8M

Efficiency



... to Spend Less

- Kookmin Bank should save \$250 million from reduction of **duplicate processes**
- Volkswagen realized a 20% **productivity** gain

Responsiveness



... to Increase Customer Satisfaction

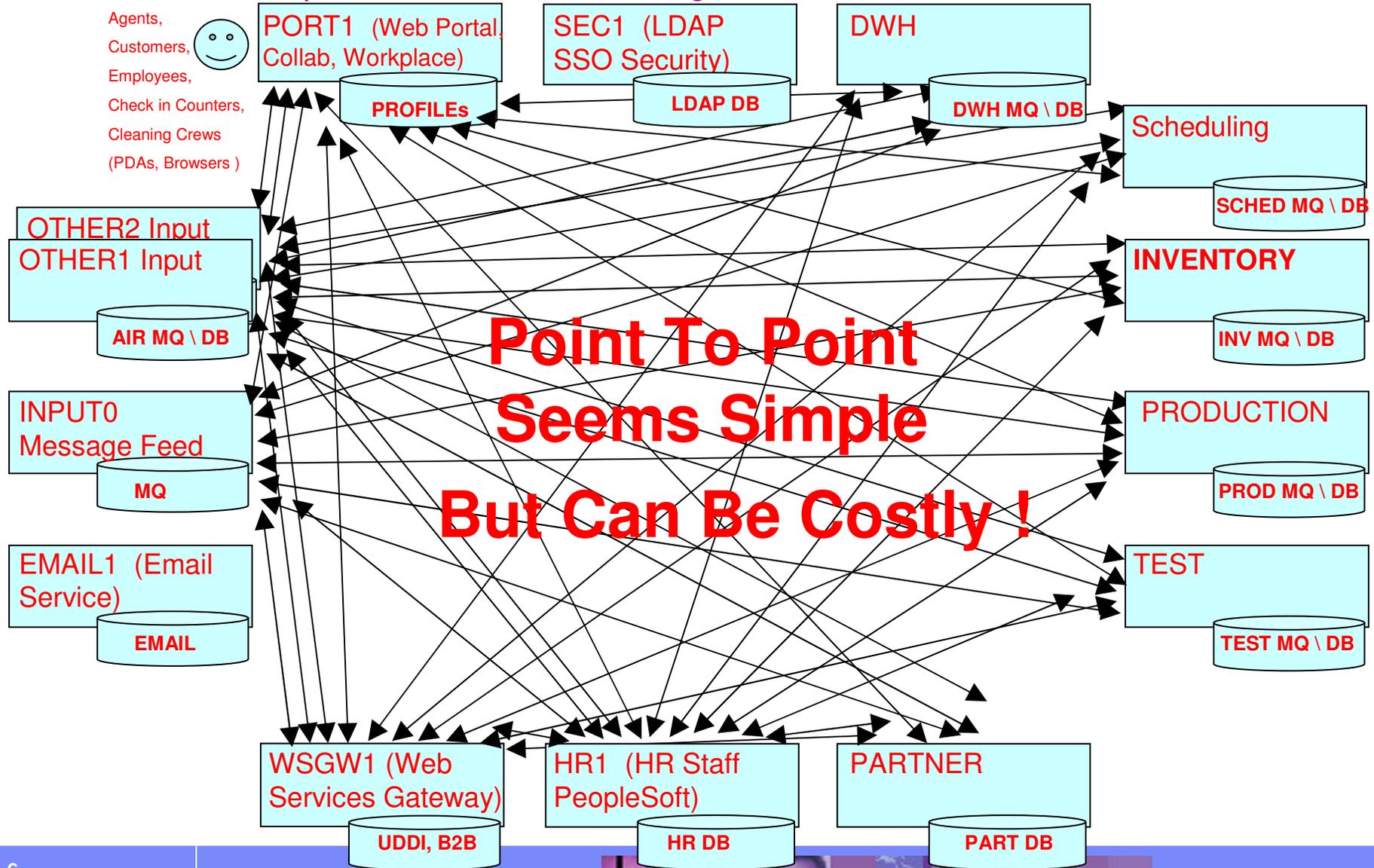
- Dassault Aviation reduced concept-to-runway **development time** by 30%
- British Petroleum decreased user-provisioning **time** from 5 days to 10 minutes





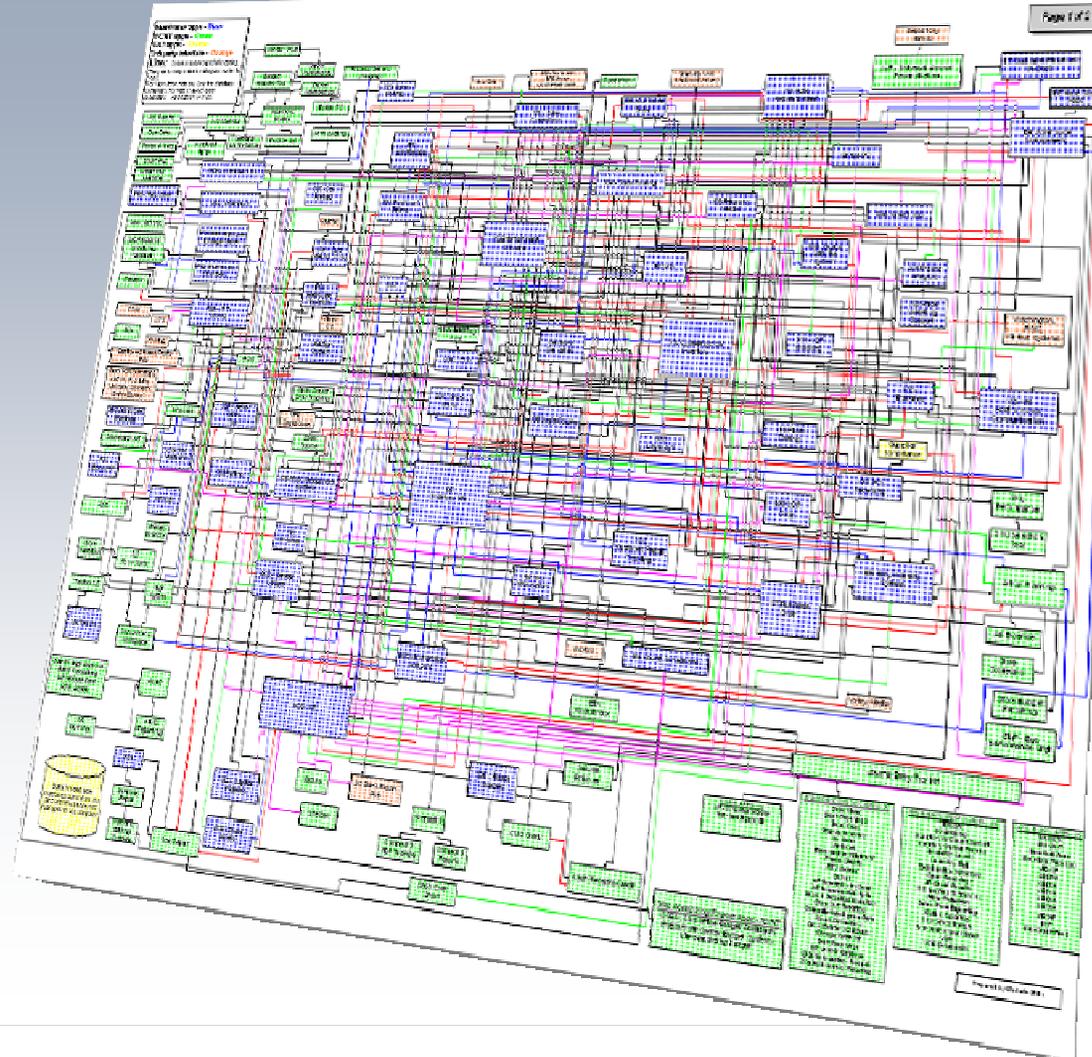
The cost of Point To Point changes

NON-ESB => "Complex, Inflexible, Brittle integration infrastructure"

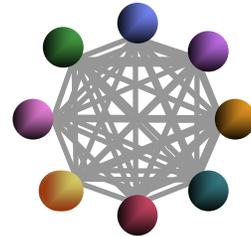


What are the *Barriers* to business Flexibility and Reuse?

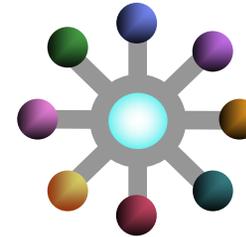
- Architectural policy limited
- Infrastructure built without roadmap
- Business process standards missing
- Tactical quick-fixes for point applications
- Redundant LOB needs



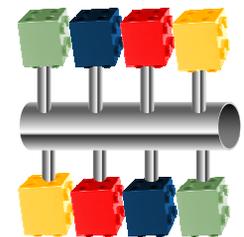
IT's Architectural Evolution to SOA: Making IT More Responsive



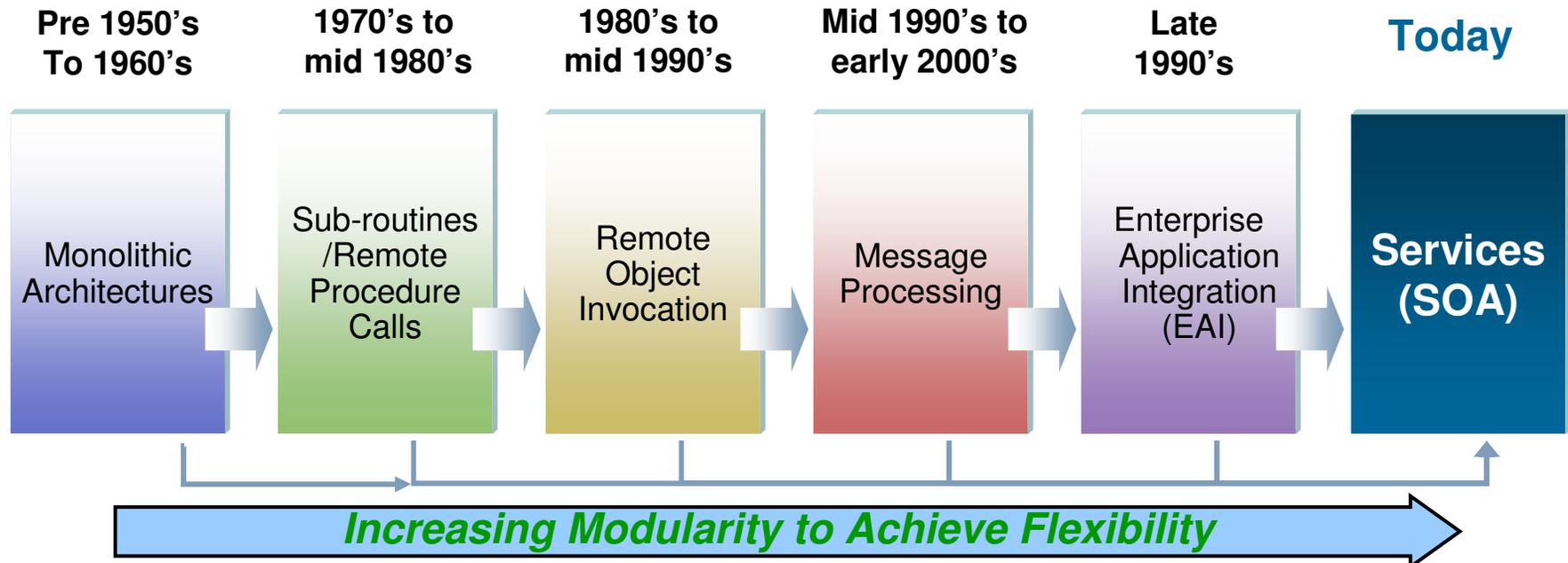
- Point-to-Point connection between applications
- Simple, basic connectivity



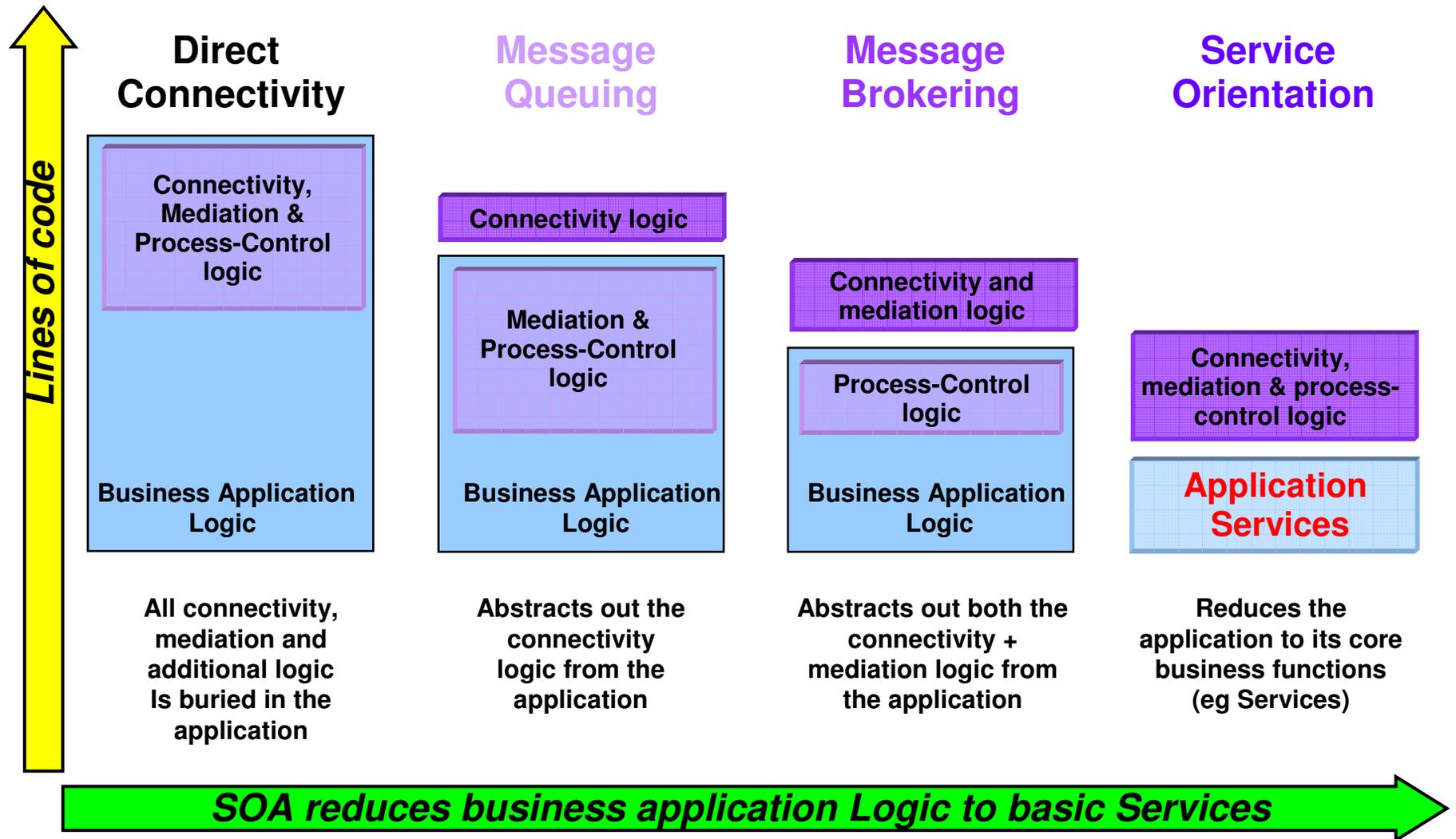
- EAI connects applications via a centralized hub
- Easier to manage larger number of connections



- Integration and choreography of services through an Enterprise Service Bus
- Flexible connections with well defined, standards-based interfaces



SOA: The Next Step on the Connectivity Evolution





The time for SOA is Now

Standards

- Broadly adopted standards (eg Web Services) ensure well-defined interfaces.
- Before, proprietary standards limited interoperability

Software Technology

- The necessary software to get started is available today
- Before, middleware software typically was not universally available

Organizational Commitment

- Governance Best Practices Exist & Business and IT are united behind SOA (63% of projects today are driven by LOB)*
- Before, Bus<=> IT communication channels & 'vocabulary' not in place

Degree of Business Focus

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

Connections

- SOA services are linked dynamically and flexibly using an ESB
- Before, service interactions were hard-coded, point-to-point and dependent on the application

Level of Reuse

- SOA services can be extensively re-used to leverage existing IT assets across the enterprise
- Before, any reuse was only within a silo'ed application

*Source: Cutter Benchmark Survey



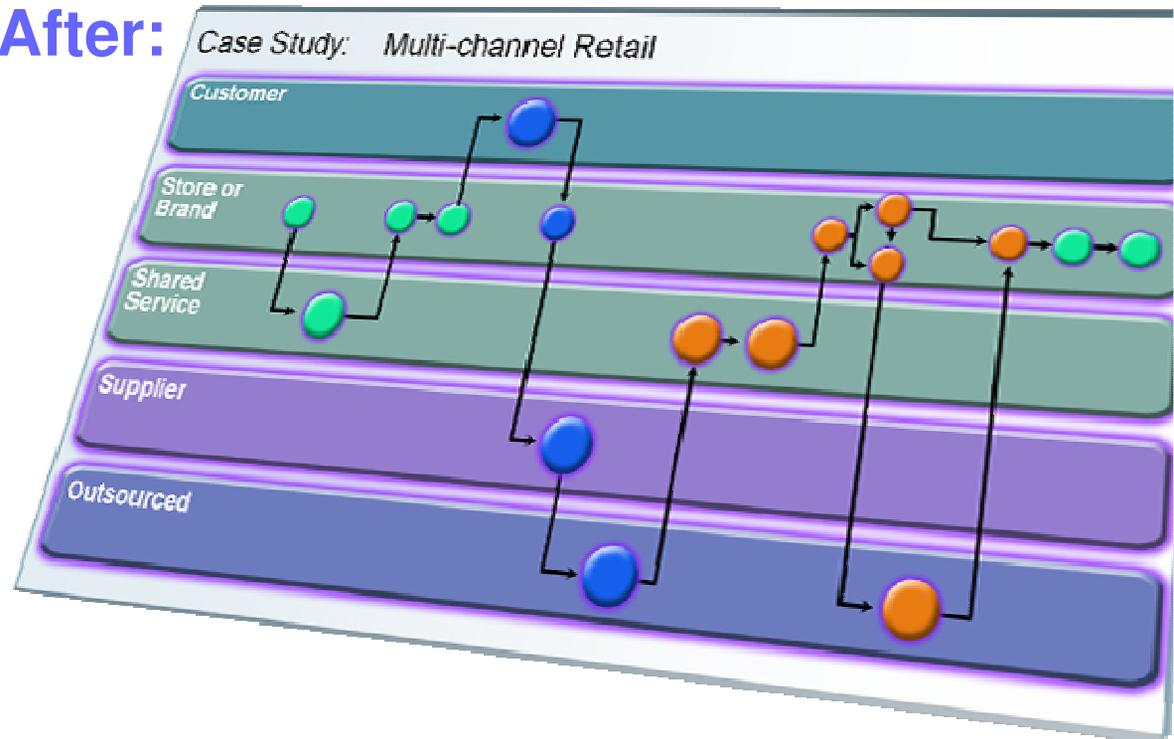
SOA yields more Business Flexibility and better Reuse

- More Flexibility
- More Speed
- More Efficiency
- Better Services
- Better Information
- Increased Revenue
- Reduced Cost
- Lower Risk

Before:

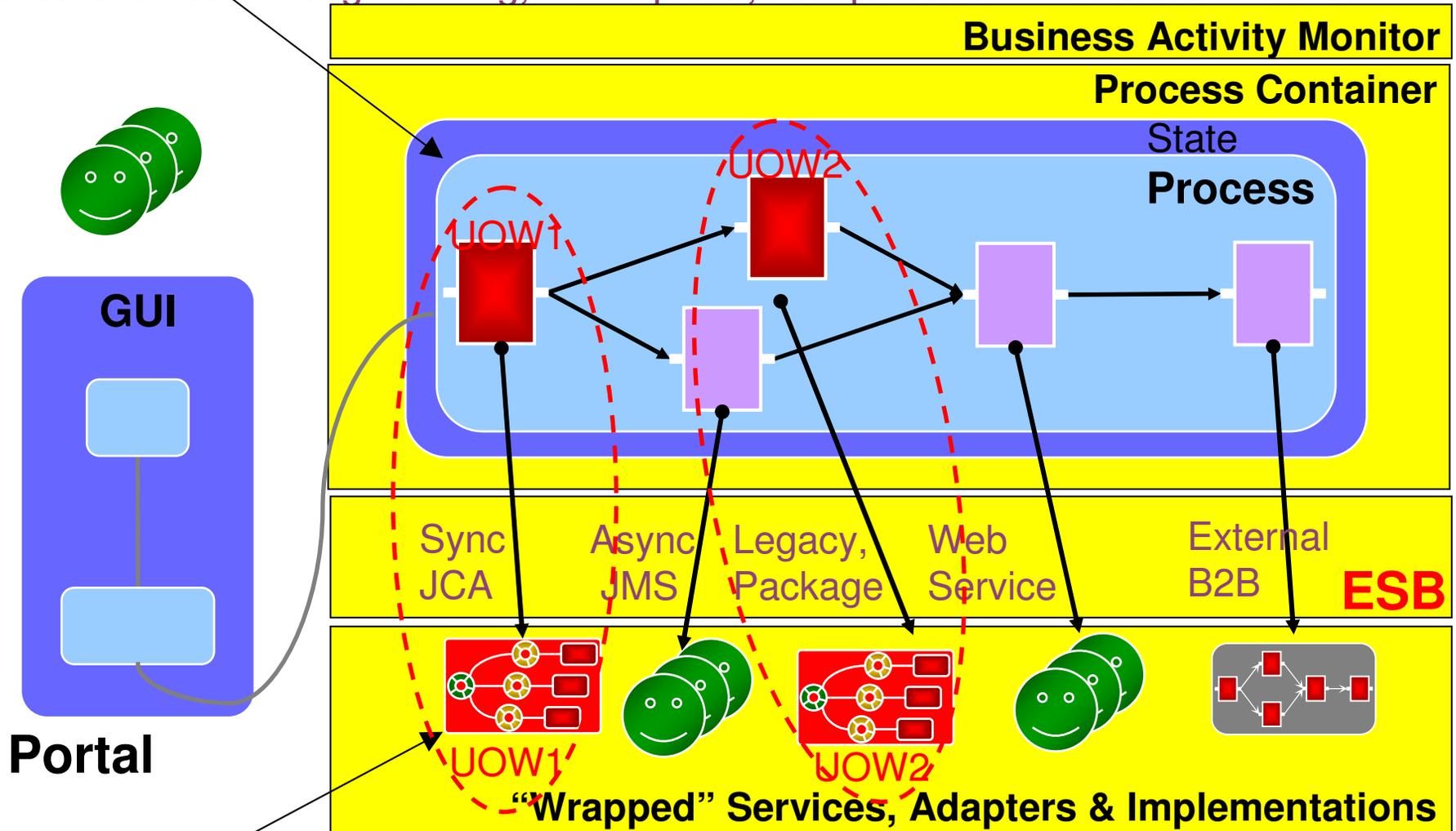


After:



SOA & Business Process Choreography Services Animation

'Coarse-Grained' – Long Running, Interruptible, Compensation Transaction network



'Fine-Grained' Transaction – Short-Running, non-Interruptible, 'ACID' XA Transaction





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SOA Concepts



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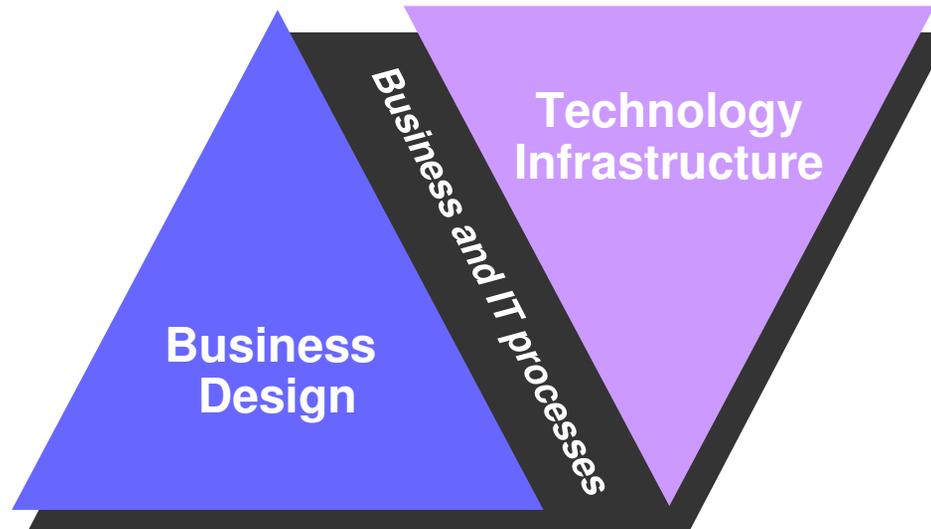
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Becoming an On Demand Business

An On Demand Business is an enterprise whose **business processes** — **integrated end-to-end** across the company and with key partners, suppliers and customers — can respond with speed to any customer demand, market opportunity or external threat.

Align

business models and strategic objectives



Integrate

people, processes, and information

Optimize

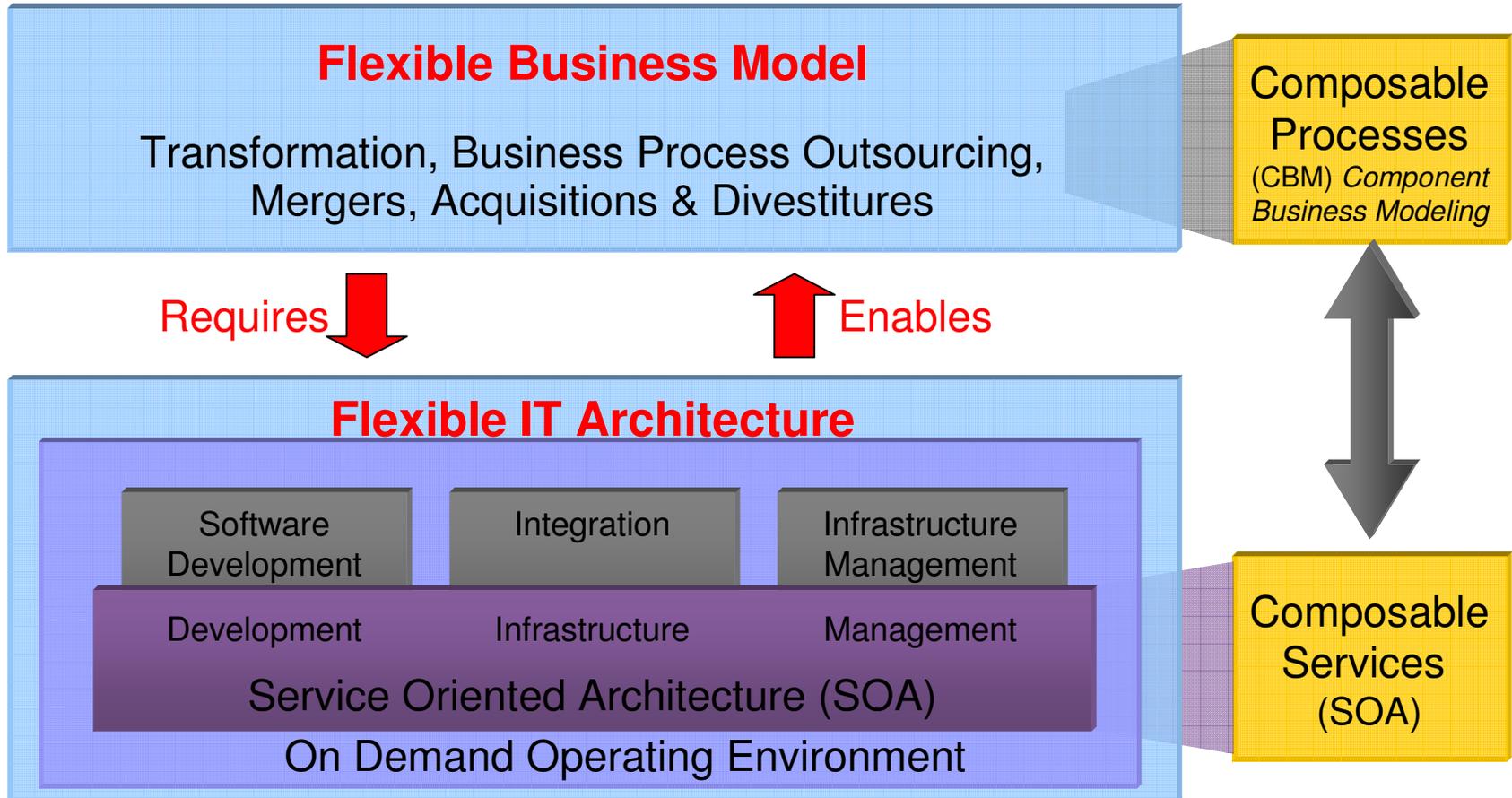
application infrastructure

Extend

your reach

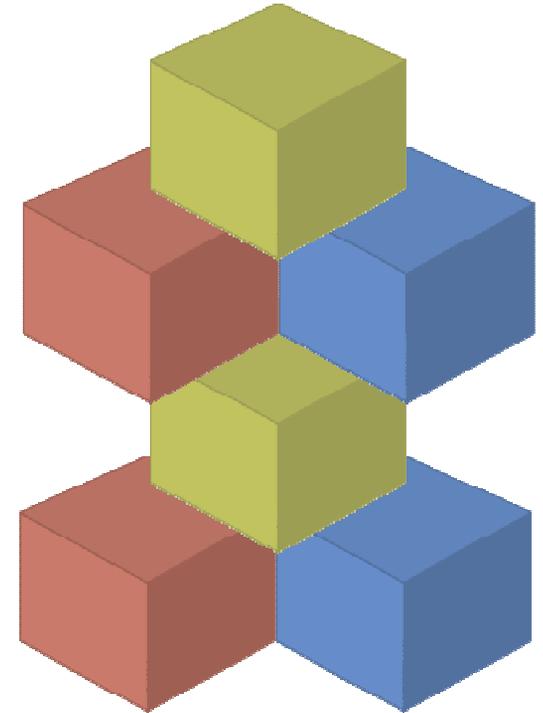
Flexible & Adaptable business models & supporting IT architectures

...are required today for business survival



Service Oriented Architecture (SOA)

- An **approach** for building distributed systems that allows tight correlation between the business model and the IT implementation.
- Characteristics:
 - Represents business function as a **service**
 - Shifts focus to **application assembly** rather than implementation details
 - Allows individual software assets to become **building blocks** that can be **reused** in developing composite applications representing business processes
 - Leverages **open standards** to represent software assets



Service Oriented Architecture

Different Things to Different People

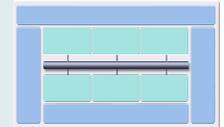
Capabilities (repeatable business tasks) that a business wants to expose as a **set of services** to clients and partner organizations

Business



An **architectural style** that requires a service provider, requestor and a service description. It addresses characteristics such as loose coupling, reuse and simple and composite implementations

Architecture



A **programming model** complete with standards, tools, methods and technologies such as Web services

Implementation



A **set of agreements** among service requestors and service providers that specify the Quality of Service and identify key Business KPIs and IT SLA metrics

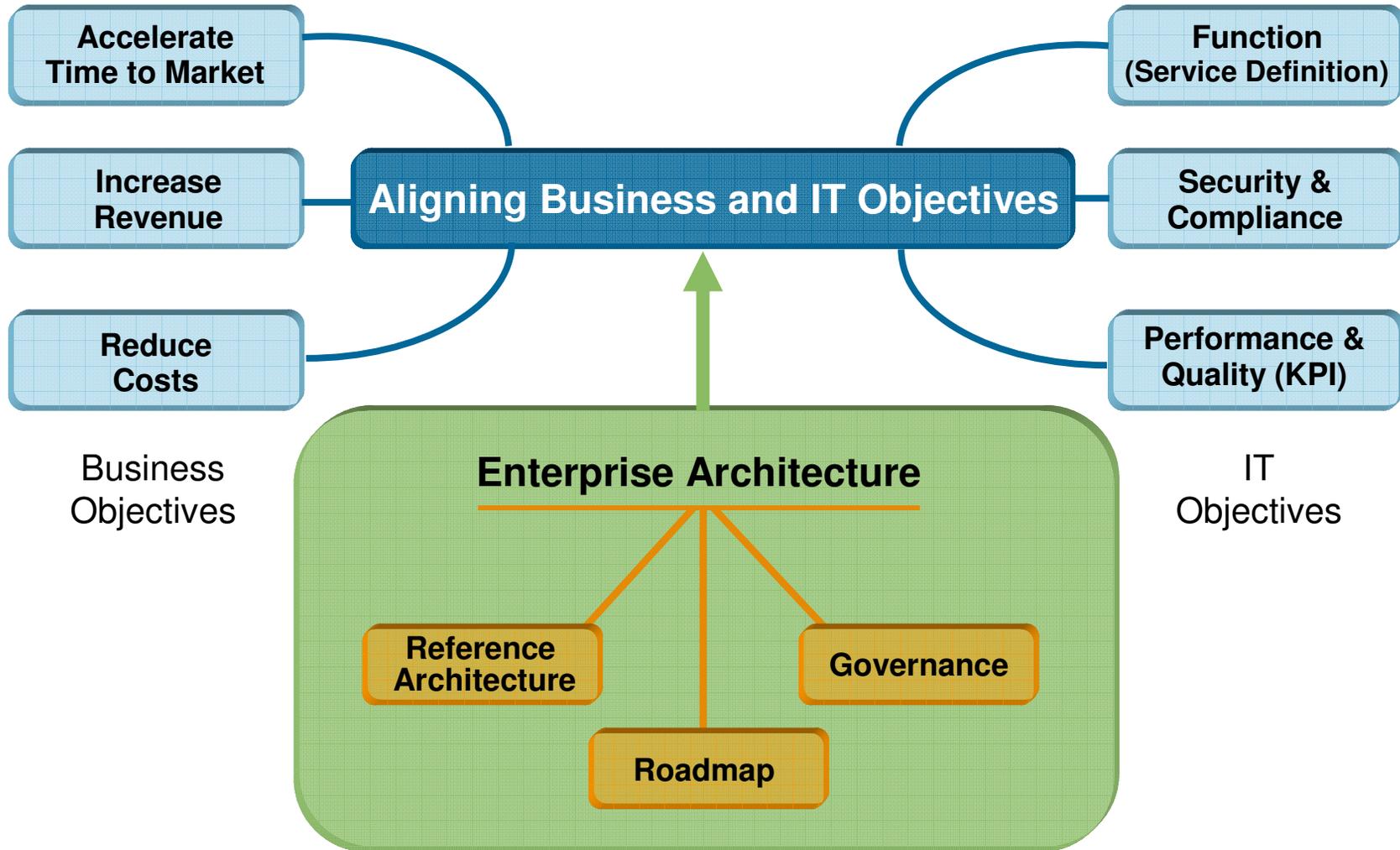
Operations



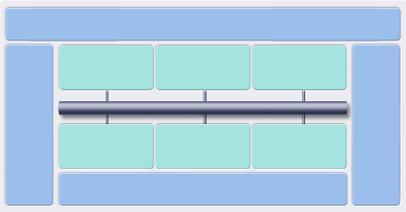
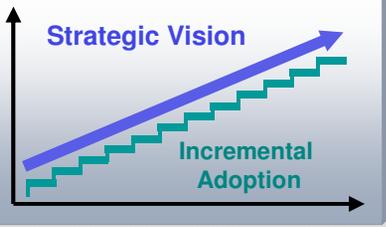
Business Flexibility, Improved customer Service, Lower Costs and Greater Revenue



SOA and Enterprise Architecture: A Common Goal



SOA: The Focus of the Enterprise Architect

Deliverable	Description	Overview
<p>SOA Reference Architecture</p>	<p>The SOA Reference Architecture defines a reference framework and corresponding IT principles for SOA implementation projects</p>	
<p>SOA Roadmap</p>	<p>The Roadmap is used to create a tailored transition plan for moving toward the SOA Reference Architecture</p>	
<p>SOA Governance Model</p>	<p>The SOA Governance Model defines the decision rights along with the associated measurements and controls</p>	



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SOA Reference Architecture



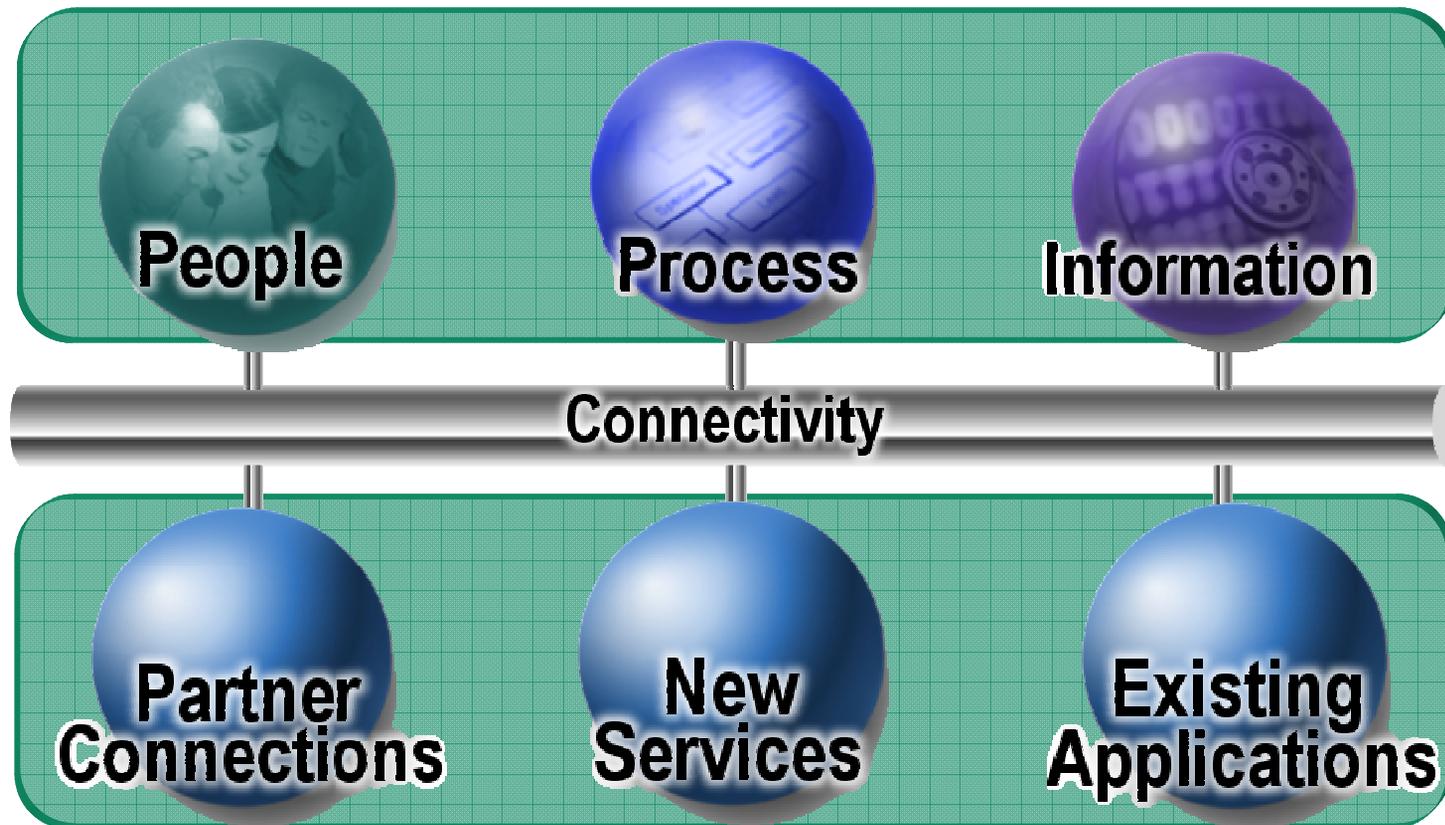
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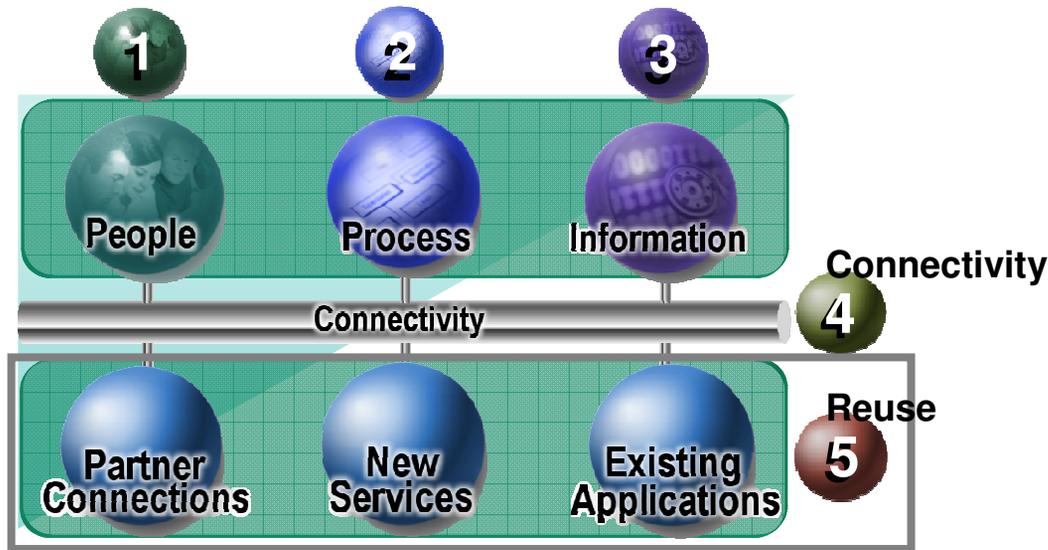
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IBM's SOA Integration Reference Model



SOA Reference Architecture Provides the Blueprint



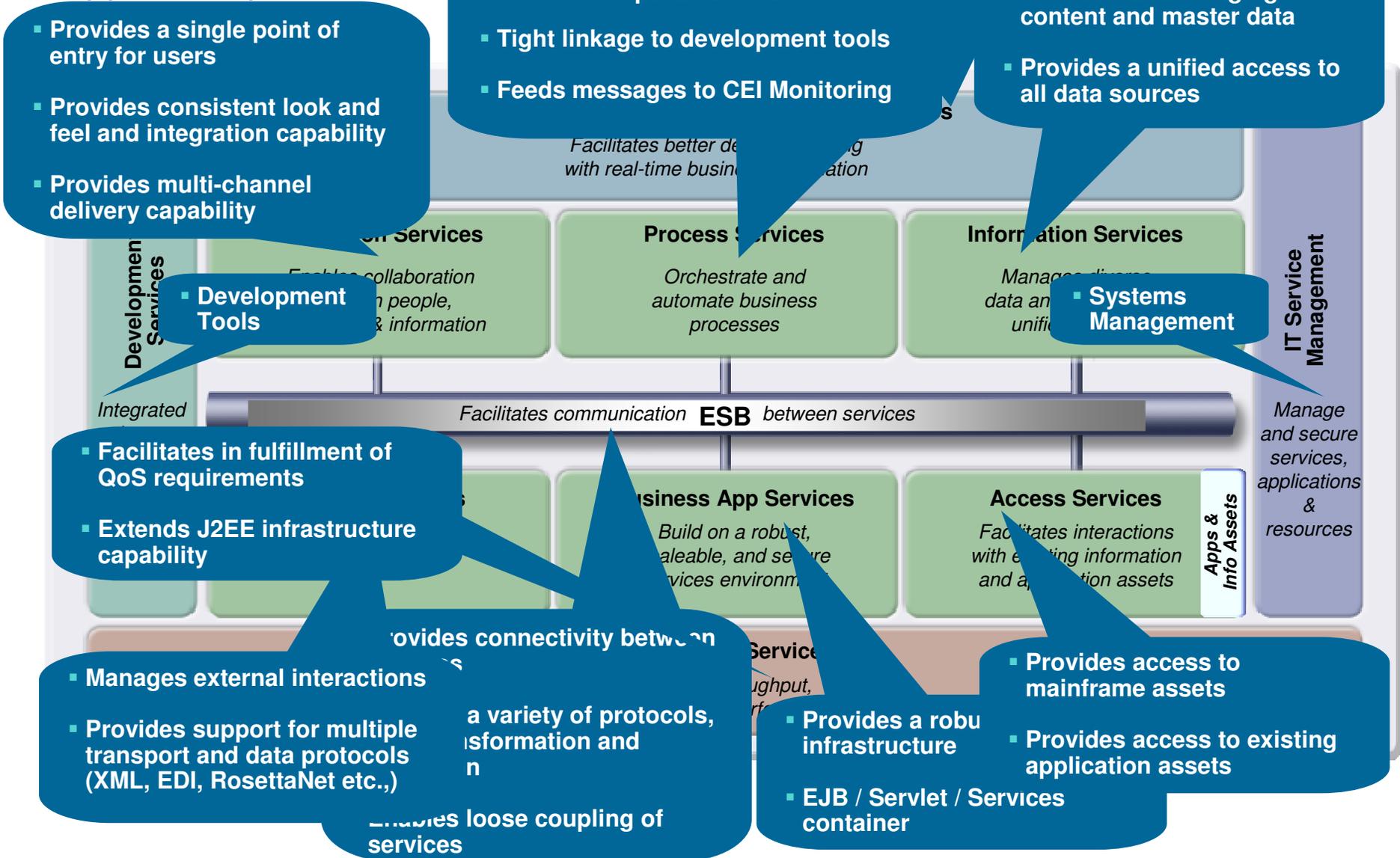
- 1 **People:** productivity through people collaboration
- 2 **Process:** business process management facilitating business innovation
- 3 **Information:** delivering information as a service
- 4 **Connectivity:** underlying connectivity to support business-centric SOA
- 5 **Reuse:** creating flexible, service-based business applications





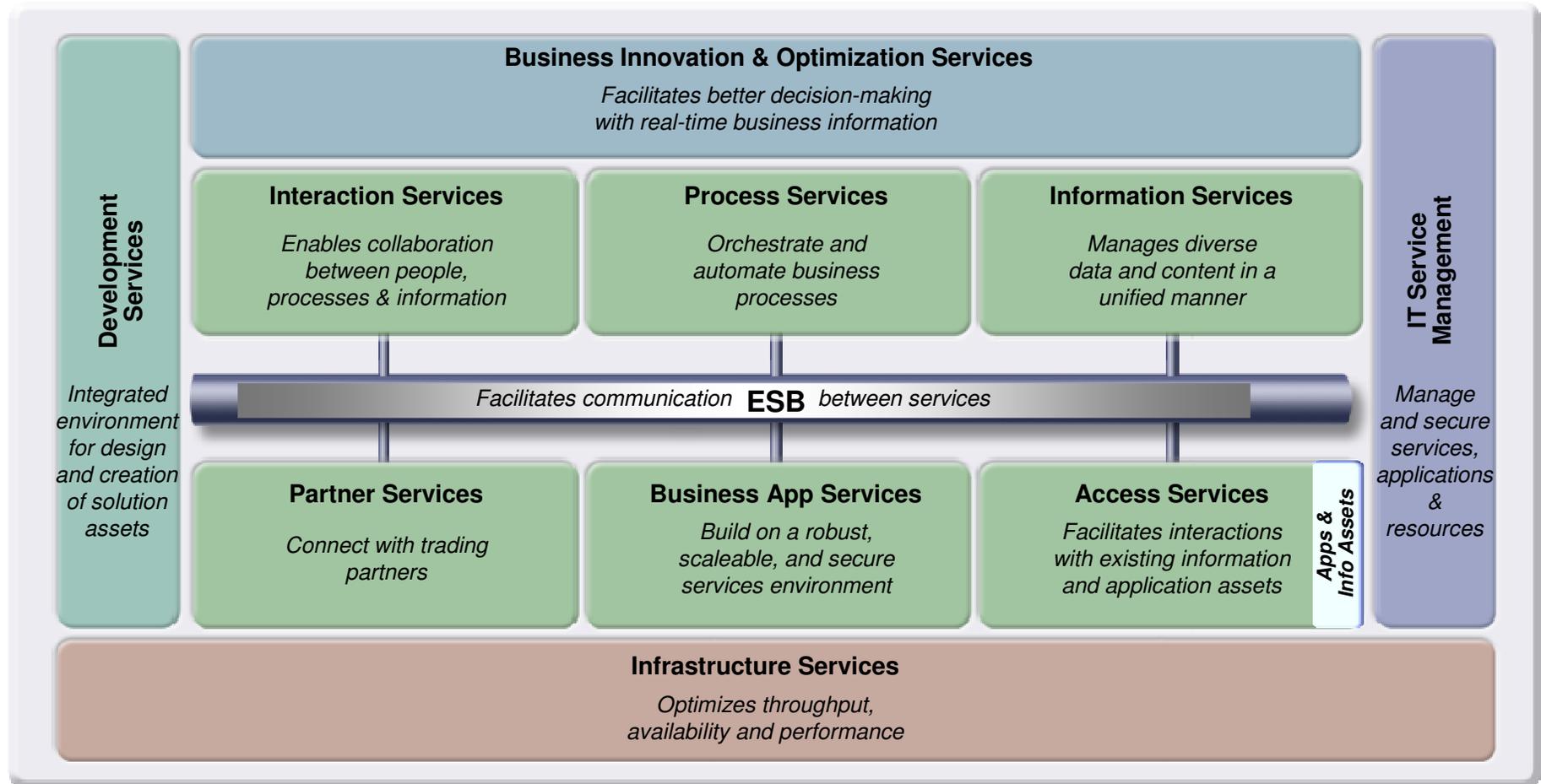
SOA Integration Reference Model

Supports Separation of Concerns



The SOA Integration Reference Model

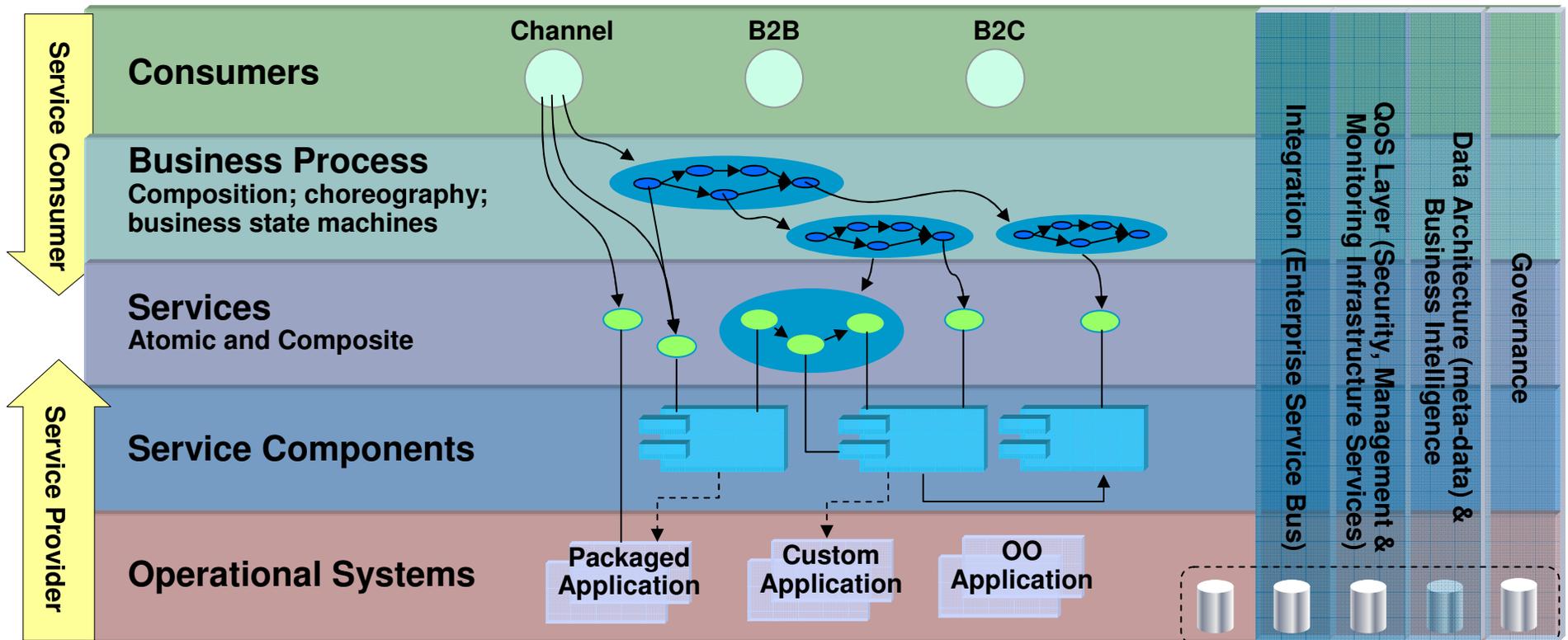
Supports both “Separation of Concerns” & the “SOA Lifecycle”





SOA Solution Abstraction Layering

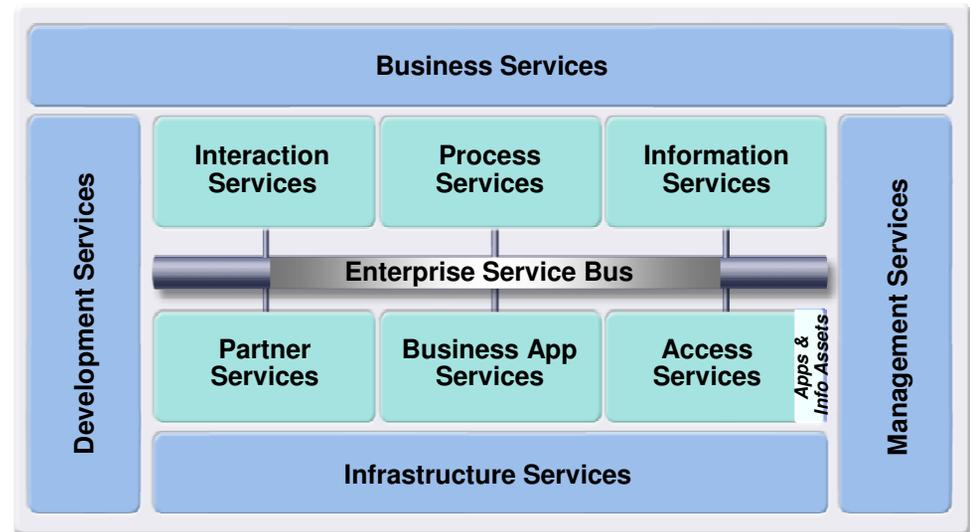
... Leveraging the SOA Reference Architecture



The SOA Reference Architecture and its Key Principles

Providing IT Flexibility to Meet the Demands of Business

- Linkage between business and IT through support of the entire SOA Lifecycle
- Connectivity and Service Isolation through the Enterprise Service Bus
- Separation of Concerns/Modularity for incremental adoption
- Component-based Programming and Solution Development
- Business and IT Monitoring and Management
- Open Standards





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SOA Implementation Roadmap



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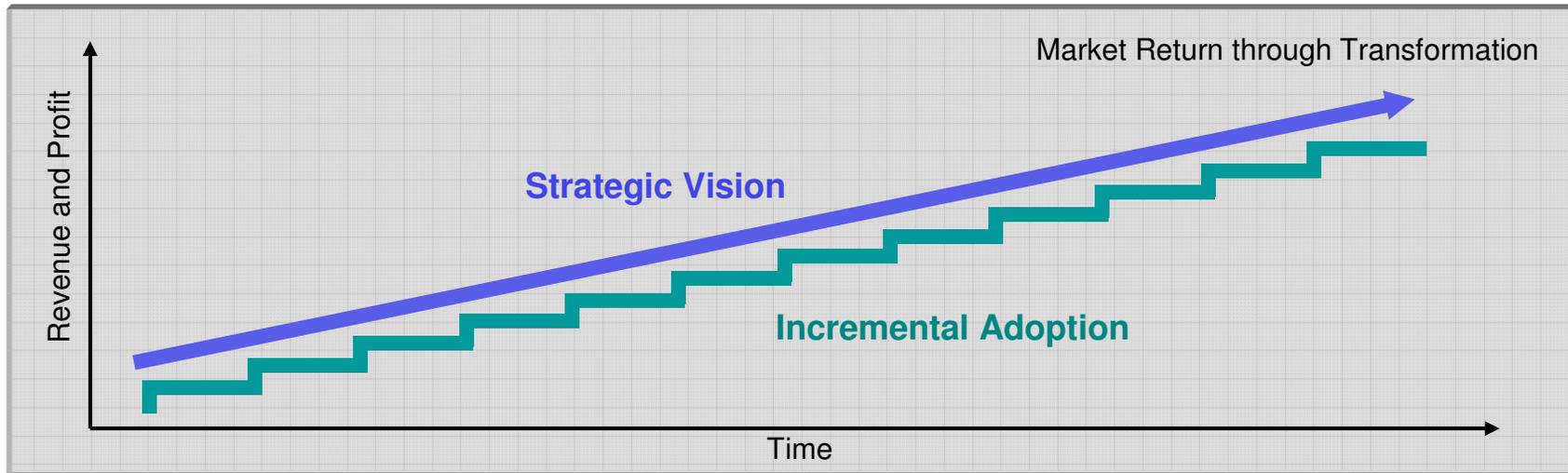
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SOA Roadmap: A Plan for Adopting SOA

SOA Goal

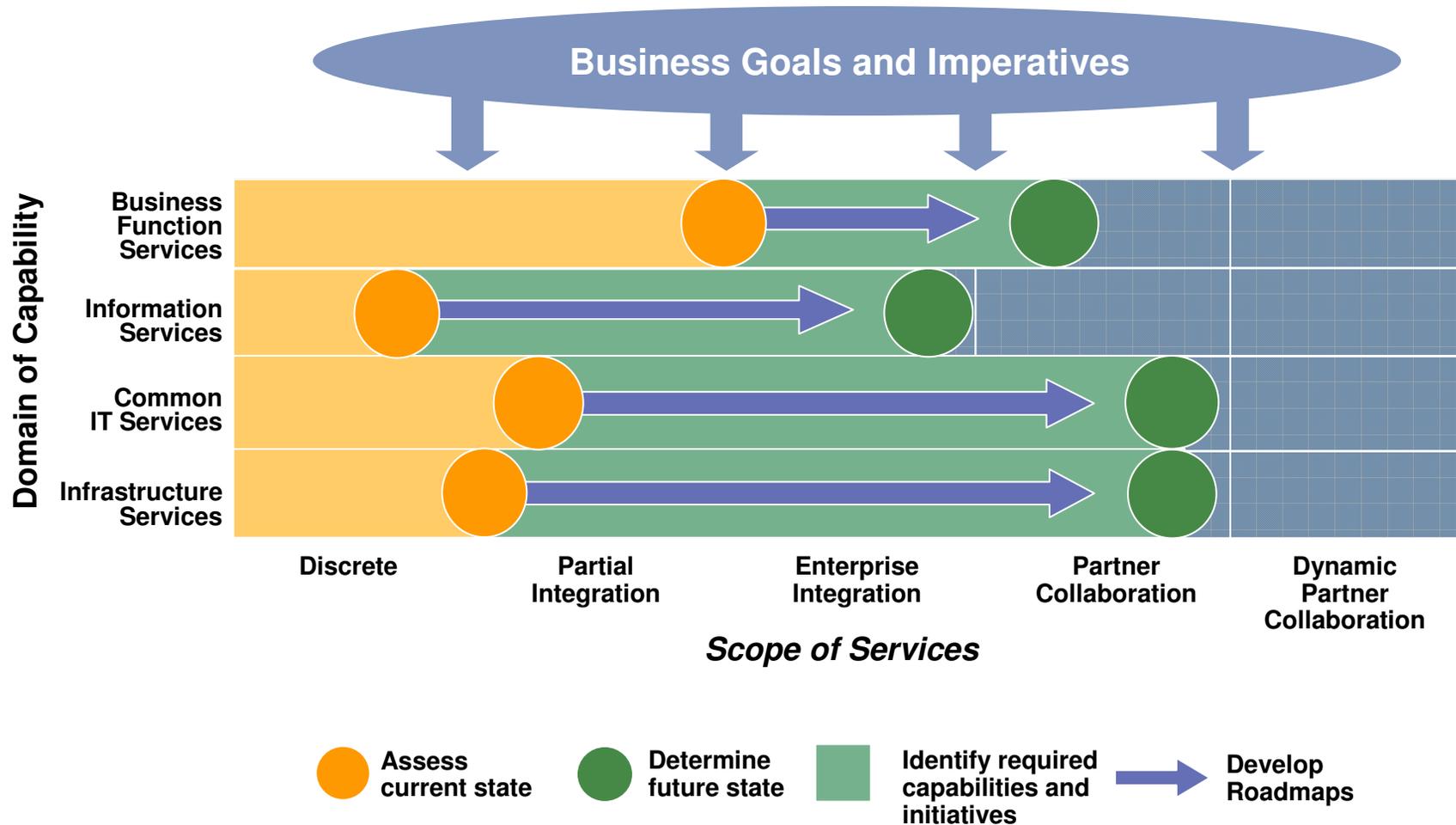
- Market return through transformation: quicker time to production, lower costs, competitive differentiation



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

Roadmaps: Building Plans In Context



Service Integration Maturity Model (SIMM)

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



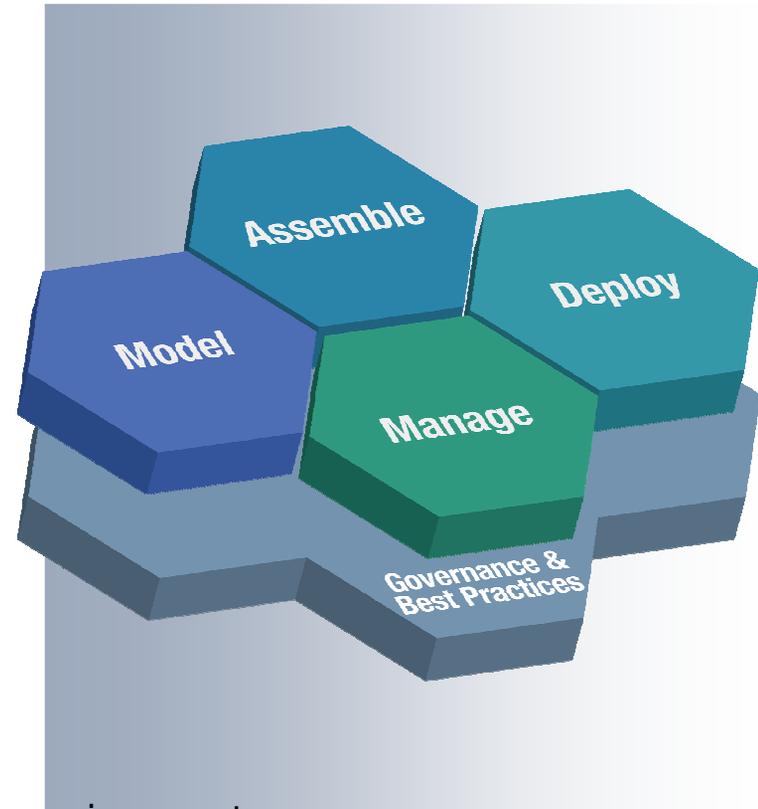
SOA Adoption Considerations

- **Business Drivers**
 - Accelerate time to market
 - Reduce costs
 - Increase revenue
 - Reduce risk and exposure

- **Organizational Readiness**
 - Executive support and sponsorship
 - Skills

- **Current Architecture and Environments**
 - Build and Runtime
 - Degree of heterogeneity

- **Operational Readiness**
 - Ability to monitor and manage current operations
 - Integration of monitoring functions into production environments





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SOA Governance



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What is Governance?

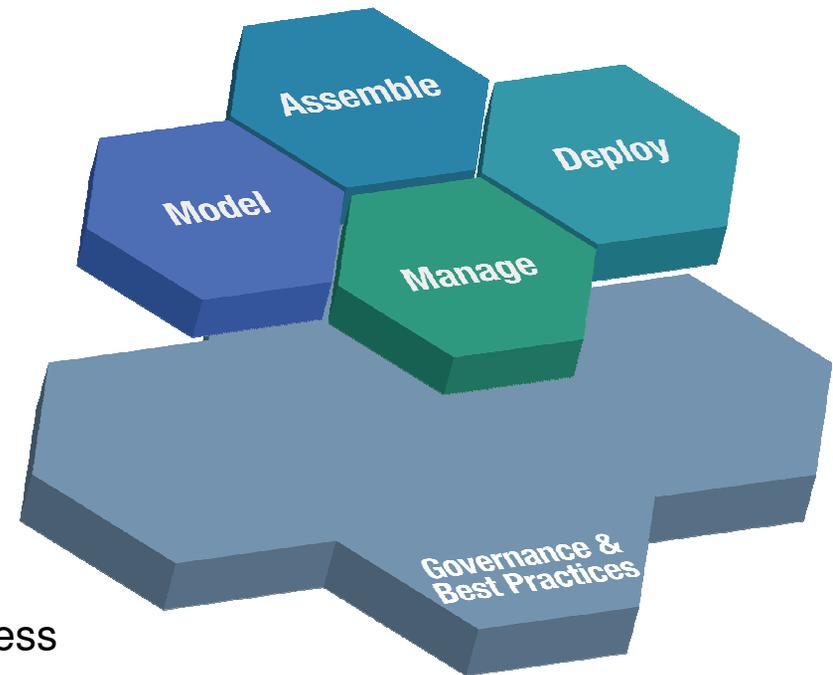
SOA Governance is a catalyst for improving overall IT Governance

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

SOA Governance

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



Why SOA Governance Matters

SOA Governance empowers teams to innovate

- 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



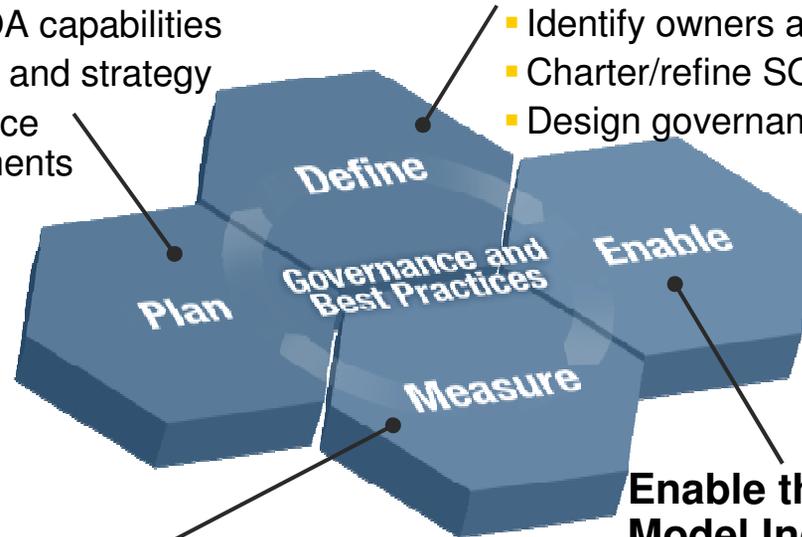
SOA Governance Lifecycle

Plan 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

Enable the Governance Model Incrementally

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

Establishing SOA Center of Excellence (SOA CoE)

Accelerate mobilization of SOA

