Redbook Overview
Patterns: SOA Design with WebSphere Message Broker and WebSphere ESB

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Date: 27/02/2007

Overview

- **IBM Redbooks**

- **Enterprise Service Bus definition and product mapping**

- **Combining Enterprise Service Buses**

- **WebSphere Message Broker & WebSphere ESB features**

- **Related technologies**

Some statistics about IBM Redbooks

- **~5 weeks duration**

- **~4 residents**

- **Generation and capture of intellectual capital**

- **Open to IBMers, business partners, and customers**

- Residents return and train 22 people on average with the new skills they have learned.
- Residents report an average productivity gain of 25%.
- 97% of managers responded "YES" to " Would you again invest another employee in a future ITSO residency?"

www.redbooks.ibm.com

600-750K visitors/month

650K+ downloads/month

Residents donated over 5425 weeks of their time in 2006

Total ITSO residents: 1103

264 Redbooks
124 Redpapers

From a recent survey: "How would you define the value of a redbook?", several respondents stated that they would equate reading one redbook to about a week of formal classroom instruction.

Related Redbooks

- **Apr 2004 – Patterns: Service-Oriented Architecture and Web Services**
- **Jul 2004 – Patterns: Implementing an SOA Using an Enterprise Service Bus**
- **May 2005 – Patterns: SOA with an ESB in WebSphere Application Server V6**
- **Nov 2005 – Patterns: Integrating Enterprise Service Buses in an SOA**
- **Jan 2006 – Patterns: Extended Enterprise SOA and Web Services**
- **Jan 2006 – Patterns: Implementing Self-Service in an SOA Environment**
- **Mar 2006 – Patterns: SOA Client Access Integration Solutions**
- **Mar 2006 – Enabling SOA Using WebSphere Messaging**
- **Jun 2006 – Getting Started with WebSphere Enterprise Service Bus V6**
- **Oct 2006 – Patterns: SOA Foundation – Service Connectivity Scenario**
- **Sep 2006 – Patterns: SOA Foundation – Service Creation Scenario**
- **Feb 2007 Draft – Implementing an ESB using WebSphere Message Broker and WebSphere ESB on z/OS**
- **Q1 2007 In Review – Patterns: SOA Design using WebSphere Message Broker and WebSphere ESB**

Cautionary Note

- **"Patterns: SOA Design with WebSphere Message Broker and WebSphere Enterprise Service Bus"**
  - This IBM Redbook is still in draft. Some of the details shown in this presentation may change upon review

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Products

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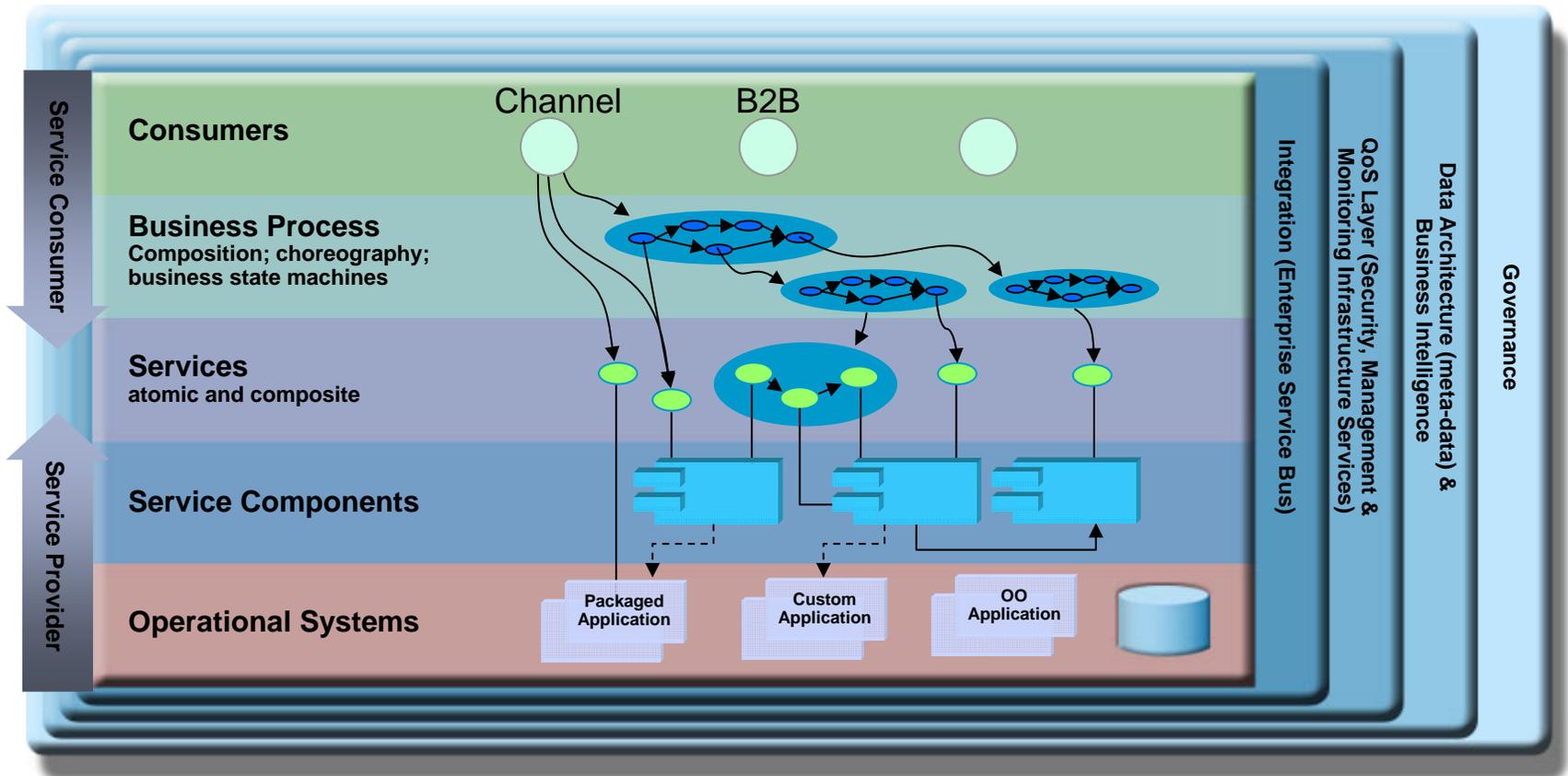**Part 3:**
Physical Scenarios

Chapter x:
Scenarios Overview

Scenarios:
Using WESB and WMB in
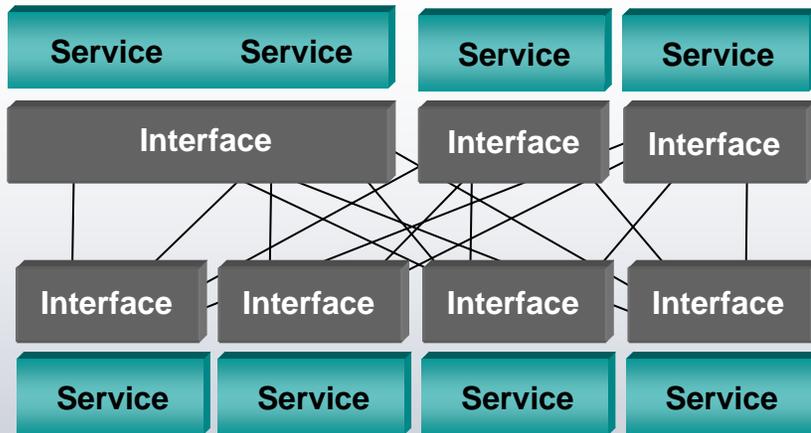combination

Scenarios:
Extending an ESB with
WSRR

Scenarios:
DataPower in an SOA

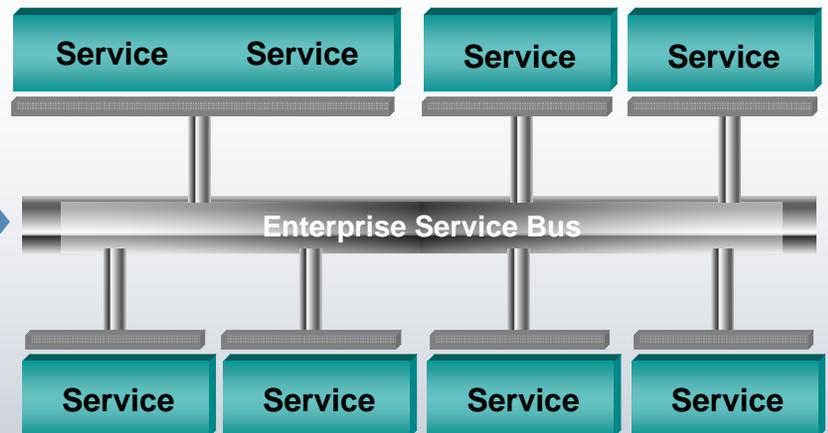# Service Oriented Architecture (SOA) Solution Layers

● Atomic Service	⬭ Composite Service	⬚ Registry

Enterprise Service Bus: Increases Flexibility and Reuse

Turn this…　　　　　　　　　　　　　　　　**…into this**

| Service | Service |
| Service | Service |

| Interface |
| Interface | Interface |

| Interface | Interface | Interface | Interface |

| Service | Service | Service | Service |

| Service | Service |
| Service | Service |

Enterprise Service Bus

| Service | Service | Service | Service |

- **Decouples the point-to-point connections from the interfaces**
- **Allows for dynamic selection, substitution, and matching**
- **Enables more flexible coupling and decoupling of the applications**
- **Enables you to find both the applications and the interfaces for re-use**

ESB is an architectural pattern, not a product

- **ESB Logical Components**
  - Hub
  - ESB Gateway
  - Service Registry
  - Adapter Connector
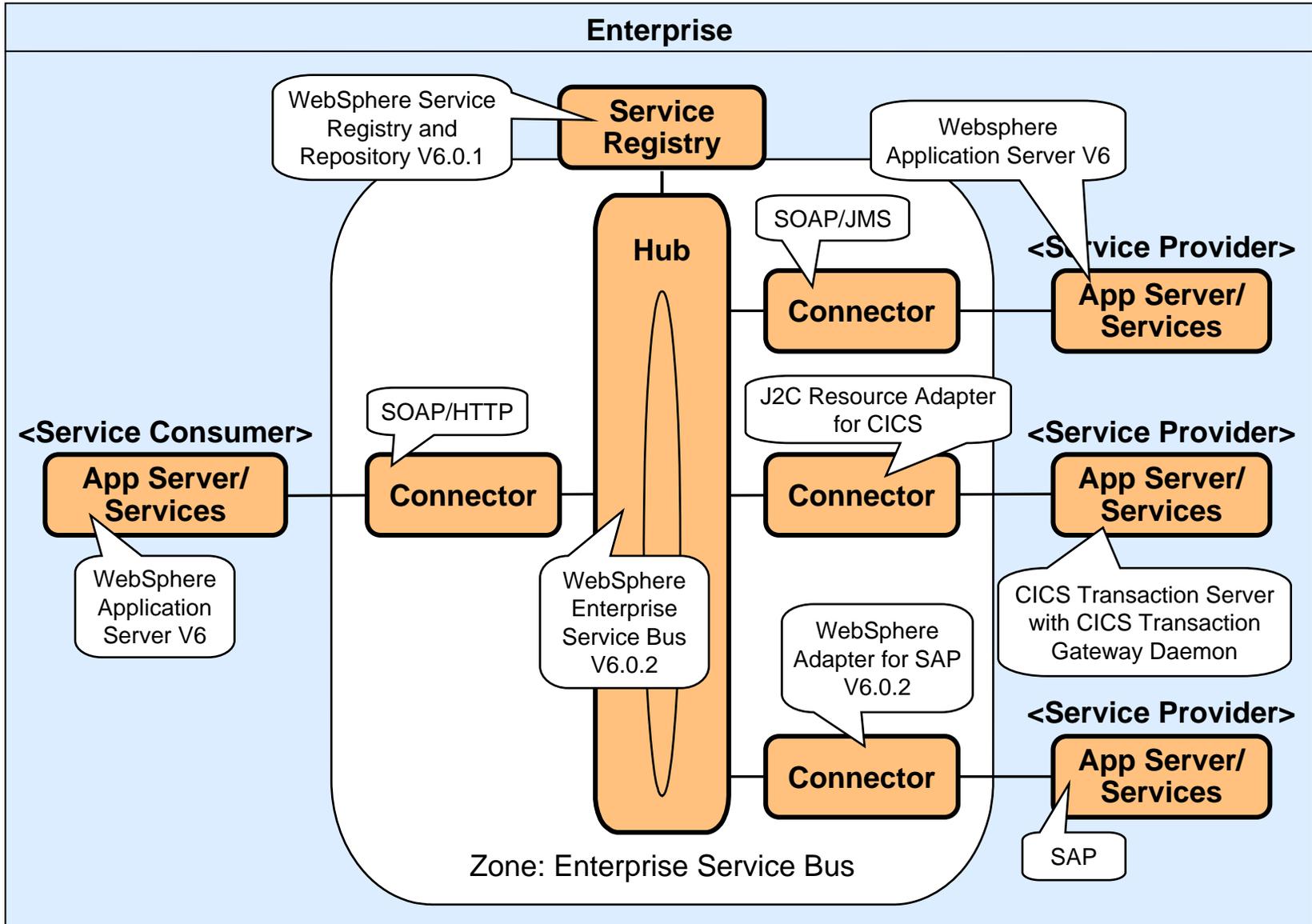 - Path Connector
  - SOA Firewall
  - Partner Gateway

- **ESB Enablement Products**
  - WebSphere Enterprise Service Bus
  - WebSphere Message Broker
  - WebSphere DataPower SOA Appliances

- **ESB Related Products**
  - WebSphere Service Registry and Repository
  - WebSphere Transformation Extender
  - WebSphere Platform Messaging
  - WebSphere MQ
  - WebSphere Adapters
 - WebSphere Partner Gateway

ESB – Basic Topology – with example product mappings

Enterprise

WebSphere Service Registry and Repository V6.0.1

Service Registry

Websphere Application Server V6

SOAP/JMS

Hub

<Service Provider>

Connector

App Server/ Services

SOAP/HTTP

J2C Resource Adapter for CICS

<Service Consumer>

App Server/ Services

Connector

<Service Provider>

Connector

App Server/ Services

WebSphere Application Server V6

WebSphere Enterprise Service Bus V6.0.2

WebSphere Adapter for SAP V6.0.2

CICS Transaction Server with CICS Transaction Gateway Daemon

<Service Provider>

Connector

App Server/ Services

SAP

Zone: Enterprise Service Bus

ESB Hub – Candidate capabilities

- **Routing and brokerage**

- **Namespace translation**

- **Service virtualisation**

- **Messaging styles**

- **Transport protocols**

- **Interface definition**

- **Messaging model**

- **Data enrichment**

- **Quality of Service**

- **Message processing**

- **Data Modelling**

- **Service levels**

- **Infrastructure intelligence**

- **Administration**

- **Security**
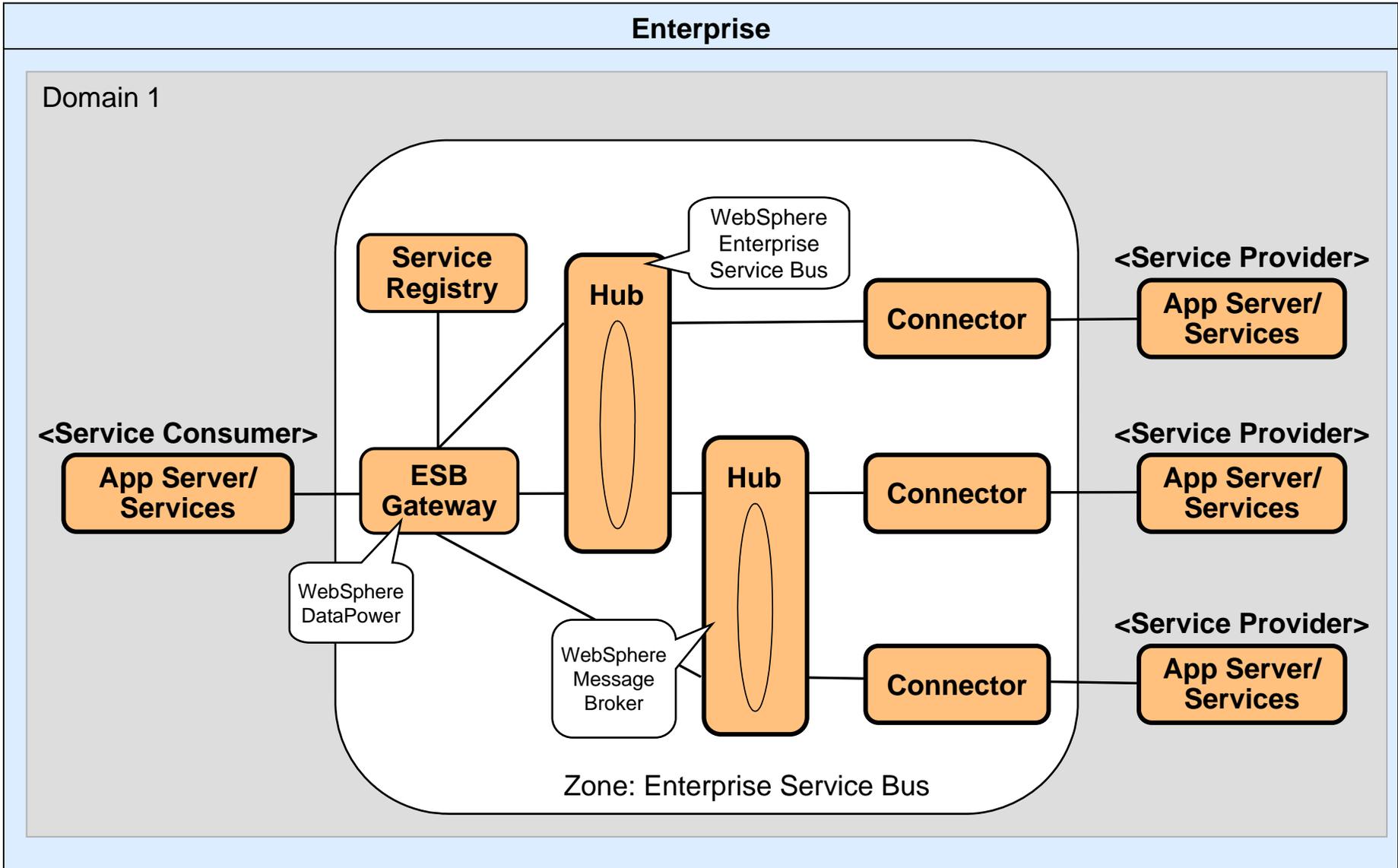
ESB – Advanced Topology
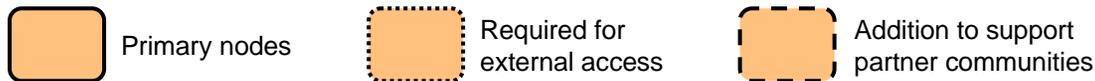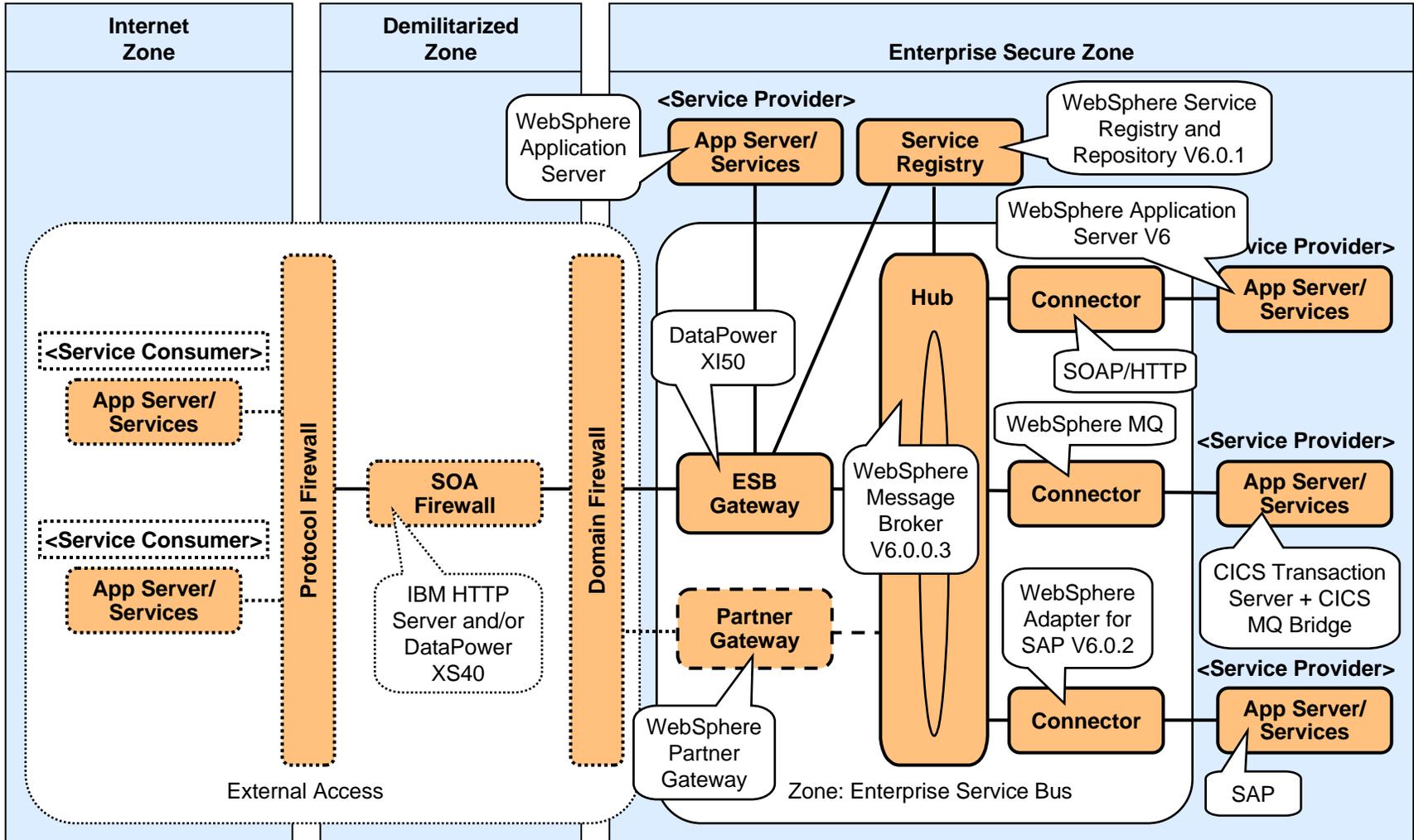
One ESB or two?

- **Multiple technologies within a single ESB**
  - WebSphere Enterprise Service Bus
  - WebSphere Message Broker
  - WebSphere DataPower
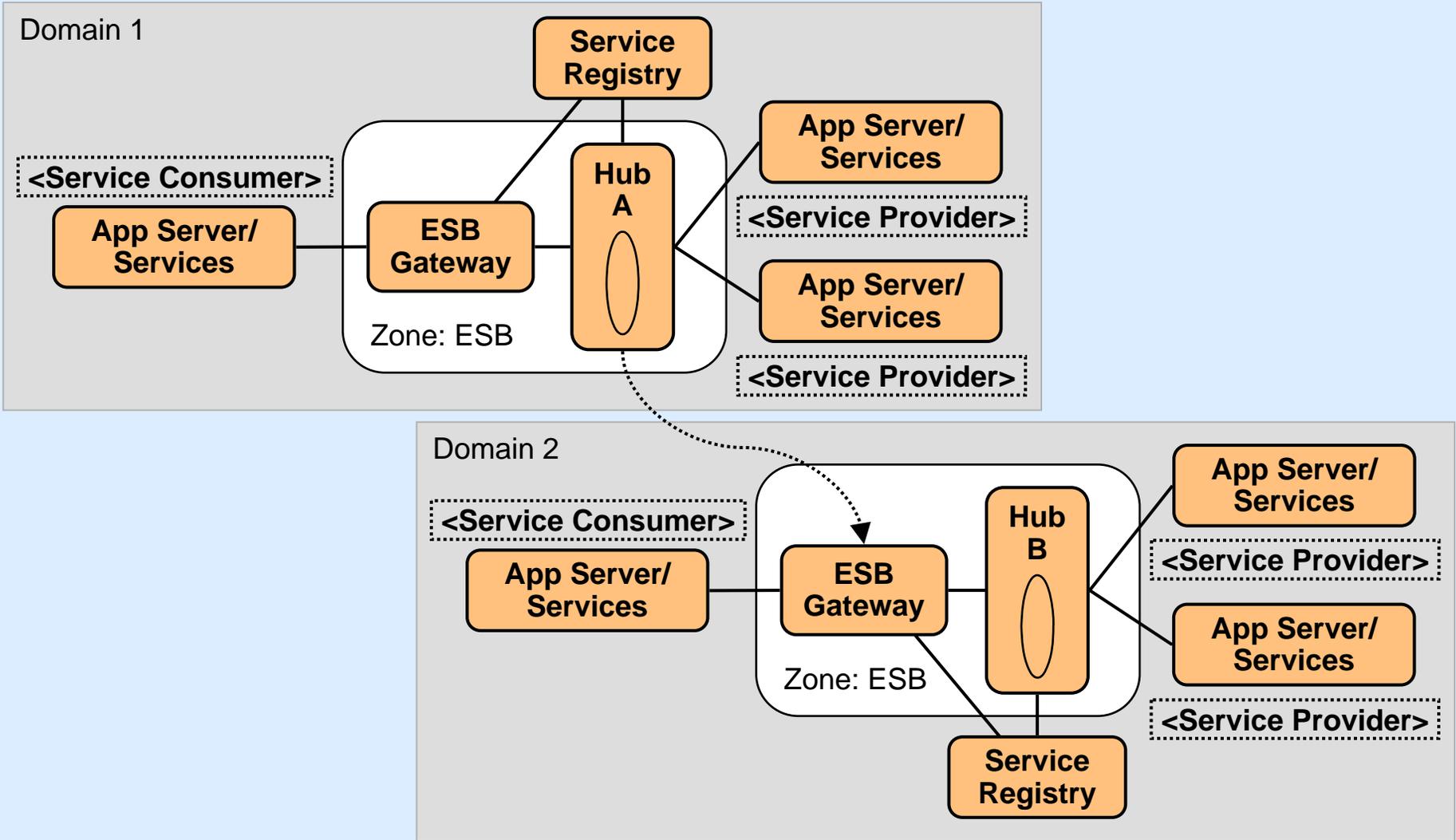 - …

- **Multiple ESBs**
  - Governance bodies
  - Funding models
  - Organizational units
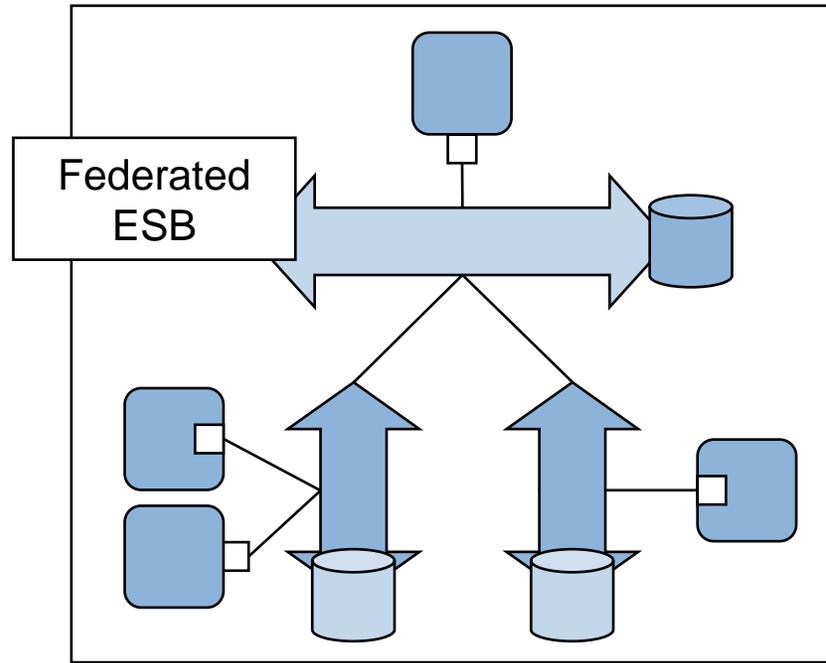 - Geographies
  - Business strategies
  - Technology domains

Single service bus containing multiple technologies

Enterprise

Domain 1

Service Registry

Hub

WebSphere Enterprise Service Bus

Connector

<Service Provider>

App Server/ Services

<Service Consumer>

App Server/ Services

ESB Gateway

WebSphere DataPower

Hub

WebSphere Message Broker

Connector

<Service Provider>

App Server/ Services

Connector

<Service Provider>

App Server/ Services

Zone: Enterprise Service Bus

Multiple ESBs – Directly Connected

Enterprise Zone

Domain 1

Service Registry

<Service Consumer>

App Server/ Services

ESB Gateway

Zone: ESB

Hub A

App Server/ Services

<Service Provider>

App Server/ Services

<Service Provider>

Domain 2

<Service Consumer>

App Server/ Services

ESB Gateway

Zone: ESB

Hub B

App Server/ Services

<Service Provider>

App Server/ Services

<Service Provider>

Service Registry

Global ESB

Directly connected ESB

Brokered ESB

Federated ESB

Registry   Consumer/Provider   ESB
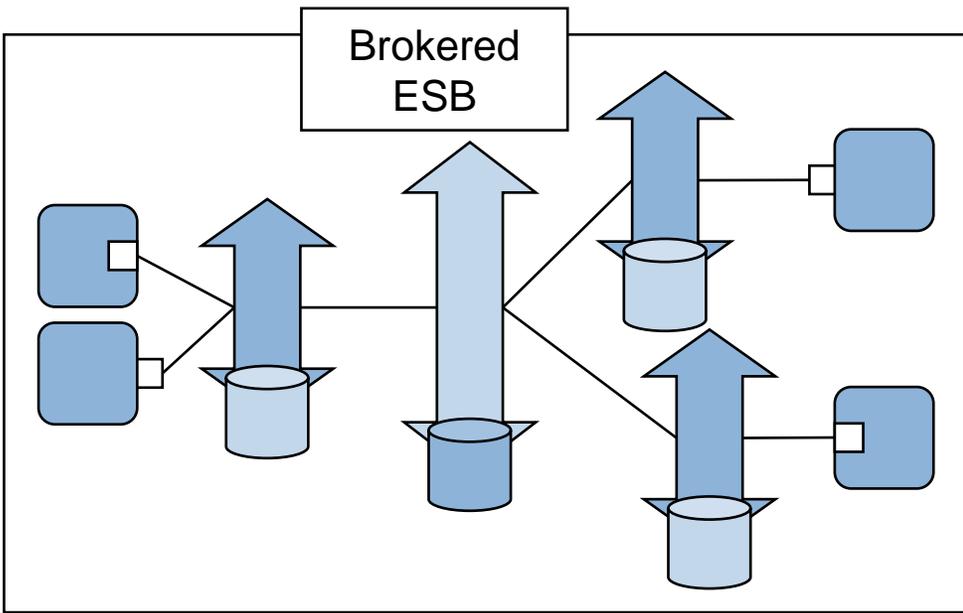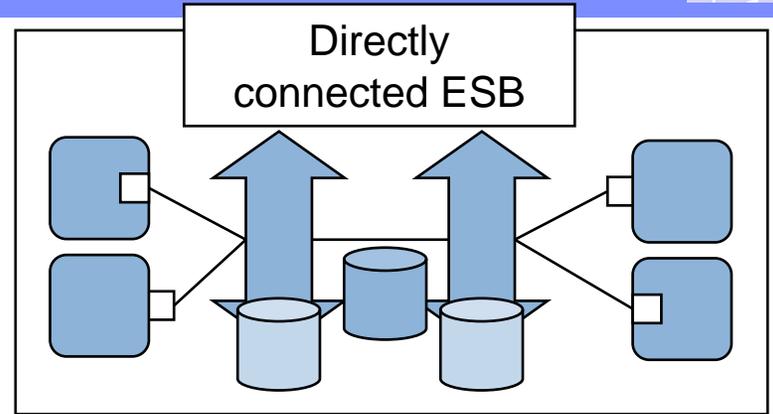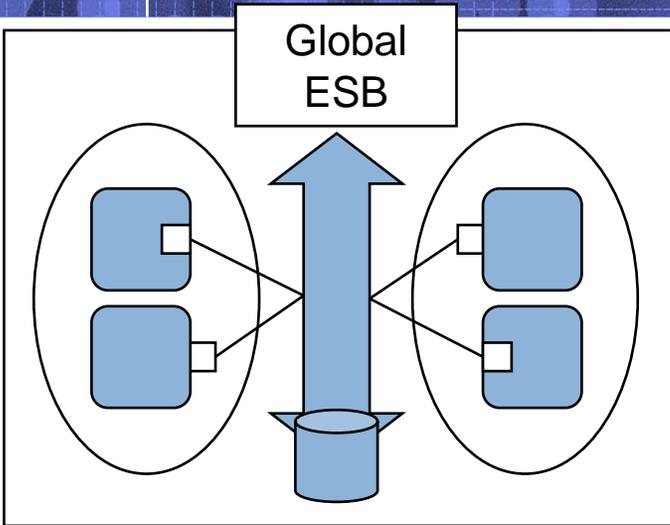
Brokered ESBs – Hub Brokerage

Enterprise Zone

Domain 1

Service Registry

<Service Consumer>

App Server/ Services

ESB Gateway

Hub A

Zone: ESB

App Server/ Services

<Service Provider>

App Server/ Services

<Service Provider>

Domain 3

<Service Consumer>

App Server/ Services

Domain 2

<Service Consumer>

App Server/ Services

ESB Gateway

Zone: ESB

Hub B

App Server/ Services

<Service Provider>

App Server/ Services

Service Registry

<Service Provider>
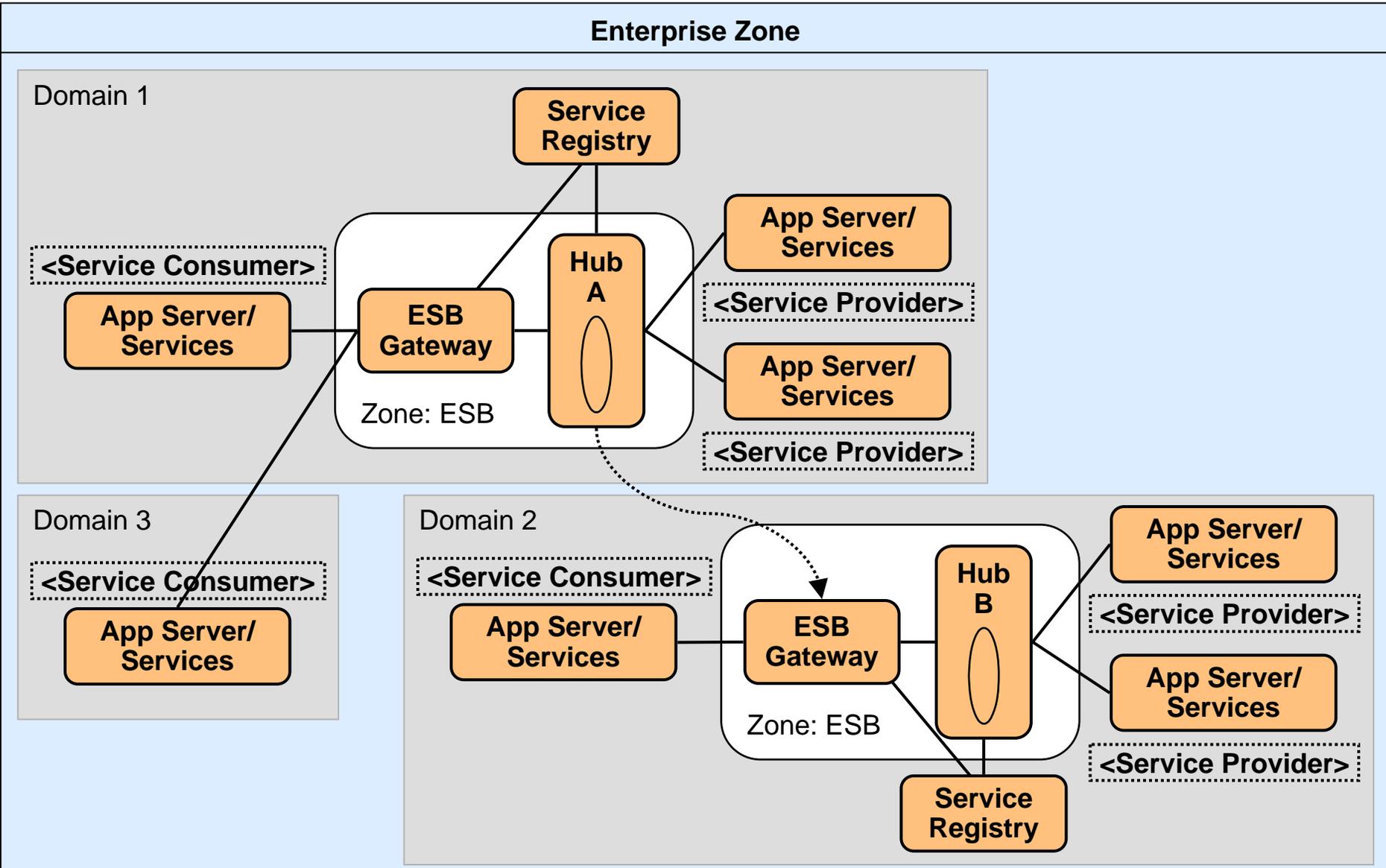
Brokered ESBs – Gateway Brokerage

Enterprise Zone

Domain 1

Service Registry

<Service Consumer>

App Server/ Services

ESB Gateway

Hub A

App Server/ Services

<Service Provider>

App Server/ Services

<Service Provider>

Domain 2

<Service Consumer>

App Server/ Services

Zone: ESB

Hub B

App Server/ Services

<Service Provider>

App Server/ Services

<Service Provider>
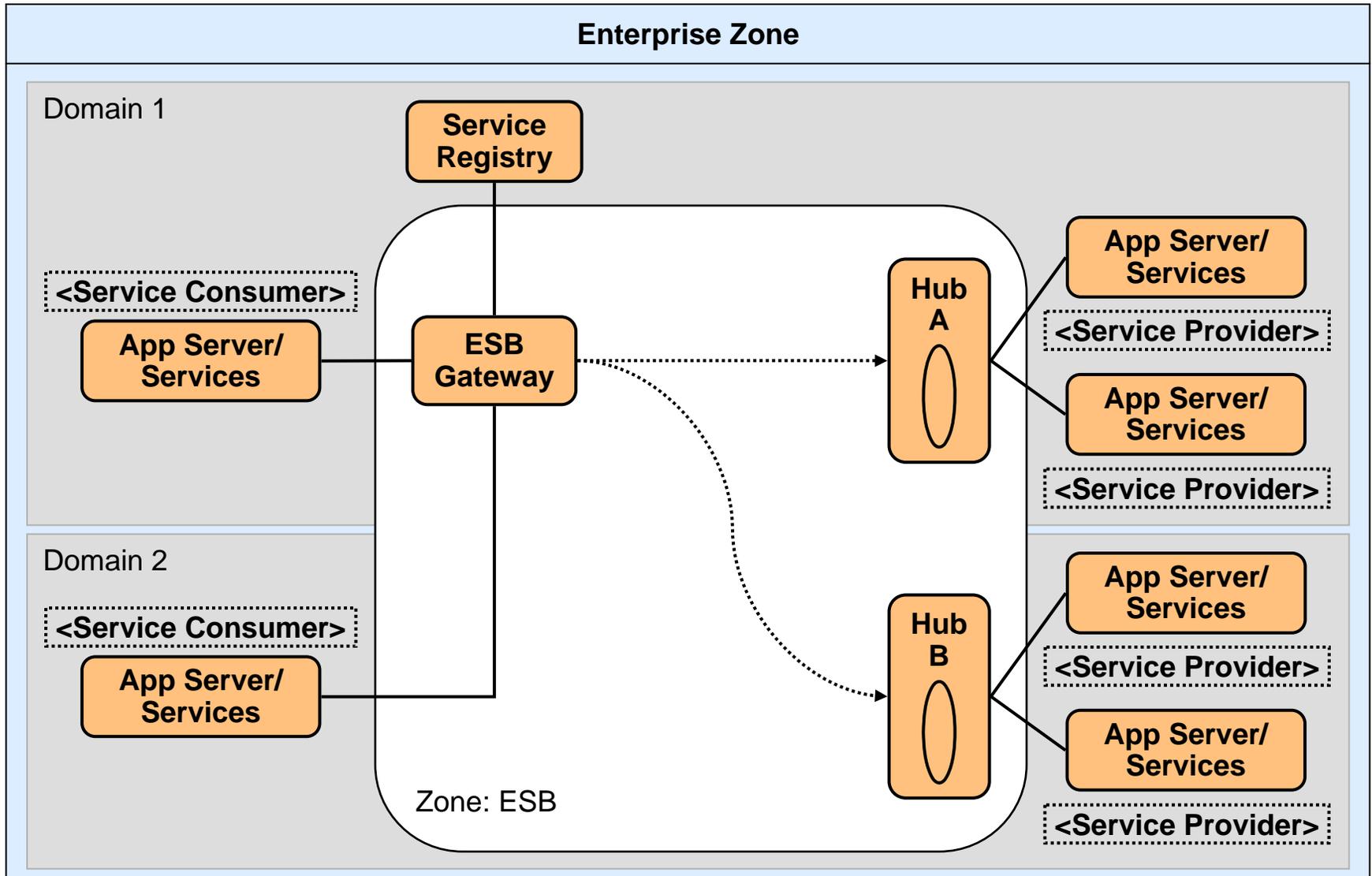
Federated ESBs

Note: Similarity to DNS

Enterprise Zone

Domain 1

Registry federation or replication

Service Registry

Zone: ESB

<Service Consumer>

App Server/ Services

ESB Gateway

Hub A

App Server/ Services

<Service Provider>

App Server/ Services

<Service Provider>

Domain 2

<Service Consumer>

App Server/ Services

ESB Gateway

Hub B

App Server/ Services

<Service Provider>

Service Registry
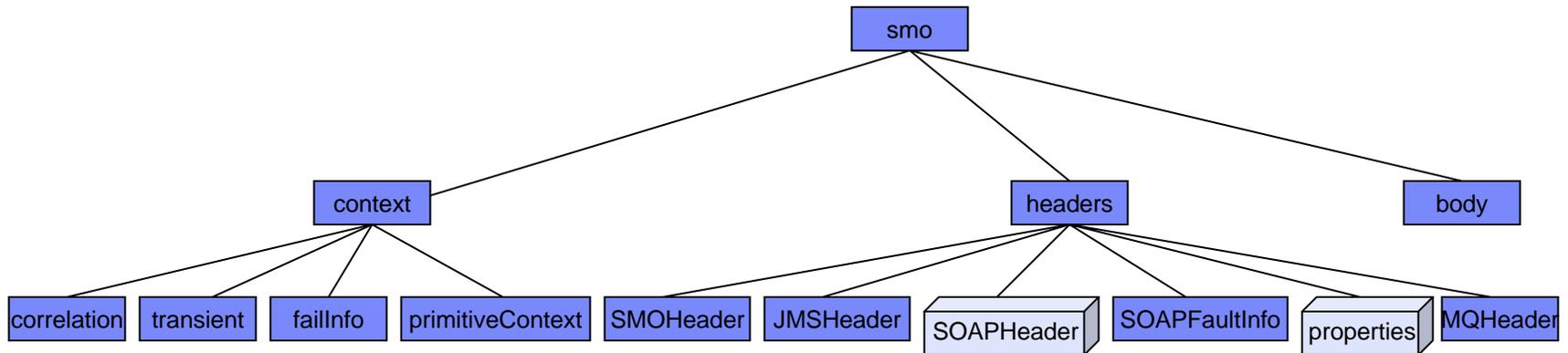
Registry federation or replication
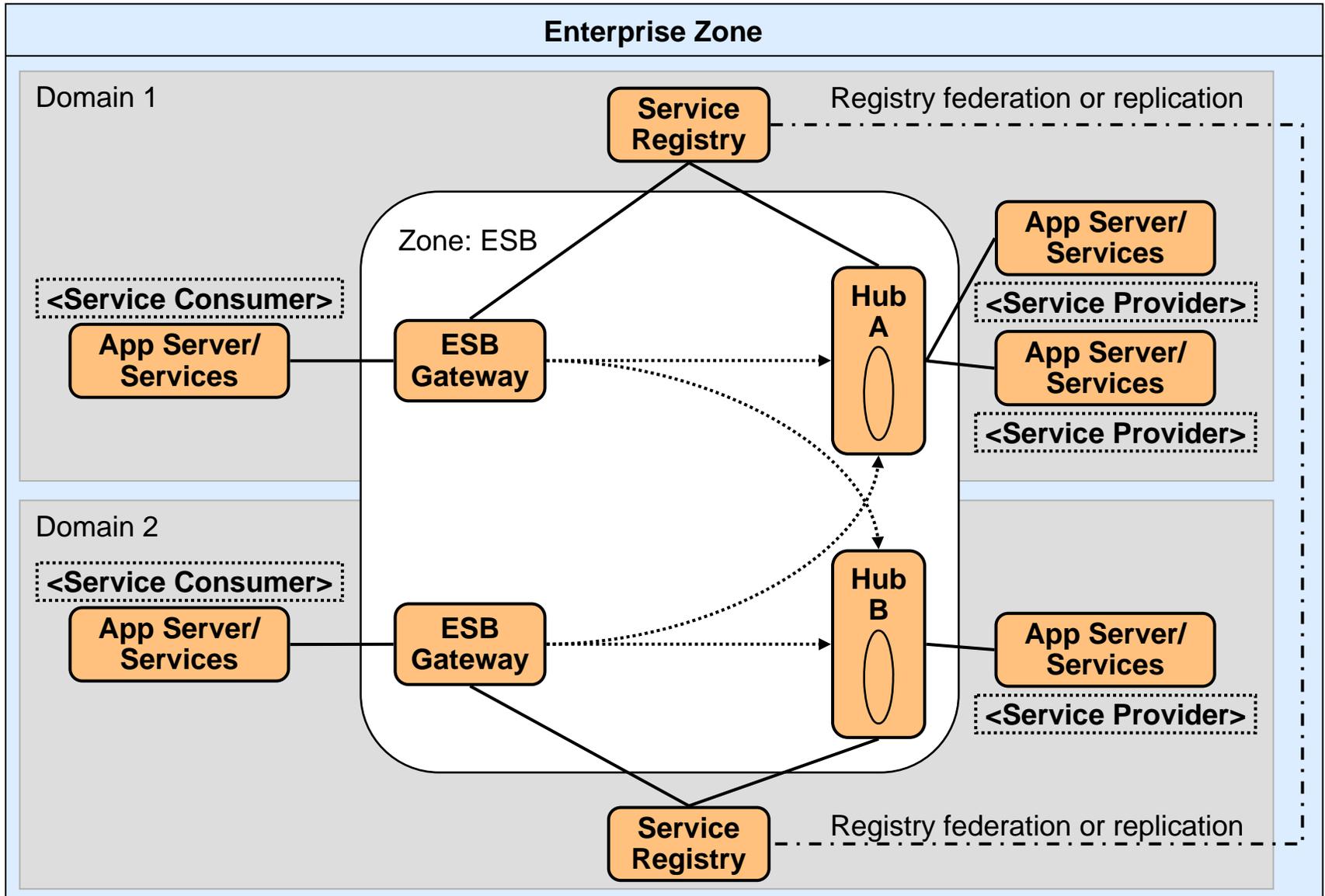
WebSphere Enterprise Service Bus – Overview

- Service Message Object (SMO)

- Service Component Architecture (SCA)

- Module = J2EE Application/EAR
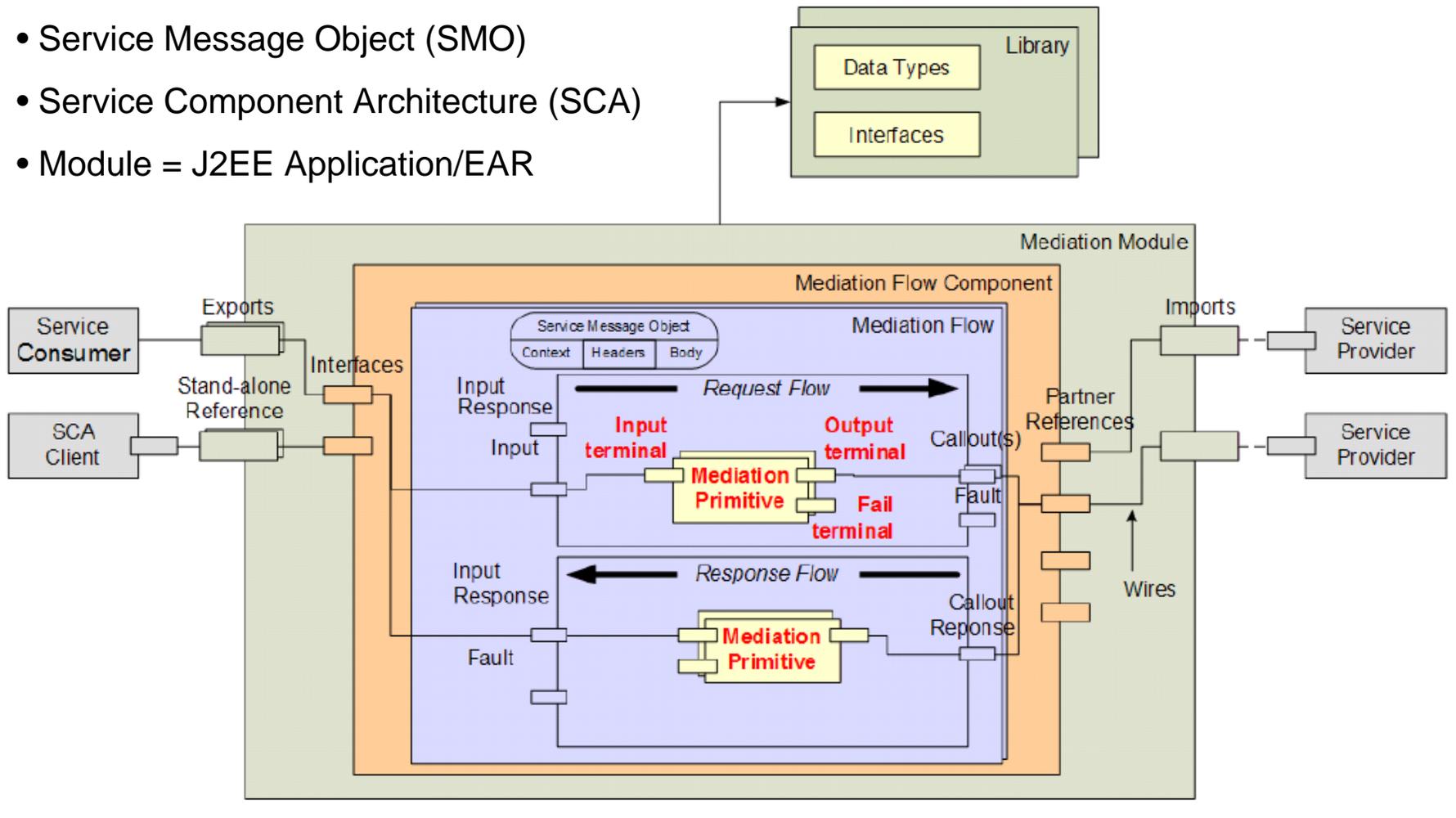
# Inside the Service Message Object

WebSphere ESB v6.0.2 – Key New Features

- **New bindings:**
  - WebSphere MQ JMS
  - WebSphere MQ native binding Performance

- **Administrative configuration**
  - Administrative configuration of end points
  - Administrative configuration of meditations
  - Dynamic end-point selection

- **Dynamic configuration**
  - Integration with WebSphere Service Registry and Repository
  - New dynamic end point lookup primitive

- **Monitoring and Management**
  - CEI (common event infrastructure) primitive for business activity monitoring and management
  - ITCAM for SOA feeds to WebSphere Service Registry and Repository

WebSphere Message Broker – Core Capabilities

- **Protocols and data formats:**
  - COBOL Copybook,CICS, VSAM, HL7, SWIFT, HL7, HIPAA, EDI-X.12, EDIFact, FIX, ACORD / AL3, TLOG, C structures, etc.
  - WebServices: XML, SOAP, JMS

- **Transports:**
  - WebSphere MQ: Enterprise, Mobile, Real-Time, Multicast and Telemetry
  - HTTP, HTTPS, JMS

- **High Volume Performance and Throughput**

- **Complex Event Processing**

- **WebSphere Adapters**
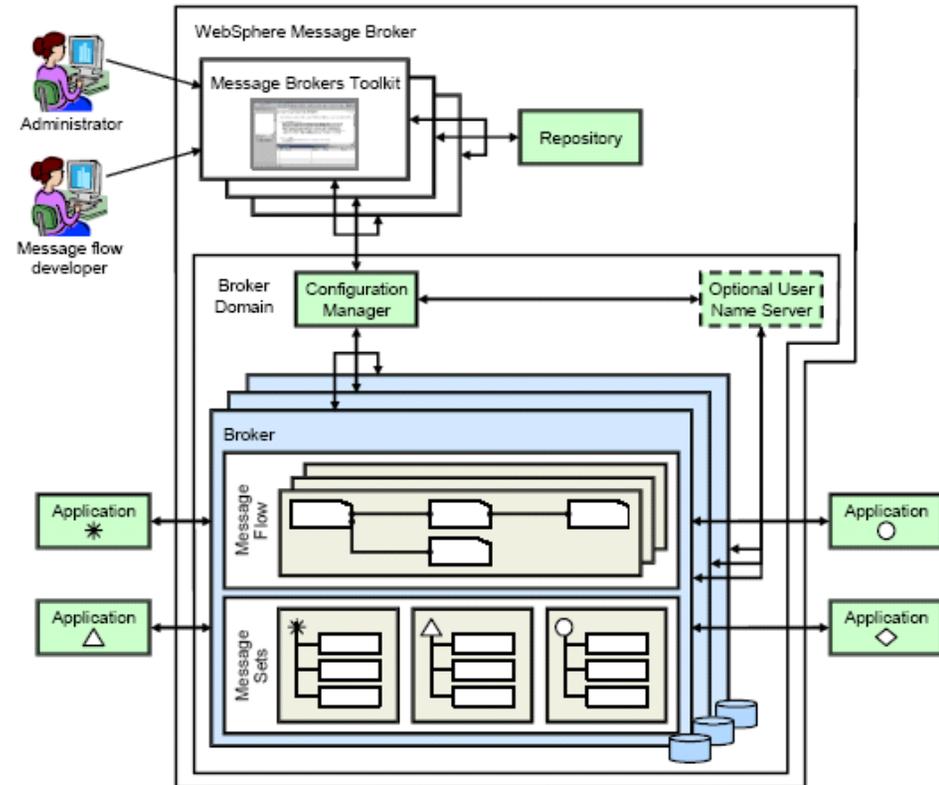
WebSphere Message Broker – Key Recent Features

- **Registry lookup nodes**

- **Java compute nodes**

- **HTTPS connectivity**

- **Integration with WebSphere Transformation Extender**

Candidate Environment Criteria

Please note that these criteria should not be used in isolation, nor should they be considered a complete list. They should be used in conjunction with a full appreciation of the subtleties of a specific technical environment.

- **Candidate WebSphere Enterprise Service Bus Environment**
  - J2EE environment
  - WebSphere Application Server environment
  - WebSphere Process Server environment
  - SCA/SDO standardisation

- **Candidate WebSphere Message Broker Environment**
  - WebSphere MQ environment
  - Very high-performance and throughput
  - Multiple transport protocols
  - Support for a wide range of non-XML data formats
  - Complex event processing
  - Multiple implementation languages
  - Design focused on low level content based routing
  - Integration with WebSphere TX

Combining WebSphere Message Broker and WebSphere Enterprise Service Bus

WESB

JMS

MQ

MQ JMS

HTTP

HTTPS

WMB
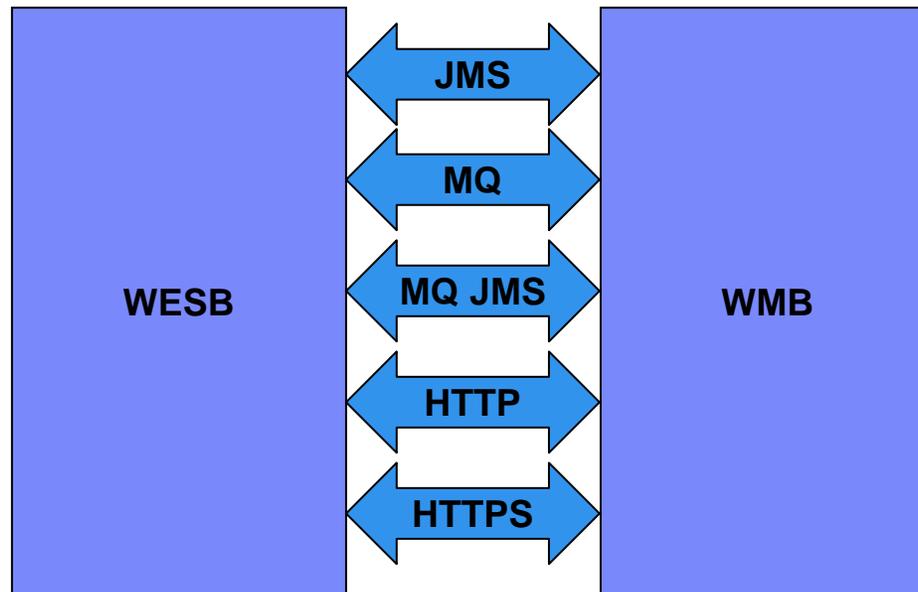
WebSphere DataPower – SOA Related Capabilities

- **XML Acceleration**
  - XML/SOAP firewall, filtering based on message content, headers, or other network variables
  - Incoming/outgoing data validation
  - Schema validation
  - XML security, access control, authentication, and authorization

- **XML Protection**
  - Includes XML threat, XML denial of service, message tampering protocol threat, XML virus, dictionary attack.
  - http://www-128.ibm.com/developerworks/websphere/techjournal/0603_col_hines/0603_col_hines.html

- **Security**
  - XML Web services access control: Includes WS-Security, WS-Trust, X.509, SAML, SSL, LDAP, RADIUS and simple client/URL maps.
  - Authentication and Authorization: Support includes IBM Tivoli Federated Identity Manager (TFIM) and IBM Tivoli Access Manager.
  - Field level message security: Selective encryption/decryption and signing/verification of entire messages or of individual XML fields.
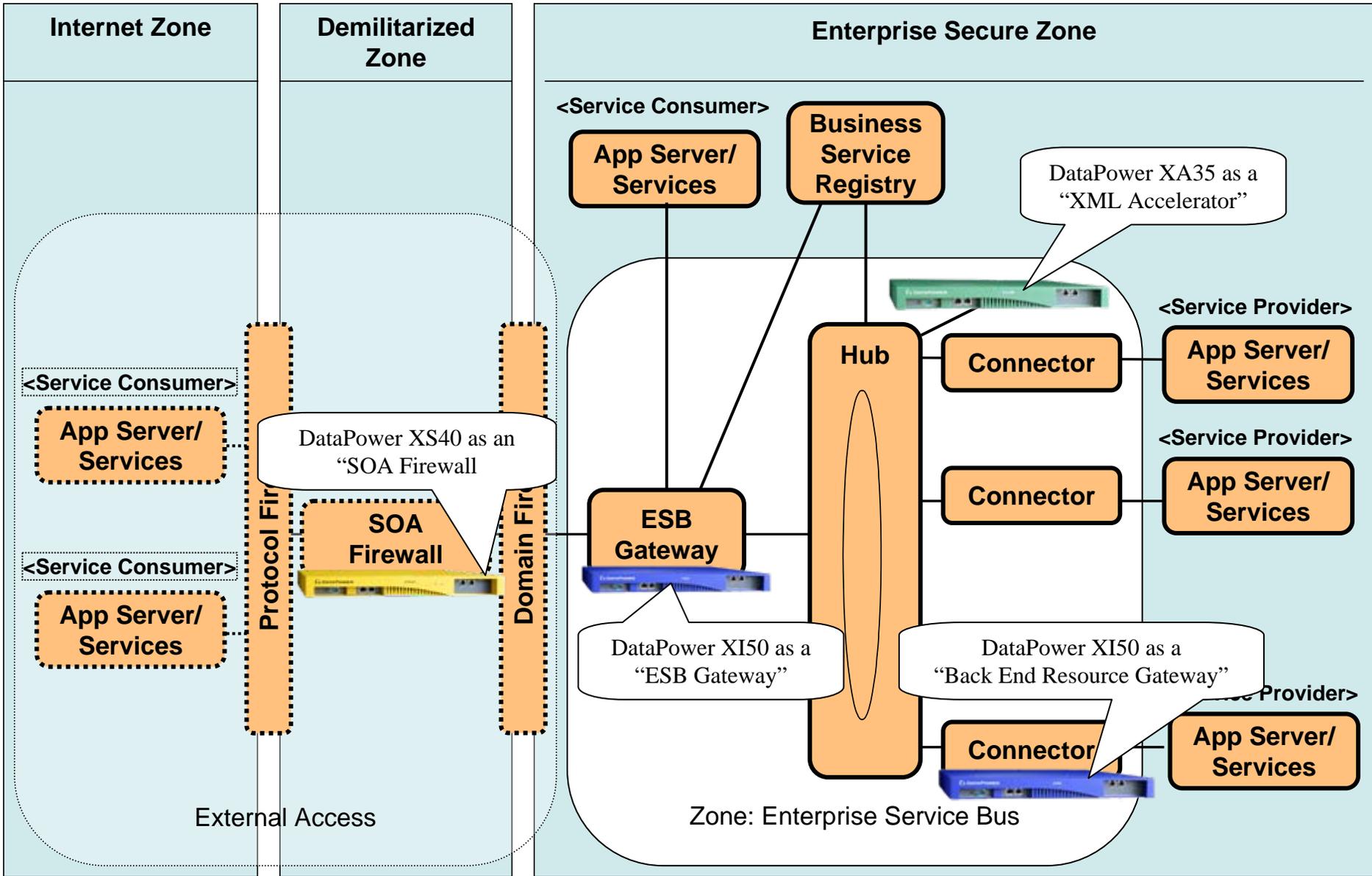
- **Service Virtualization**
  - Routing: URL re-writing, WS-Addressing, HTTP header manipulation, based on message content, database lookups or registry lookups.
  - Data Model and Namespace translation. Wire speed translation using XSLT.
  - Versioning: Combining routing, lookups and translation to manage service versioning.

- **Protocol Switching**
  - Protocols. Includes HTTP, HTTPS, JMS, WebSphere MQ.
  - Any-to-any Transformation Engine: Examples include EDI, COBOL Copybook, ISO 8583, CSV, ASN.1 and ebXML.
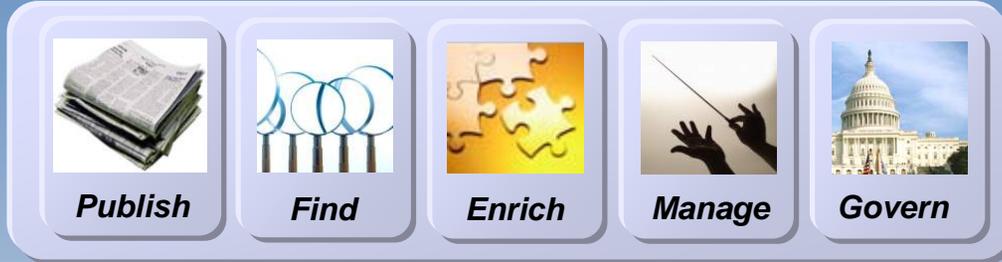
- **Monitoring and Management**
  - Statistics: Includes throughput, transaction counts, errors, server health information, traffic statistics
  - Remote management: Includes SNMP, script-based configuration, remote logging
  - Web service management: Support for Web services Distributed Management (WSDM), UDDI, WSDL, Dynamic Discovery, and other service level management configurations.
  - Integration with various monitoring products such as IBM Tivoli Enterprise™ Monitoring, and Netegrity SiteMinder.

Internet Zone

Demilitarized Zone

Enterprise Secure Zone

<Service Consumer>

App Server/ Services

Business Service Registry

DataPower XA35 as a "XML Accelerator"

<Service Provider>

Hub

Connector

App Server/ Services

<Service Provider>

Connector

App Server/ Services

<Service Consumer>

App Server/ Services

DataPower XS40 as an "SOA Firewall

<Service Consumer>

App Server/ Services

SOA Firewall

Protocol Firewall

Domain Firewall

ESB Gateway

DataPower XI50 as a "ESB Gateway"

DataPower XI50 as a "Back End Resource Gateway"

<Service Provider>

Connector

App Server/ Services

External Access

Zone: Enterprise Service Bus

WebSphere Services Registry and Repository

WebSphere Service Registry and Repository

Publish | *Find* | *Enrich* | *Manage* | *Govern*

Publish *Find*

Encourage Reuse
Find and reuse services for building blocks for new composite applications.

Enrich

Enhance Connectivity
Enable dynamic and efficient interactions between services at runtime.

Assemble *Deploy* *Model* *Manage* *Governance & Best Practices*

Govern

Enable Governance
Govern services throughout the service lifecycle

Manage
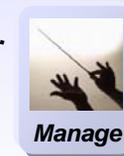
Help optimize service performance
Enable enforcement of policies. Impact analysis

Service Registry – Key ESB related features

- **Service virtualization**
  - Runtime access to acquire endpoint details dynamically
  - Versioning
  - Routing
  - Data model translation
- **Policy**
  - Runtime and/or configuration time
  - Access to policies defining quality of service attributes
  - Could include validation of interface schema
- **Availability and performance**
  - Store and provide performance and availability data
  - Enable dynamic routing

Scenarios in the Redbook

- **Configuring WESB and WMB for HTTPS**

- **Directly Connected ESBs – WESB and WMB**
  - WESB -> WMB using SOAP over HTTP
  - WESB -> WMB using MQJMS
  - WESB -> WMB using MQXML
  - WMB -> WESB using SOAP over HTTP

- **WebSphere DataPower as an SOA Firewall**

- **Using WSRR from WESB and WMB**
  - See WSRR Redbook

Summary

- **IBM Redbooks**

- **Enterprise Service Bus definition and topologies**

- **Combining Enterprise Service Buses**

- **WebSphere Message Broker & WebSphere ESB**

- **Related technologies**

Questions?