



Considerations for selecting an ESB



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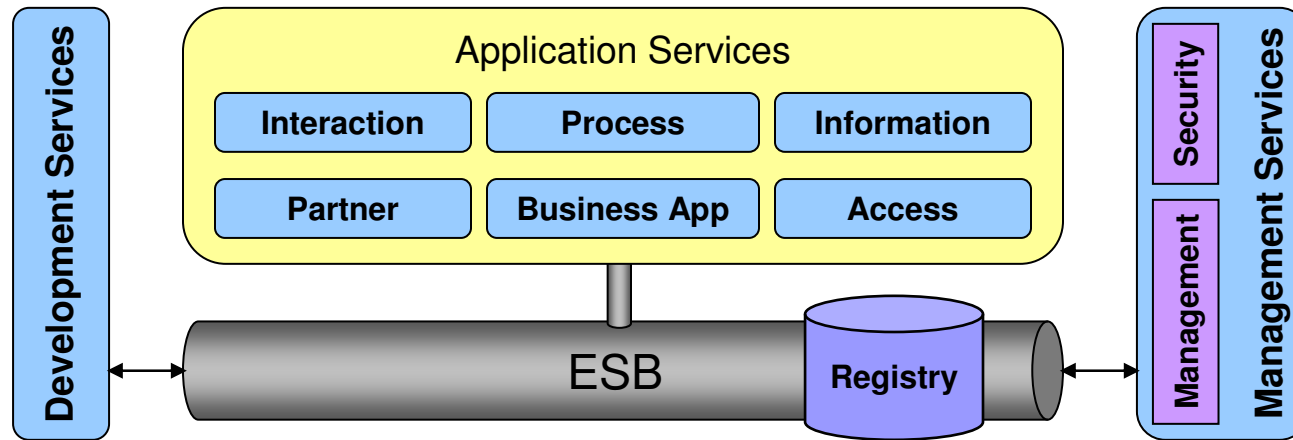
Agenda

- Examine Federated ESB
- Discuss Some Criteria for ESB Choice
- Examine Some Case Studies



SOA: Unlock business value.
→ New software and services.

An ESB-centric view of the SOA Foundation Logical Model



■ Outside ESB

- Business Logic (Application Services)
 - ESB contains connectivity logic
 - Criteria: semantics versus syntax

■ Loosely coupled to ESB

- Security and Management
 - Policy Decision Point outside the ESB
 - ESB can be Policy Enforcement Point

■ Tightly coupled to ESB

- Service Registry
- Registry a Policy Decision Point for ESB
- ESB a Policy Enforcement Point for Registry
- But, Registry has a broader scope in SOA

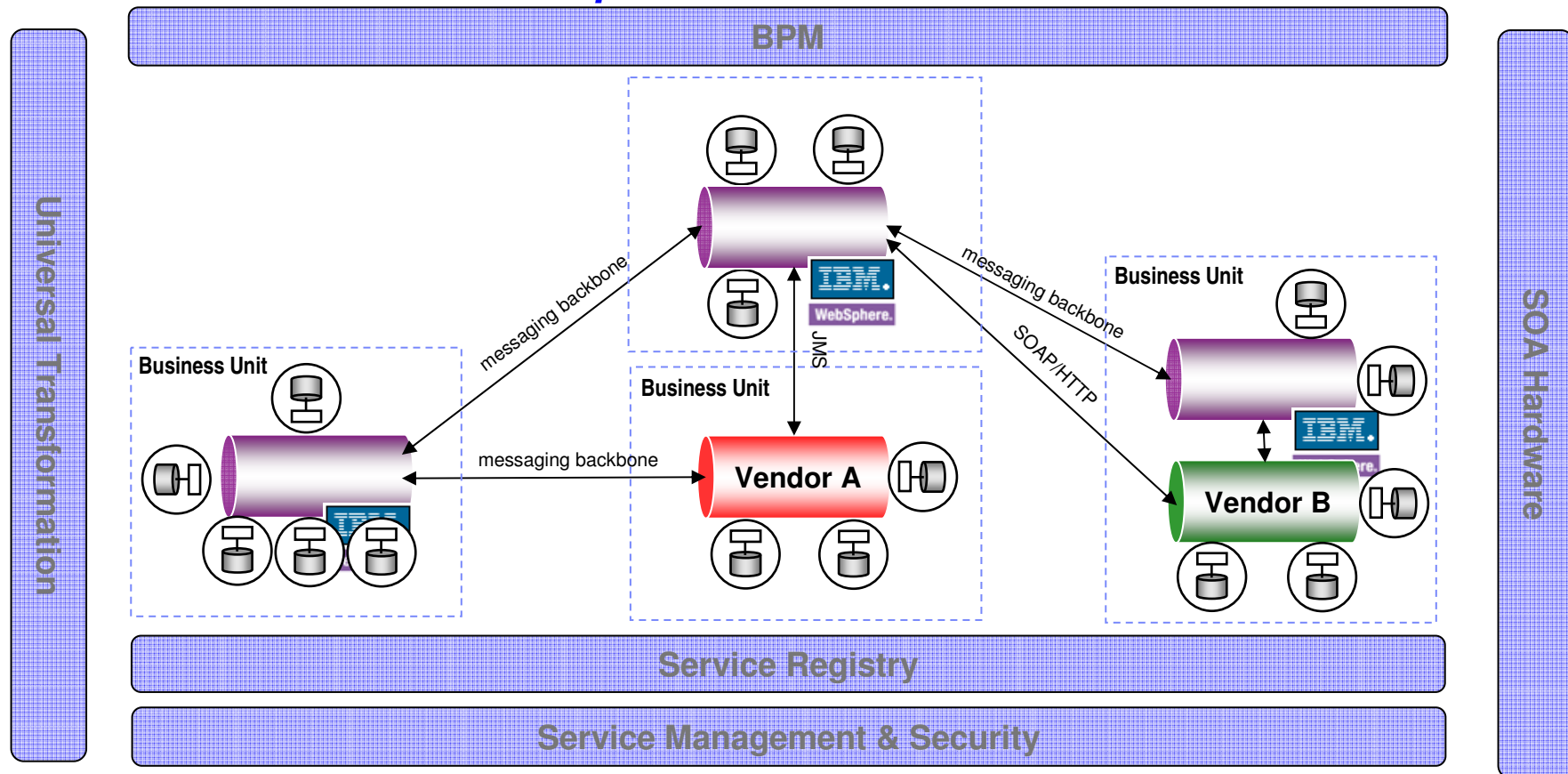
■ Tooling required for ESB

- Development
- Administration
- Configure ESB via Service Registry

Described in <http://www-128.ibm.com/developerworks/architecture/library/ar-esbpat1/>

Advanced ESB Deployments – Federated ESB Topologies

- **A single enterprise-wide ESB is rarely attainable – most businesses will have multiple ESBs across business units**



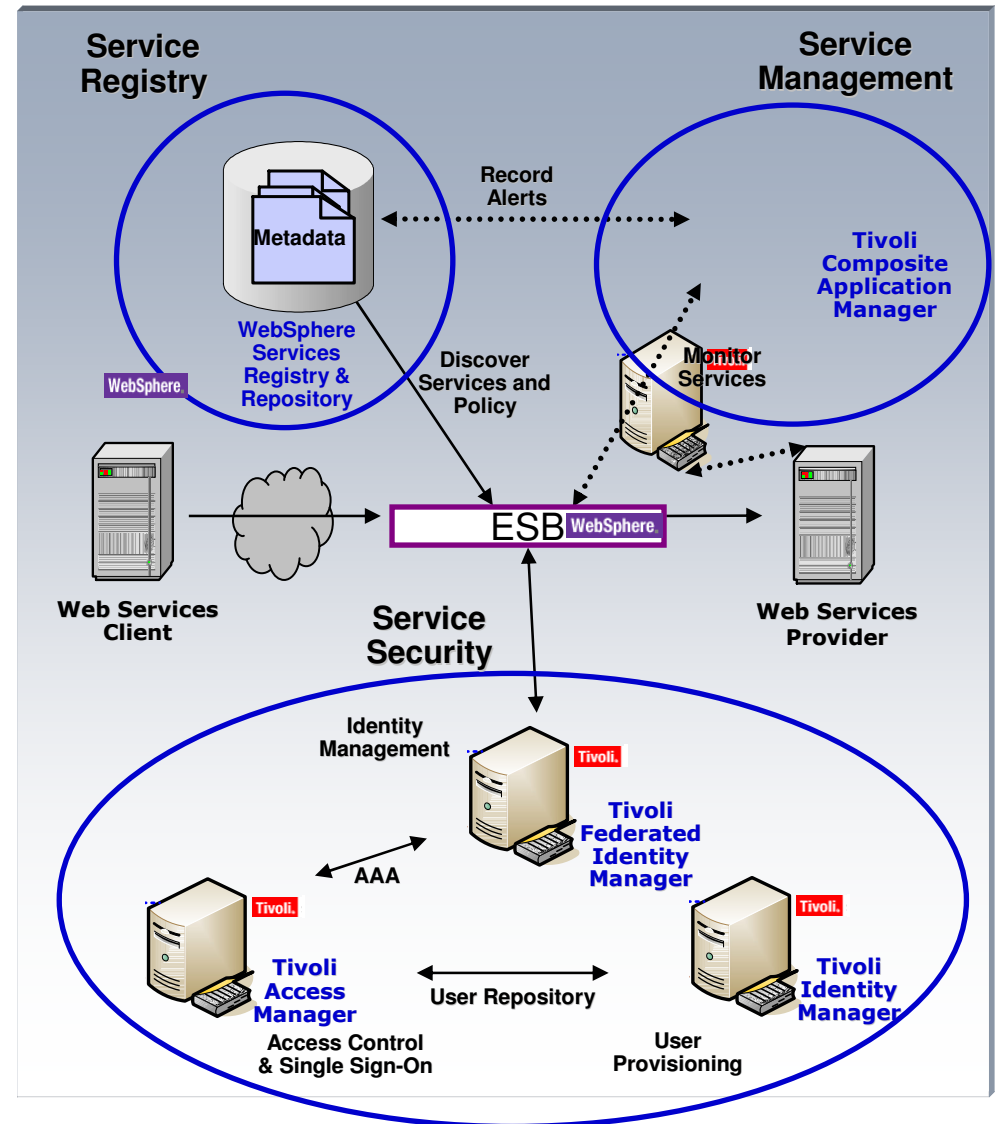
- **As business processes span organizational boundaries, businesses will need to enable integration across ESBs, which requires an SOA competency center with strong governance practices and support capabilities**

Why Federated?

- **Different “Domains” in Enterprise**
 - Business and Funding Models are Distributed or Federated
 - Distributed geographical locations
 - Distributed Governance
 - Differing ESB requirements best met by different products
 - Acquisitions have existing ESB infrastructure in place
 - Decoupling to allow asynchronous development and deployment
- **Best Practice – Architecture aligned to business model**
- **Best Practice – Isolate critical environments**
- **Yet ... enable Enterprise-level service reuse across domains**

The Federated ESB at a glance

- **Service Registry: WebSphere Services Registry and Repository**
 - Store, access, and manage information to support a successful service-oriented architecture (SOA) implementation
- **Service Management: ITCAM for SOA**
 - Service management solution to monitor and log service performance
- **Service Security**
 - **Tivoli Federated Identity Manager**
 - User access management solution to provide federated SSO and deliver a centralized, pluggable identity trust management service
 - **Tivoli Access Manager**
 - User access management solution to provide web SSO and protect diverse set of web applications & resources
 - **WebSphere DataPower XML Security Gateway XS40**
 - XML threat protection and security enforcement
 - **Tivoli Identity Manager**
 - User management solution to provision & manage user identities throughout their lifecycle.



Key Criteria for ESB selection

- **These are some considerations only**
 - This is not an complete list of criteria to follow
 - It does not address all details

- **IMPORTANT**
 - Sometimes the answer is not one product, but multiple products and technologies

Key Criteria for ESB selection

- **Communication Protocols & Interaction Patterns**
 - Critical (e.g., MQ, SOAP/HTTP, pub/sub)
 - Accommodated
 - “Associated” standards (e.g., WS-Security, headers)
 - APIs (e.g., JMS)
 - Adapters (e.g. SAP)
- **Message Models & Meta-models**
 - Critical (e.g., XSD, specific XML schema)
 - Accommodated
 - “Associated standards” (e.g., SOAP headers, attachments)
 - “Optimizing capabilities” (e.g., Weak-typing, validation)
 - Adapters (e.g. SAP IDOC)
- **Mediation Flows and Mediation Patterns**
 - Service virtualization
 - Conversion
 - Transformation
 - Routing
 - Aspect oriented connectivity
 - Management integration
 - Security integration
 - Logging, monitoring, auditing integration
 - Breadth of pre-built mediation primitives
 - Custom mediation capability and Programming model
 - Weak-typing
 - Support for pre-built mediation flows (templates)
 - Metadata driven

Key Criteria for ESB selection (cont.)

- **Qualities of service**
 - Heterogeneous transaction coordination
 - Reliable/assured delivery
 - Performance
 - Message size
 - Throughput
 - Scalability
 - Reliability
 - Availability
- **Non-functional**
 - Affinity to SOA environment (e.g., WebSphere Process Server)
 - Affinity to IT environment (e.g. J2EE application server)
 - Development tooling capabilities and affinity to current tools
 - Configuration and administration tooling capabilities
 - Existing and required skill set (e.g., J2EE skills)
 - Product maturity and comfort level with leading edge products
 - Price and total cost of ownership

Decision Guide - When to use each product

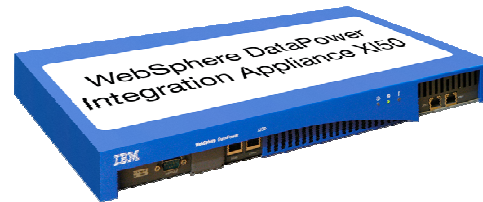
ESB offerings from IBM WebSphere

Each delivers a common set of ESB capabilities



ESB offerings from IBM WebSphere

- Mediations to enable common patterns
- Transformation of common data formats
- Connectivity via common protocols



- Leading web services standards
- First class interoperability between ESB products
- Mission-critical qualities of service

Simplified Decision Guide – When to use WebSphere ESB?

- **You use WebSphere Application Server**
 - Your team has skills with WAS Administration and Java coding
- **You are now or planning on developing business process using WebSphere Process Server**
 - WebSphere ESB and WPS have common tooling, programming model, and runtime
- **You are integrating with ISV business applications hosted on WAS or 3rd party solutions which extend and support WAS**
- **You are focused on standards based interactions using XML, SOAP, and WS***
- **You want to mediate between Web services and existing systems using JMS and WebSphere JCA Adapters**
- **Reliability and extensive transactional support are key requirements**
- **You want to minimize your server investment by co-hosting WebSphere services and ESB in one application server**

***Support for industry standard formats can be achieved via the use of either WebSphere Adapters or WebSphere Transformation Extender.*

Simplified Decision Guide – When to use WebSphere Message Broker?

- **You are currently using WebSphere MQ or WebSphere Message Broker**
 - Migrate to V6.1; implement ESB Patterns
 - Leverage existing WMB skills
- **You have extensive heterogeneous infrastructures, including both standard and non-standards-based applications, protocols, and data formats**
 - You have extensive MQ skills and infrastructure
 - You are using Industry formats such as SWIFT, EDI, HL7
 - You are integrating core z assets (e.g. connecting to CICS COBOL applications)
- **You are connecting to Web services using SOAP, and optionally WS-Security, WS-Addressing and Attachments**
- **You are implementing a wide range of messaging and integration patterns**
 - Examples include event processing, complex transaction processing
- **You need extensive pre-built mediation support**
- **You have complex transformation needs**
- **Reliability and extensive transactional support are key requirements**
- **To achieve high performance with horizontal and vertical scaling**

Simplified Decision Guide - When to use DataPower XI50?

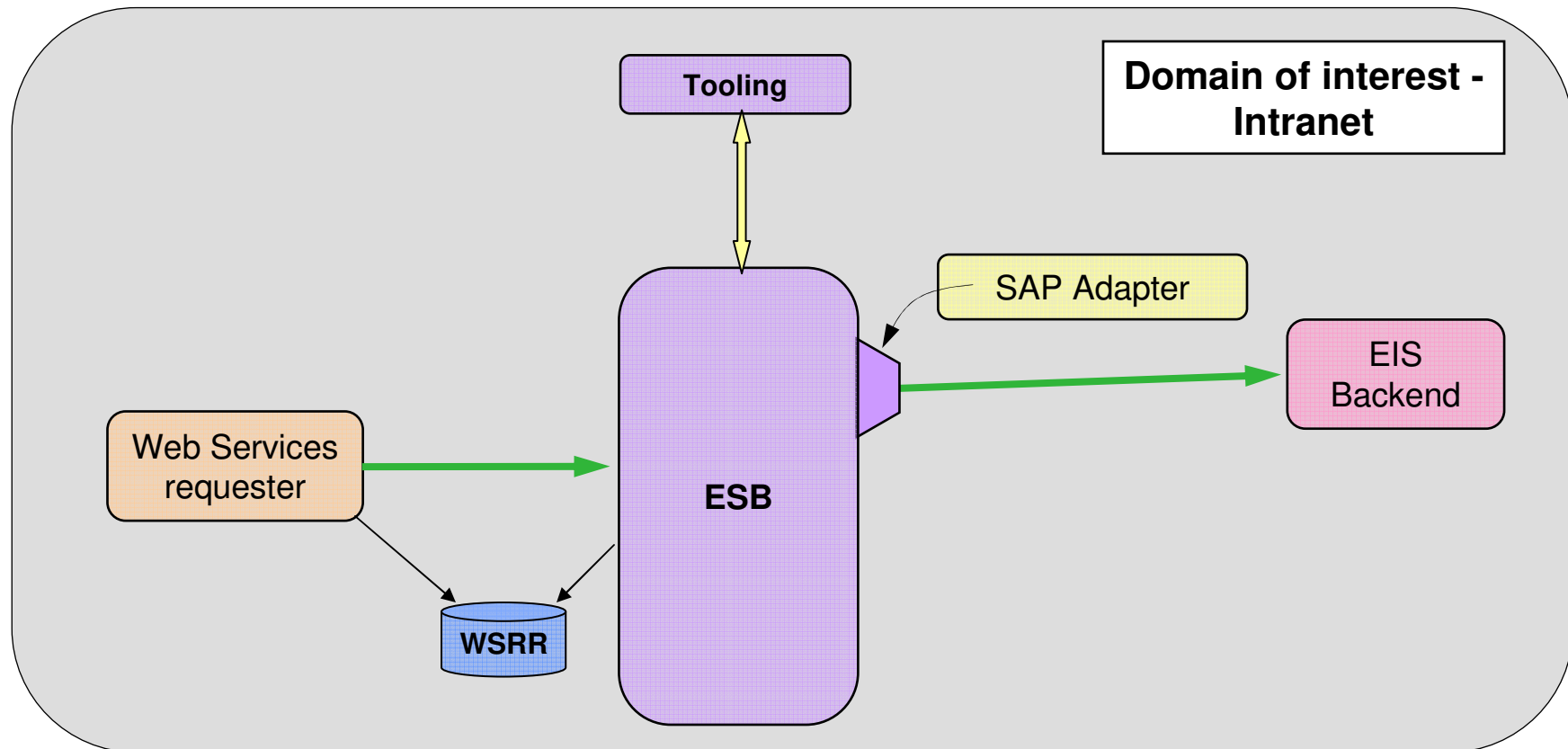
- **Ease of use is a pre-dominant consideration**
 - Simple experience of drop-in installation and admin-based configuration with no or minimal development required
- **You are transforming between XML-and-XML or XML-and-any other format**
- **You are using XML-based or WS-Security extensively**
- **Your interaction patterns are relatively simple**
- **You require use of advanced Web services standards**
- **Your mediation requirements are met by the existing DP mediations and minimal extensibility is needed**
- **You need to minimize message latency when adding an ESB layer**
- **You are doing extensive XML processing combined with high performance requirements**
- **Your ESB must be in production very quickly**

Note: When using an ESB Gateway pattern, use DataPower XS40

- All XML interaction with 3rd parties should go through XS40 for XML threat protection

Generic ESB Case Studies

Case 1 – Adapting Enterprise applications to web services



Case 1 Description

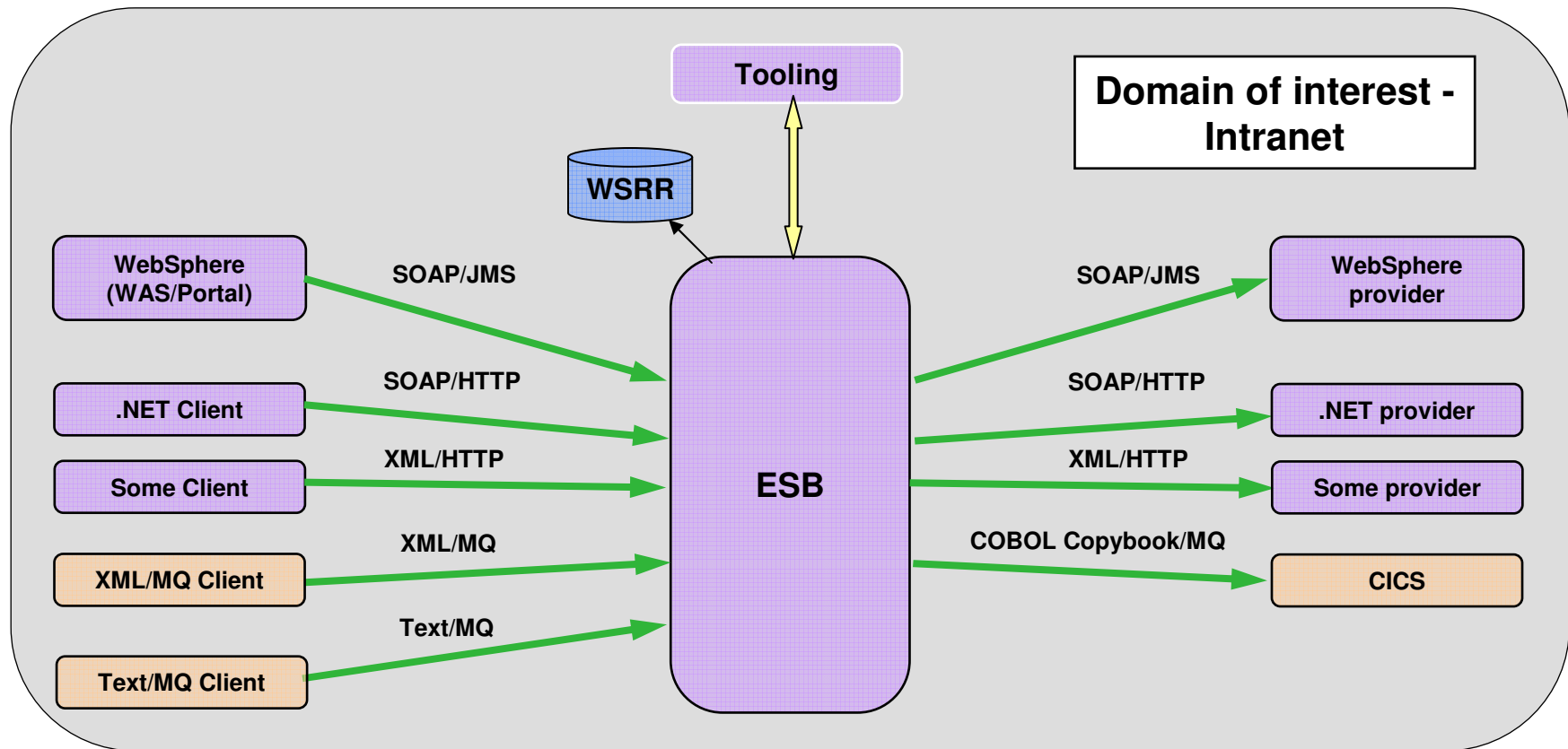
- **Customer environment**
 - This customer is leading adopter of technology. Comfortable with sophisticated solutions
 - WebSphere Application Server customer
- **Business Requirements**
 - The customer wants to provide web service access to functionality in an Enterprise Information System such as SAP R/3, PeopleSoft, or Oracle Financials
 - Intranet environment doesn't require complex security considerations
 - The integration is based on message exchange/data replication scenarios - there is no business process or data synchronization between clients and EIS systems
 - Support moderate volume of requests
- **Technical Requirements**
 - The targeted integration is one-to-one, i.e., one ESB virtual service maps to one EIS application, although multiple EISs can be exposed as web services at the same time
 - Data transformation should use XSLT; development tooling important
 - Log the messages as they flow through the hub – asynchronously to a file
- **Architecture Decisions**
 - J2EE environment preferred
 - Use available adapter product to simplify development

Case 1 Analysis

- **Infrastructure Pattern > ESB**
 - Service virtualization
 - Domain isolation unimportant

- **ESB Product selection > WebSphere ESB**
 - Transport Protocols
 - JCA adapter supported
 - SOAP/HTTP
 - Synchronous Request/response sufficient
 - Message models
 - XML metamodel desired
 - Content model supported
 - Mediation flows
 - XSLT transformation and supporting tooling
 - QoS and Non-functional requirements
 - J2EE foundation (WebSphere Application Server)
 - XSLT transformation skills available
 - Adequate throughput and/or response time
 - Leading edge adopter

Case 2: Connectivity between heterogeneous requesters and providers (Multi-protocol Exchange)



Case 2 Description

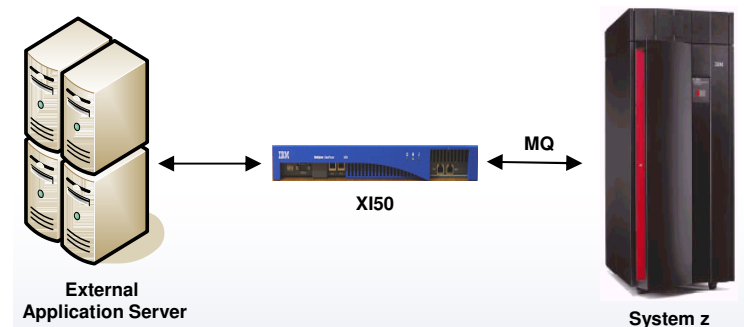
- **Customer environment**
 - Customer is a leading adopter of technology. Comfortable with sophisticated solutions
- **Business Requirements**
 - Any provider must be accessible via multiple heterogeneous requesters
 - Support moderate volume of requests
 - Intranet environment does not require complex security considerations
 - Global transactions across multiple heterogeneous transaction managers
- **Technical Requirements**
 - ESB must support
 - Communication protocol conversion, but not adapters
 - Flexible data model conversion, with acceptable performance and adequate tooling
 - Enterprise class persistent messaging backbone
- **Architecture Decisions**
 - Canonical data model(s) used in ESB
 - Consumers and providers must adapt to the service definition supported by the ESB

Case 2 Analysis

- **Infrastructure Pattern > ESB**
 - Significant service virtualization
- **ESB Product selection > Message Broker**
 - Transport Protocols
 - Multiple protocols
 - Synchronous and asynchronous Request/response
 - MQ provides enterprise class persistent messaging backbone
 - Message models
 - Multiple built-in message metamodels
 - Content models supported
 - Mediation patterns
 - Significant protocol conversion capability
 - Significant transformation capability with supporting tooling
 - Supports advanced correlation of asynchronous request/response
 - Extensive runtime configuration options
 - QoS and Non-functional requirements
 - Global transactions across multiple heterogeneous transaction managers
 - Mature product which supports throughput and/or response time
 - Sophisticated transformation skills available

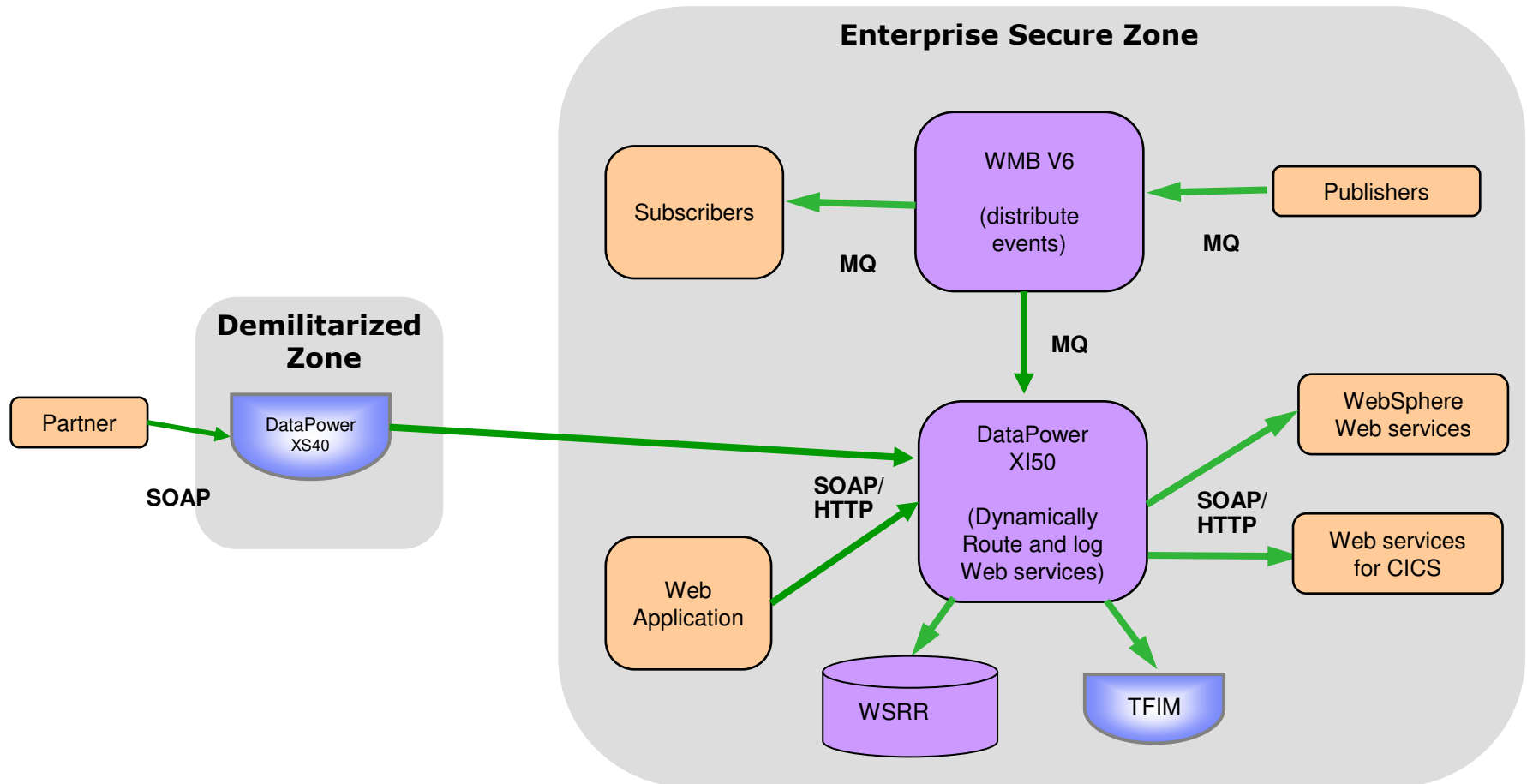
Case 3: SOA Security & Integration

- **Challenge**
 - Difficult to modify home-grown custom software application
 - Adopt SOA to enable an online Web service to greatly increase revenues, while reducing costs & increasing the security of the service
- **Solution**
 - Deployed WebSphere DataPower Integration Appliance XI50 for SOA security and to transform & route messages
 - Acts as a gateway by forwarding messages to System z mainframe to be checked against database
 - Integrates ACORD XML services with existing WebSphere MQ
 - Integrates SchemaTron validate to generate XSLT to load the generated XSLT onto the XI50 for runtime execution & filtering
- **Benefits**
 - More than 10 times faster than internally developed custom software
 - Fraud-protection processes are faster, more secure & less error prone
 - Web service allows MIB to offer more services to customers while reducing overhead cost



- WebSphere DataPower Integration Appliance XI50
- WebSphere MQ
- System z

Client Example of Federated ESB



Resources

- New! Redpaper - IBM Connectivity Reviewer's Guide
<http://www.redbooks.ibm.com/redpapers/pdfs/redp4434.pdf>
- ESB Portfolio Trifold.
ftp://ftp.software.ibm.com/software/websphere/integration/wbimessag ebroker/esb_trifold_0103A.pdf
- Which ESB on System z? Selection Guidelines for WebSphere Message Broker, WESB and DataPower XI50 - July 30 <http://www-306.ibm.com/software/os/systemz/telecon/30jul/>
- Teleconference: z/OS and Linux for System z: Selecting the best SOA platform for you - July 9 <http://www-306.ibm.com/software/os/systemz/telecon/9jul/>
- Teleconference: Strategic options for extending CICS to an SOA <http://www-306.ibm.com/software/os/systemz/telecon/23apr/>
- System z software working in harmony for the SOA enterprise of today and tomorrow. How WebSphere, DB2, CICS, IMS and WebSphere MQ interoperate
ftp://ftp.software.ibm.com/software/htp/cics/tserver/v32/library/WSW14020-USEN-00_systemz_harmony_0324A.pdf

Thank
You

Federated ESB Defined

- **The Enterprise Service Bus consists of all the domain service buses, and the backbone bus if needed**
- **Service messages flow across more than one bus**
- **Majority of service requests to providers are within a domain and are mediated by a single domain service bus**
- **Some shared services may be **provided** by a domain for use by other domains**
- **Some consumers in one domain may **request** services provided by another domain**
- **All service requests between domains maybe routed by a ‘backbone bus’**
 - Common aspects can be applied
- **Enterprise services may be available directly on the backbone bus**
- **Also federated**
 - Service registry
 - Security
 - Management

Top Questions for ESB Product Selection

... vary for each company

- **Does it support for my messaging backbone (ex. MQ, Tibco RV)?**
- **How can it connect to and how easy is it to integrate my EIS and legacy systems (ex. Adapter to SAP, CICS)?**
- **To what degree does it support my models and metamodels (ex. HL7)?**
- **Does it support WS * standards which are needed immediately? How well does its roadmap for WS* match feature requirements?**
- **How many of my mediation requirements are fulfilled by pre-built mediations?**
- **Including custom mediation and extensibility capabilities, can it meet all the functional requirements?**
- **Can it meet my throughput and latency requirements? In combination with assured delivery?**
- **Does it meet my transaction and reliability requirements?**
- **To what degree does it support my security standards and infrastructure?**
- **Is an SOA Appliance (combined hardware and software) an option?**
- **What is the software license cost? For development, for initial production, to scale up as demand grows?**
- **How well does it match the skills of my organization? What is the skill gap?**