Considerations for selecting an ESB

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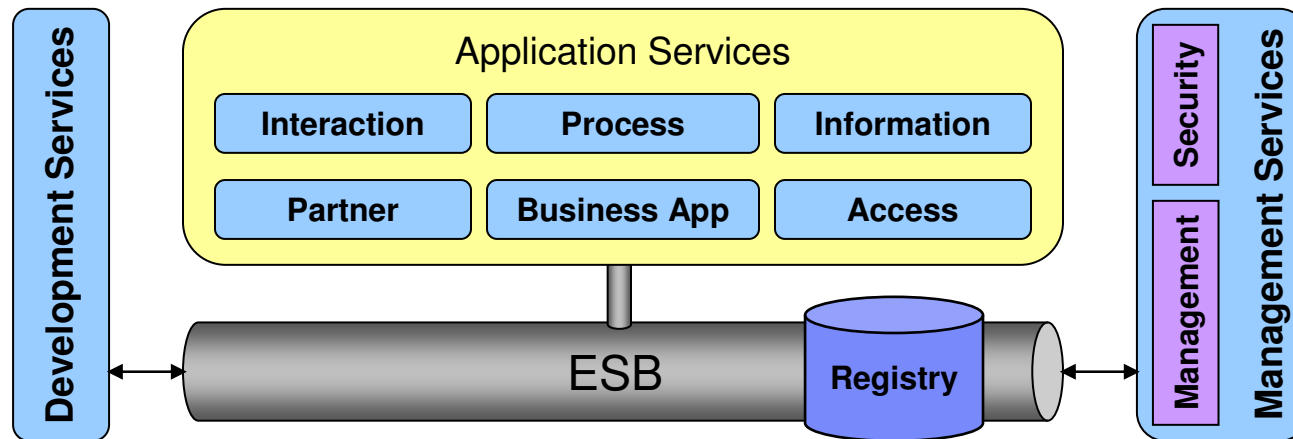
Agenda

- 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 Logical Model

- Outside ESB
  - Business Logic (Application Services)
    - ESB *does* contain integration logic or connectivity logic
    - Criteria: semantics versus syntax; aspects
- 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
  - Configures ESB via Service Registry

Described in a developerWorks article by Greg Flurry
http://www-
128.ibm.com/developerworks/architecture/library/ar-esbpat1/

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Advanced ESB Deployments – Federated ESB Topologies

➢ **A single enterprise-wide ESB is rarely attainable – most businesses will have multiple ESBs across business units**
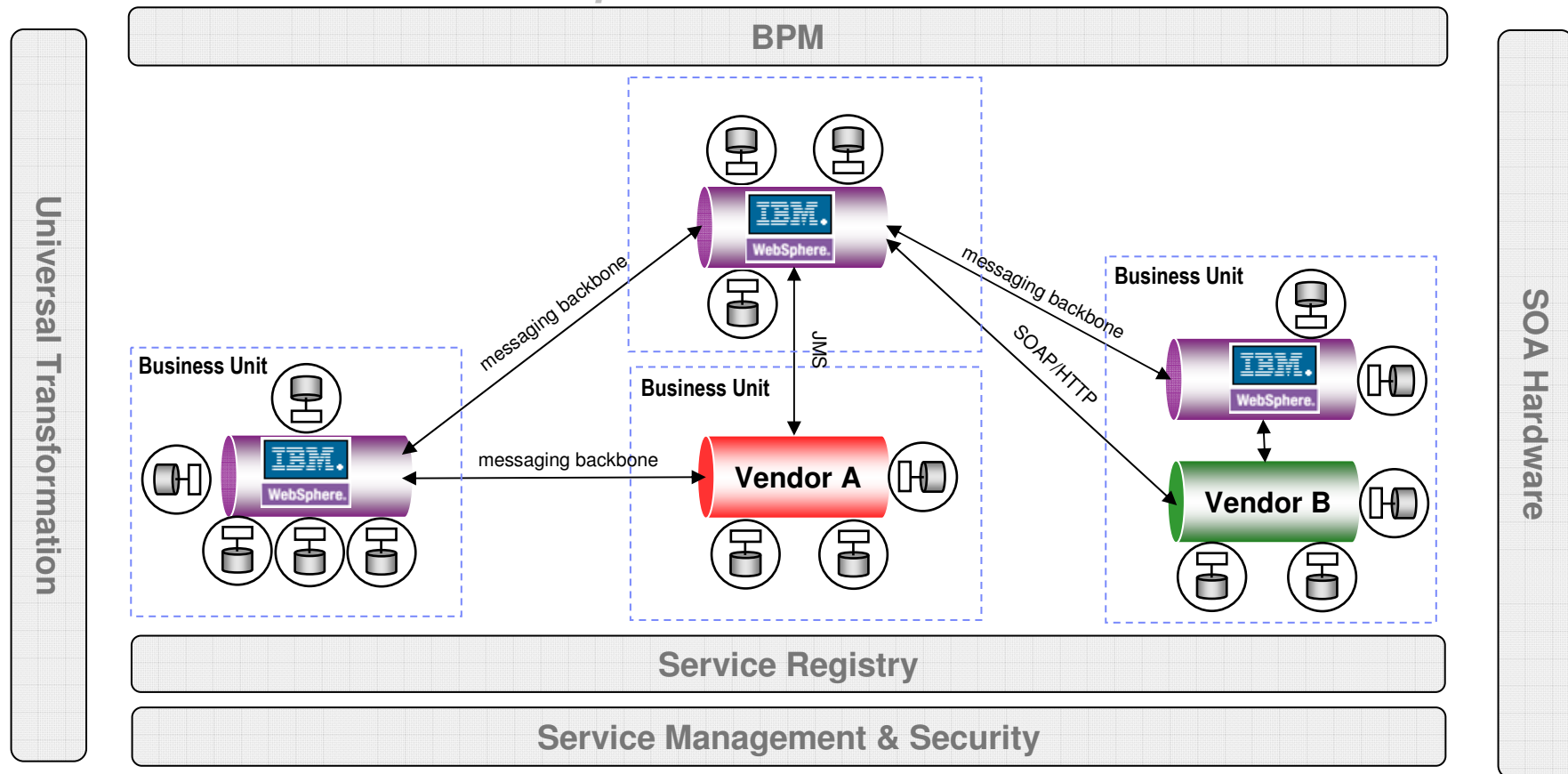
➢ **As business processes span organizational boundaries, businesses will need to enable integration across ESBs, which requires an SOA competency center with strong governance practices and support capabilities**

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.
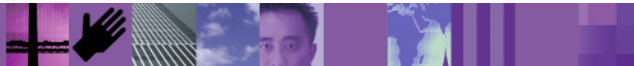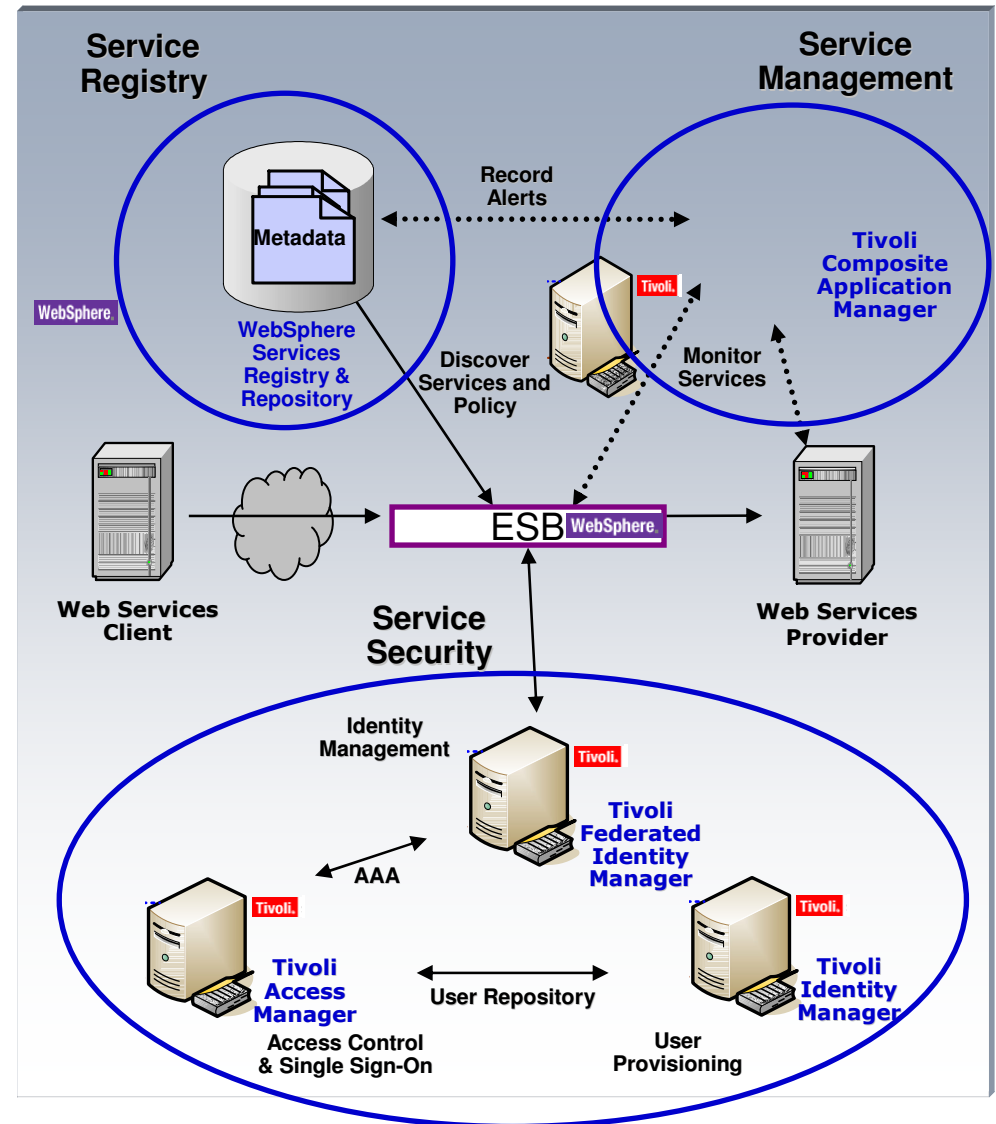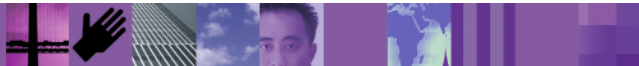
Key Criteria for ESB selection

- 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

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 engine(s)
    - 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

WebSphere ESB

WebSphere Message Broker

ESB offerings from IBM WebSphere

WebSphere DataPower Integration Appliance XI50
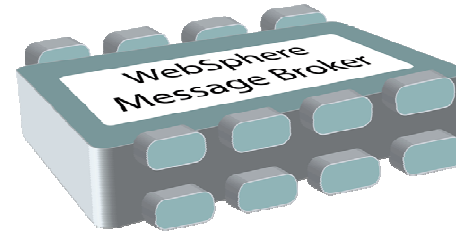
- Mediations to enable common patterns

- Transformation of common data formats

- Connectivity via common protocols
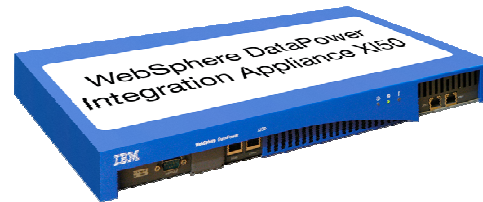
- Leading web services standards

- First class interoperability between ESB products

- Mission-critical qualities of service

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

Decision Guide – When to use WMB v6?

- You are currently using WebSphere MQ or WebSphere Message Broker
  - Migrate to V6; 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 implementing a wide range of messaging and integration patterns
  - Examples include event processing, message splitting, aggregation

- 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

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

- Your interaction patterns are relatively simple

- Your mediation requirements are met by the existing DP mediations and minimal extensibility is needed

- You are using XML-based or WS-Security extensively

- You require use of advanced Web services standards

- You need to minimize message latency when adding an ESB layer

- You are doing extensive XML processing combined with high performance reqs

- Your ESB must be in production very quickly

Note: When using an ESB Gateway pattern, use DataPower XS40
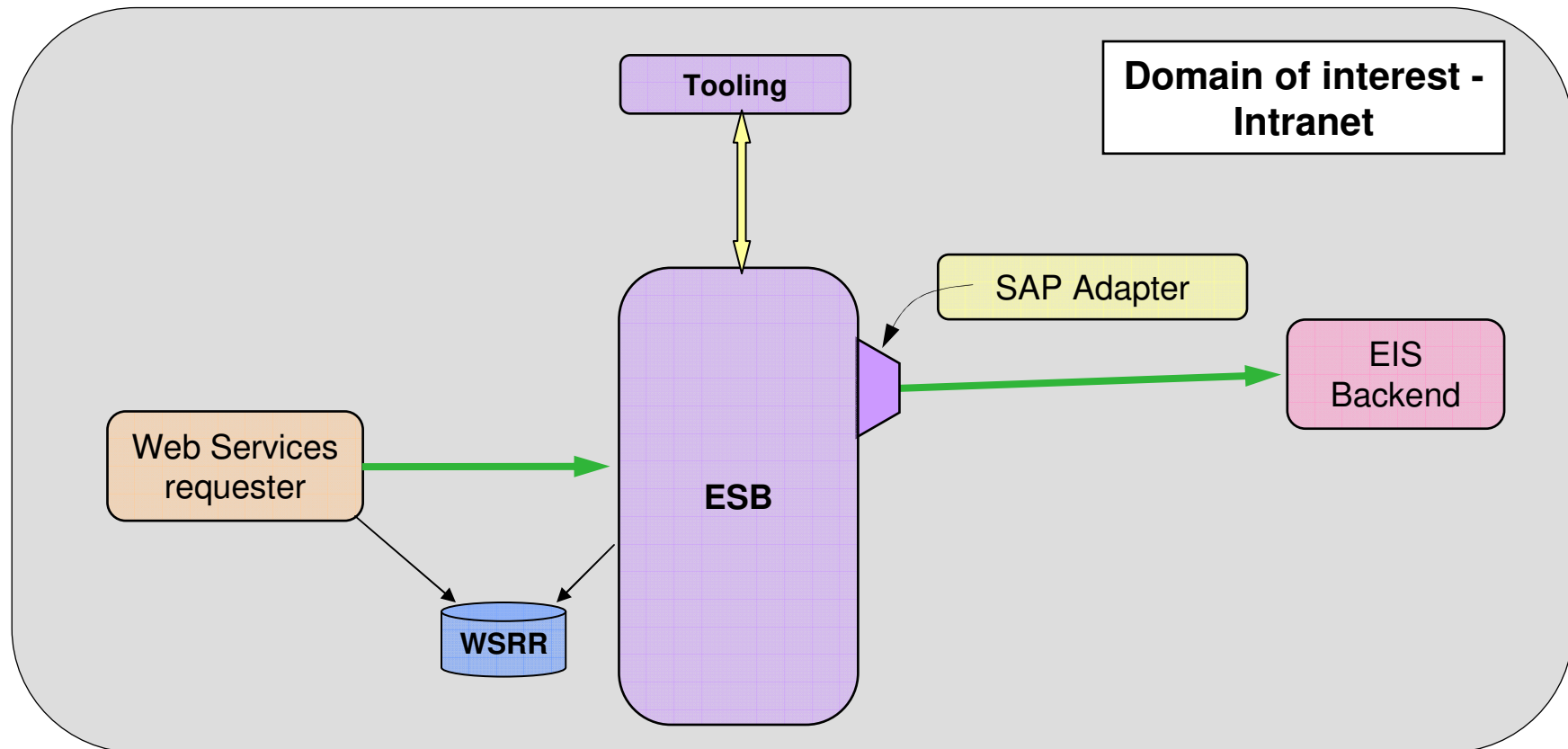 - All XML interaction with 3rd parties should go through XS40 for XML threat protection

Generic ESB Case Studies

Case 1 – Adapting Enterprise applications to web services

Tooling

Domain of interest - Intranet

SAP Adapter

EIS Backend

Web Services requester

ESB

WSRR

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
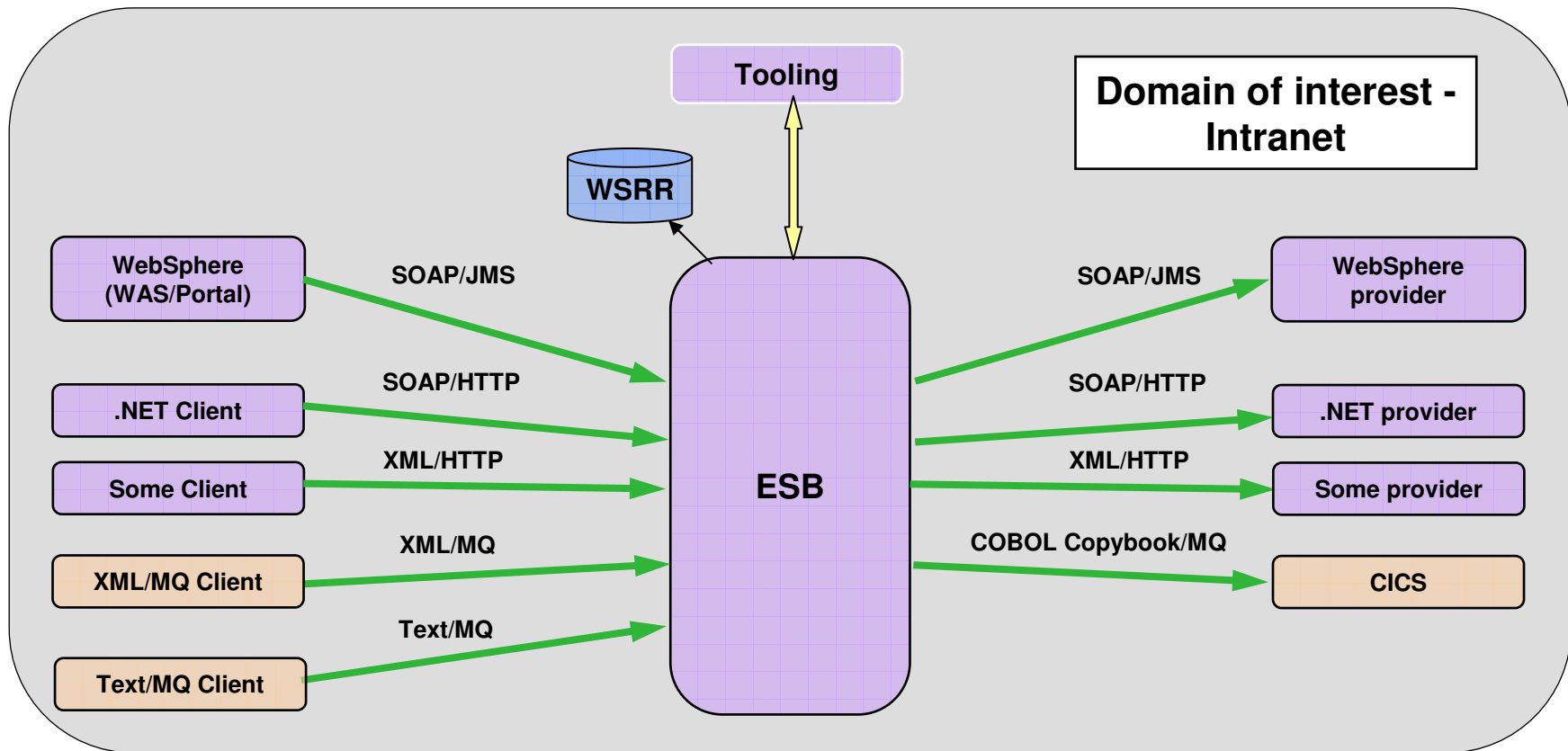 - Use available adapter product to simplify development

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
    - XLST 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)

Tooling

WSRR

Domain of interest - Intranet

Source	Protocol		Target
WebSphere (WAS/Portal)	SOAP/JMS	SOAP/JMS	WebSphere provider
.NET Client	SOAP/HTTP	SOAP/HTTP	.NET provider
Some Client	XML/HTTP	XML/HTTP	Some provider
XML/MQ Client	XML/MQ	COBOL Copybook/MQ	CICS
Text/MQ Client	Text/MQ		

ESB

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
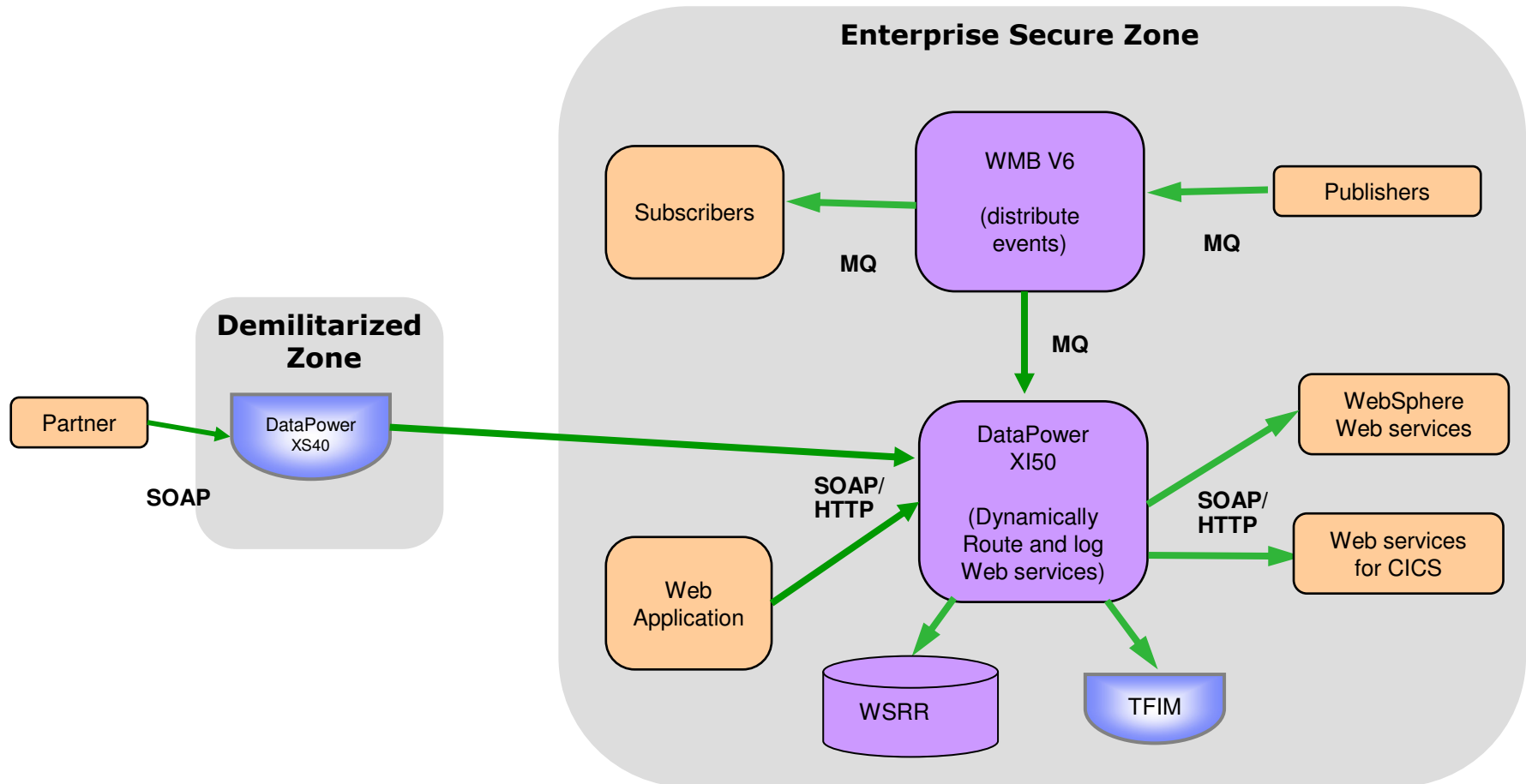
Case 3: SOA Security & Integration

- 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

MQ

XI50

**External
Application Server**
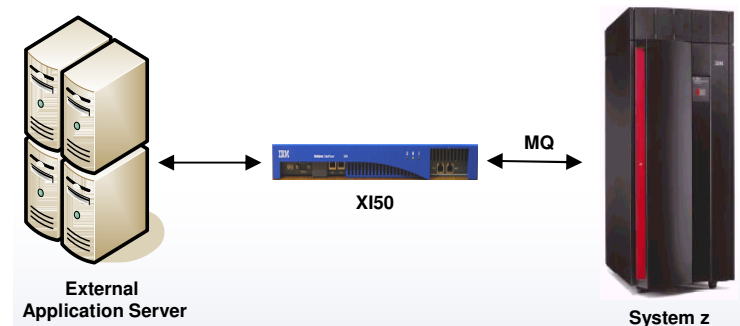
System z

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

Client 1 Example of Federated ESB

Enterprise Secure Zone

Subscribers ← WMB V6 (distribute events) ← Publishers

MQ

MQ

MQ

Demilitarized Zone

Partner → DataPower XS40

SOAP

DataPower XI50 (Dynamically Route and log Web services)

SOAP/HTTP

Web Application

SOAP/HTTP

WebSphere Web services

Web services for CICS
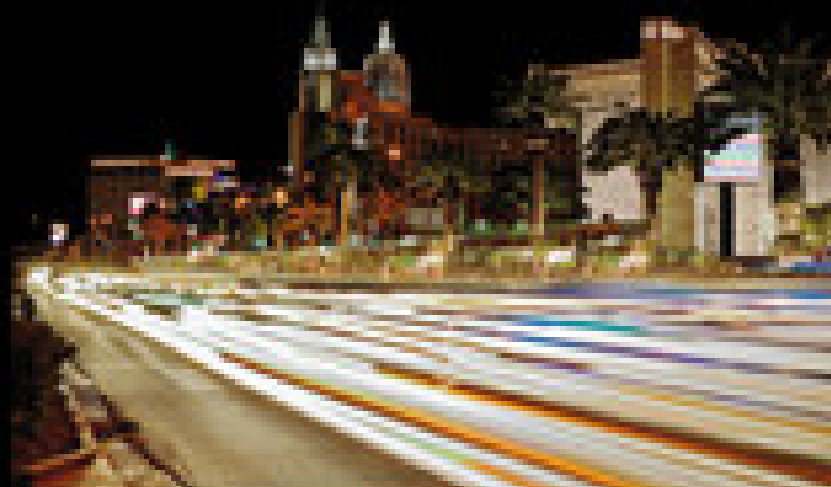
WSRR

TFIM

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STOP TALKING **START DOING**

IBM

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