



WebSphere Software

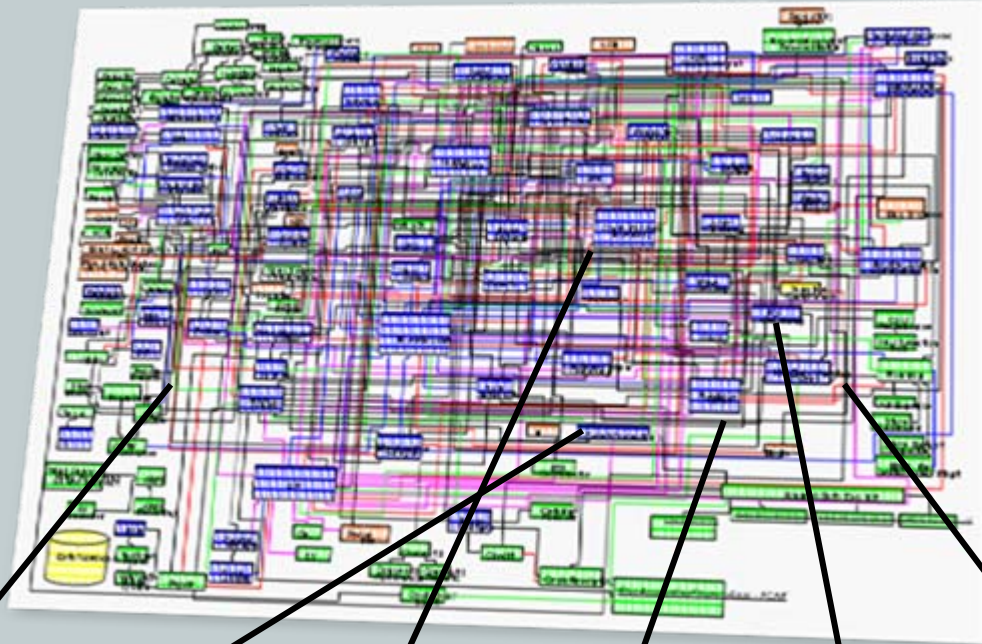
# ESB from IBM WebSphere

# The Challenge

## Business Objectives



- *Complex processes & systems*
- *Complex applications & interfaces*
- *Difficult to adapt quickly*
- *Large portion of IT budget spent on maintenance, not on new value add investments*



## Resources and IT Assets



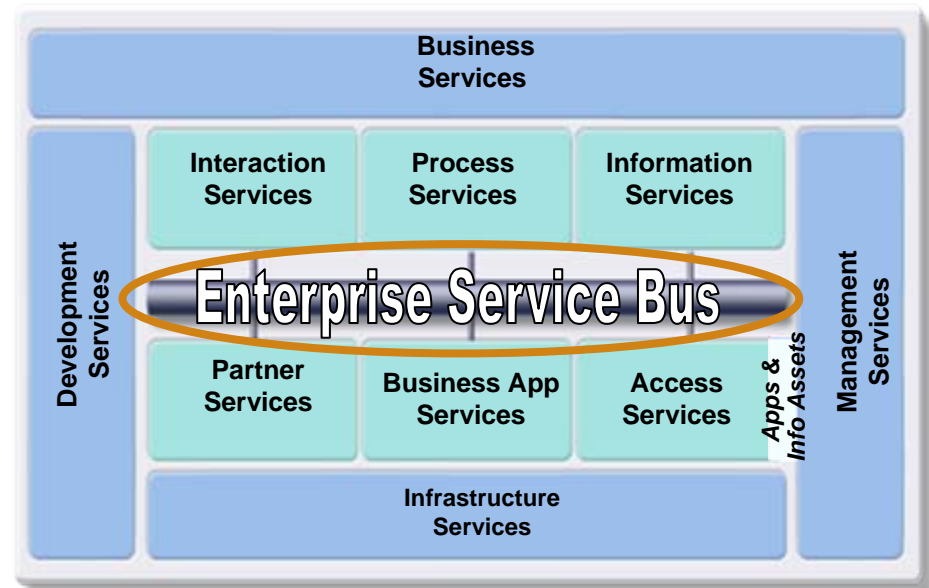
# SOA Connectivity business value

Complex IT connectivity:  
highly coupled, costly to  
maintain, and resistant  
to change



Flexible and dynamic IT  
connected through a  
responsive Enterprise  
Service Bus

*How to achieve this? SOA Connectivity...*



# The Enterprise Service Bus

*An Enterprise Service Bus (ESB) is a flexible connectivity infrastructure for integrating applications and services.*

***An ESB performs the following between requestor and service***



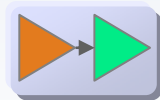
## **MATCHES & ROUTES**

communications between services



## **CONVERTS**

between different transport protocols



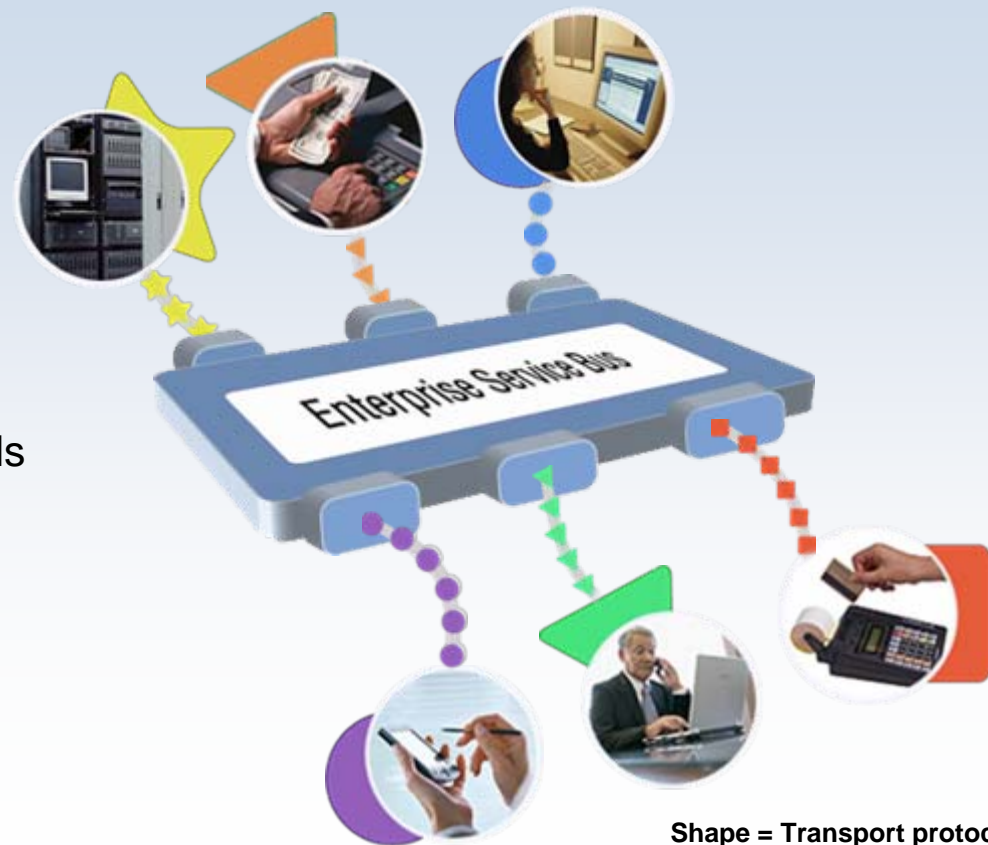
## **TRANSFORMS**

between different data formats



## **IDENTIFIES & DISTRIBUTES**

business events



Shape = Transport protocol  
Color = Data format

# Why an ESB to Meet Your Connectivity Needs?

*Flexible connectivity infrastructure for integrating applications and services*

## Benefits include...

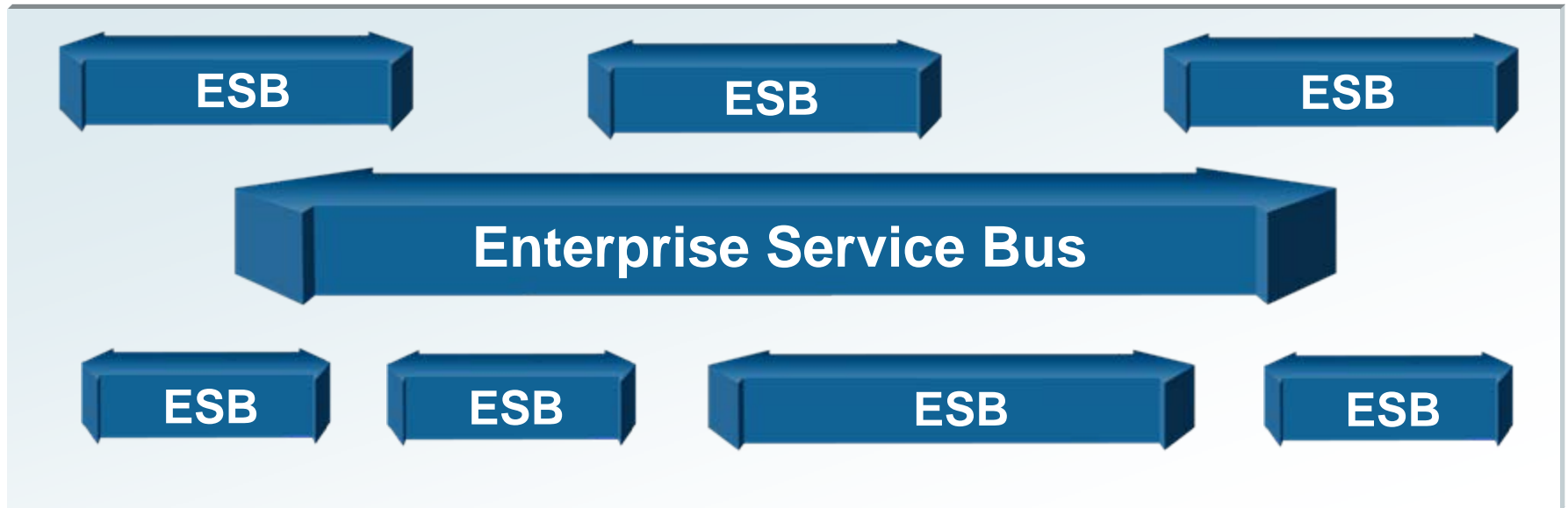
- Reduce the number, size, and complexity of interfaces
- Reduces cost and risk involved as business changes and new opportunities arise
- Promotes reuse
- Dynamic real-time, event-driven SOA

## Resulting in...

- Reliable and secure data movement
- Application Developers focused on business logic
- Common tools, management and support



## An ESB is by its nature a distributed architecture



- An ESB is a core technology to enable SOA.
- Multiple ESB configurations and topologies are possible.
- Different “types” of ESBs can serve different functions.
- Many ESBs from different vendors will proliferate within organizations.

# ESB offerings from IBM WebSphere

*WebSphere delivers the most complete ESB solution*



## **WebSphere ESB**

*Built on WebSphere  
Application Server for an  
integrated SOA platform*



## **WebSphere Message Broker**

*Built for universal connectivity and  
transformation in heterogeneous  
IT environments*

**ESB  
offerings from  
IBM WebSphere**



## **WebSphere DataPower Integration Appliance**

*Purpose-built hardware ESB  
for simplified deployment and  
hardened security*

# 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

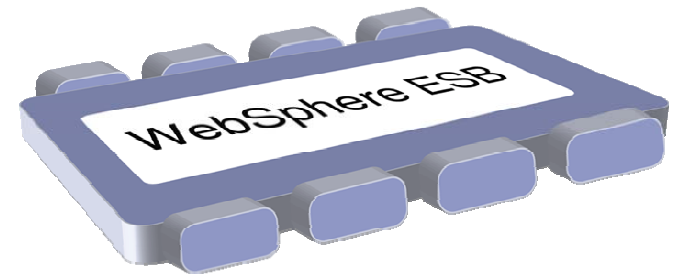




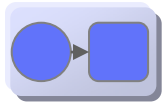
# WebSphere ESB

*Built on WebSphere Application Server for an integrated SOA platform*

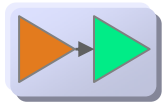
- Integrates seamlessly with WebSphere platform
- Delivers business-critical qualities of service
- Easily extended to WebSphere Process Server
- Integrated solution for service mediation and hosting



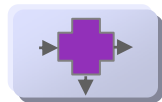
Delivers leadership in SOA standards for service composition, and leverages the embedded messaging and web services engines from WebSphere



Integrates everything with WebSphere Adapters for enterprise applications, the breadth of the WebSphere ecosystem, and support for standard protocols



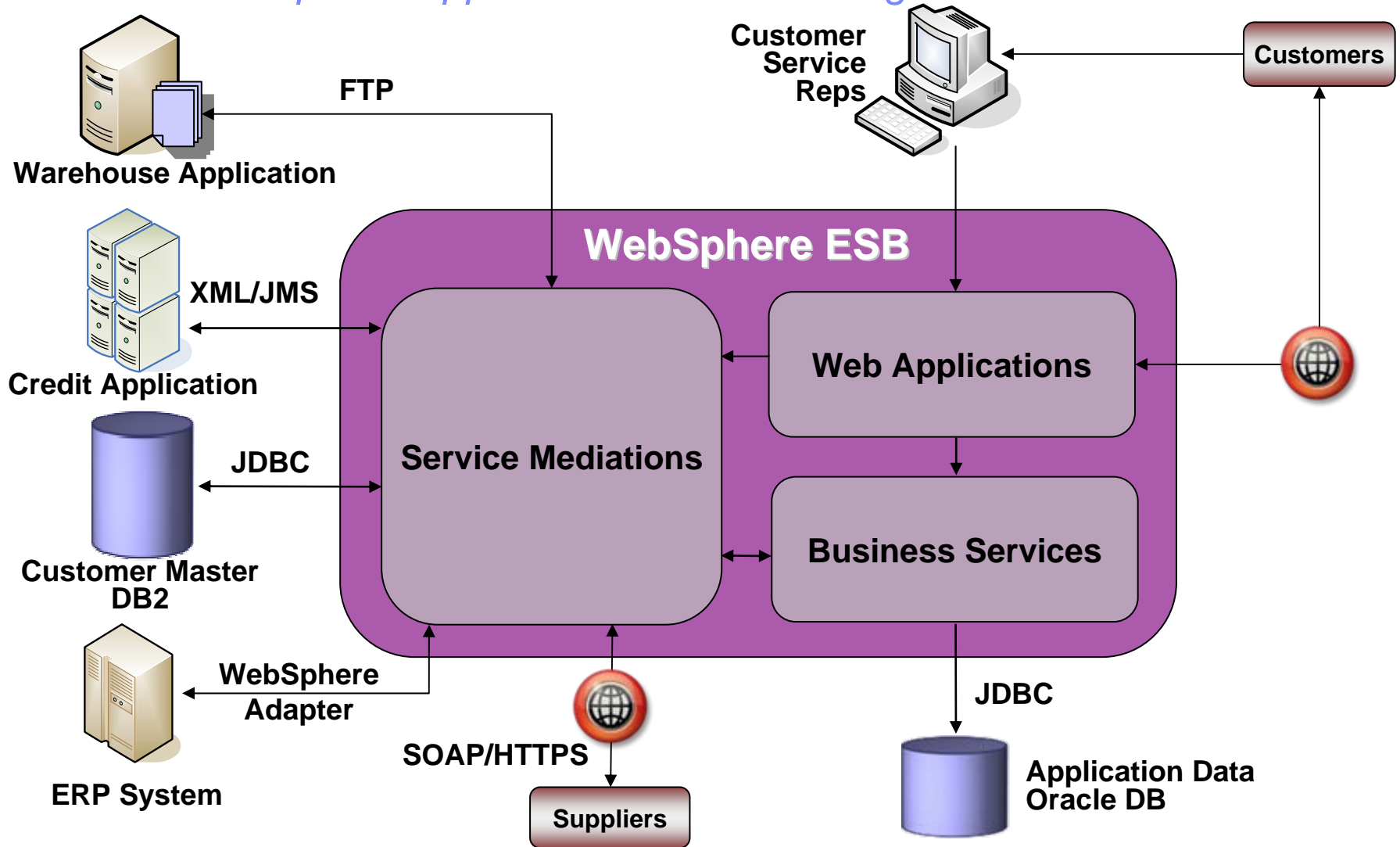
Optimized for standard XML and web services formats, with basic support for other common formats



Provides business visibility with embedded event engine for Business Activity Monitoring solutions

# WebSphere ESB

*Scenario – Composite application service hosting and mediation*



# Government Agency for Bankruptcy Services

## *Bankruptcy case management application*



▶ **Challenge:** Upgrade bankruptcy case management system from a legacy green-screen Unix system to a more flexible SOA solution leveraging existing back-end systems

▶ **Requirements:**

- Decouple business logic from integration logic, including first class XML and transformation, routing, and the ability to support a canonical data model
- Rapid development of the ESB solution with an easy-to-use, graphical tool
- Simplified integration with general ledger system data store running on MS SQL Server, and other back-end systems
- Highly available and scalable application hosting services for the ESB and case management web application

▶ **Solution:** **WebSphere ESB** with **WebSphere Integration Developer**

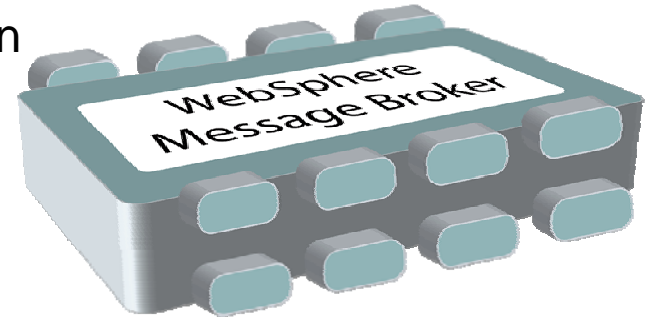
▶ **Benefits:**

- Deployed new application rapidly and economically, while enabling flexibility to future change
- Seamless upgrade path from existing WebSphere Application Server ND implementation to WebSphere ESB
- Integrated SOA platform delivers cost efficiencies in software/hardware, and in development/operations skills

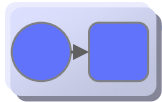
# WebSphere Message Broker

*Built for universal connectivity and transformation in heterogeneous IT environments*

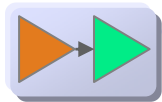
- Delivers universal connectivity and transformation
- Provides a flexible solution to address a wide range of requirements
- Optimized to accommodate any IT environment
- Offers unique quality of service and connectivity on z/OS



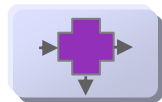
Exploits the unparalleled reach and reliability of the WebSphere MQ enterprise messaging backbone



Integrates everything through standard protocols, WebSphere Adapters for enterprise applications, and specialized connectivity options



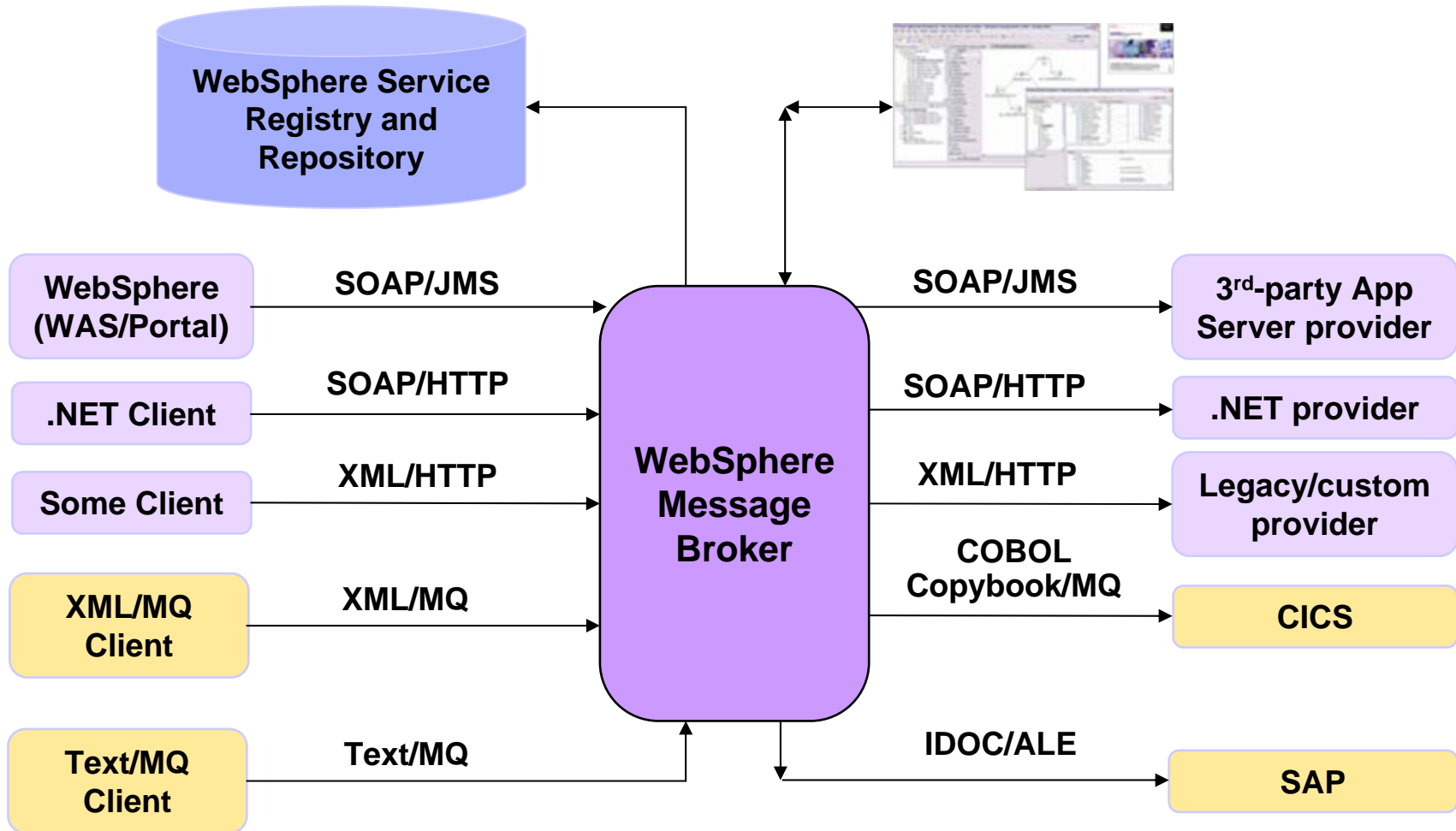
Enables transformation between a wide range of data formats, including XML, legacy, and industry standards, and custom formats



Optimized for high-volume processing and rapid time to value for complex mediation requirements with a robust set of pre-built mediation function

# WebSphere Message Broker

## Scenario – Heterogeneous service mediation



# Xerox

## Enhances Productivity with ESB and SOA



- ▶ **Challenge:** the widespread duplication of efforts to custom code new business applications for its many product divisions became a bottleneck that hampered productivity. Custom coding for new and updated business applications slowed production and raised costs.
- ▶ **Requirements:**
  - Integrate across 50+ back-end applications built upon multiple databases, a variety of application technologies, and multiple data formats
  - Enable client applications to access back-end systems as loosely-coupled services
  - Rapid, graphical development of the ESB solution without custom coding
  - Business-critical solution with demanding scalability, performance, and 24x7 availability requirements
- ▶ **Solution:**
  - **WebSphere Message Broker** for the ESB with WebSphere MQ messaging
  - **WebSphere Application Server Network Deployment** for new applications
- ▶ **Benefits:**
  - 100% payback of project investment in 24 months
  - Savings of over \$700K per year in costs to deploy new solutions
  - 75% reduction in time to deploy new solutions

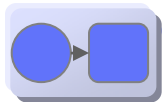
# WebSphere DataPower Integration Appliance XI50

*Purpose-built hardware ESB for simplified deployment and hardened security*

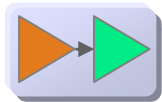
- Redefines the boundaries of middleware with specialized hardware
- Many functions integrated into a single device
- Simplified deployment and ongoing management



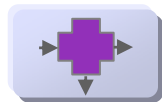
Secures services on the network with sophisticated web services access control, policy enforcement, message filtering, and field-level encryption



Optimized to bridge between leading standard protocols at wirespeed, including web services, messaging, files, and database access



Enables transformation between a wide range of data formats, including XML, legacy, and industry standards, and custom formats

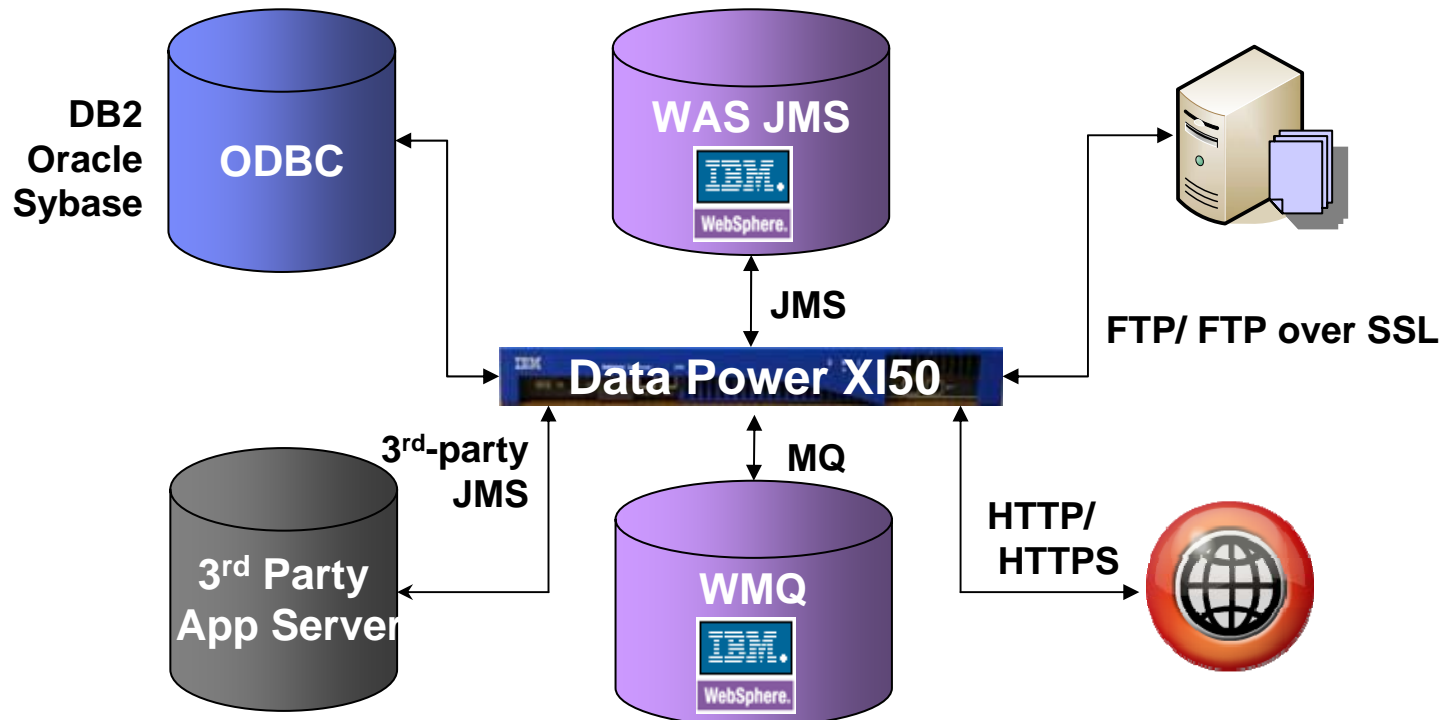


Captures and emits events to facilitate web services management and enable business visibility in Business Activity Monitoring solutions

# WebSphere Data Power XI50

## Scenario – Protocol bridging

- **First-class support for message and transport protocol bridging**
  - Protocol mediation with simple configuration
    - HTTP ↔ MQ ↔ WebSphere JMS ↔ FTP ↔ Tibco EMS
  - Request-response and sync-async matching
  - Able to configure to preserve fully guaranteed, once-and-only-once delivery





# Sprint

## ESB for Policy Enforcement of SOA



▶ **Challenge:** Deploying a new eBonding architecture (DRAWBridge) that exposes existing business support services as Web services. The architecture must be standards based, provides security compliance and the capability to dynamically control use of services.

▶ **Requirements:**

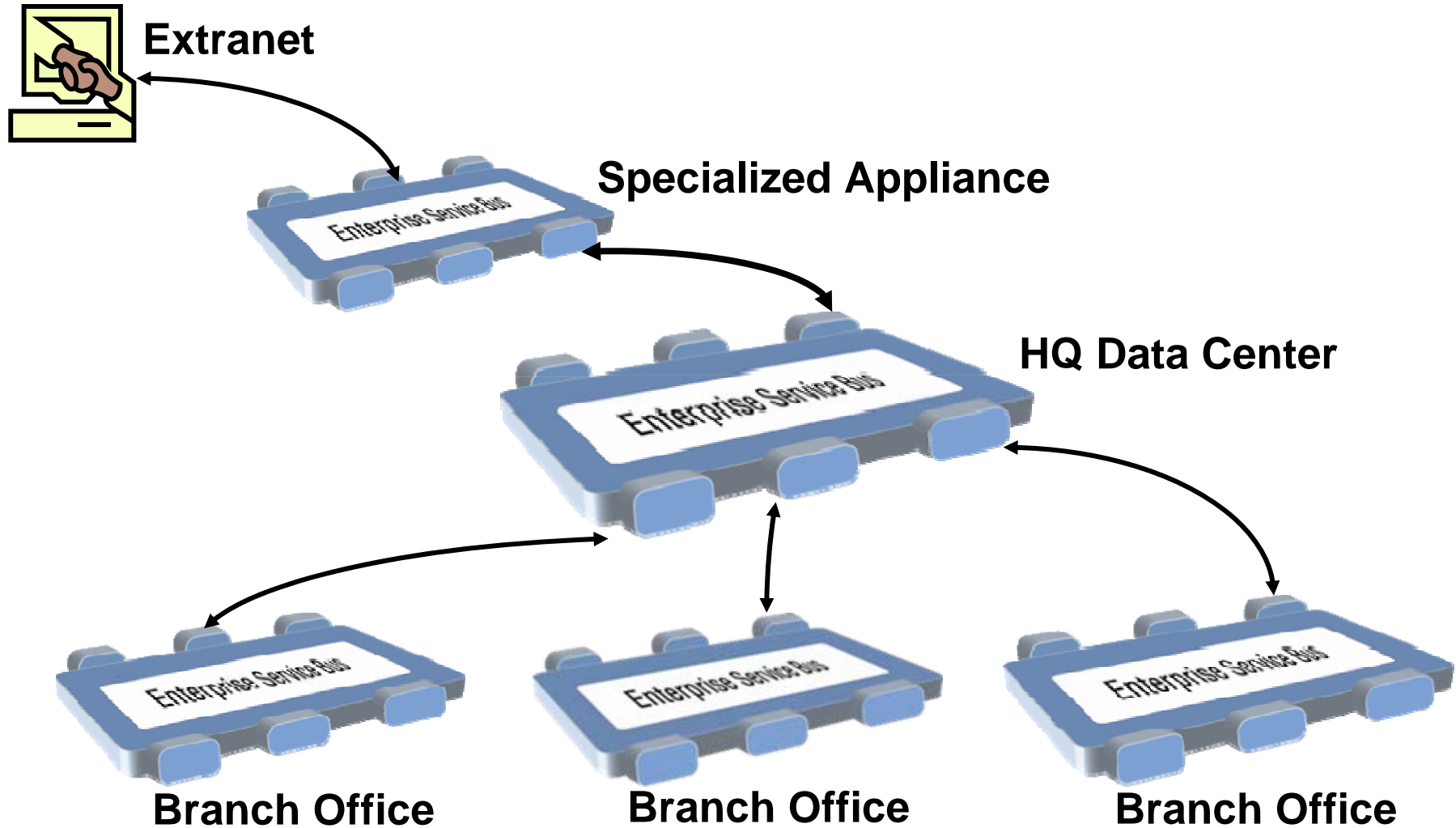
- Scalable integration layer, security compliance, protocol conversion
- UDDI for documenting services
- Support for existing business host services

▶ **Solution:** **WebSphere DataPower Integration Appliance XI50** and Registry/Repository provides integration, SOAP-XML/HTTP to MQ bridging, security authentication via the WS-Security standard, UDDI registration and discovery, Web Services policy management including SLA definitions and prioritization as well as monitoring/reporting on service performance

▶ **Benefits:**

- ESB that is scalable, easy-to-deploy, quick to configure & simple to manage
- Faster time to market creates the ability to meet project deadlines
- Lower cost

# Multiple ESB Configurations Working Together



# Selecting an ESB is a First Step for Business Success

## ***Will Your ESB Infrastructure Limit Your Business, will you be able to:***

- Grow or make use of new technologies?
- Respond fast enough for changes?
- Have reliable and secure access to the right system?
- Meet your needs be limited by your ESB
- Enable your ESB enable you to exceed expectations?

## ***What Happens When an ESB Only Solves Part of the Problem?***

- Business applications and operations grind to a halt
- Regulatory Compliance and Audit failures; Penalties and Lawsuits



# Can you deliver?



Break through limits to deliver end-to-end reliable and secure connectivity with integration to all applications, systems and services

***An ESB without limits delivers greater breadth and depth of functionality***

# Your Business Needs an *ESB Without Limits*



An ***ESB without limits*** breaks down the barriers by providing a solution with greater...

- Breadth: Three ESB product offerings optimized for various connectivity scenarios
- Depth: Complete set of connectivity capabilities to extend your ESB

# 5 ways to accelerate time to value for your SOA

- 1 Service Enablement
- 2 Universal Transformation
- 3 Messaging Backbone
- 4 SOA Hardware
- 5 Service Registry

# 1 Service Enablement

- Writing complex communications code.
- Running so many different applications that it was unable to easily integrate the new software into its existing infrastructure.
- Implementing a customized connection for each new project.
- New business service requires information held and managed by several applications and databases.



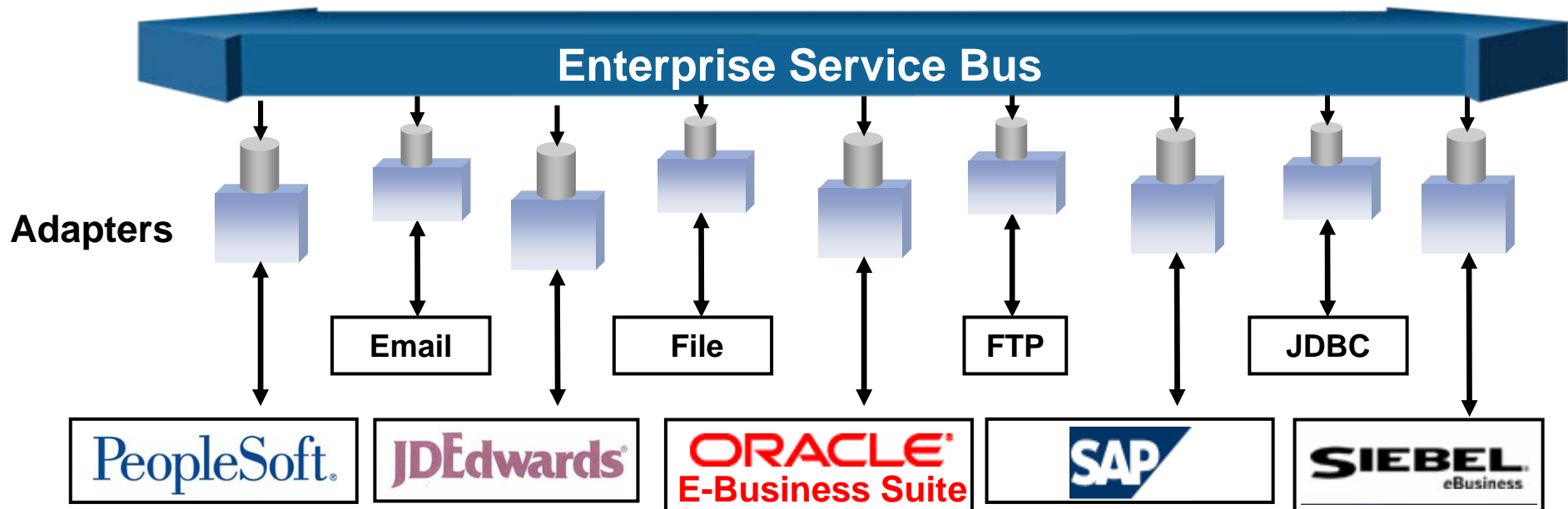
- Developing custom interfaces to link the ERP software with its in-store applications, but the process was time-consuming and costly.
- The bank had created approximately 180 point-to-point connections and interfaces which were difficult to manage and increased the complexity.

# Solution: WebSphere Adapters

*service-enable existing applications*



- A consistent framework for access to back-end systems and technologies
- Mission-critical quality of service
- A portfolio of pre-built application adapters as well as a toolkit to generate your own





# Benefits

- Speed time to market
- Ease of use
- Lower business risk
- Increased cost savings
- Based on open standards



# Customer Example: GROHE AG

## *Speedy Integration of SAP with Legacy Business Systems*

1

Service  
Enablement

▶ **Business Challenge:** Create 14 application interfaces to integrate new implementations of SAP modules with legacy applications in a cost effective manner within two months

- ▶ **Solution:** ESB enables a global exchange of information; Service-enable legacy systems in a building-block approach to facilitate future business integration projects.
- ▶ **Results:** Decreased average integration time by up to 84% , new services online within two to four weeks and passing and transforming up to 25,000 messages per day.
- ▶ **Implementation Details:** WebSphere Adapters for SAP and JDBC, WebSphere Message Broker, WebSphere MQ Servers: IBM System p 670; Services: SerCon GmbH, an IBM company.

## 2 Universal Transformation

- Need a system that can deliver information to other departments or applications.
- Limited skills in house and need a solution that is easier to learn, quicker and simpler to get up and running.
- Increasingly diverse and incompatible range of apps, partners, and platforms.
- Redeploying EDI apps to the Internet .



- Have a batch environment, looking for a non invasive way to validate documents.
- Building a gateway for exchanging HIPPA EDI messages.
- Use WebSphere Transformation Extender to integrate my existing business systems to SWIFT - need the same for SEPA.
- Need to validate and transform documents at their source as well as in the middle tiers.

# Solution: WebSphere Transformation Extender

- Code-free design and deployment
- High throughput execution of complex transformations
- In-process data validation
- Solution Accelerator Packs
- One engine, multiple deployment options including zSeries

## Healthcare

HIPAA, HL7,  
NCPDP

## Finance

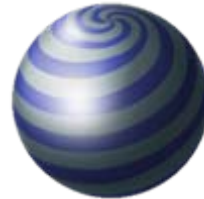
SWIFTNet FIN, SEPA,  
SWIFTNet Funds

## EDI

EDIFACT  
X12, EANCOM

And others...

## *Industry packs*



- Map
- Transform
- Validate

## *Deployment Options*

WebSphere ESB  
WebSphere Message Broker  
WebSphere Application Server

WebSphere Process Server  
Stand alone  
System z (native)

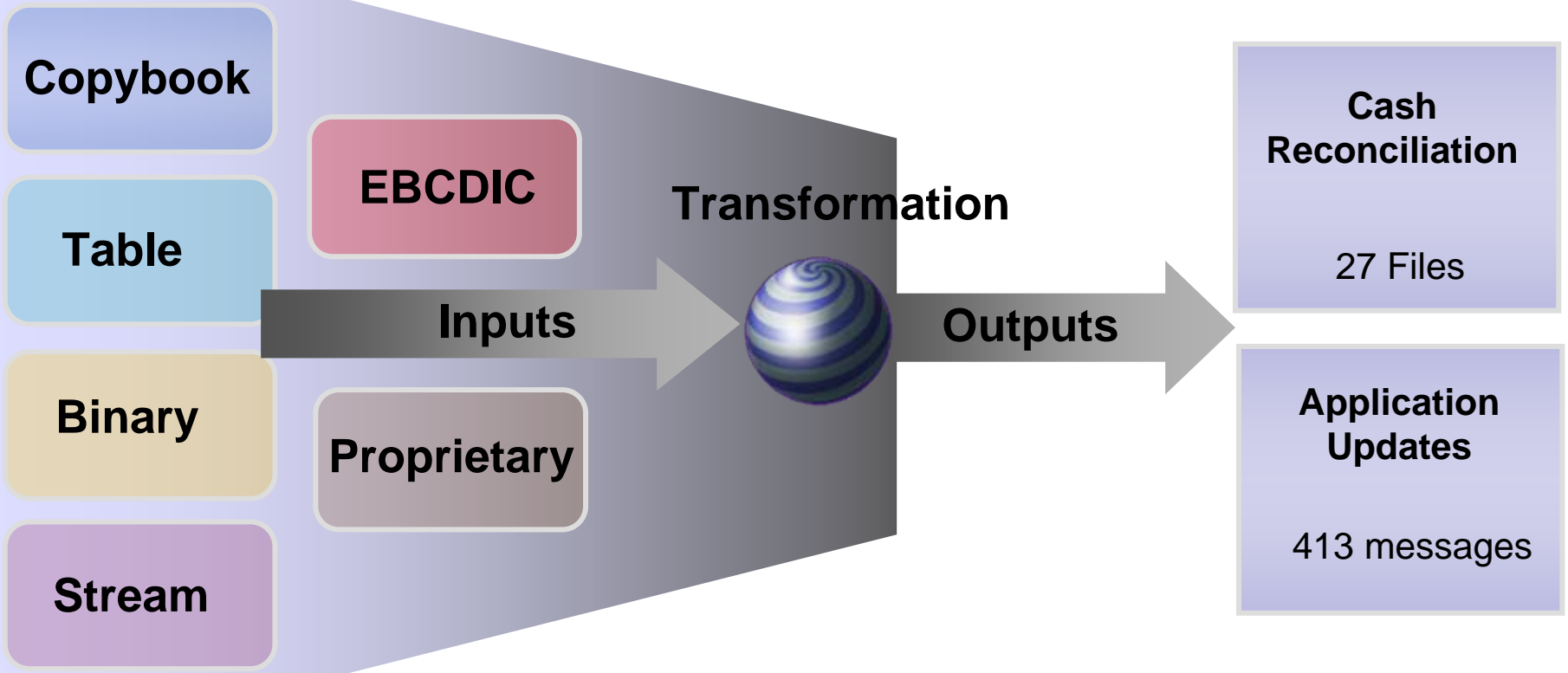
Windows  
UNIX  
Linux

# Customer Example

*Processing Information, all business rules and usage mechanisms intact...*



Universal Transformation



# Benefits

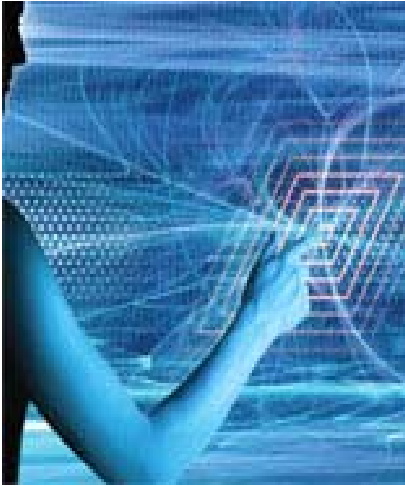
2

**Universal  
Transformation**

- Solves really hard problems in less time, with one common design method that involves no coding
- One set of skills, deployment flexibility
- Lowers cost per transaction
- Reduces impact of Industry imperatives
- Enhances compliance to industry and regulatory authorities



### 3 Messaging Backbone



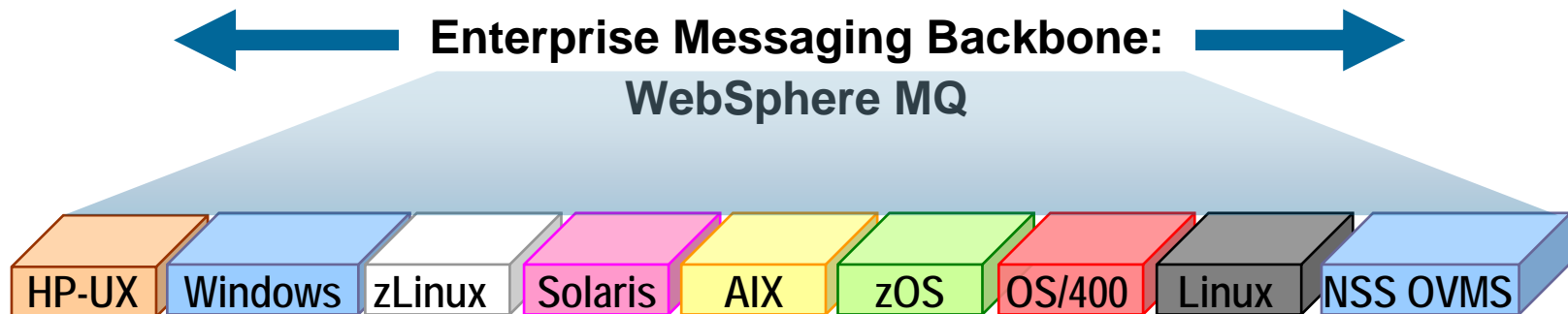
- Connect the new with the now: integrate SOA components with today's core IT without disruption
- Reduce time spent maintaining existing applications so that more effort can be devoted to innovation
- Prepare for regulatory compliance by reducing risk of business data being lost or corrupted

- Increase the security of business data being moved around the enterprise
- Connect Web services reliably, provide foundation for an ESB
- Link together incompatible systems
- Maximize the ROI of existing applications by re-using them in new ways
- Eliminate errors moving information between IT systems

# Solution: WebSphere MQ

*Reliable messaging backbone for SOA*

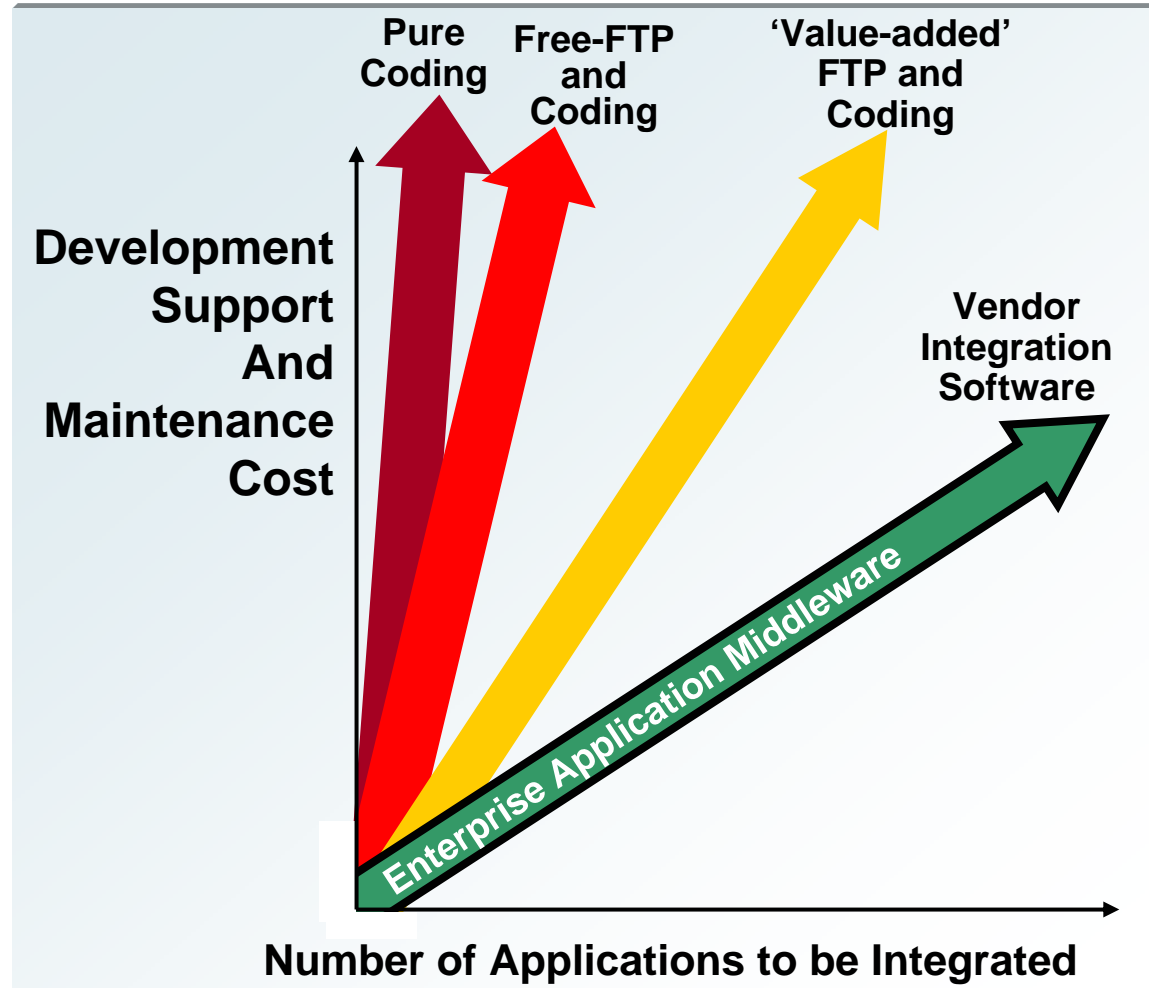
- Reliable messaging for applications and Web services
- Integrates virtually any commercial IT system
- Proven qualities of service and availability for mission-critical applications
- Supports industry standard interfaces
- Connects Web Services with non-Web Services
- Ubiquitous transport to extend and underpin your ESB





# Benefits

- First Step to SOA
- Increased ROI of applications
- More reliable processes
- Reduce integration time
- Reduced specialist skills
- Supports industry standards
- Ease of use
- Reduced maintenance
- Minimized risk and disruption
- Protect existing investments
- Proven



Adapted from: *Software Strategies*, "Enterprise Integration Challenge," 2006

# Customer Example: Canadian Tire

## *Slashes Time to Integrate Applications*

3

Messaging  
Backbone

▶ **Business Challenge:** Complexity of integrating over 50 disparate applications and platforms, databases, data entry points and transaction processing protocols; inability to share information slowed launch of new services and impeded innovation

- ▶ **Solution:** A WebSphere MQ that reliably connects applications as part of an SOA that unlocks valuable information
- ▶ **Results:** Reduced application integration time by 85%; Handles over 1 M messages each month; Accelerated time to market for new services; Resolved data inconsistencies; Strengthened compliance and reporting processes. *"IBM WebSphere MQ provides guaranteed delivery... In 10 years, we've never lost a message or a piece of data"*
- ▶ **Implementation Details:** WebSphere MQ, WebSphere Transformation Extender

## 4 SOA Hardware

- **Scalability:** XML Web services are bandwidth, CPU and memory intensive
- **Performance:** some XML-based applications literally grind to a halt
- **Risk:** SOA connects systems never before connected
- **Security:** many services are clear text over HTTP with no inherent security
- **Integration:** connecting XML Web services to non-XML legacy applications
- **Standards:** ever expanding while ever in flux
- **Business & Operations:** financial, technical, SOA expertise and org. challenge

# Solution: SOA Hardware Appliances - a game changer!



SOA  
Hardware

- Market Forces
  - Enterprise need for 'Drop-in' solution / Simplified Deployment
  - Demand for higher level of security offered by purpose-built device
  - Key Market Trend: IT appliances as a delivery form factor
  - Convergence of traditional IT and Networking
- Refactoring of IT infrastructure: many core SOA functions integrated, configured and managed in a single device
- Higher levels of security and performance require specialized hardware
- Addresses the divergent needs of different groups
- Appliances simplify the deployment, management and integration of key SOA functions

WebSphere DataPower SOA Appliances redefine the boundaries of middleware extending the SOA Foundation with **specialized, consumable, dedicated SOA appliances** that combine **superior performance and hardened security** for SOA implementations.

# Benefits: Specialized network devices simplify, help secure & accelerate SOA



SOA  
Hardware

## XML Accelerator XA35



- Accelerates XML processing and transformation
- Increases throughput and reduces latency
- Lowers development costs

## XML Security Gateway XS40



- Helps secure SOA
- Web services security, routing and management
- Drop-in, centralized policy enforcement
- Easily integrates with existing infrastructure

## Integration Appliance XI50



- Transforms messages
- Bridges multiple protocols
- Routes messages based on content and policy
- Integrates security and policy functions

# Customer example: Intuit Inc.

*Simplify, Help Secure, & Accelerate SOA*



SOA  
Hardware



## Business Challenge:

Deploy a more scalable infrastructure to support secure online transactions with a solution to enhance scalability, manageability & reliability of IT environment



**Solution:** WebSphere DataPower provides protocol mediation functions & accept front-end requests via TIBCO EMS. The appliances implemented secure, transform & route Web services calls to the appropriate endpoint.



**Benefits:** Increased security for high volume credit card authorization services, without performance degradation. Faster to implement than software & lower maintenance costs.



**Implementation Details:** WebSphere DataPower Integration Appliance XI50, WebSphere DataPower XML Security Gateway XS40.

## 5 Service Registry

### *How do I...?*

**Govern services as part of my SOA?**

**Manage the services lifecycle?**

**Help services interact efficiently and dynamically with each other?**

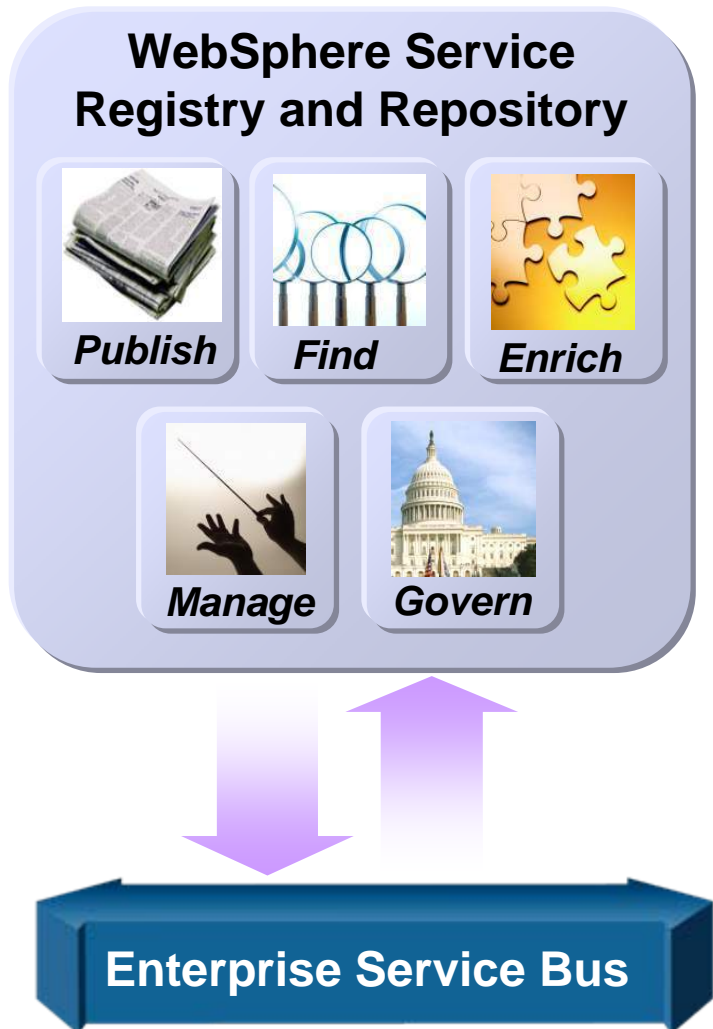


**Increase service reuse?**

**Eliminate “rogue services” and ensure control of my SOA?**

# Solution: WebSphere Service Registry & Repository

5  
Service  
Registry



## ***Enhance Connectivity***

Enable dynamic and efficient interactions among services at runtime

New Mediation capabilities allows dynamic endpoint lookup and selection

Access to real time service metadata information enhancing ESB interactions

Enable efficient interactions between services at runtime

Eliminate development time and expense rewriting mediations



# Benefits: Get the most value from SOA

5

Service  
Registry

## Improves Visibility

- Provides runtimes with dynamic access to service metadata
- Helps manage service relationships and dependencies

## Improves Reliability

- Ensures services interact with the most appropriate and most available services

## Reduces Risk

- Ensures services interactions are optimized and properly managed and governed

## Reduces Time to Market

- Rapid assembly and/or re-configuration of composite applications by enabling dynamic service interactions

## Reduces Costs

- Promotes reuse and reduces development costs

# Customer Example: Large Manufacturer

## *Enabling SOA governance and enriching connectivity*



Service  
Registry



### ▶ **Business Challenge:**

- Eliminate redundant application development
- Reduce spending on the IT infrastructure
- Improve responsiveness to business needs

- ▶ **Solution:** WebSphere Service Registry and Repository and WebSphere Message Broker were deployed to increase services reuse and optimize service interactions
- ▶ **Benefits:** Provide visibility and organize services; Track and monitor the lifecycle of the service from development to deployment; Improve time to market by enabling dynamic service interactions
- ▶ **Implementation Details:** WebSphere Message Broker, WebSphere Service Registry and Repository

## ESB offerings from IBM WebSphere

- **WebSphere ESB:**  
built on WebSphere Application Server for an integrated SOA platform



- **WebSphere Message Broker:**  
built for universal connectivity and transformation in heterogeneous IT environments



- **WebSphere DataPower Integration Appliance XI50:**  
purpose-built hardware ESB for simplified deployment and hardened security



## Reducing IT Complexity is Easier with an ESB

- The role of the ESB is to decouple connectivity logic from application and process logic, thus making the benefits of SOA possible
- IBM has the broadest ESB portfolio, plus products to extend your ESB
- The IBM strategy is to provide a family of ESBs that are optimized to uniquely meet customer needs



# Customers Realizing SOA Value Across Industries

Half of the world's 30 biggest electronics companies

10 of the world's 10 biggest auto manufacturers

More than 3,200 SOA Business Partners

10 of the world's 10 biggest banks

4 of the world's 10 biggest retailers

9 of the world's 10 biggest telcos



90 SMB references

8 of the world's 10 biggest insurers

80% of the biggest US health plans

**97% of customers justified their SOA project on cost  
100% saw increased business flexibility**

# WebSphere

## *The Clear Choice for SOA*



- Over 3000 BPM assets in SOA Business Catalog
- Contributors to over 50 SOA standards committees
- More than 2,500 SOA Business Partners

### **Nobody invests and innovates more**

- \$1B increase in investment next 3 years
- 15K practitioners, expected to grow by 65% next 3 years
- 300+ SOA-related patents

### **Or has broader market acceptance**

- 1.1M+ Registered developers on IBM SOA platform
- Over 87,000 customers
- Over 3,000 SOA Engagements and Assessments

# For more information...

## **WebSphere offerings for Application Integration**

<http://www.ibm.com/software/info1/websphere/index.jsp?tab=solutions/appintegration>

## **ESB without limits from WebSphere**

[www.ibm.com/software/integration/esb](http://www.ibm.com/software/integration/esb)

**For more IBM ESB success stories, visit:**

[www.ibm.com/software/success](http://www.ibm.com/software/success)



The words "Thank You" are rendered in a large, 3D, light blue font. Each letter is filled with a different photograph of a diverse group of people, including men and women of various ethnicities, smiling or looking towards the camera. The letters have a slight shadow, giving them a three-dimensional appearance.



IBM Software Group

# WebSphere Enterprise Service Bus

## *Technical Overview*

**An IBM Proof of Technology**





# Core Principles of the ESB Architectural Pattern



- ESB inter-connects requestor and provider
  - ▶ Interactions are *decoupled*
  - ▶ Supports key SOA principle – *separation of concerns*
- ESB provides **Service Virtualization** of
  - ▶ *Identity* via routing
  - ▶ *Protocol* via conversion
  - ▶ *Interface* via transformation
- ESB also enables **Aspect Oriented Connectivity**
  - ▶ Security
  - ▶ Management
  - ▶ Logging
  - ▶ Auditing
  - ▶ ...

# Why an ESB to Meet Your Connectivity Needs?

*Flexible Connectivity Infrastructure for Integrating Applications and Services*

- Reduce the number, size, and complexity of interfaces
- Reduces cost and risk involved as business changes and new opportunities arise
- Promotes reuse – Data and business logic more usable, and applications easier to service-enable
- Dynamic real-time, event-driven SOA – replacing unresponsive, batch-updating IT systems



## Leverage the benefits

***Reliable and secure data movement*** – anywhere in the enterprise

***Application Programmers focused on logic*** – simplified programming tasks

***Dedicated environment*** – Common tooling, management and operational support



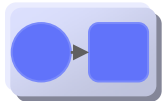
# WebSphere ESB

*Built on WebSphere Application Server for an integrated SOA platform*

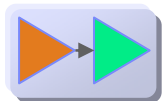
- Integrates seamlessly with the WebSphere platform
- Delivers business-critical qualities of service
- Easily extends to WebSphere Process Server
- Integrated solution for both service mediation and service hosting



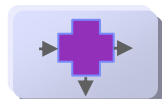
Delivers leadership in SOA standards for service composition, and leverages the embedded messaging and web services WebSphere Application Server engine



Integrates everything with WebSphere Adapters for enterprise applications, the breadth of the WebSphere ecosystem, and support for standard protocols

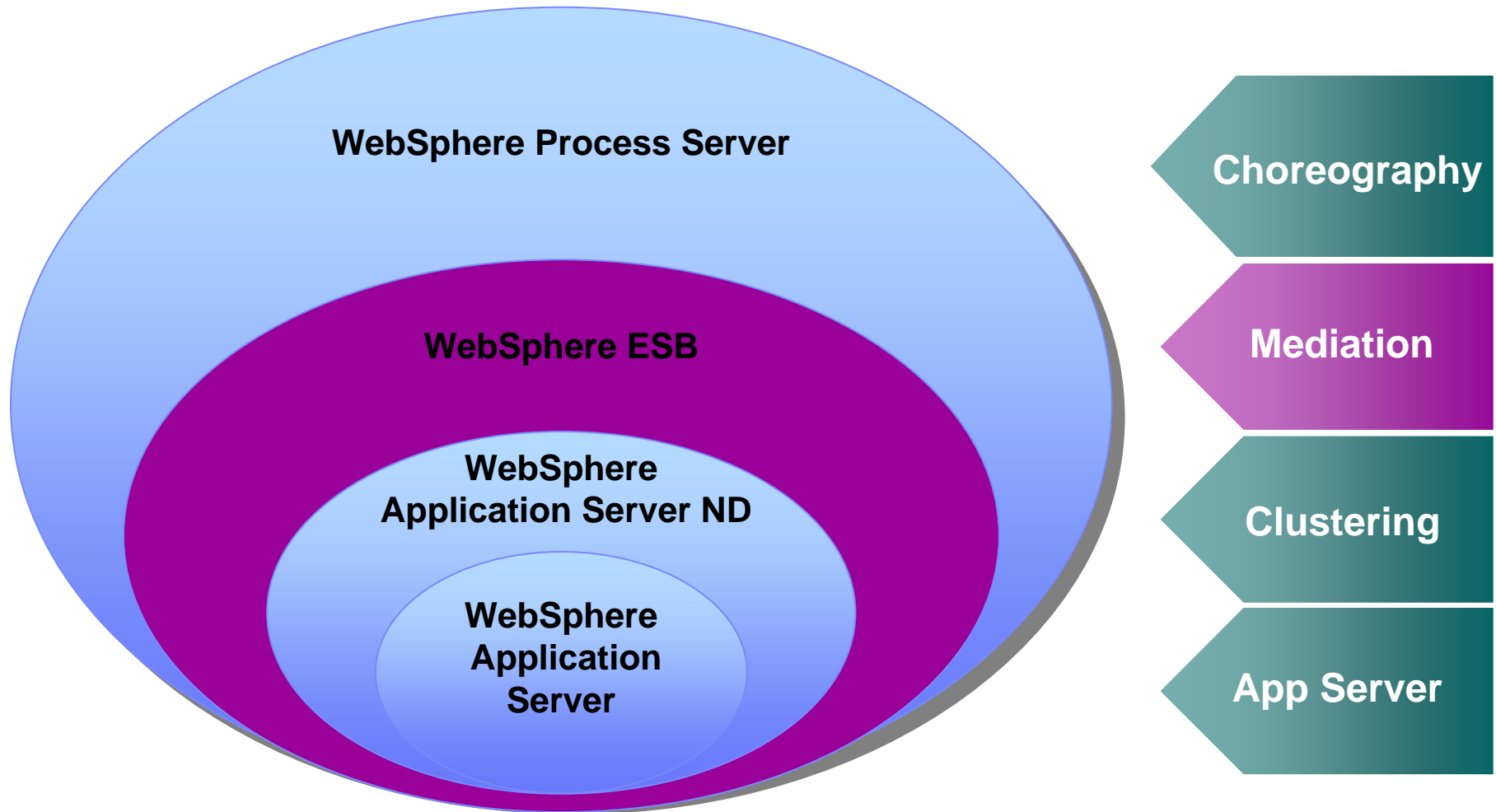


Optimized for standard XML and web services formats, with basic support for other common formats



Provides business visibility with embedded event engine for Business Activity Monitoring solutions

# WebSphere Application Server, WESB, and Process Server



# WebSphere ESB and WebSphere Application Server

**WebSphere ESB:  
Mediation layer builds on WebSphere Application Server  
foundation to provide intelligent connectivity**

- Pre-built mediation functions and easy to use tools enable rapid construction and implementation of a Enterprise Service Bus
- Leverage visual tooling to exploit supplied pre-built mediation functions

**WebSphere Application Server:  
Transport layer foundation provides infrastructure  
via JMS 1.1, HTTP, IIOP**

# WebSphere ESB and WebSphere Process Server

**WebSphere Process Server:  
Process layer builds on WebSphere ESB and WebSphere Application Server  
foundation to deliver robust business process management**

**Built on a common foundation, so that WebSphere ESB  
customers can easily migrate upward and leverage:**

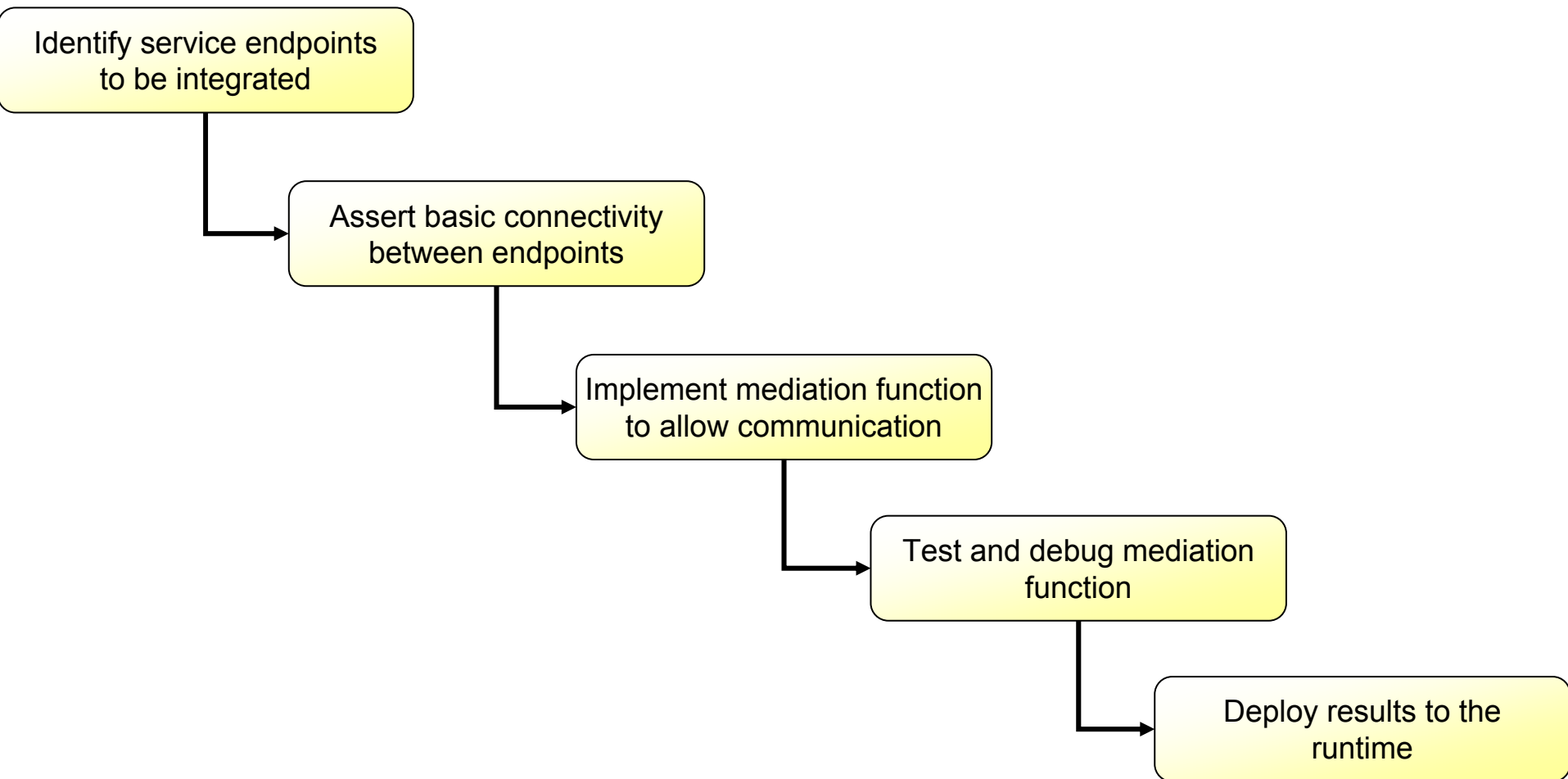
- Support for all styles of integration, including human tasks, roles based task assignments, and multilevel escalation.
- Business rules, business state machines, and selectors to dynamically choose interface based on business scenarios
- Change business processes on the fly with relatively minimal skills

**WebSphere ESB:  
Mediation layer builds on WebSphere Application Server  
foundation to provide intelligent connectivity**

**WebSphere Application Server:  
Transport layer foundation provides infrastructure  
via JMS 1.1, HTTP, IIOP**

***Use WebSphere Process Server when you need to automate business processes that span people, workflows, applications, systems, platforms, and architectures.***

# Typical Integration Developer Task Flow



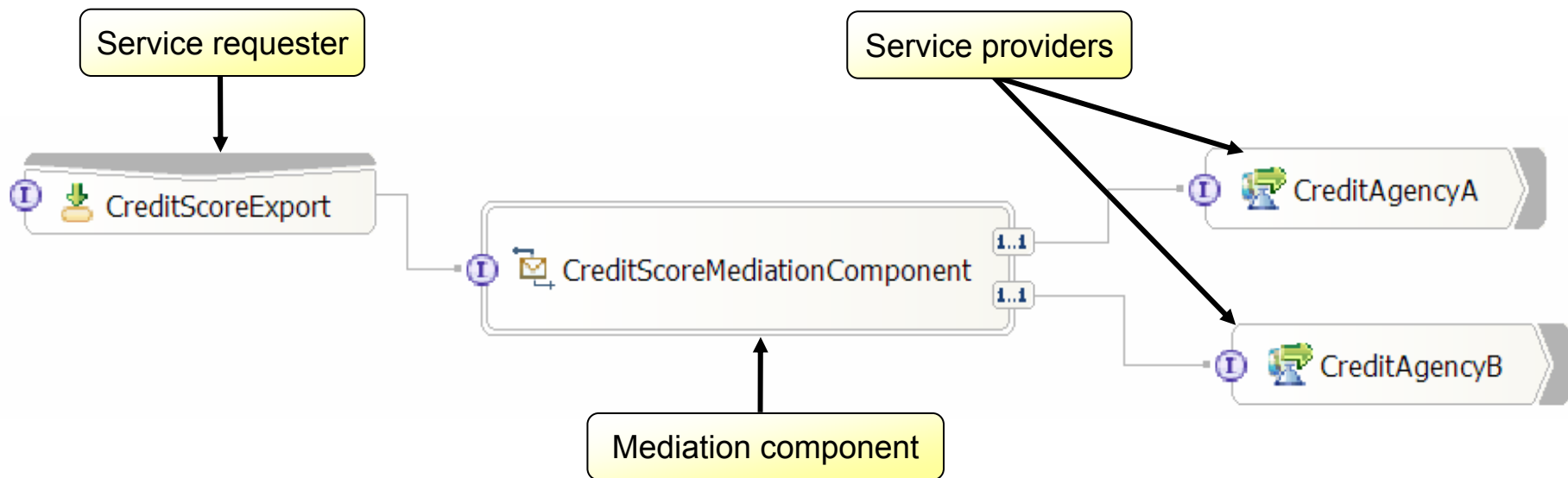
# Identify Service Endpoints to be integrated

- Concept

- ▶ The mediation module defines a mediation component and the endpoints it mediates in the form of imports and exports

- Task

- ▶ Define mediation module and component
- ▶ Define imports for service providers
- ▶ Define exports for service requesters





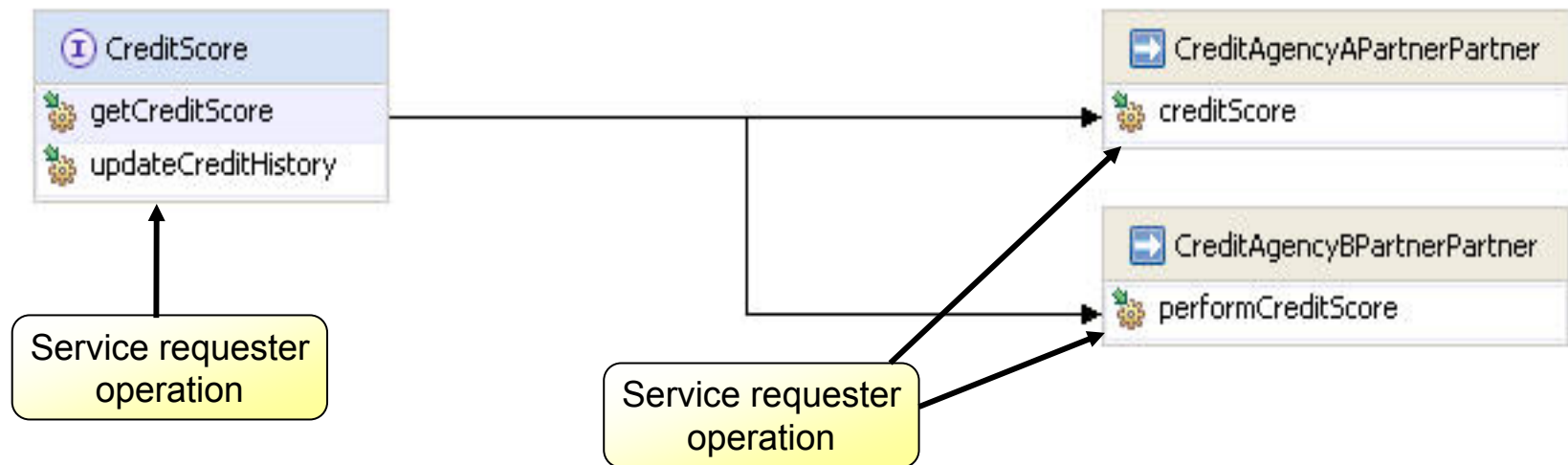
# Assert the basic connectivity between endpoints

- Concept

- ▶ Operation connections define links between service requester interfaces and service provider interfaces
- ▶ Define paths along which mediation can occur

- Task

- ▶ Identify paths between, and connect requester operations to provider operations



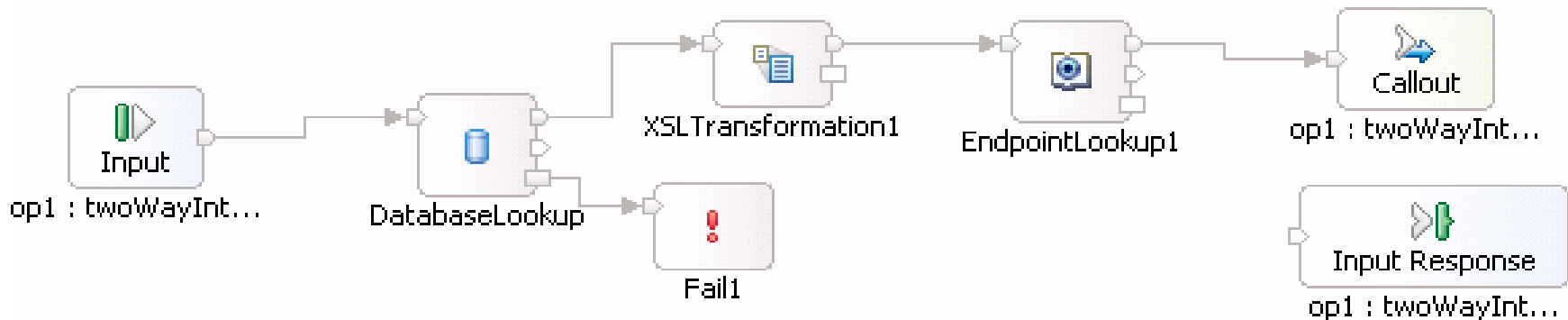
# Implement mediation function to allow communication

- Concept

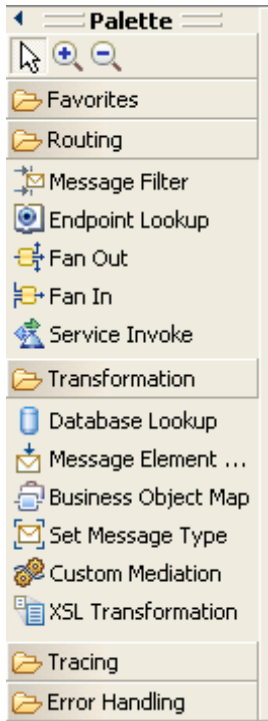
- ▶ Mediate message using supplied primitives and/or by implementing custom mediations
- ▶ Mediate the message in the form of a Service Message Object

- Task

- ▶ Construct a mediation flow by selecting and connecting mediation primitives together



# Mediation Flows



Terminals act as wiring points and are typed

Input node represents an operation on the Components interface

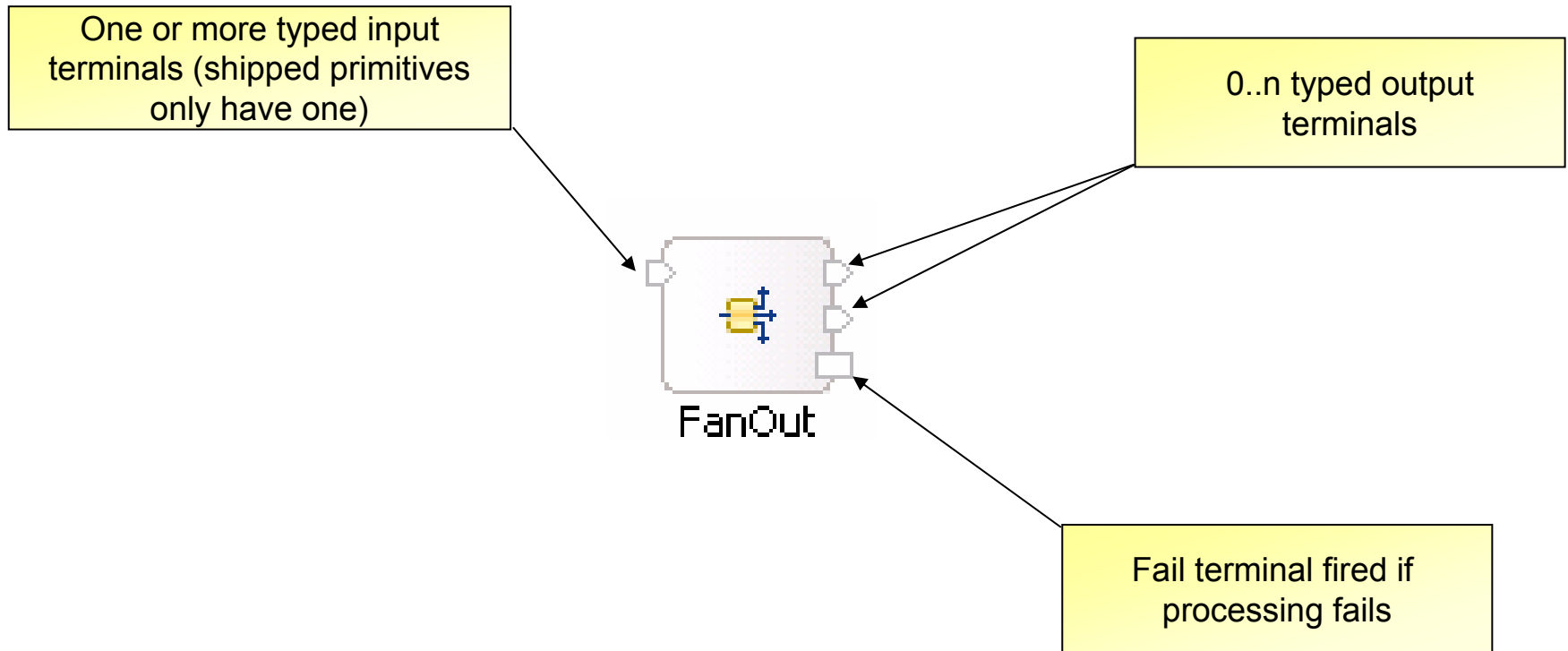
Toolbar palette contains mediation primitives

Callout node represents an operation on a reference partner

Input Response node allows mediation flow to return directly to the caller



# Mediation Primitives - Anatomy



# Mediation Routing Primitives



MessageFilter

*Message Filter* – routes within a flow



ServiceInvoke

*Service Invoke* – invokes a service between the end points of a flow



EndpointLookup

*End Point Lookup* – Dynamically searches WebSphere Service Registry and Repository to determine service endpoints



FanOut

*Fan Out* – send copies of a message out multiple paths



FanIn

*Fan In* – aggregates messages following a Fan Out

# Mediation Transformation Primitives



DatabaseLookup

*Database Lookup* – adds content from database



MessageElementS...

*Message Element Setter* – set message content



XSLTransformation

*XSL Transformation* – transforms content



BOMapper

*Business Object Maps* – transforms content, maintains relationships, change summaries



SetMessageType

*Set Message Type* – allows weakly typed data to be strongly typed



CustomMediation

*Custom Mediation* – executes custom Java code

# Mediation Tracing and Error Handling Primitives



*Message Logger* – logs to database



*Event Emitter* – emits business events to Common Event Infrastructure



*Fail* – terminates flow with an exception

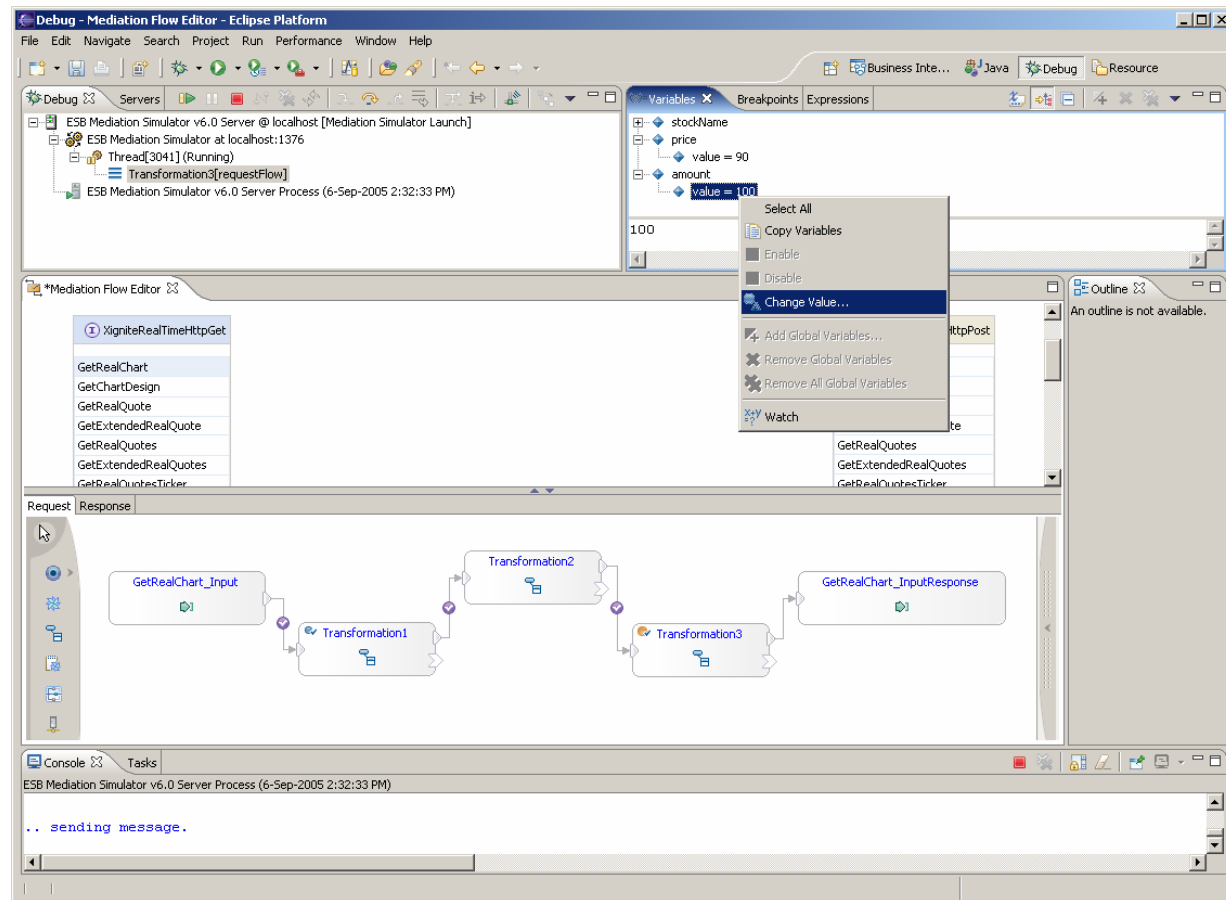


*Stop* – terminates flow normally

# WID Mediation Visual Debug

*Use the visual debugging tools to debug a solution*

- Debug mediation flows using an in-place visual debugger
- Breakpoints can be added, step into, through, or over areas of interest while inspecting the values of the messages





# Questions



# Thank You



# WebSphere Message Broker



**WebSphere** software

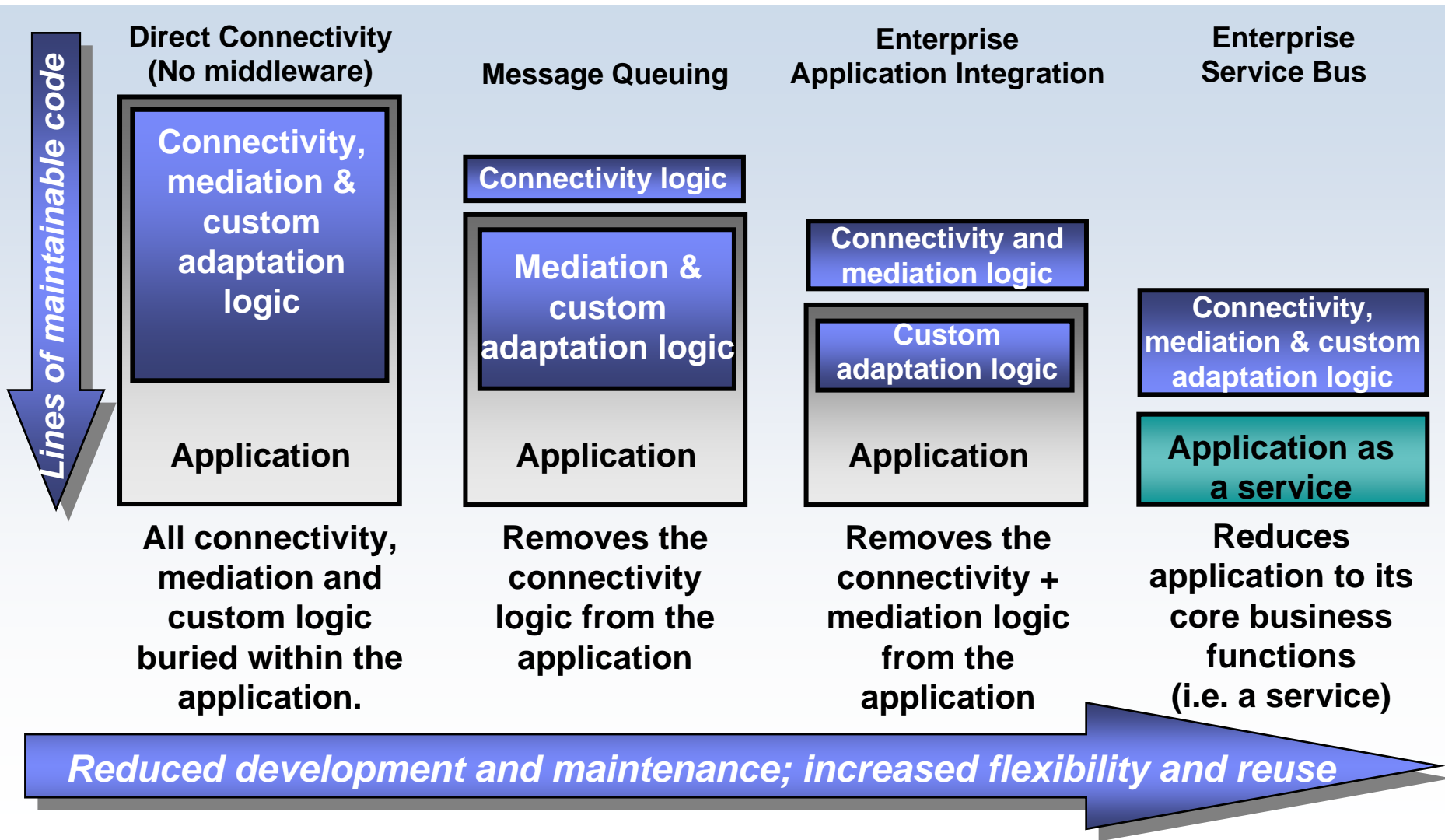


# *Agenda*

- Introduction
- Message Broker Constructs
- Product Architecture



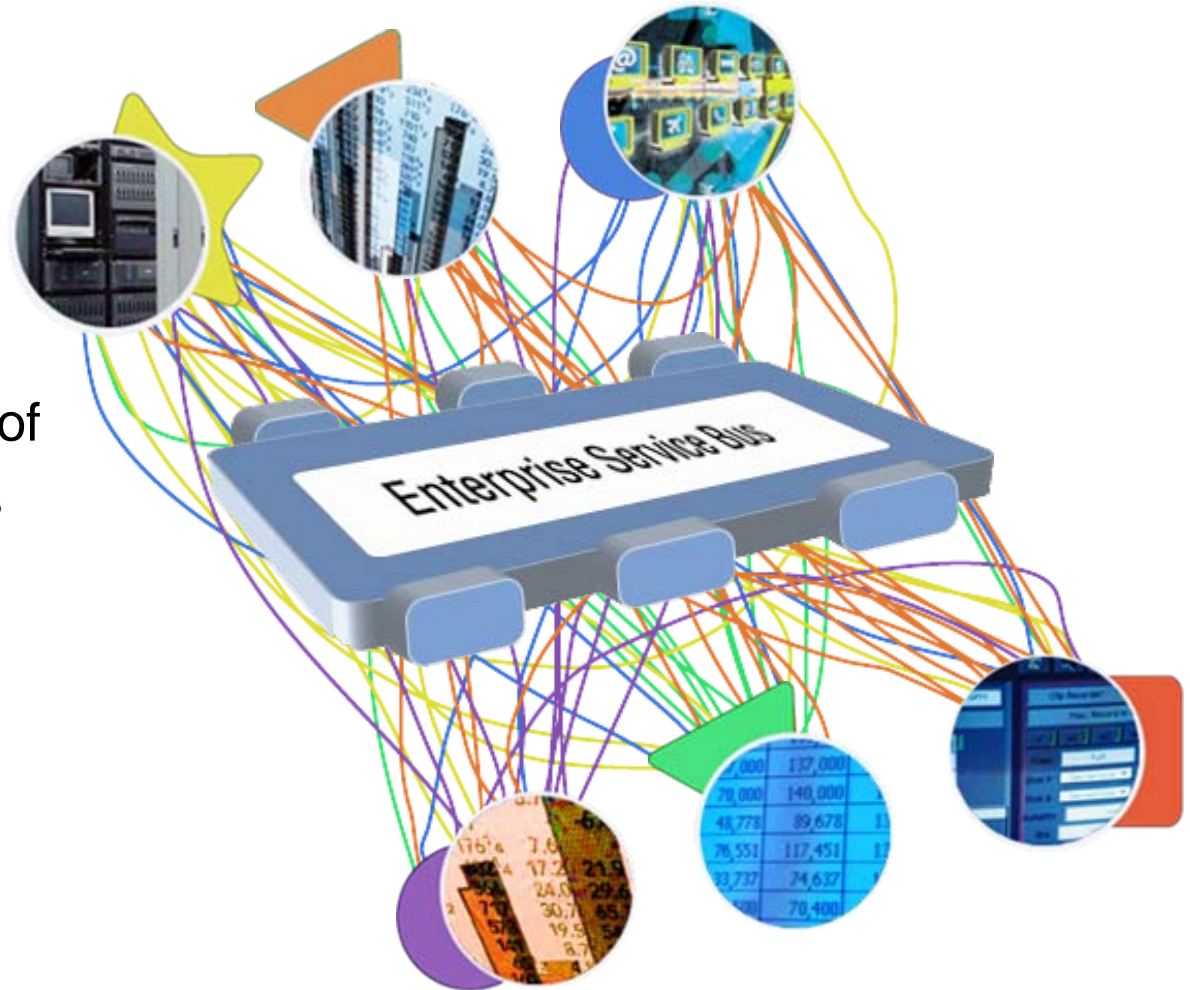
# Integration Technology Evolution



# Can development and maintenance be made less complex?

## We need to...

- ✓ Decouple interfaces from applications
- ✓ Enable all applications to communicate with each other regardless of
  - ✓ Programming languages
  - ✓ System platforms
  - ✓ Programming models
  - ✓ Protocols
  - ✓ Data formats
- ✓ Facilitate Application Reuse



***The solution: the Enterprise Service Bus***



# What is an Enterprise Service Bus?

*An Enterprise Service Bus (ESB) is a flexible connectivity infrastructure for integrating applications and services.*

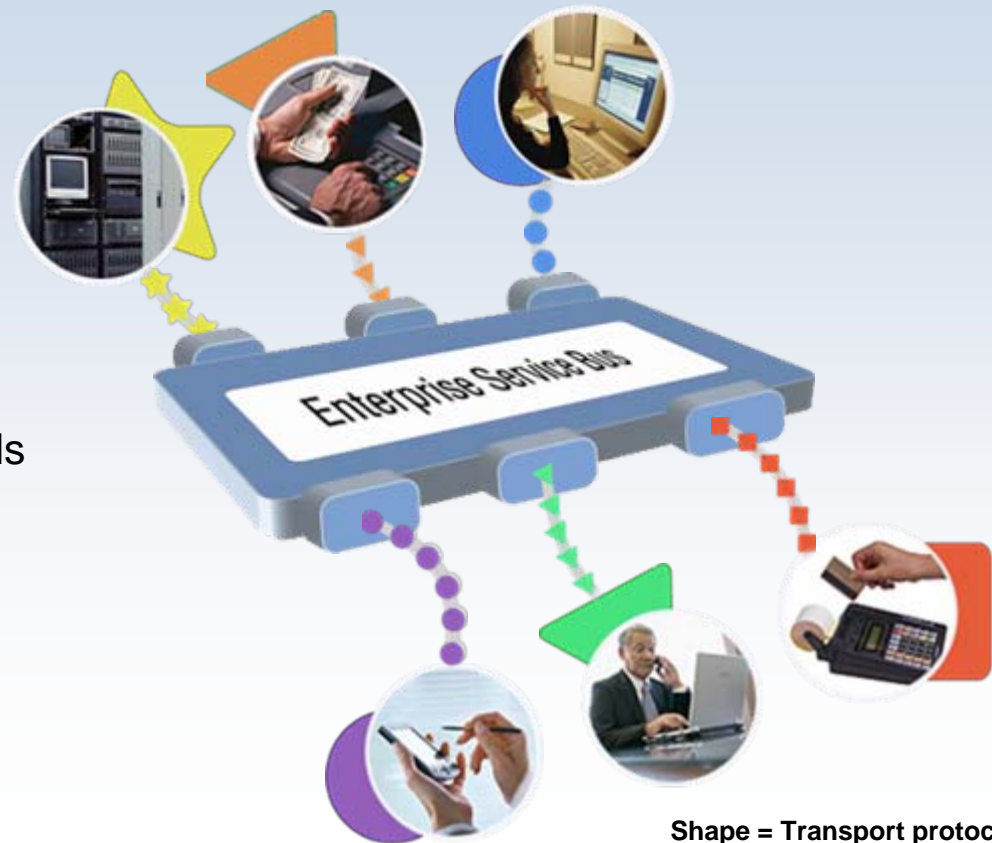
**An ESB performs the following between requestor and service**

 **MATCHES & ROUTES**  
communications between services

 **CONVERTS**  
between different transport protocols

 **TRANSFORMS**  
between different data formats

 **IDENTIFIES & DISTRIBUTES**  
business events



Shape = Transport protocol  
Color = Data format



# WebSphere Message Broker

*Delivering an advanced ESB to power your SOA*

## Provides universal connectivity

- Provides Web Services connectivity and non standard interface connectivity
- Unmatched ability in integrating many systems, platforms, devices, and APIs
- Facilitates service oriented integration

## Provides universal data transformation

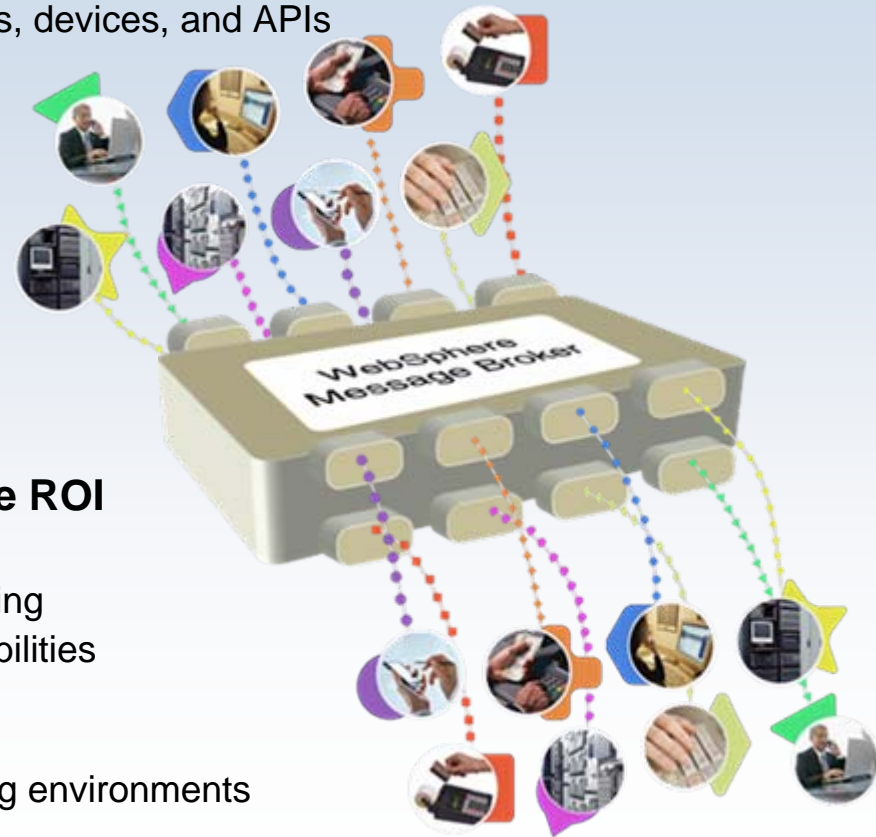
- Advanced message transformation, enrichment, and routing
- Option to use WebSphere TX
- Support for industry standard data formats (AL3, HL7, SWIFT, HIPAA, EDI, etc.)

## New & improved pre-built capabilities to improve ROI

- Leverage existing skills with rich Java and XML support
- Implement complex event processing with no programming
- Offers simple and easy to use tools with advanced capabilities

## Leverage the performance

- Offers performance of traditional transactional processing environments

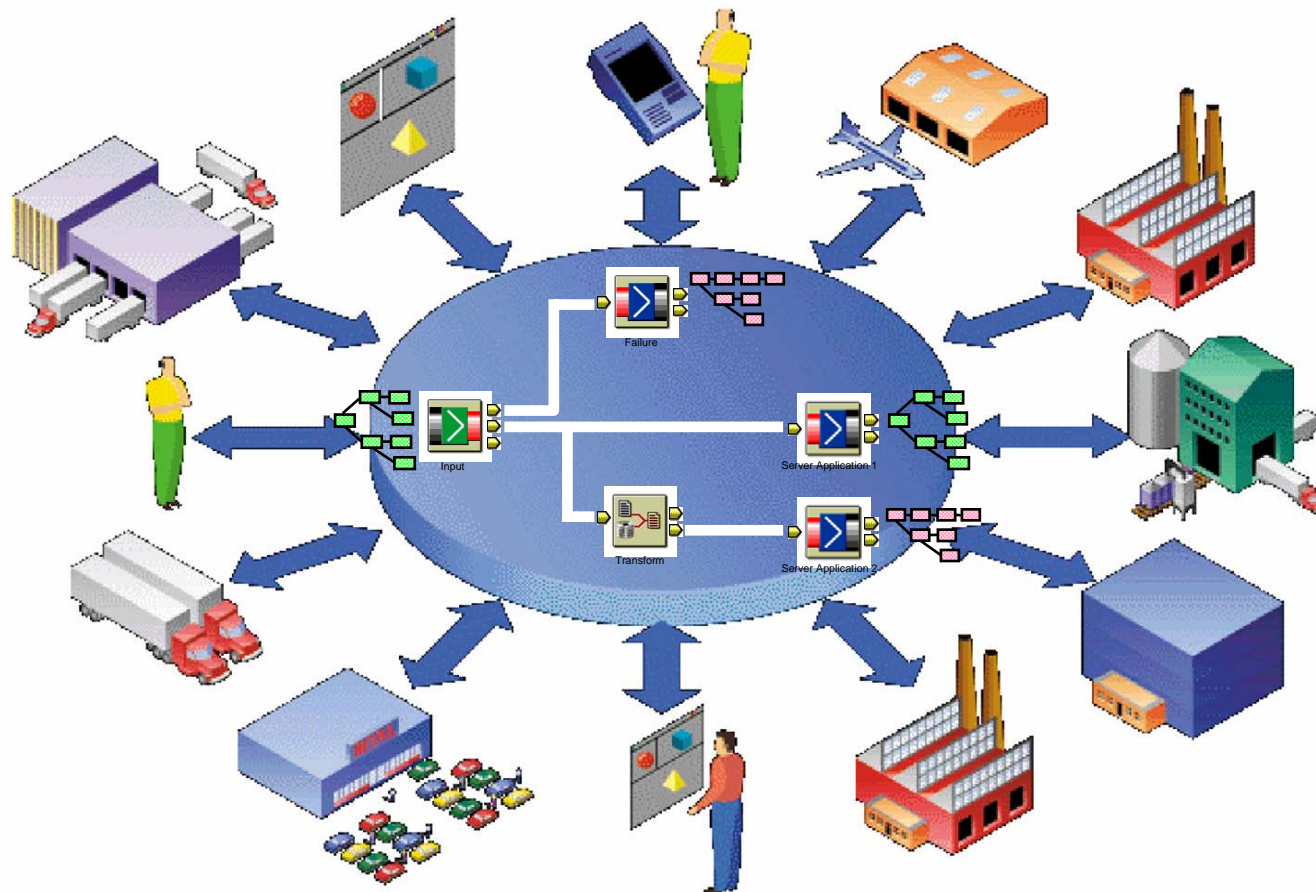


*Integrate standards-based as well as existing non-service enabled applications into SOA*





# Characteristics of WebSphere Message Broker



- Non-Invasive
- Transformation
- Content Based Routing
- DBMS Integration
- Fully Transactional
- Effective, Powerful Tooling
- Simple
- Extensible
- Standards based

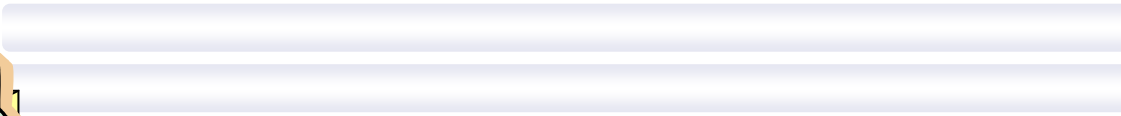
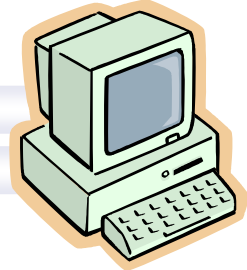
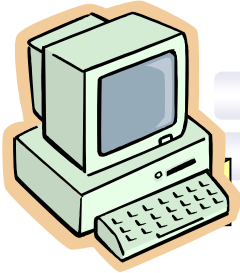


# *Agenda*

- Introduction
- Message Broker Constructs
- Product Architecture



# How Do we Connect Applications?



**Protocols**

Applications need to talk with each other over a communications protocol.  
*e.g. MQ, TCP/IP, HTTP, File system, FTP, SMTP etc.*

**Message Formats**

Applications need to exchange data, with specific formats  
*e.g. Binary (C/COBOL), XML, Industry (SWIFT, EDI, HL7), User-defined*

**Mediation Patterns**

Mediation patterns allow applications to interoperate. e.g. Route, Transform, Enrich, Filter, Monitor, Distribute,



# WebSphere Message Broker – Protocols and Applications

## IBM Protocols

**WebSphere MQ (+ PM4Data)**  
(Enterprise applications (+ managed file transfer))

**WebSphere MQ Everyplace**  
(Mobile device applications)

**WebSphere MQ Telemetry**  
(RFID, sensors & actuators)

**WebSphere MQ Real-time**  
(Very low latency over WANs, and the Internet)

**WebSphere MQ Multicast**  
(Reliable Multicast Messaging (RMM))  
(Very low latency for LANs)

## Industry and Vendor Protocols

**Any 3<sup>rd</sup>-party JMS**  
(TIBCO EMS, Sonic MQ, BEA JMS, webMethods, See Beyond, Vitria)

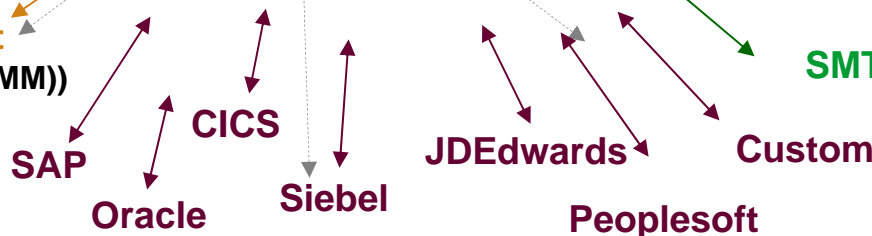
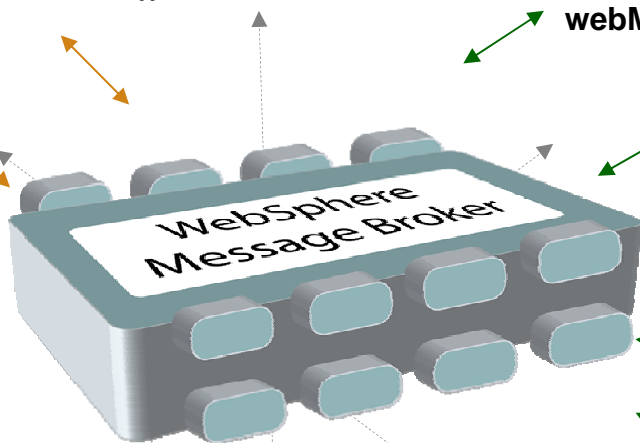
**TIBCO Rendezvous**  
(plug-in component)

**HTTP and HTTP(S)**

**FTP and File**

**TCP/IP Sockets**

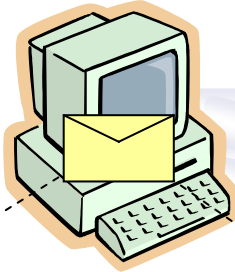
**SMTP**



## Enterprise Applications

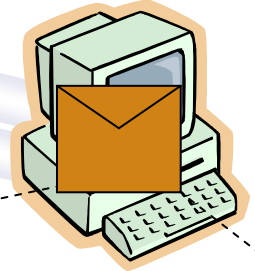
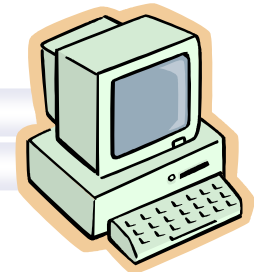


# WebSphere Message Broker Constructs - Mediation Patterns



Mr. Smith,  
Graphics Card, 32,  
100, 11/07/08

[Customer, Order, Quantity, Price, Date]



```
<order>
  <name>
    <first>John</first>
    <last>Smith</last>
  </name>
  <item>Graphics Card</item>
  <quantity>32</quantity>
  <price>200</price>
  <date>07/11/08</date>
</order>
```

[Customer, Order, Quantity, Price, Date]

## An Application Integration Scenario.

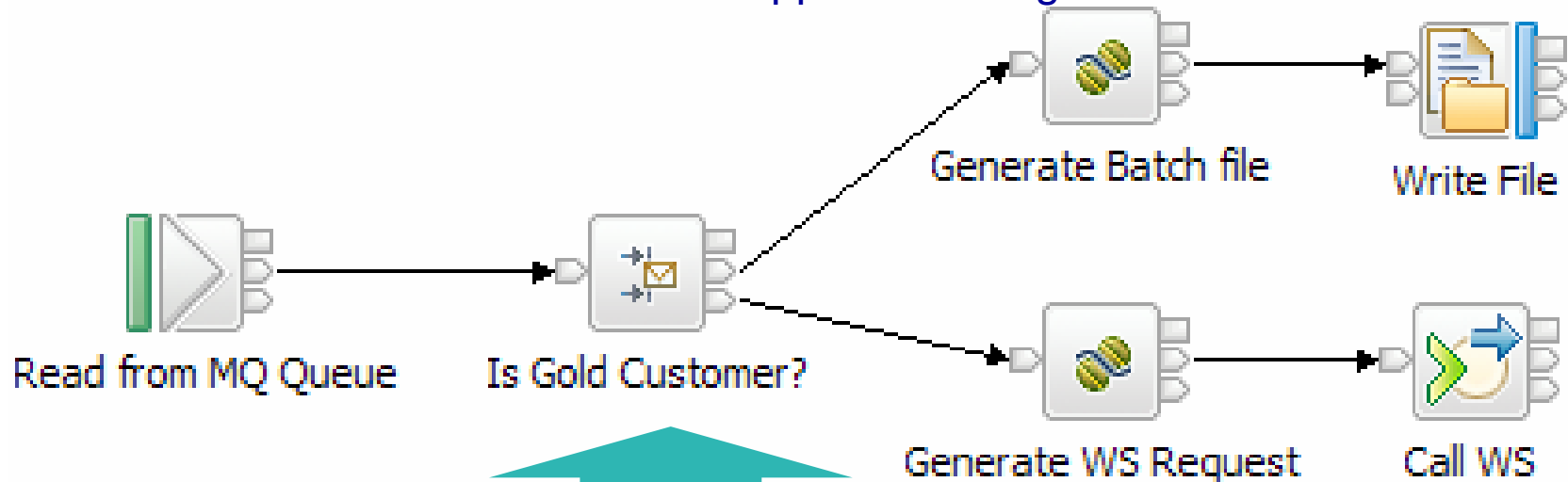
- Application A sends some data to application B with agreed format (UK currency)
- Application C is introduced. It needs the same data, but needs data in different format (US currency and XML)
- So, we now have an integration choice to make. Either application C must be enhanced to support the data format between A and B, or application A must be enhanced to support application C's data format.



# WebSphere Message Broker Constructs – Flows and Nodes

## Message Flows

Provides the processing sequence required to connect applications together



## Nodes

Performs a different (input, output or processing) action



# Message Flows Characteristics

- Message flows are transactional

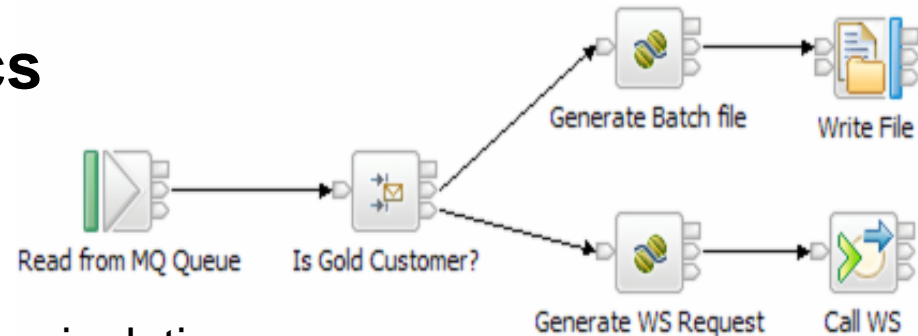
- Provides vital processing and data manipulation
- Completes all or none of its processing successfully.

- Message flows are multithreaded

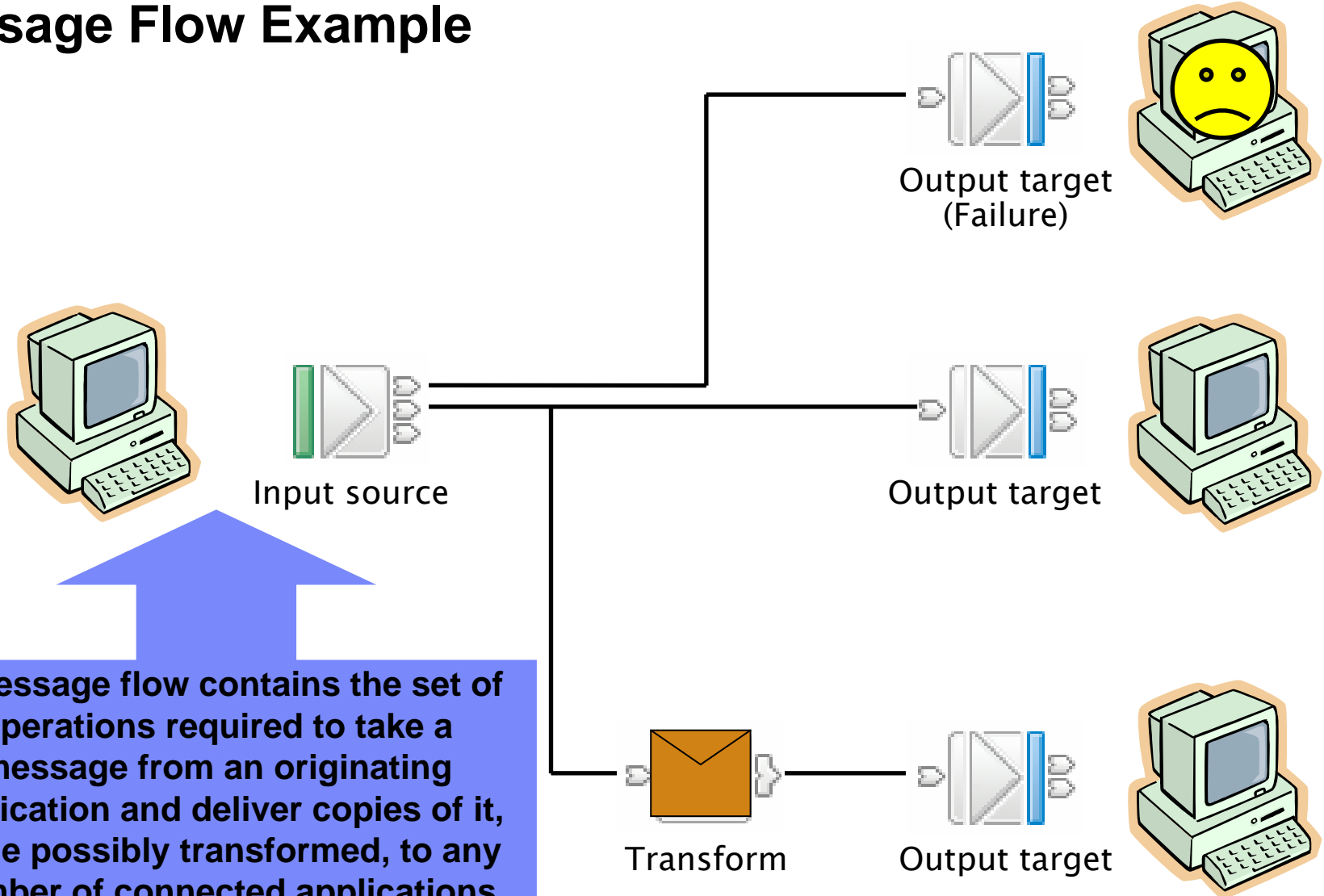
- Message passing through a series of nodes will execute on a single thread.
- Message flows can be defined with many additional threads assigned to them to increased message throughput.
- Peak workloads use additional threads, which are pooled during inactivity.

- Message flow nesting and chaining allow construction of enhanced capabilities.

- Sophisticated flows can be rapidly constructed by linking individual flows together as well as nesting flows within each other.



# Message Flow Example

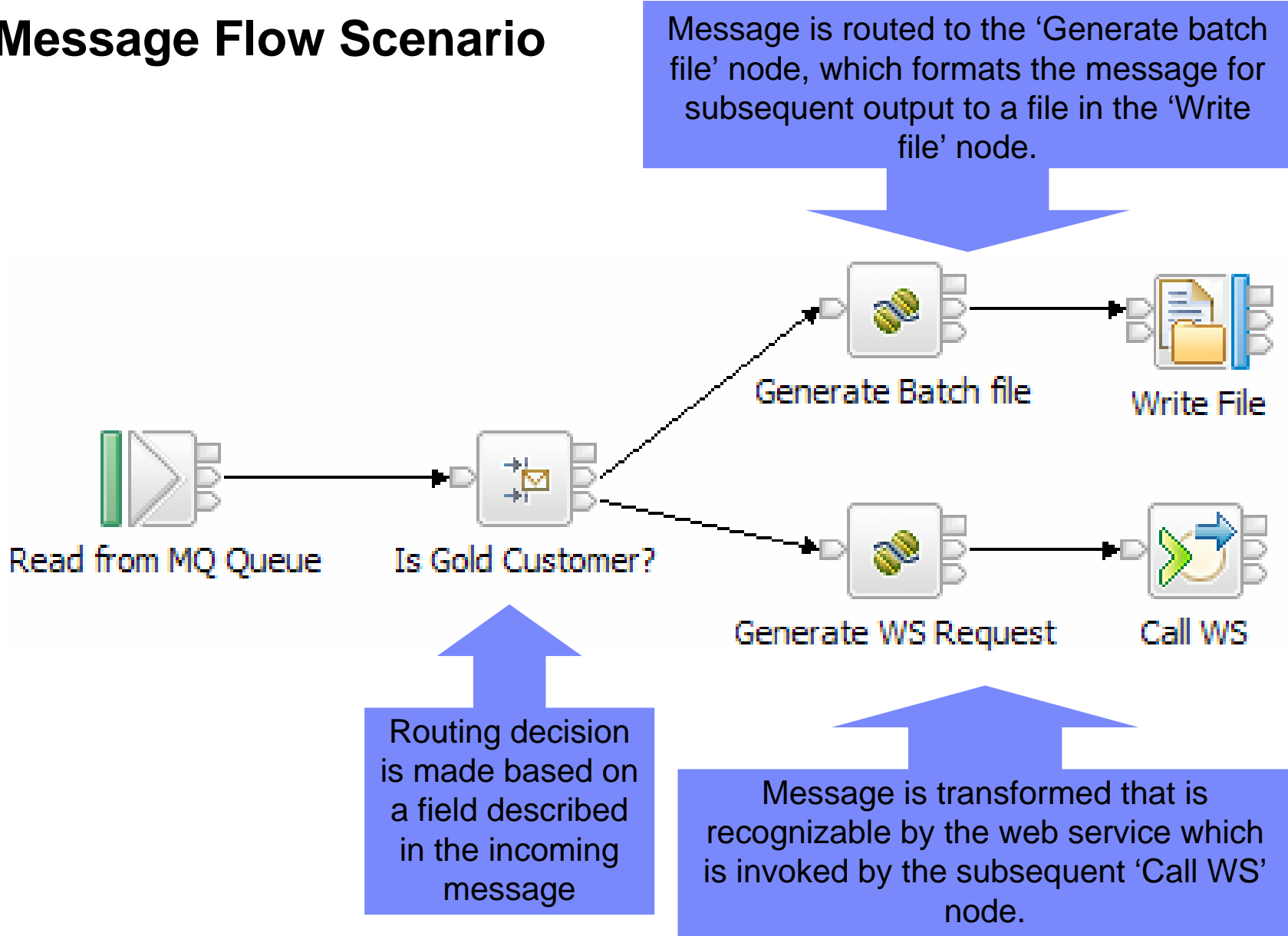


**A message flow contains the set of operations required to take a message from an originating application and deliver copies of it, some possibly transformed, to any number of connected applications for processing.**



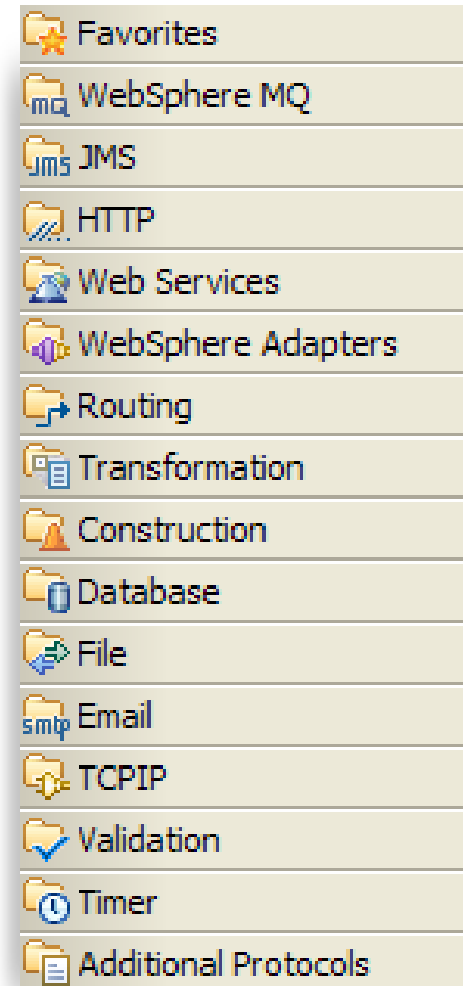


# Message Flow Scenario

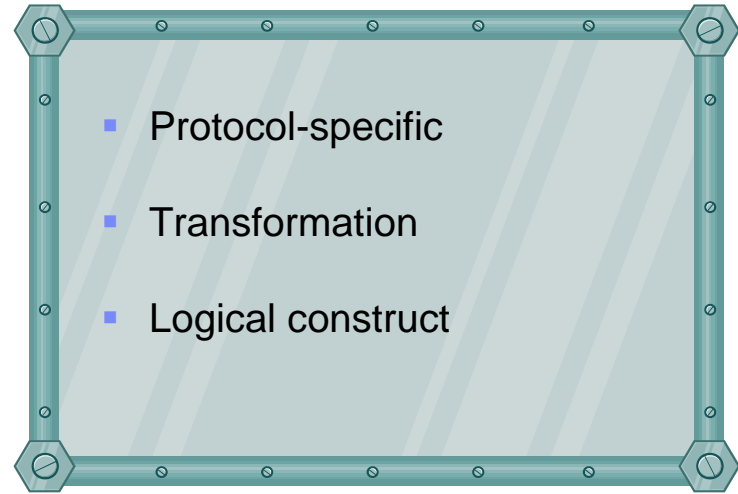
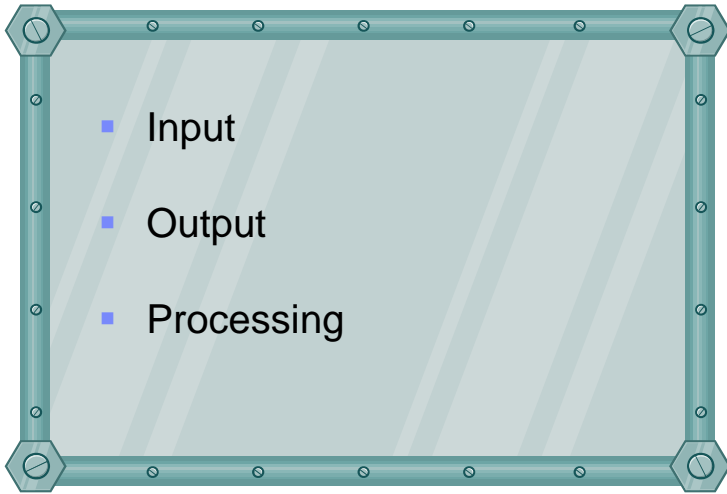


# Nodes

- The building blocks of message flows
- Each node type performs a different (input, output or processing) action
- Many different node types
  - Grouped into logical categories in the message flow editor



# Node Types



## Examples:



HTTP  
Input



JMS  
Output



Database  
Insert



MQ  
Get



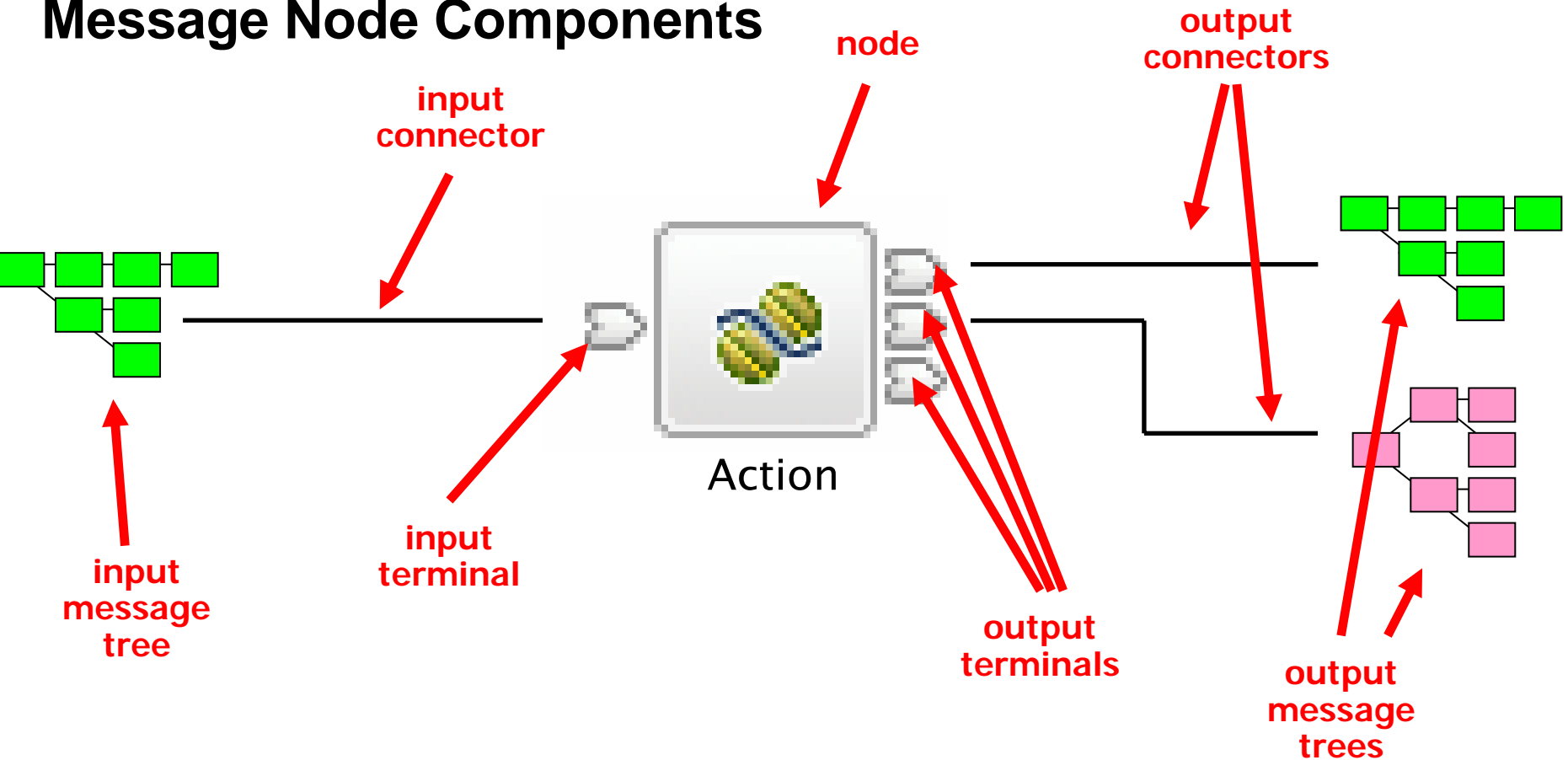
XML  
Transform



Try  
Catch



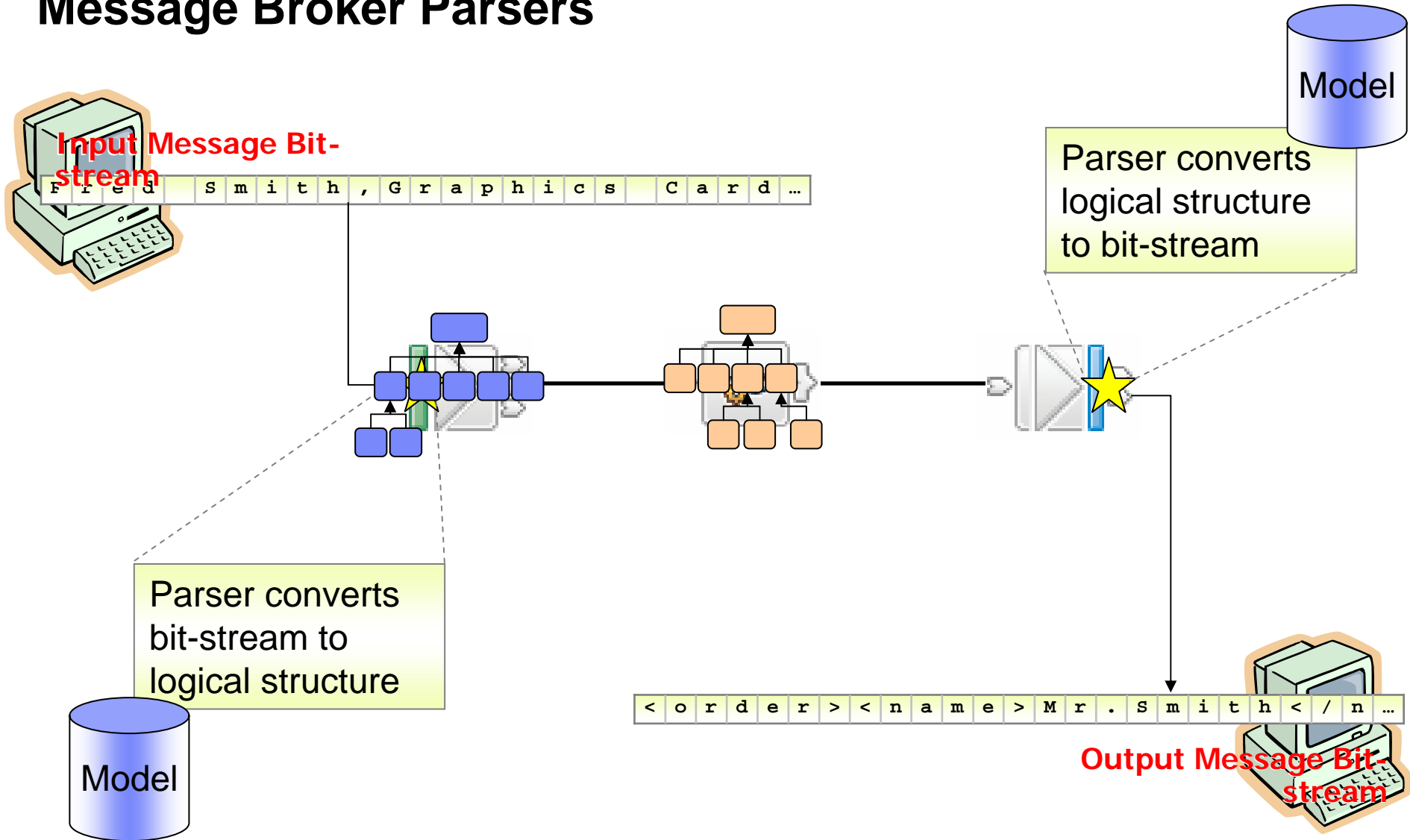
# Message Node Components



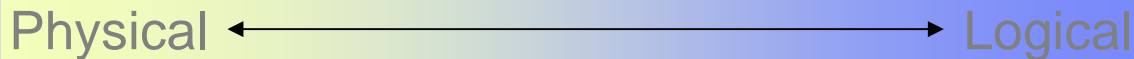
- Nodes represent functional routines encapsulating integration logic
- Terminals represent the various outcomes possible from node processing
- Connectors join the various nodes through their terminals



# Message Broker Parsers



# Message Modeling in Message Broker



**XML** →

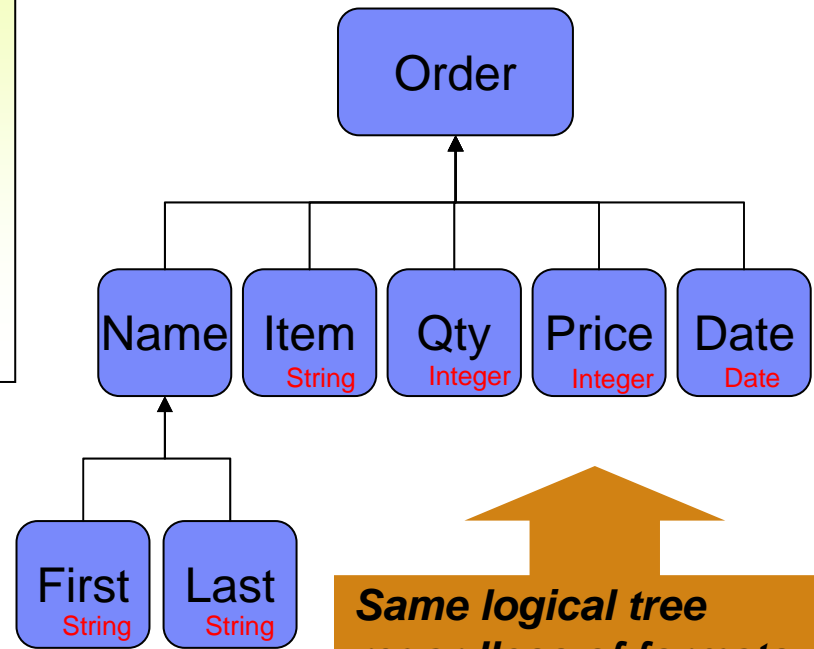
```
<order>
  <name>
    <first>John</first>
    <last>Smith</last>
  </name>
  <item>Graphics Card</item>
  <quantity>32</quantity>
  <price>200</price>
  <date>07/11/08</date>
</order>
```

**CSV** →

```
John,Smith,Graphics Card,
32,200,07/11/08
```

**Custom** →

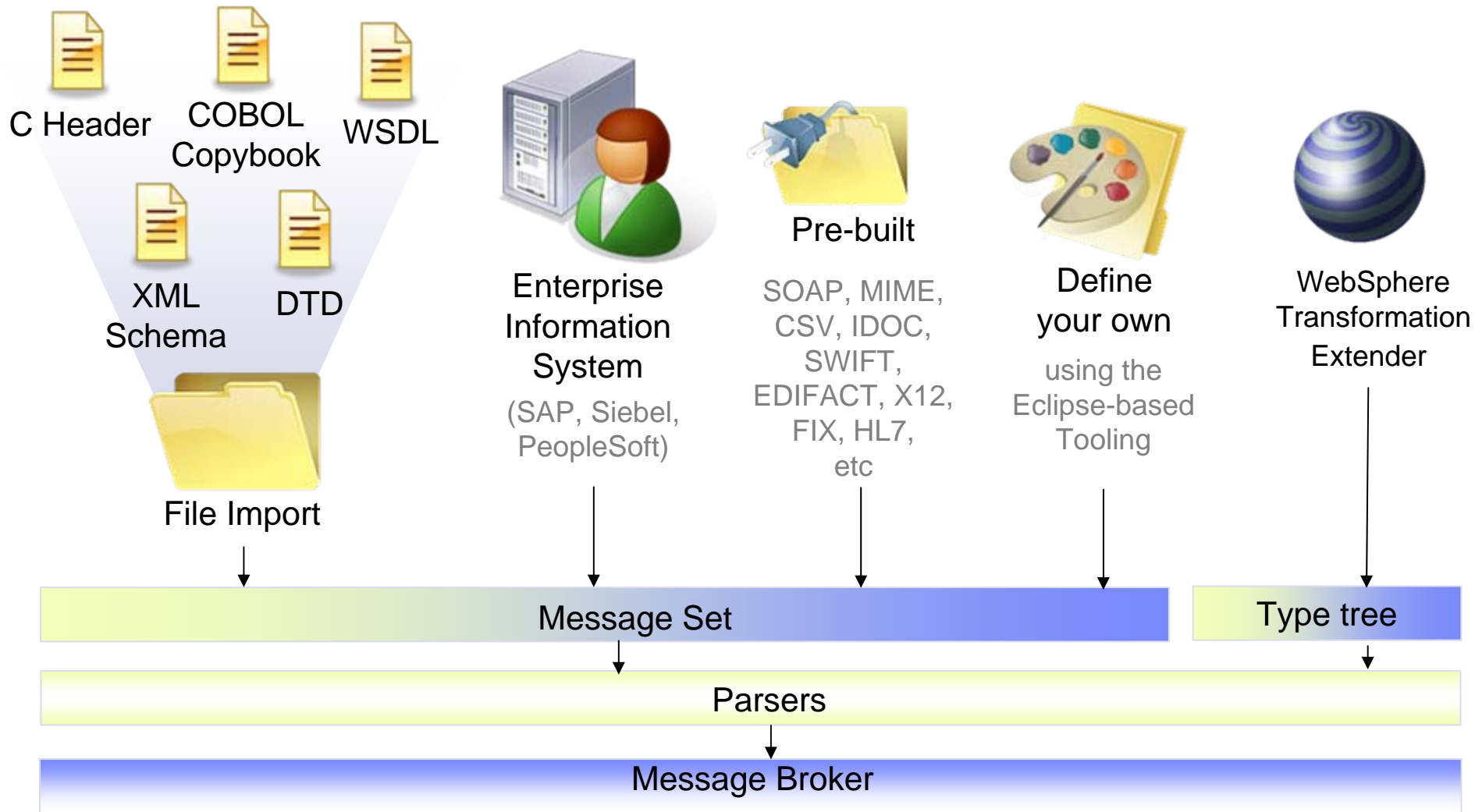
```
John Smith.....
Graphics Card.....
3220020071108.....
```



**Same logical tree regardless of formats making it easy to add new formats**

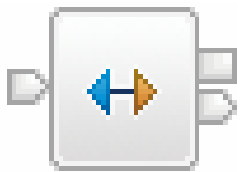
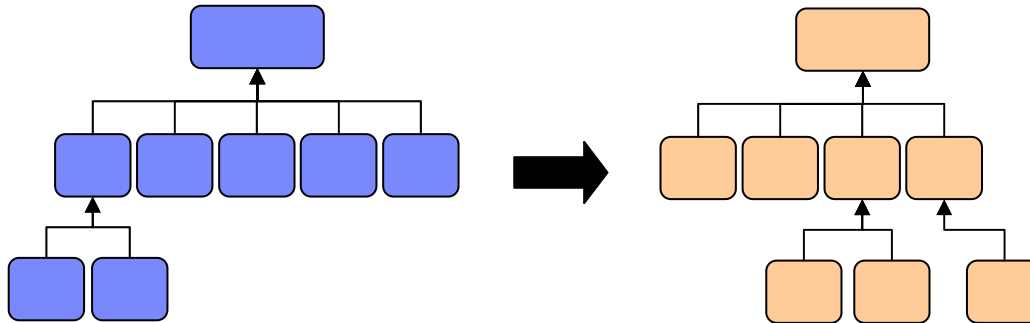


# Different options for creating Message Models



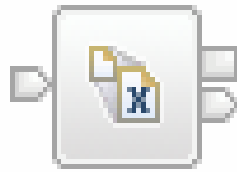
# Message Transformation

- The conversion of one message format into another



**Mapping**

- Graphical, easy to use
- Drag and Drop fields, apply functions



**XSL Transform**

- Convert XML to anything
- Uses standard XSL Style sheets



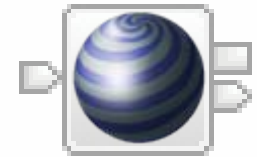
**Compute**

- Describe powerful transformations quickly
- Uses SQL-based language (ESQL)



**JavaCompute**

- Uses Java programming language
- Ability to use XPath



**WTX Map**

- Run a WebSphere Transformation Extender map



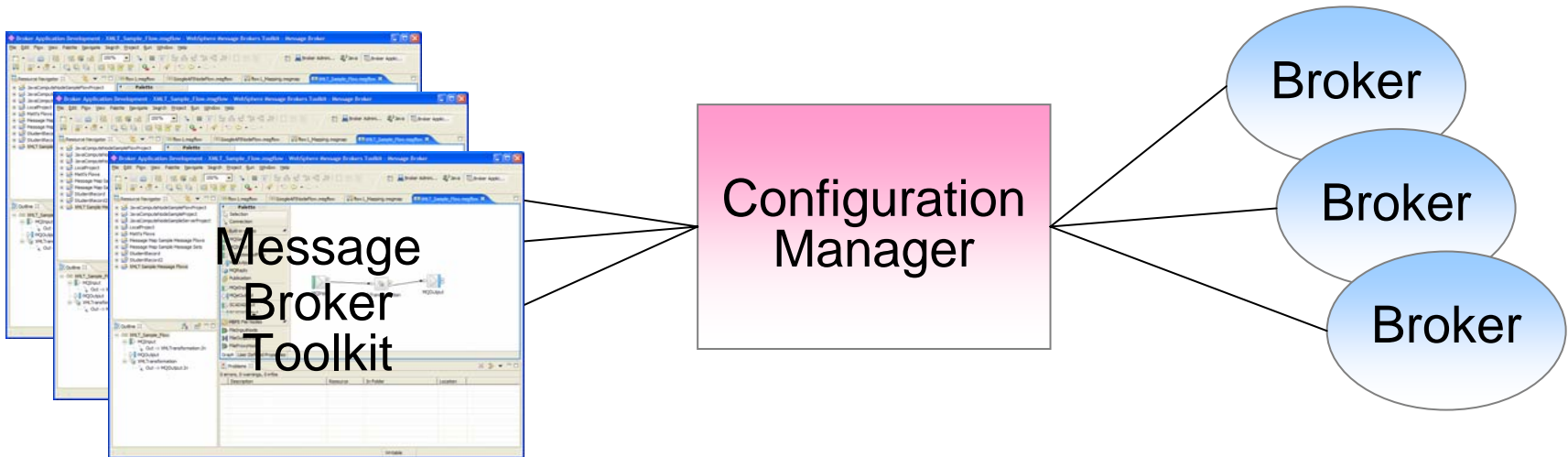


# *Agenda*

- Introduction
- Message Broker Constructs
- Product Architecture



# Product Architecture

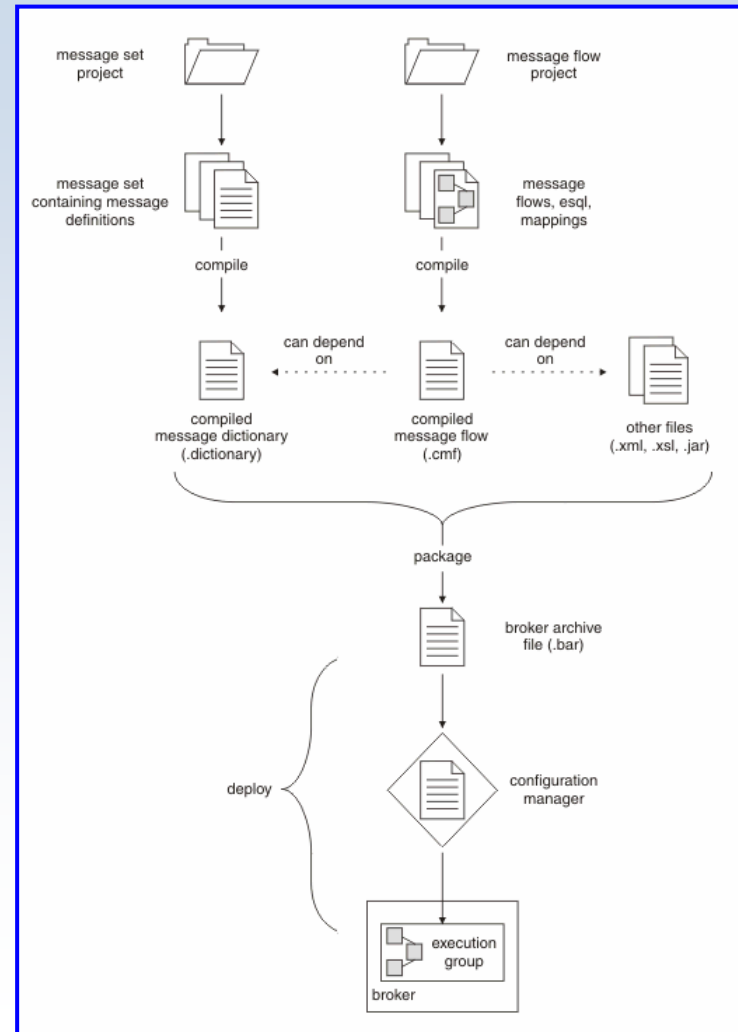


- Broker Development and Administration Environment
- Based on Rational Application Developer
- Windows and Linux
- Manages a domain of brokers
- Drives deployment
- Controls access to domain
- Standalone runtime environment
- Execution groups for isolation and scalability
- Many different platforms
- Also provides runtime security model and augmented pub/sub



# Message Flow Deployment

- Package message flows and relevant resources in broker archive
  - Automatically compile
- Broker Archive editor
  - Edit / refresh archive content
  - Change deployment settings
- Hot Deployment
  - **Drag & Drop deploy**
  - Incremental deployment



# Broker Archive Editor

- Easily Change Deployment settings
- Edit / refresh archive content
- Change deployment settings
  - ▶ MQ settings
  - ▶ Data source
  - ▶ Transaction
  - ▶ Number of instance
  - ▶ Validation

The screenshot displays the Broker Archive Editor interface. At the top, there are tabs for 'PurchaseOrderFlow.msgflow', 'PurchaseOrderFlow', and 'localhost\_NETCQMGR\_default.bar'. Below the tabs, the 'Content' section is visible, with the instruction: 'Add and remove deployable files from this archive. Deployable files are message flows, message sets, style sheets, XML and JAR files.' A toolbar contains icons for adding, deleting, and refreshing files. A table lists the following files:

Name	Type	Modified	Version	Comm...	Size
PurchaseOrderFlow.cmf	Compiled message flow	Oct 29, 2006 11:41:24 AM			443...
PurchaseOrderMessageSet.dictionary	Dictionary file	Oct 29, 2006 11:41:24 AM			23333
ProcessShipping.cmf	Compiled message flow	Oct 29, 2006 11:41:20 AM			4349

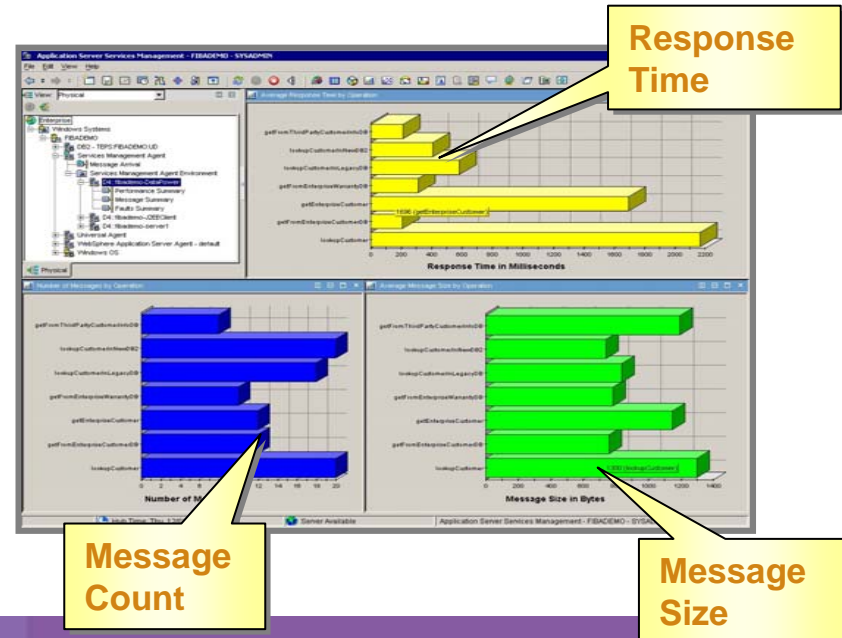
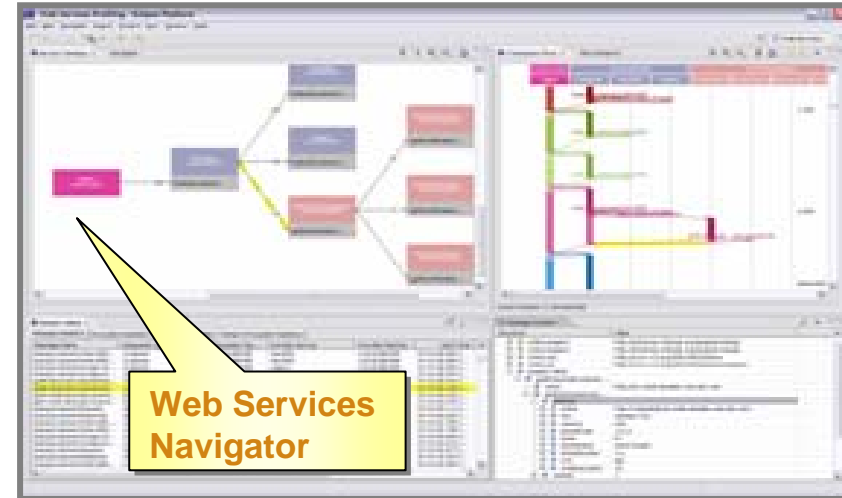
Below the table, there is a checkbox labeled 'Show source files' which is checked. At the bottom, the 'Alerts (2 items)' panel is open, showing the 'Properties' for 'PurchaseOrderFlow.cmf'. The 'Deployable' section shows the 'Workspace resource' as '/PurchaseOrder/PurchaseOrderFlow.msgflow' with a 'Change...' button. The 'Last compile status' section shows the following log entries:

```
Processing file PurchaseOrderFlow.msgflow
Successfully added file PurchaseOrderFlow.msgflow to archive file
```



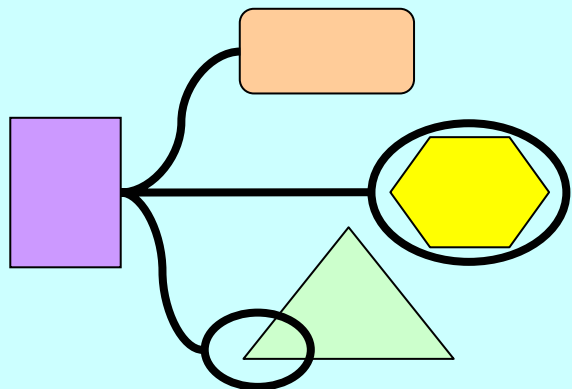
# Monitoring

- Broker provides extensive monitoring and tracking capability
  - Accounting and Statistics
  - Message Tracking Exits
  
- Many monitoring and message tracking tools available from IBM and Business Partners, for example
  - IS02 SupportPac
  - Omegamon XE
  - Q Nami!
  - ITCAM for SOA
  
- Broker event publishing
  - e.g. Ability to publish business events

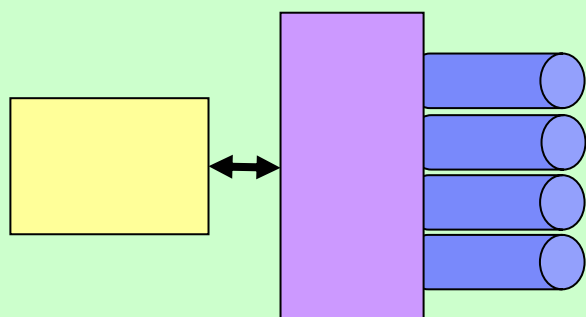


# Usage Patterns with Message Broker

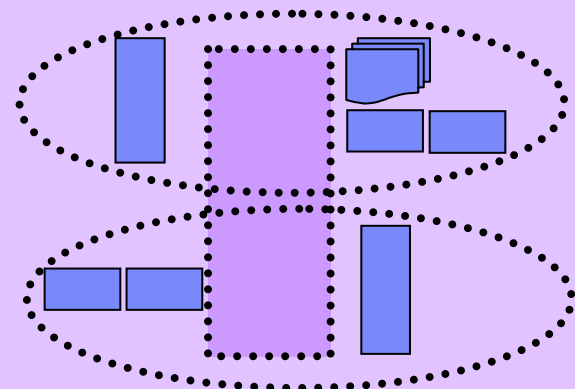
*Service Enablement*



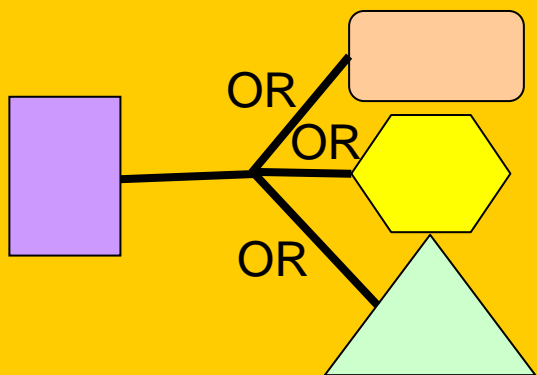
*Message Enablement*



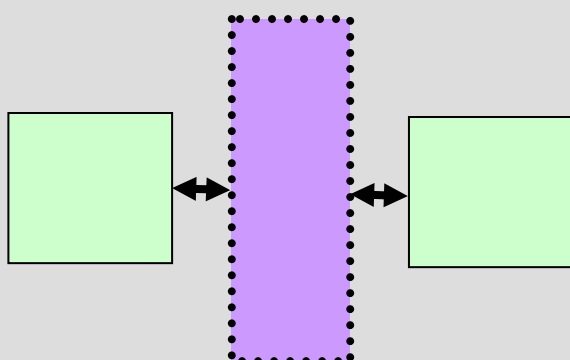
*File Processing*



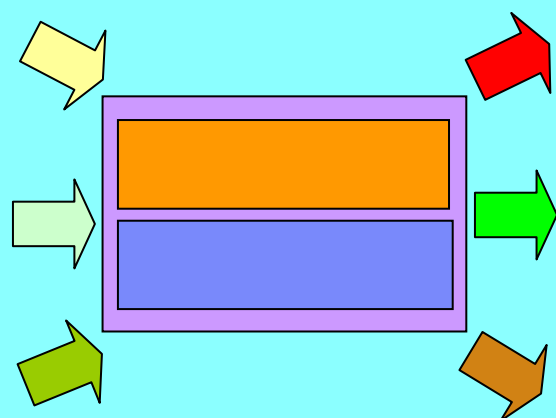
*Service Virtualization*



*Message Brokering*



*Event Processing*



# Questions



# Thank You







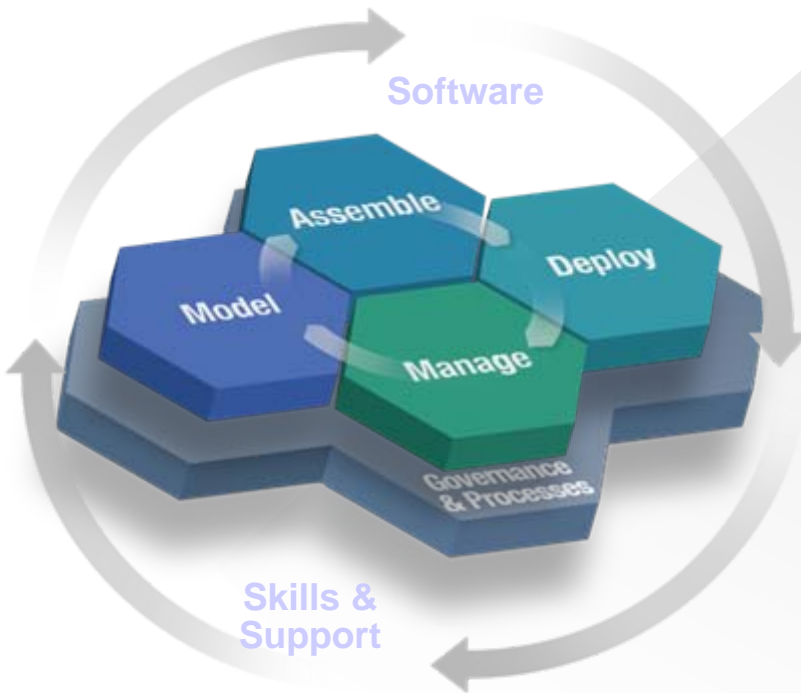
IBM Software Group

# WebSphere DataPower SOA Appliances

**WebSphere** software



# DataPower Helps Solve XML, Web Services Challenges



## An SOA Appliance...



**Creating customer value through extreme SOA performance and security**

- **Simplifies** SOA with specialized devices
- **Accelerates** SOA with faster XML throughput
- **Helps protect** SOA XML implementations

### **DataPower SOA專用設備**

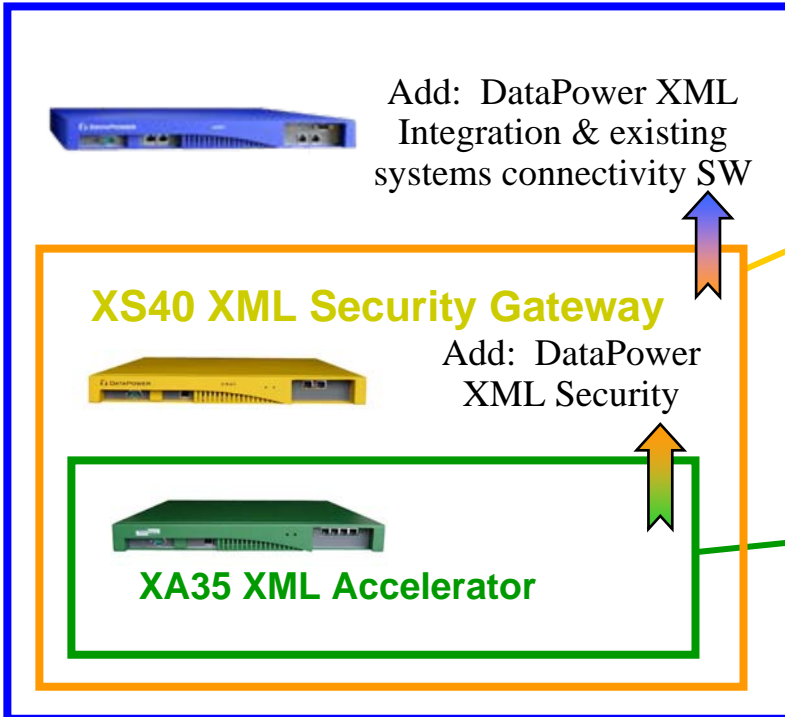
- ※針對這些挑戰而設計的硬體
- ※簡化、加速 XML 處理能力，提升安全機制
- ※整合其它應用程式

## Definition of “Appliances”

- **A purpose-build hardware product**
  - Customer buy box not a “CD”
- **Combination of HW SW Support**
- **High-value functionality**
  - Software capabilities
  - Higher customer value
- **“Drop-in” solution**
  - **Consumable**
  - **Simpler**
  - **More Secure**

# DataPower Product Packaging

*DataPower products offer customers significant performance, ease of use, and packaging advantages for managing rapidly growing XML-based data*



## ■ XI50 Integration Appliance

- Expands support to non-XML solutions
- Many-to-'Many' Conversion at Wirespeed
- Integrated message-level security



## ■ XS40 XML Security Gateway

- Security, agility and performance
- Device can off-load application security software
- Performs XML Web services security functions (parse, filter, validate schema, encrypt/decrypt, signatures, access control, and more)



## ■ XA35 XML Accelerator

- Offloads overtaxed servers by processing XML, XSD, XPath and XSLT at wire speed
- No more hand-optimizing XML
- HW + SW provides enterprise-class performance



# XA35 XML Accelerator

## Architecture – Proxy Mode

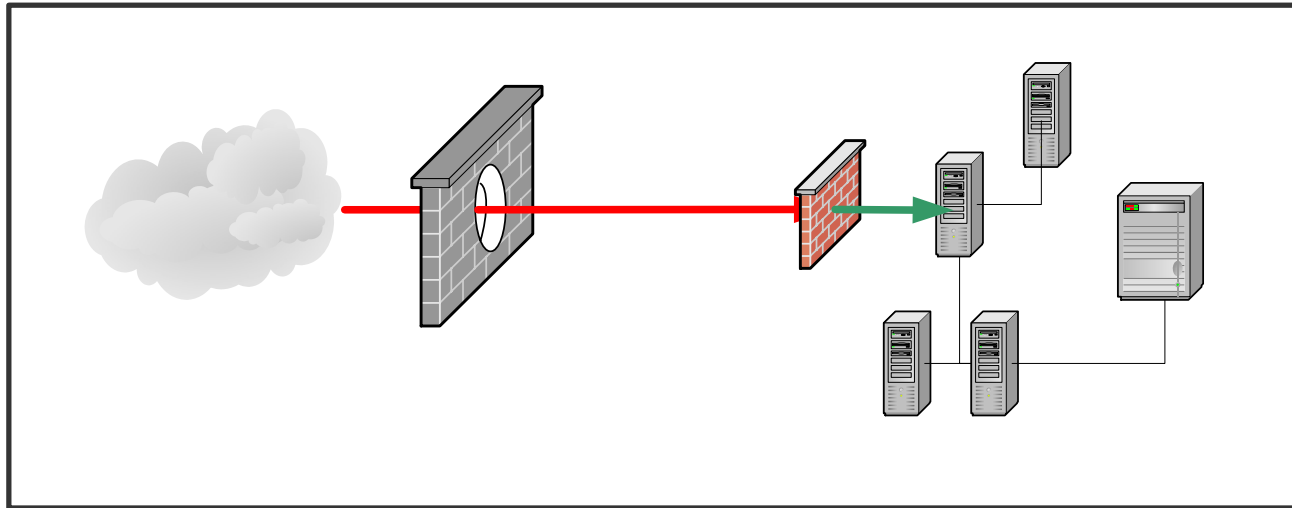


- Acts as Proxy
  - **Fields all requests but only processes XML requests**
- Fast & Easy Installation
  - **No code changes, APIs or extra complexity**
- Seamless Operation
  - **No changes to network infrastructure**
- Wirespeed Transformation
  - **Supports multiple applications concurrently**

## Security: Top Concern for SOA

Easy to Use Appliance Purpose-Built  
for SOA Security

- XML Web services easily expose backend systems to customers, partners
- Traditional security devices do not secure XML/SOAP



Solution: Multiple level of defense

- **First Level:** XML Security Gateway for enhanced security, scalability, and simplicity
- **Second level:** Application server for additional processing

# DataPower XS40 Security functions



Easy to Use Appliance Purpose-Built  
for SOA Security

- **XML Message Security**
  - Data Confidentiality –Encryption/Decryption
  - Data Integrity –Digital Signature
  
- **XML Firewall**
  - *Threat Protection*
    - XPath injection, SQL injection,
    - XML XPath filtering
    - XML well-formedness validation
    - XML schema validation
  - *XML Denial of Service (XDoS)*
    - Single-message XDoS-Jumbo Payload, Recursive Element.
    - Multi-message XDoS -XML Flood and Resource Hijacking
  
- **XML Web Services Access Control**
  - AAA Framework
  - XS40's Authentication, Authorization, Audit (AAA) Framework
  
- **Wirespeed Security Device**

## XI50-Legacy Integration



- Acts as proxy
  - Fields all requests but acts only on those that require action
  - Performs message transformation, routing, security
- Seamless operation
  - No changes to network infrastructure





# DataPower appliance Use Scenarios

## 1. Portal Acceleration

- Speed up XML to HTML rendering for dynamic content generation

## 2. WebService Security

- XML Denial of Service Attack
- Web Services digital signature verification

## 3. Web Services Management

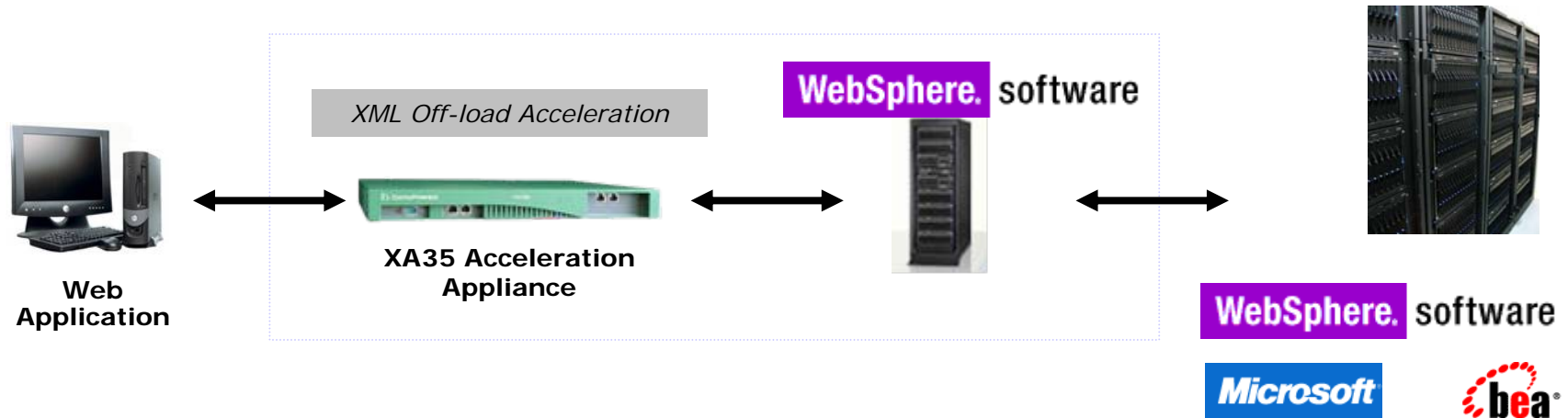
- Securing External Web Services
- Manage Web services easily through service level management, security management, enterprise management console

## 4. Legacy backend accessed WebService through MQ

# 1 Web 交互應用, 動態門戶訊息查詢效率問題

應用場景:

企業入口網站-Portal查詢



Solution:

高性能、XML 處理解決方案

無需更改應用架構及編碼，透過簡單配置實現加速功能倍數以上效率的提升

# DataPower appliance Use Scenarios

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## 4. Legacy backend accessed WebService through MQ

## WebService Security

### 應用範例:

簡單與外部用戶的資訊整合，以Web Service的形式對外提供服務。

傳統防火牆對XML的惡意攻擊無能為力

- XML/SOAP Validation
- XML Document Size Attacks



### Solution:

- 1-提供解決XML 安全性問題並能保護後端系統正常運行
- 2-能與Tivoli安全解決方案整合，實現集中式的安全管控

# DataPower appliance Use Scenarios

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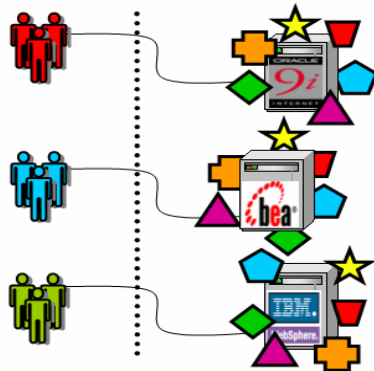
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## 4. Legacy backend accessed Webservice through MQ

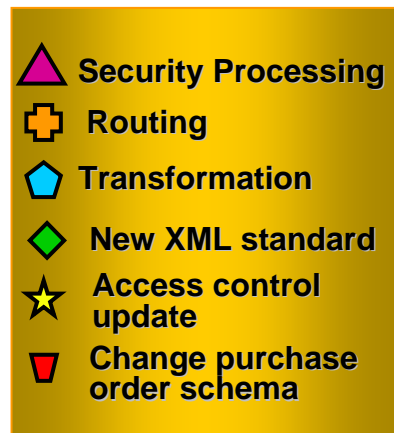
# SOA Appliances Centralize Web Services Functions

- DataPower Web Services Proxy can provide AAA features.
- With the help of DataPower, you can use XML and Web Services technologies in a secure, efficient
- DataPower make management easy way.

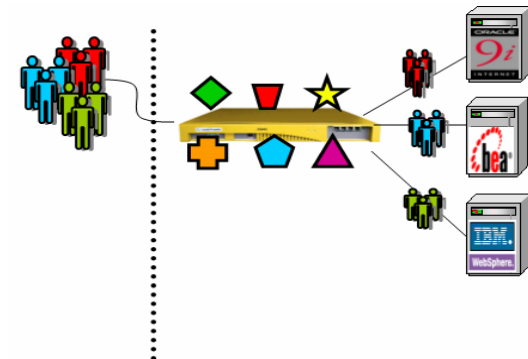
## Before SOA Appliance



Update application servers individually



## After SOA Appliances



Secure, route, transform all applications instantly  
No changes to applications

# DataPower appliance Use Scenarios

## 1. Portal Acceleration

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## 3. Web Services Management

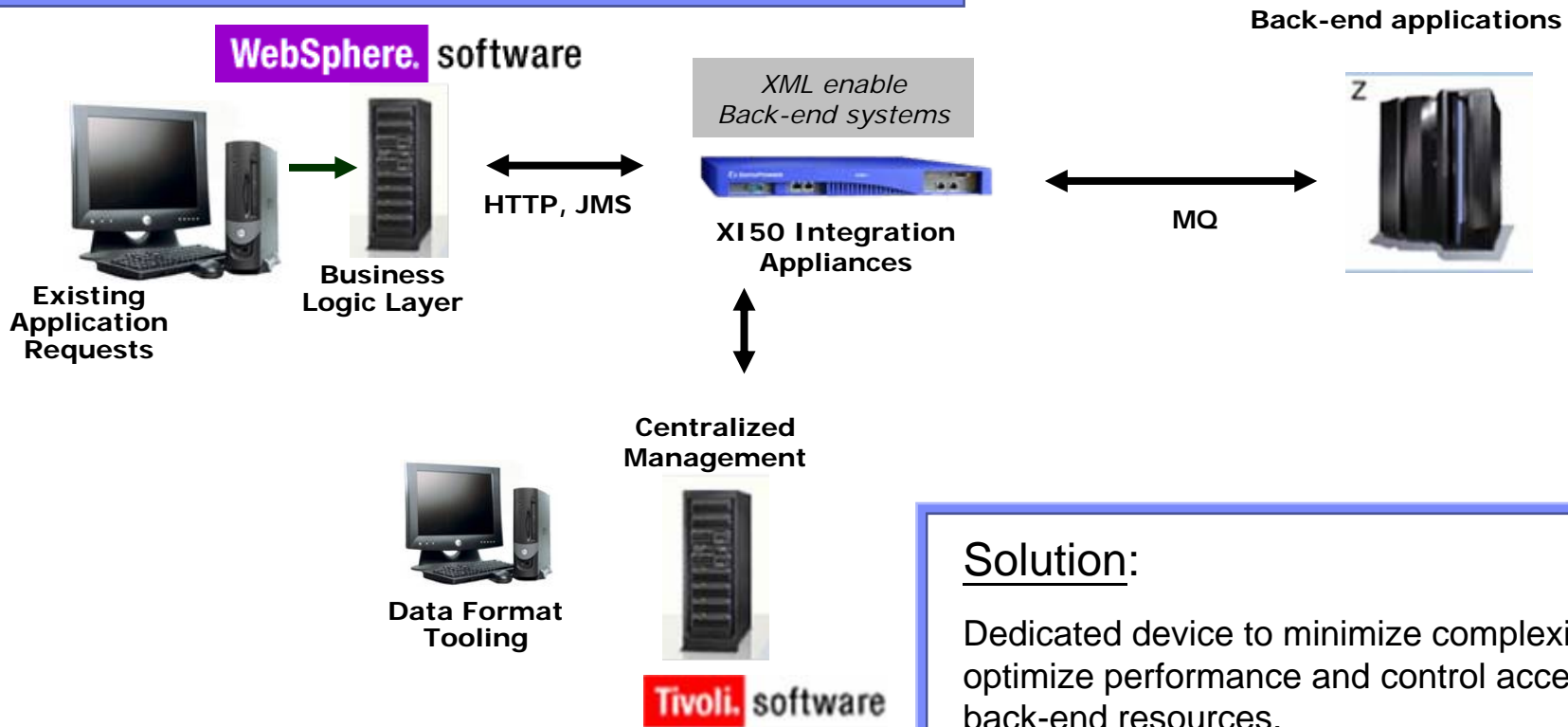
- Securing External Web Services
- Manage Web services easily through service level management, security management, enterprise management console

## 4. Legacy backend accessed WebService through MQ

**4** IBM Customers looking to *Simplify* Access to Back-end Systems via SOA

Case in point:

SOA enable back-end systems without deep Web Services technical skills.



Solution:

Dedicated device to minimize complexity and optimize performance and control access to back-end resources.