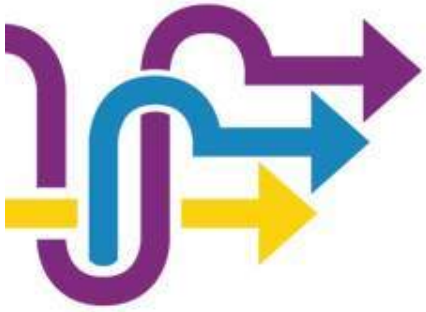

# Smart Connectivity:
## *SOA Enrichment with the Enterprise Service Bus*

Jack Carnes

Executive IT Specialist

WW Connectivity Technical Sales Support

Business Agility

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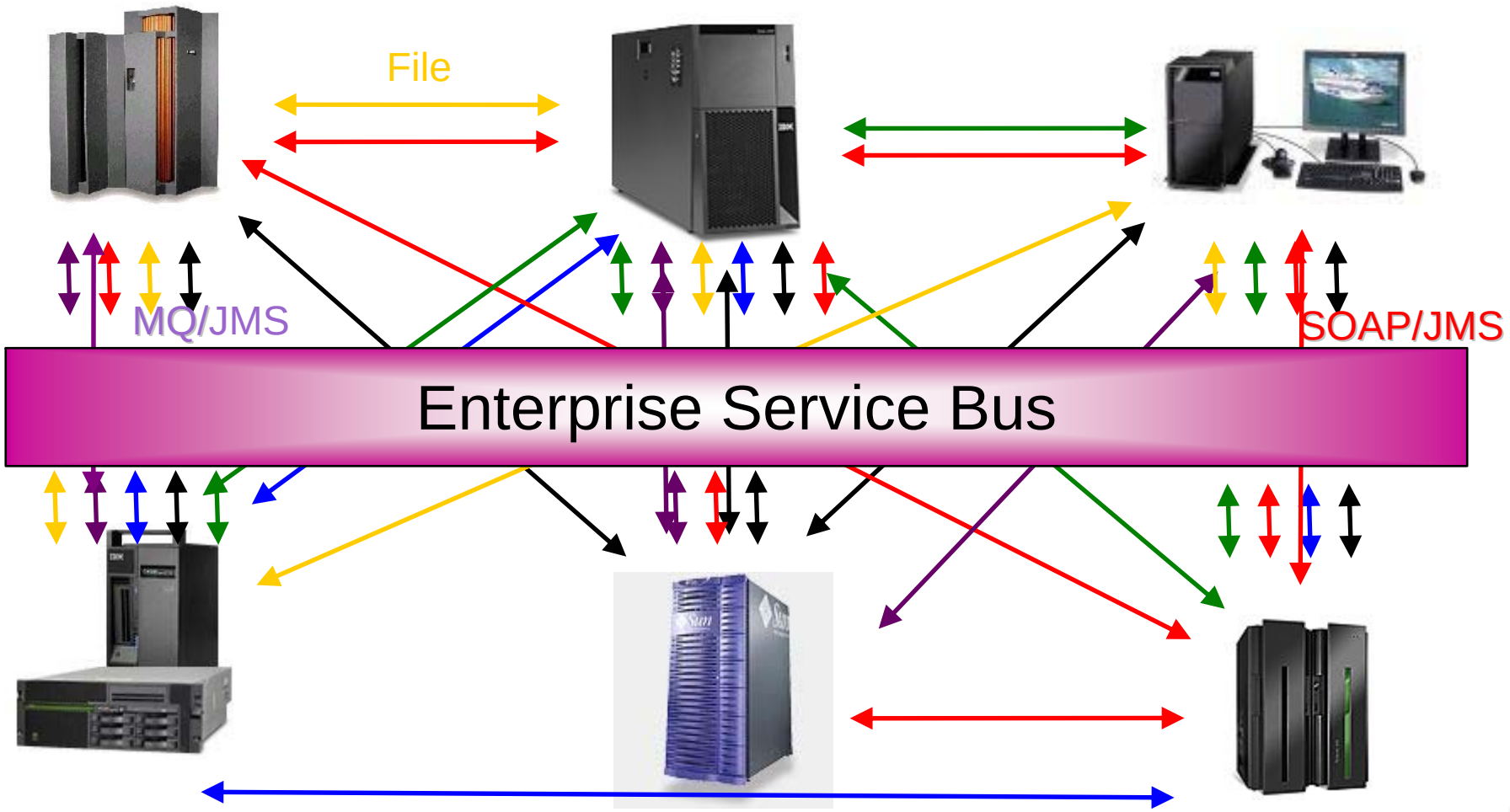
# Agenda

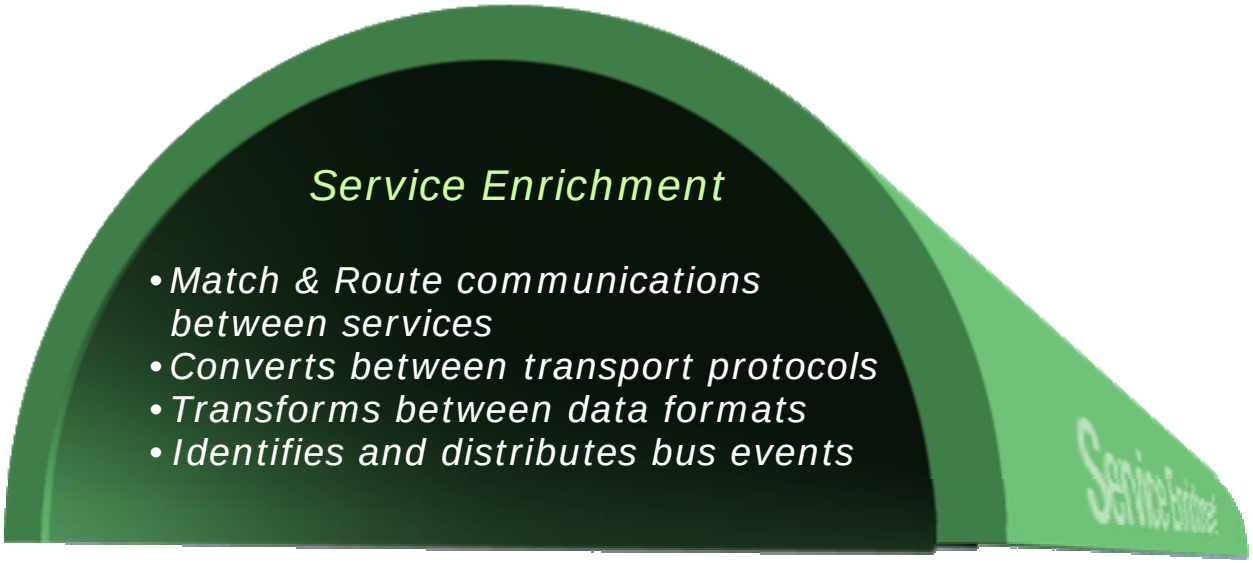
- ESB and Connectivity Overview
- Processing Scenarios & Usage Patterns
- Pattern Technology
- Product Overview and Roadmap

# ESB and Connectivity Overview

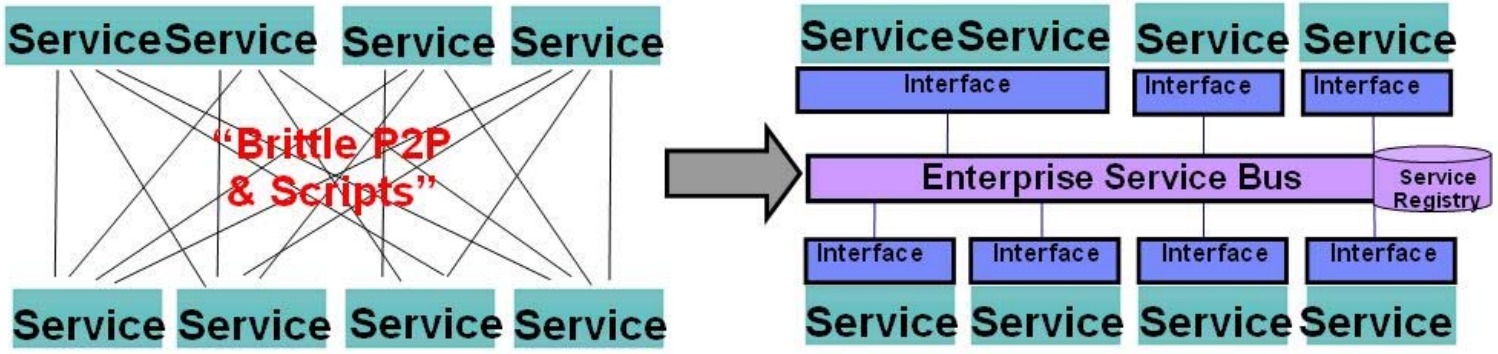
# ESBs Simplify Connectivity



# Enrich your SOA connectivity …



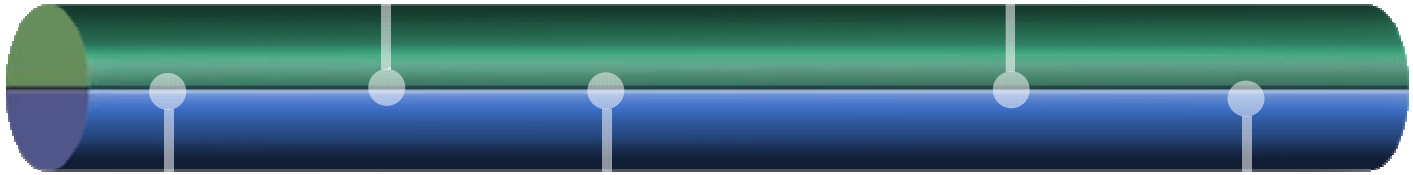

**… simplifying the overall architecture and reducing IT cost**



# Agile Connectivity:
## *The Enterprise Service Bus (ESB)*


Connects everything to everything

Matches & routes communications between services



Transforms between different data formats

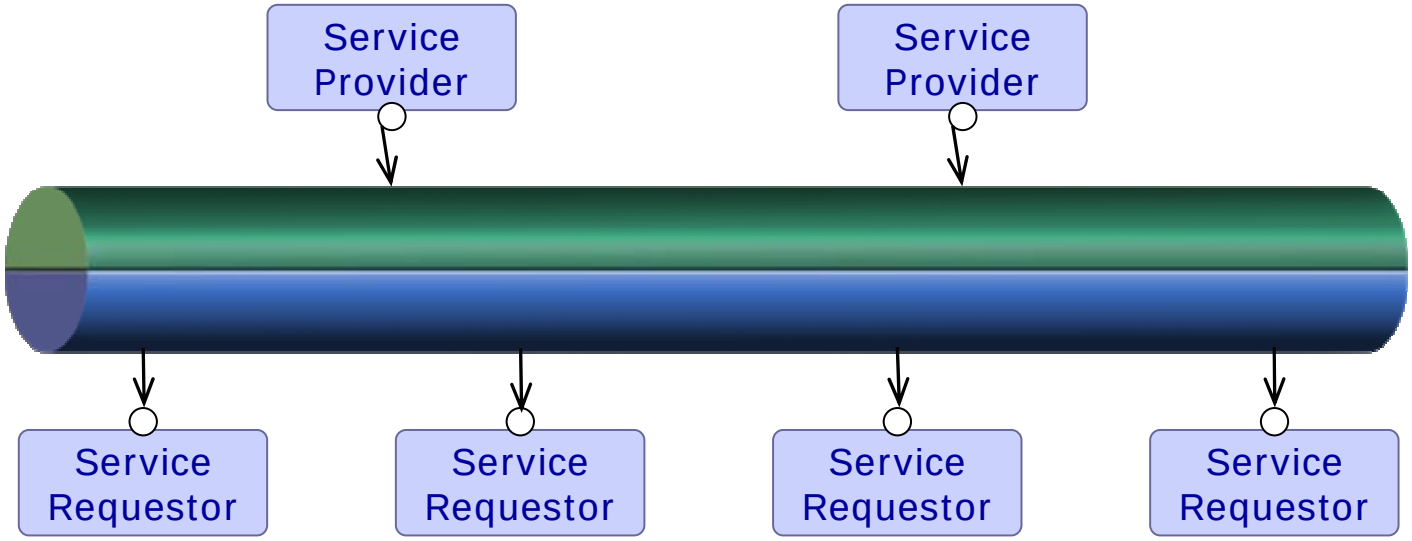
Converts between different transport protocols

Distributes Business events

*An ESB enables flexible SOA connectivity for integrating business applications, services and processes*

# Two core principles enable flexibility

The ESB faciltates the *decoupling of interactions* between requestor(s) and provider(s)




The ESB fulfils *two core principles* in support of *separation of concerns*:

**Service Virtualization**

- ★*Routing*
- ★*Protocol and transports*
- ★*Transformation of interfaces*

**Aspect Oriented Connectivity**

- ★*Security*
- ★*Management*
- ★*Log and Audit*
- ★*Event tracking*

*etc ...*

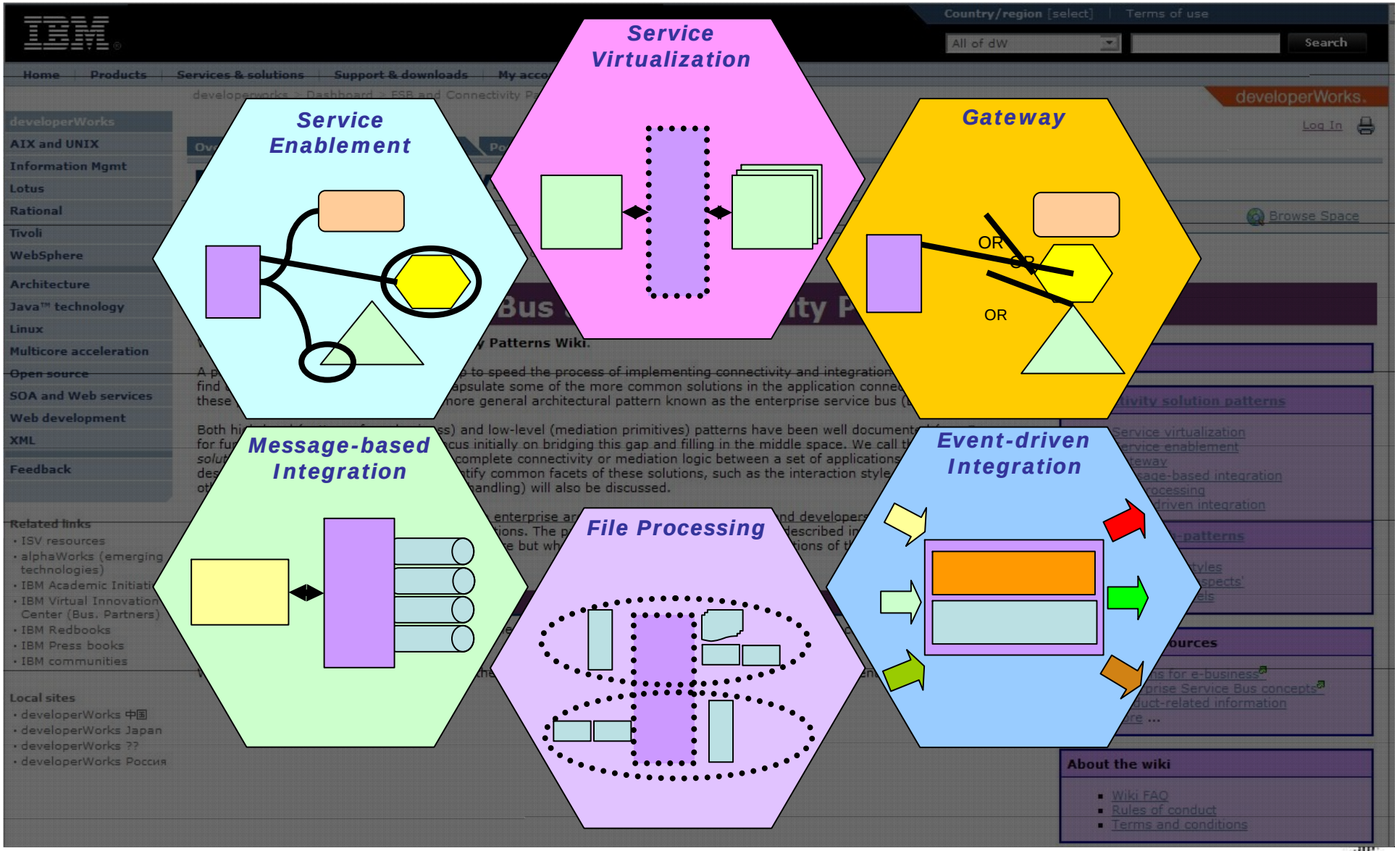
# Processing Scenarios

# & Usage Patterns





# Many Defined Patterns for ESB-based Solutions




**www.ibm.com/developerworks/wikis/display/esbpatterns**

# Key Scenarios Deliver Significant Business Value

- Extend the Reach of Existing Applications: Multi-channel Processing
- Easily transform batch-oriented file work into online requests
- Get the Most from Packaged Applications
- Connect Devices to the Enterprise
- Provide a Policy Enforcement Point for secure application connectivity
- Make an Application Inventory and Govern Processing with a Registry
- Apply Business Rules to achieve Smart Connectivity
- Monitor your Business Activity and Act Intelligently
- Initiate and Support Business Processes
- A Flexible Infrastructure to Support Change

# Extend the Reach of Existing Applications (1/2)

***Provide and Consume Web Services***

- **Web services are now established as an interoperability standard**

– Vitally important from a business to business connectivity perspective

– Businesses to consume each others' services using these well defined standards

–Internal standardization between parts of the same organization via Web Services

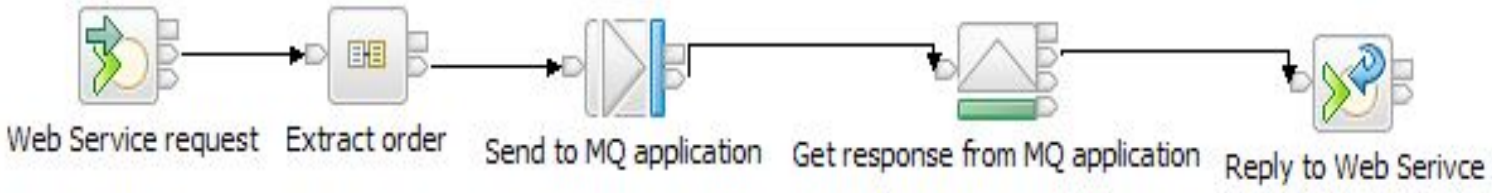
- **Adoption of Web Services by many subsystems is not universal**

– ESB allows your existing applications to be exposed as web services

– ESB 'universal translator' converts web service to existing formats and protocols

– Existing applications can consume web services without change

– Exploit web services with limited new development skills and platforms



# Extend the Reach of Existing Applications (2/2)

***MQ enable all your applications***

- **ESBs allows you to use MQ technology to the fullest extent**

– Robust, transactional, reliable, high-performance messaging

– ESB provides an incredibly broad range of connectivity mechanisms available to MQ

– Any application can easily connect to the MQ infrastructure inbound or outbound

- **Examples**

– Transform a TCP/IP based application by allowing it to consume regular MQ messages

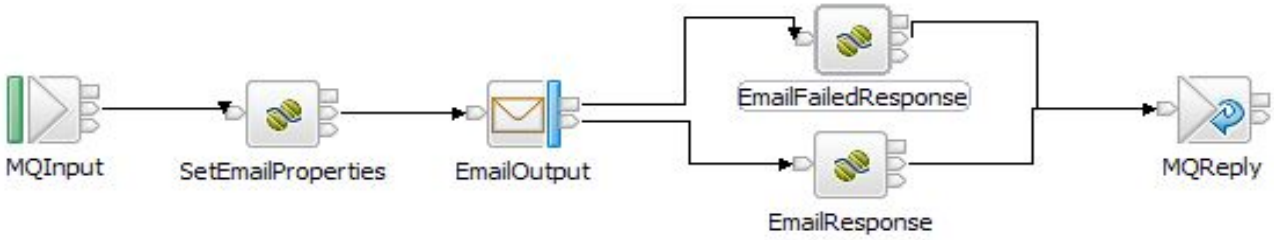
– MQ applications access an external Web Services provided by a Business partner

– MQ applications access ERP systems such as SAP, SEBL, PeopleSoft...

- **The Goal: Multi-Channel Connectivity**

– Consuming Services and Applications independent of client implementation

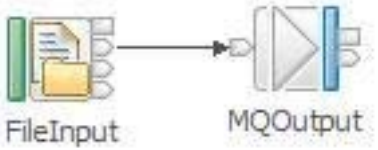
– Increasingly relevant in world of device proliferation

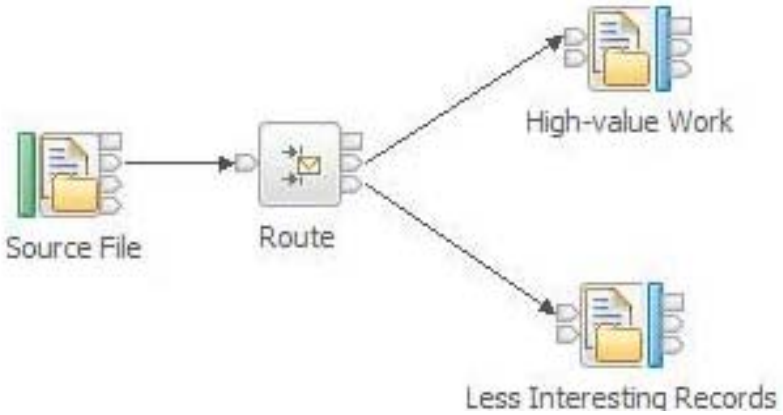


# Combine File-based and On-line Processing

***Unlock the valuable business data in your files***

- **Files exchange between applications still popular and effective**
  - Flexible method of exchange: Neither enterprise has to mandate technology
- **There are legitimate reasons for using files to exchange information**
  - Usually relate to the way businesses run or physical processes occur
- **Examples**
  - A cargo ship has thousands of containers each with hundreds of palettes
  - Reduce unit transaction costs by aggregating numerous clients requests
- **End to End File Movement and File Processing**
  - Reliable and secure delivery File Transfer with MQ FTE
  - File processing allows clients to get file/batch work



# Get the Most From Packaged Applications

***Move information to and from packaged applications***

- **Packaged applications play a vital role**
  - SAP for purchasing, sales, inventory…
  - SEBL for Sales, PeopleSoft for HR
  - Oracle, JDEdwards…


- **Interfaces are often non standard: e.g. SAP BAPIs, IDOCs**
  - Processing and data are isolated from other applications
  - Result: packaged apps have difficultly using/generating information for other apps
  - Inhibits adoption of a best of breed philosophy
- **Support for SAP, SEBL, PeopleSoft, inbound and outbound**
  - Adapter components built-in to ESB
  - Drive new work into its packaged application from any other supported source
  - Can send information from packaged application to any other supported target
  - Packaged applications can focus on what they do best **and** be integrated

# Connect Devices to the Enterprise

***To and from a broad range of devices***

- **Industry Observation**
  - "How to I get information from everywhere, understand it, and act?"
  - Medical, Energy and Utilities, Distribution, Transport, Gaming…
  - Issues based e.g. traffic congestion, efficient energy, timely supply…
- **A Smarter Planet is full of devices**
  - Data is generated *outside* the enterprise
  - Typically very large numbers of devices
  - Often concentrator technology; differentiate, integrate & forward
  - MQTT for standards based device integration
  - Small footprint client, embeddable
  - Lightweight protocol for bandwidth cost (by-the-byte)
  - Fragile network support for hostile environments
- **Connect Devices, Apply Intelligence**
  - ESB connects devices to enterprise systems
  - Apply intelligence in near real-time
  - Passive and active systems

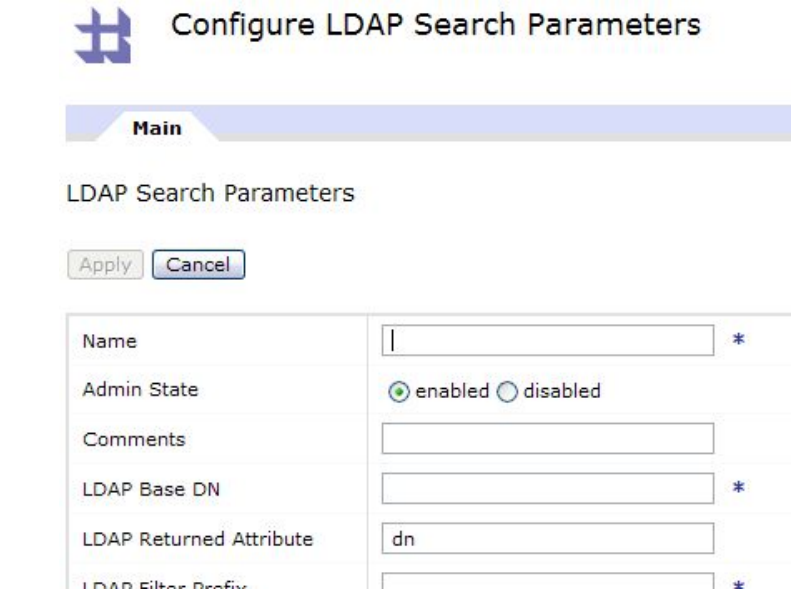
IBM is working with Brisbane, London, Singapore and Stockholm to deploy smarter traffic systems. Stockholm has seen approximately 20 percent less traffic, a 12 percent drop in emissions and a reported 40,000 additional daily users of public transportation.

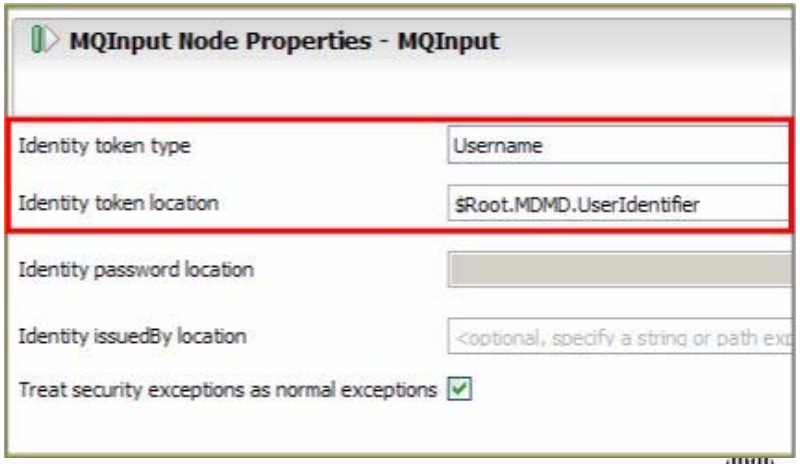
# Provide a PEP for Secure Application Connectivity

***Secure application identity, authentication and authorization***

- **Application connectivity => security domain changes**
  - Identity management, access control, authorization, and authentication mechanisms (AAA) are essential
  - ESB support many protocols and transports
  - Web Services, MQ, JMS, HTTP and HTTPS
  - ESB supports a broad variety of security tokens
  - Userid/pw, X509, SAML, Kerberos, LTPA…

- **ESB performs role of Policy Enforcement Point (PEP)**
  - PDP combination provides a secure infrastructure
  - Ensures conformance to centralized security policy
  - Many different PDP technologies supported
  - Lightweight Directory Access Protocol (LDAP)
  - Microsoft Active Directory, Open LDAP…
  - Tivoli Federated Identity Manager (TFIM)
  - zOS SAF including RACF
  - Security hardened DMZ device strengths

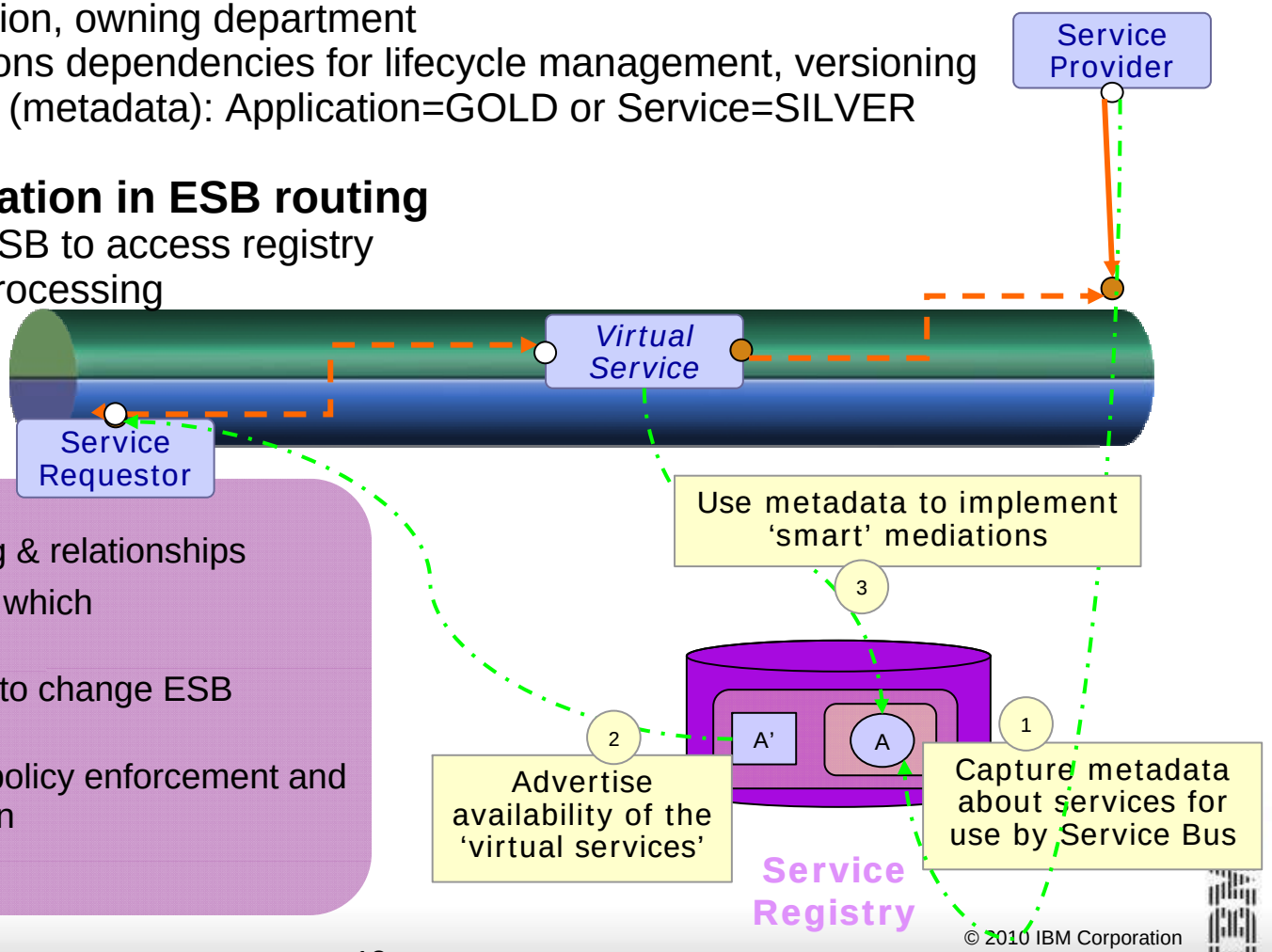


# Derive Value from an Application Inventory

***Understand your application assets and control their access dynamically***

- **Catalog application and service assets using a registry, e.g. WSRR**
  - Web Service and MQ Service definitions
  - Classifications: by function, owning department
  - Relationships: applications dependencies for lifecycle management, versioning
  - User defined properties (metadata): Application=GOLD or Service=SILVER
- **Use registry information in ESB routing**
  - Built-in facilities allow ESB to access registry
  - Enables policy based processing




Primary use cases:

- **Visibility:** application catalog & relationships
- **Governance**: who accesses which applications/services
- **Dynamicity**: update registry to change ESB behaviour without redeploy
- **Policy based Processing:** policy enforcement and policy based service selection

# Business Rules for Smart Connectivity

***Apply rules to ESB data in-flight***


Rule-based Decision Services render decisions on input data
Most often this data comes from a variety of data sources
i.e. aggregation, transformation is needed

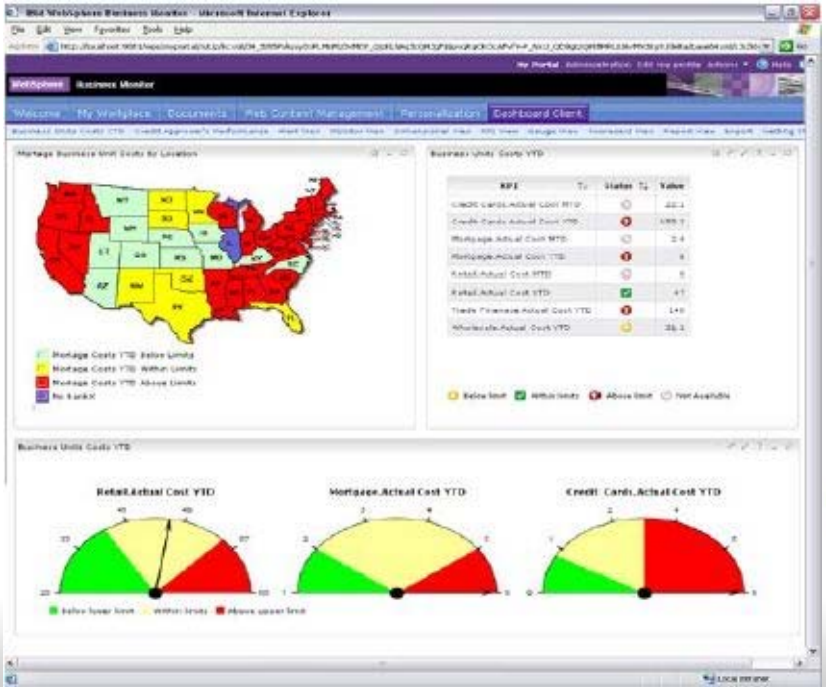
Rule-based Decision Services send outcome decisions to other systems
Output data needs to be transported and dispatched to one or many systems

Automate decisions
Implement, manage & share decisions services across IT infrastructure
ILOG JRules for Embedded rules and ILOG Rules Server subsystem

# Business Activity Monitoring & Event Intelligence

***Understand the importance of ESB data and detect business situations***

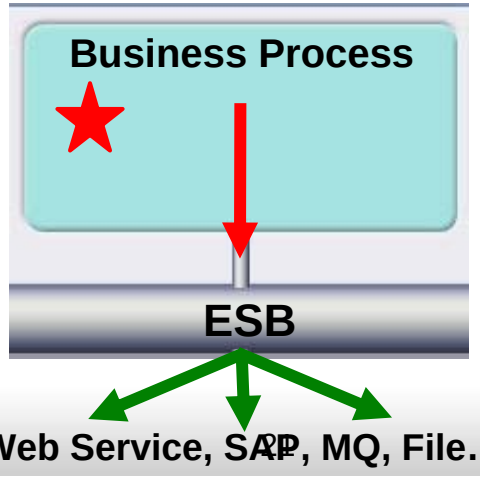
- **ESB connectivity allows processing of events from many sources, targets**
  - Capture business relevant information to feed to WebSphere Business Monitor
  - Examples: total dollar trade value per day, total number of orders per hour
  - Capture business events for correlation using WebSphere Business Events
  - Look for correlations in data, e.g. fraud, Up-sell and Cross-sell opportunities, CRM
  - Audit, Repair and Replay transported events
- **Generate Business Monitoring Events from existing connectivity**
  - Enables integration with WebSphere Monitor to display and analyze KPIs
  - Design time and operational time event activation
  - Notification via CEI & Publish subscribe
- **WebSphere Business Events**
  - Capture events from ESB and other sources
  - Analyse to generates interesting new event
  - Stimulus for business process
- **Capture Events for Audit and Logging**
  - Verify transport of traffic; dates and payloads
  - Replay recorded messages to consumers
  - Includes replay to ESB for reprocessing

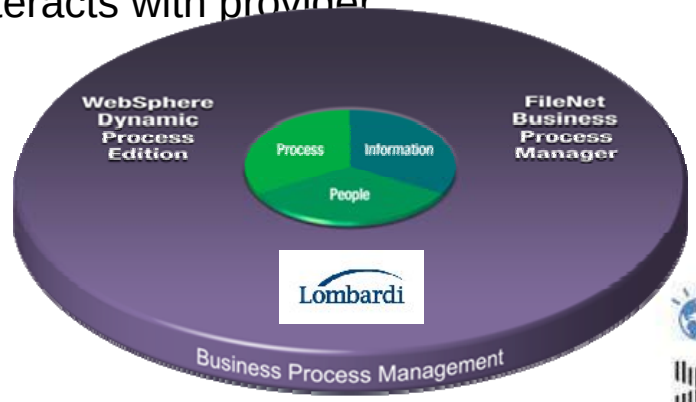


# Initiate and Support Business Processes

***Compose existing applications and services to create new value***

- **ESB Event Capture and Process Initiation**
  - Breadth of ESB connectivity enables multiple business process starting points
  - Identify event and initiate business process
  - e.g. message, file, web service, device endpoints can start business process
  - Synchronous and asynchronous invocation for short & long running transactions
  - Multiple options with Process Server, Lombardi, FileNet…
- **Business Process Connectivity**
  - Exploit range of ESB connectivity to abstract and simplify BPM
  - Process focus on WHAT rather than ESB focus on WHERE, HOW concerns
  - ESB receives service request and routes, re-formats, interacts with provider

# A Flexible Infrastructure to Support Change

***Enable Application and Service Replacement with minimum risk***

- **ESB creates a Virtual Service**

– Implementation details of a service to be hidden

– Flexibility in implementation; change implementations without affecting consumers

– Introduce new interfaces to existing service in parallel with new interfaces

- **Examples include M&A, Decommissioning & External partner communication**

– Connect newly acquired systems, particularly relevant in M&A

– Formats and Protocols of acquired technology differ from current systems

– ESB provides managed interface to acquired systems for in-house systems

– Provides new interface for acquired systems

– Staged decommission of legacy implementations

– Maintain existing interface to new implementation

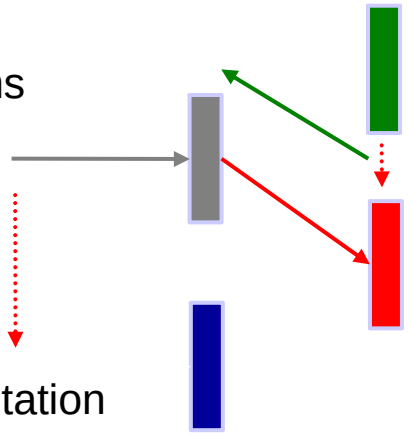
– Allows Managed risk of client migration

– Often combined with new interface definition, often to enable service orientation

– External partner communication

– ESB provides interface to external systems

– Allows partners to be swapped in and out without affecting consumers

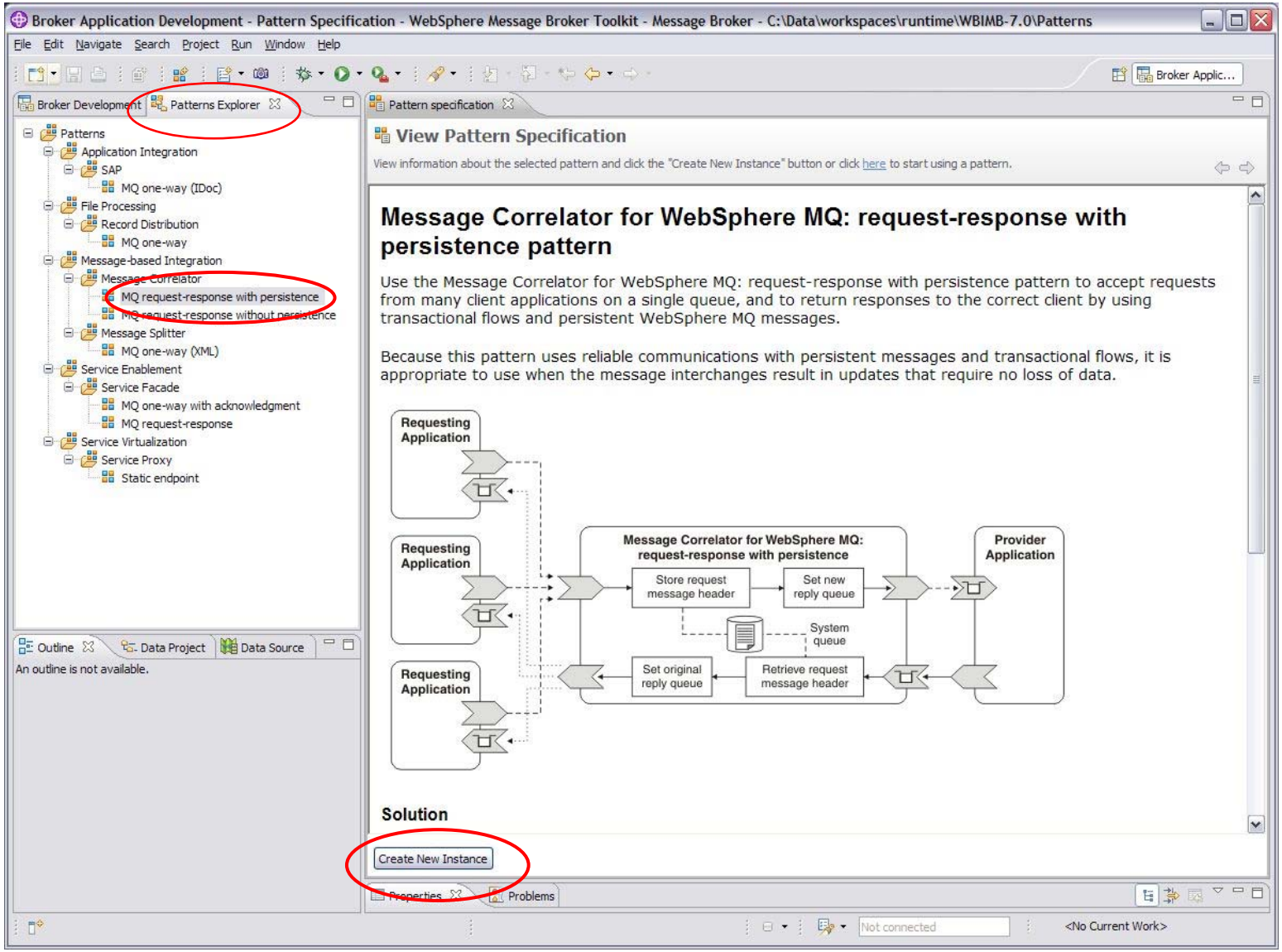


# Pattern Technology

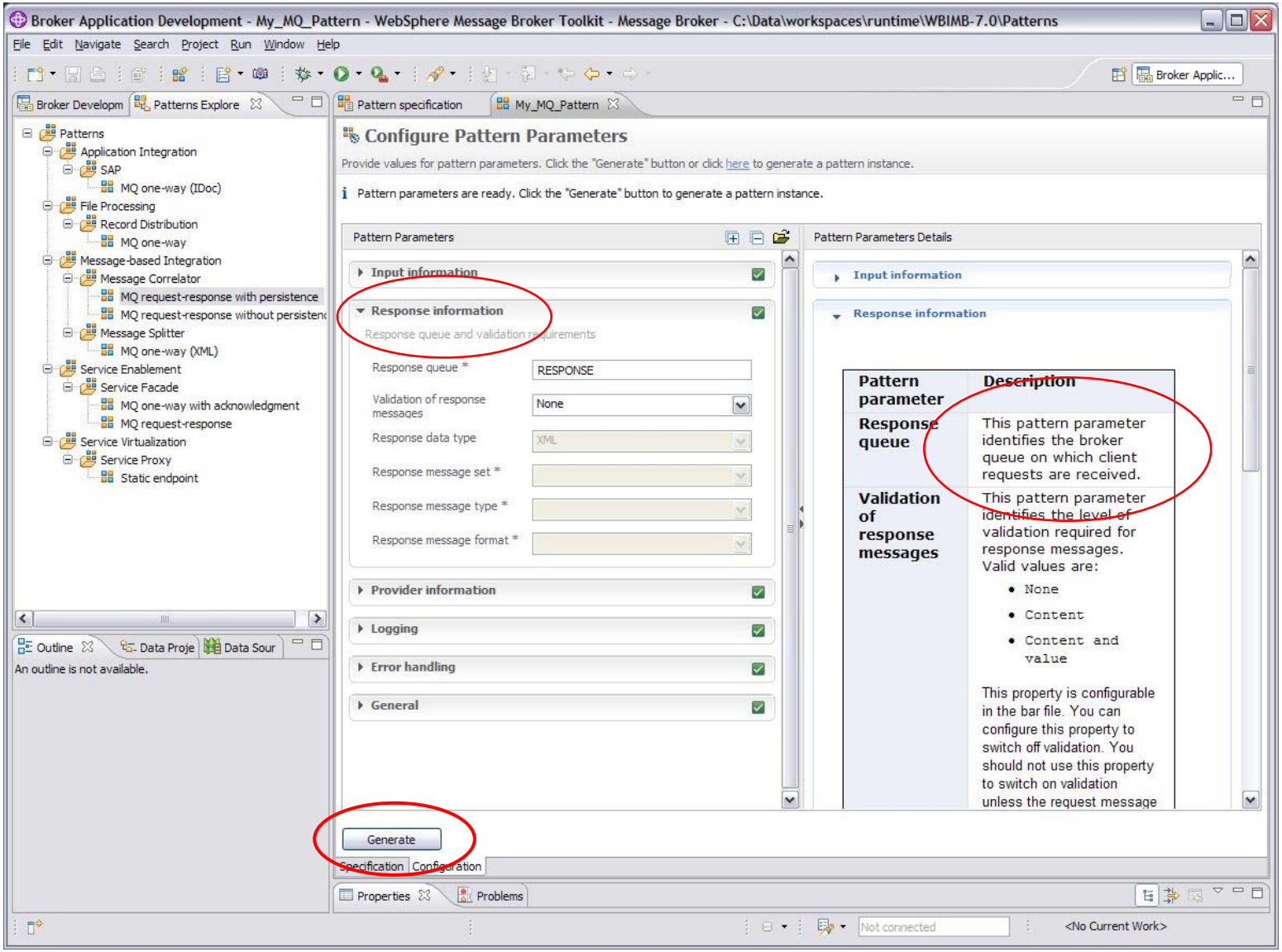
# Patterns for Simplified Development

- **Patterns Based Development**
  - Create top-down, parameterized connectivity solutions
    e.g. Web Service façades, Message oriented processing, Queue to File
  - IBM pre-supplied patterns
    Simplifies creation of most common scenarios according to best practices
  - Complements existing bottom-up constructional approach for bespoke connectivity
- **Patterns Explorer**
  - Inventory of key patterns available for solution generation
  - Each pattern contains clear help to explain context and applicability
- **Pattern Generation**
  - Enables simple creation of solution artefacts from pre-supplied pattern
  - Pattern Properties allow configuration of behaviour
  - Solutions can be modified and/or regenerated
- **Evolution**
  - Pattern Capture creates user patterns from solution artefacts
  - Pattern Management: provides post deployment customization and operation of solutions

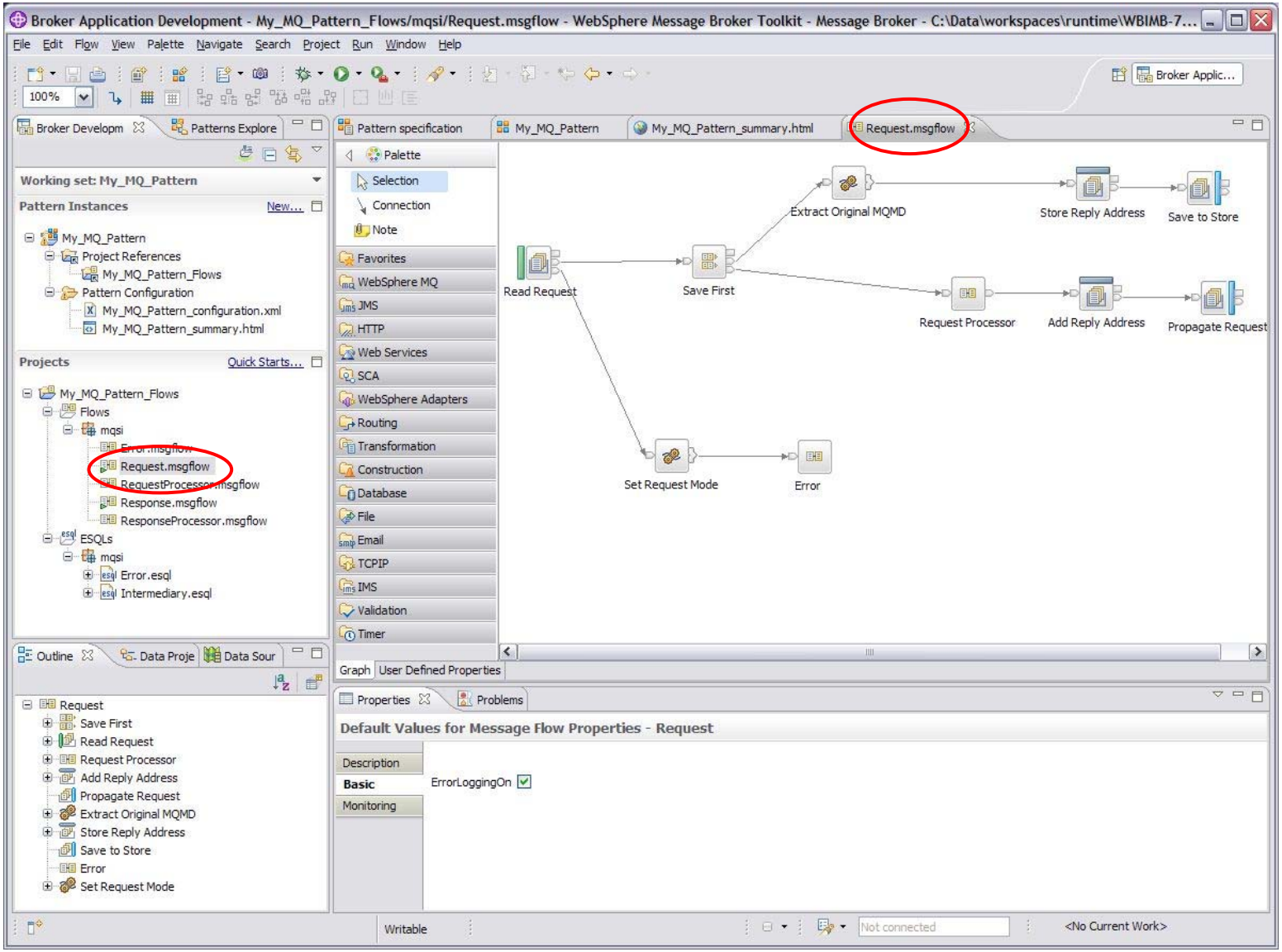
# Pattern Technology Demo (1/4)



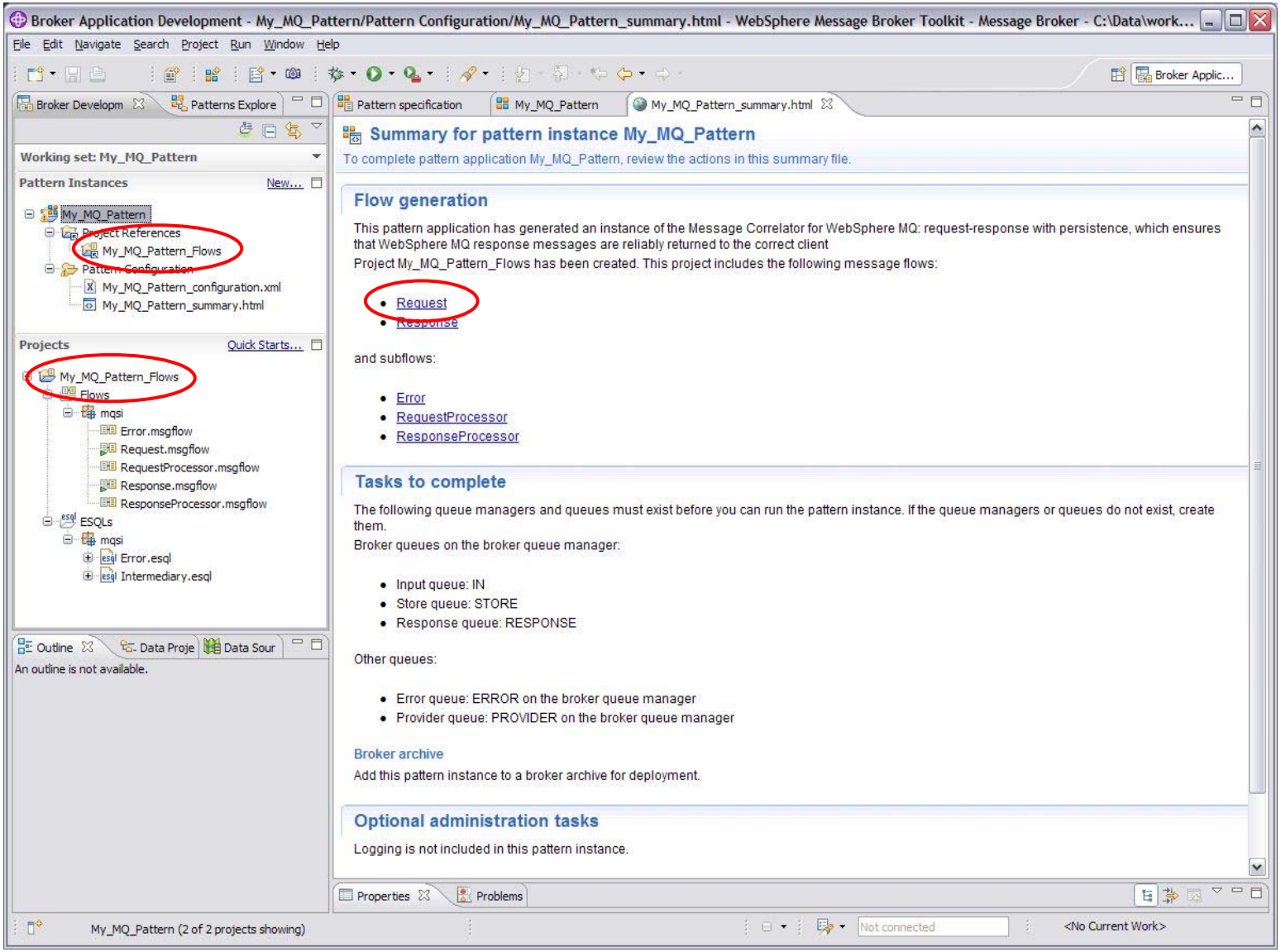
# Pattern Technology Demo (2/4)



# Pattern Technology Demo (3/4)



# Pattern Technology Demo (4/4)



# Patterns for Simplified Development (rpt.)

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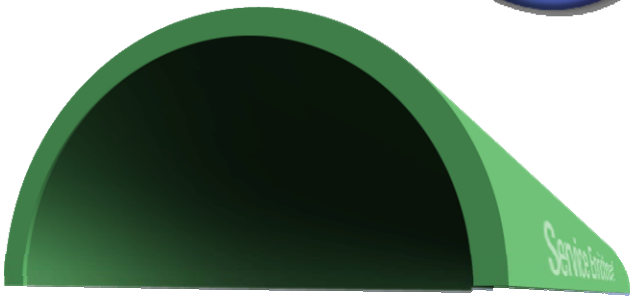
# Product Overview and Roadmaps

# IBM WebSphere Message Broker Product Line

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

- **Endless integration** to virtually any platform, operating system or device
- **Exploits** the industry-leading WebSphere MQ messaging infrastructure
- **Easily handles** complex messaging structures delivering extensive administration and systems management facilities
- **Continued Innovation**:
  - Over 100 nodes for connectivity, integration, and transformation
  - Starter to full enterprise versions
  - Works with the latest implementations of standards

- WebSphere Message Broker Starter Edition
- WebSphere Message Broker for Remote Deployment
- WebSphere Message Broker
- WebSphere Message Broker for Retail Store Edition

# WebSphere Message Broker

- **Universal Connectivity**
  - Simplify application connectivity to provide a flexible and dynamic infrastructure

- **Routes and transforms messages FROM anywhere, TO anywhere**
  - Supports a wide range of protocols
    MQ, JMS 1.1, HTTP(S), Web Services (SOAP, REST), File, ERP (SAP, SEBL…), TCP/IP, SCA
  - Supports a broad range of data formats
    Binary (C/COBOL), XML, SOAP, CSV, Industry (SWIFT, EDI, HL7…), IDoc, User Defined
  - Interactions and Operations
    Route, Filter, Transform, Enrich, Monitor, Distribute, Decompose, Sequence, Correlate, Detect

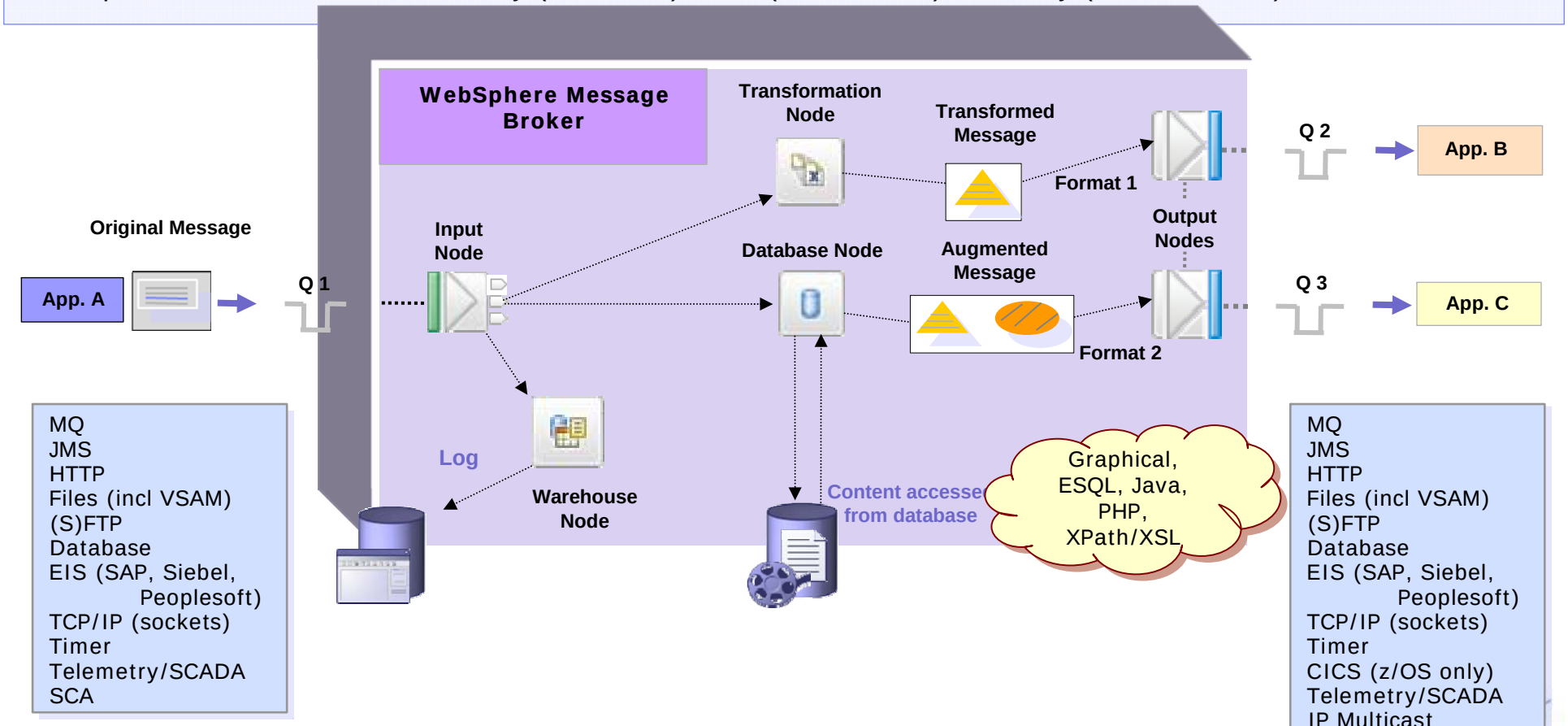
- **Simple programming**
  - Patterns based for top-down, parameterized connectivity of common use cases
    e.g. Web Service façades, Message oriented processing, Queue to File…
  - Construction based for bottom-up assembly of bespoke connectivity logic
    Message Flows to describe application connectivity comprising…
    Message Nodes which encapsulate required integration logic which operate on…
    Message Tree which describes the data in a format independent manner
    Transformation options include Graphical mapping, PHP, Java, ESQL, XSL and WTX

- **Operational Management and Performance**
  - Extensive Administration and Systems Management facilities for developed solutions
  - Wide range of operating system and hardware platforms supported
  - Offers performance of traditional transaction processing environments
  - Available in Trial, Remote Deployment, Get Started and Enterprise deployment options

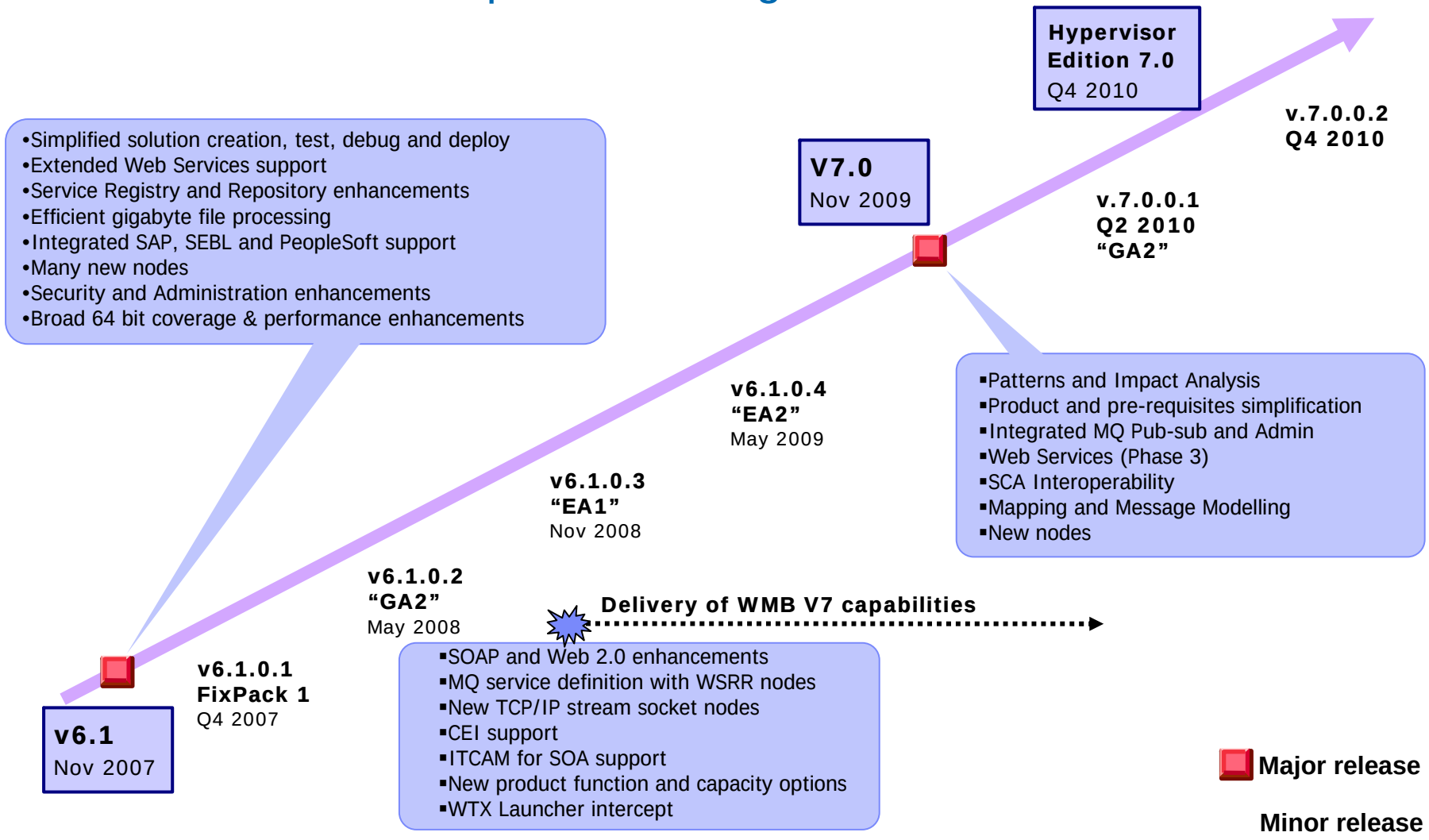
# WebSphere Message Broker: Overview

## Universal connectivity and transformation in heterogeneous IT environments

- ✓Simple and flexible programming: message flows, message nodes and message model, patterns
- ✓Multiple transformation options: including Graphical mapping, PHP, Java, ESQL, XSL and WTX
- ✓Comprehensive data formats: Binary (C/COBOL), Text (XML/CSV/…), Industry (SWIFT/EDI/…), User Defined



# What's Next in WebSphere Message Broker?

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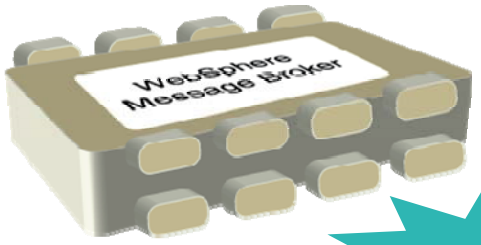
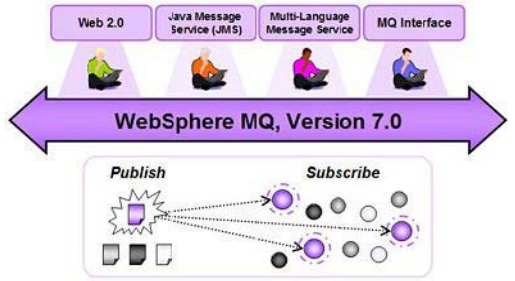
**The information on the new product is not a commitment, promise, or legal obligation to deliver any material, code or functionality.**
**The development, release, and timing of any features or functionality described for our products remains at our sole discretion**

# Message Broker 7 Overview

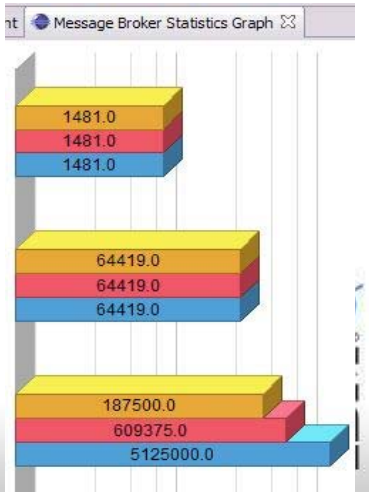




- **Simplicity and Productivity**
  - Radically streamlined product prerequisites and components
  - Simplified connectivity development using IBM pre-supplied patterns
  - Impact Analysis to manage development artefact changes
  - MB Explorer for dedicated administration tooling
  - SCA nodes for WPS Interoperability
- **Universal Connectivity for SOA**
  - Integrated content based MQ PubSub management & security
  - PHP nodes for Web 2.0 support
  - Enhanced SAP, Siebel, PeopleSoft packaged application support
  - New Sequence and Resequence nodes
- **Dynamic Operational Management**
  - New operational facilities for audit and monitoring, including WBM
  - Enhanced statistics to understand broker performance
  - Improved user trace to easily understand message flow behaviour
  - Enhancements for WSRR processing: Service Federation Management
  - Software HA Multi-instance Queue Managers and Brokers
- **Platforms, Environments and Performance**
  - Exclusively 64bit Broker support, including z/OS
  - Performance monitoring tools and very reduced memory footprint







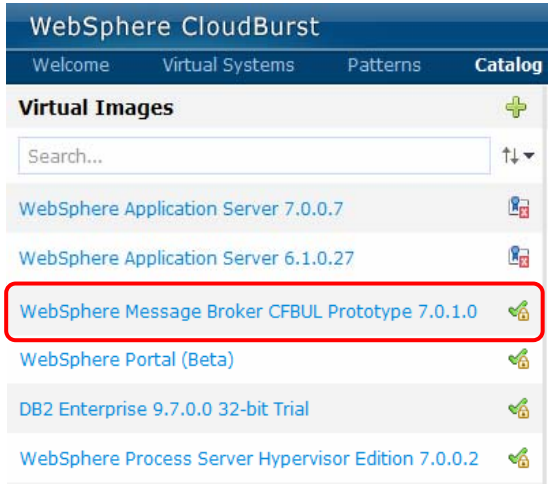
# Hypervisor Edition V7.0


- **A New Feature to simplify provisioning MB (and MQ)**
  1. Initial system deploy resulting in quicker time to solution value
  2. Fix pack deploy reduces existing system recurring maintenance cost

1. **Hyper Visor Edition Packages**
   - Pre-built installed VM image for OS+HW combination
     RHEL 5.5 for VMWare ESX x86-64 initial release adds to SOE
     Package includes all MQ & MB components
     Includes regular VMWare image & WCA image
   - Updated when new fix pack levels released
     Download to customer site from IBM web
     Uploaded to WCA using CLI scripts or Image Loader tool

2. **Configuration Patterns and Scripts**
   - HVE Scenario Configuration Information
     WCA Base Pattern with configuration script packages
   - Base WCA Pattern for most popular MQ and MB topology configurations
     *Basic Broker, Advanced Broke*r, *<User Pattern>*
   - Script Packages configure base pattern
     *Create Exec Group, Deploy BAR, Run MQSC, <User Script>*
     Emergency Fix also possible: iFix binary + script package to drive installer

- **Full Function Deployed Configuration**
  - Interaction with deployed MQ, MB components as per regular deployment




# Message Broker 7001 Content

- **Simplicity and Productivity**
  - User Defined Patterns allowing users to create their own patterns alongside built-in suite
  - User Defined Sub flows to encapsulate user logic and simplify distribution
  - Expanded Patterns Explorer for more built-in patterns

- **Universal Connectivity for SOA**
  - SOAP/JMS and other Web Service related enhancements
  - Database input node for database driven message flows
  - Multi-platform CICS node for direct region connectivity
  - FTE file input and output nodes for end-to-end file processing
  - CORBA request node to facade CORBA systems

- **Dynamic Operational Management**
  - Extended security tokens including SAML, Kerberos, LTPA and RACF pass tickets
  - PEP node for mid-flow security processing
  - Comprehensive operational statistics to understand resource utilization and behaviour
  - Web Services Policy Analytics for WSRR

- **Platforms, Environments and Performance**
  - Windows 7 and Server 2008 support, including 64 bit execution groups
  - More databases: solidDB, SQL Server z/Linux & DB2 9.7

# WebSphere Message Broker Continued Success

## *Financial Services*

- 80% of the top 10 banks in America use Message Broker
- Millions of transactions per day


## *Insurance and Healthcare*

- 90% of the top insurances companies use Message Broker
- One company handled 42% more transactions per day

## *Automotive*

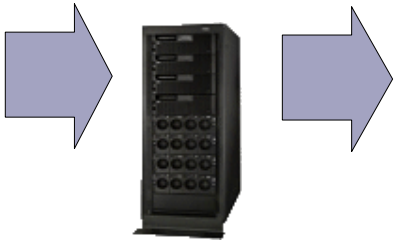
- Used in 9 of the top automotive companies
- Integrates supply chain management system with critical production data


*"It's going to give us unprecedented agility. We'll be able to re-merchandise our Web stores on the fly in response to competitive offers. That will make us much more relevant to the customer, which is critical.."*

CIO,
Retailer

# WebSphere Message Broker On POWER7 Is 53 Times Faster Than BizTalk On HP Nehalem

**Message Workload**



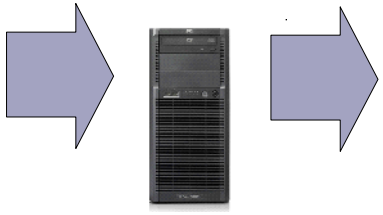
**Message Broker v7**
7 Execution Groups
MQ Server 7.0.1
AIX v6.1 64 bit

**IBM Power 750 3.0 GHz**
8 cores

21,808
Messages/sec
(Projected POWER 750 8 core 3.0GHz)

**$51** per message/sec

**Message Workload**



**Biztalk 2009**
12 Host Instances
**SQL Server 2008**
MQ Server 7.0.1
Windows 32bit

**HP Nehalem**
8 cores

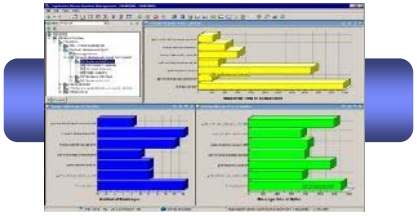
409
Messages/sec

$538 per message/sec

Workload is mix of in/out, routing, transformation, transformation and routing messages

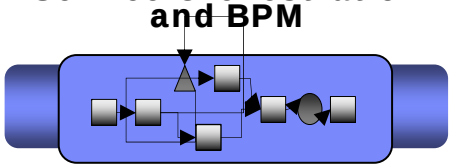
# The ESB …
## *at the heart of a smart connectivity 'ecosystem'*

**Service Monitoring**



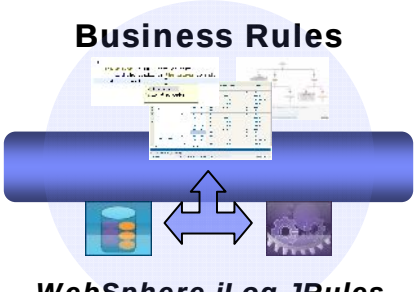
***Tivoli CAM for SOA***

**Service Orchestration and BPM**



***WebSphere Process Server***

**Business Rules**



***WebSphere iLog JRules***
***WebSphere Event Server***

**Service Security**

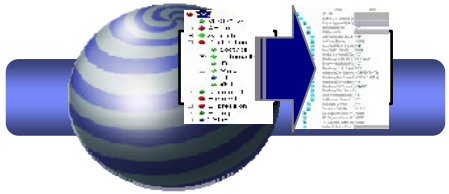
***Tivoli Security Products***




**Service Registry**


***WebSphere Services Registry and Repository***


**Universal Transformation**



***WebSphere Transformation Extender***

**Messaging Backbone for SOA**


***WebSphere MQ***