



Extending Your Mainframe for More Business Value

Add A Workload –
Communications Backbone

Business Challenge

Our payments business is a key source of revenue, but it is too costly to maintain the connections



**Service Oriented Finance
CIO**

A Communications Backbone can solve this problem



IBM

Providing Application-to-Application Connectivity In A Diverse Environment

■ System Platforms



■ Programming Models

Asynchronous
Messaging

Synchronous
RPC

Publish/
Subscribe

■ Programming Languages

RPG

COBOL



■ Transport Protocols

Web
Services

WebSphere
MQ

JMS

FTP

TCP/IP
Multicast

HTTP

SMTP

■ Standards & Message Formats

ACORD

HIPAA

ebXML

COBOL
Copybook

SWIFT

EDI-X.12

Custom Formats

XML

IFX

AL3

EDI-FACT

HL77

Word/Excel/PDF

Quiz

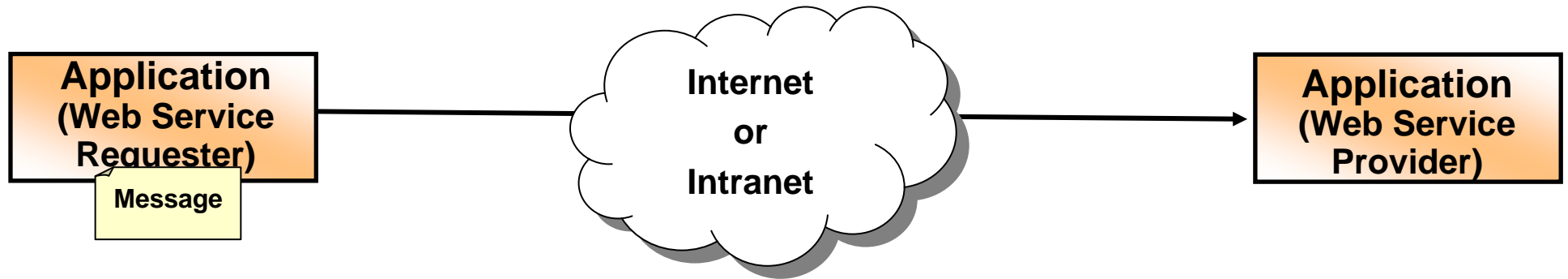
- What is An Enterprise Service Bus?

Answer:
An ESB connects anything
to everything

How to Provide Application-to-Application Connectivity

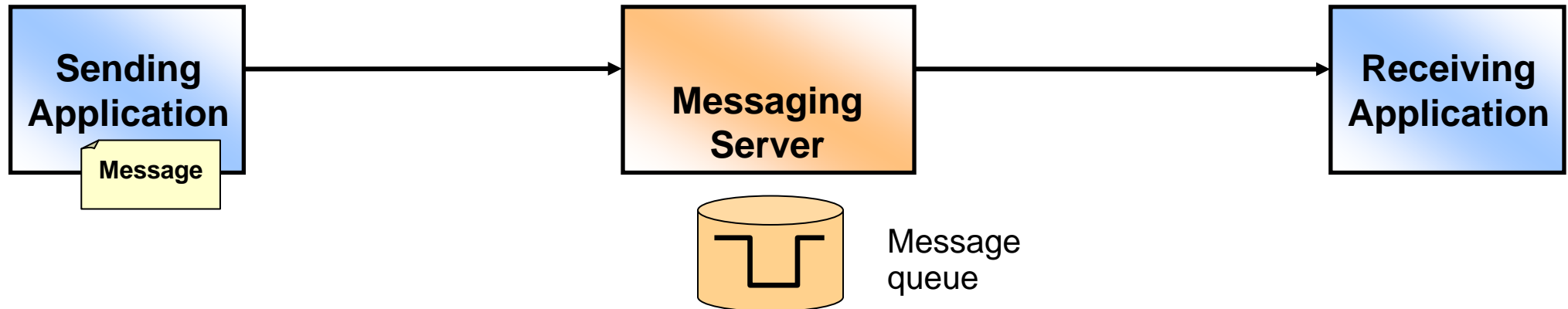
- Installed environments are very diverse
 - ▶ No single technology can provide the all of the required power and flexibility
- Use a combination of middleware technologies as needed
 1. **Web Services**
Standards-based, heterogeneous, Internet-based exchanges
 2. **Asynchronous Messaging**
Adds reliability, assured delivery, application de-coupling
 3. **Mediation Broker**
Adds services to transform and enrich information as it flows from one application to another
- Implementations of these technologies is known as an **Enterprise Service Bus**

Web Services Provide Simple Point-to-Point Connectivity



- Advantages
 - ▶ Almost every platform supported
 - ▶ Standards-based, works across the internet
- But there are considerations...
 - ▶ The requester and provider must be running at the same time
 - ▶ No infrastructure for managing overall web services
- Mainframe supports web services via WebSphere Application Server, CICS, and IMS SOAP Gateway

Message Queues Provide Greater Flexibility with Asynchronous Messaging

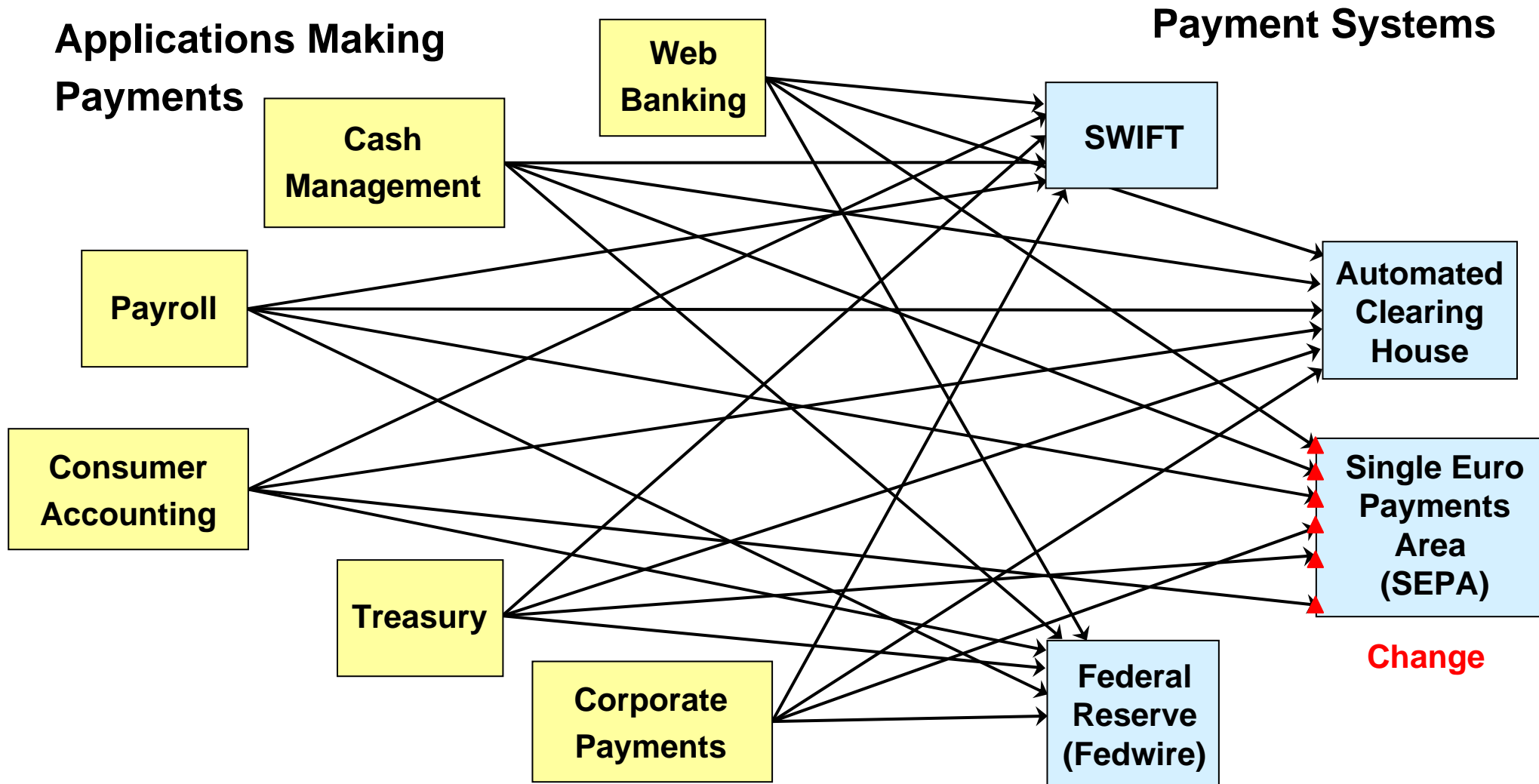


- Sender and receiver do not need to run at same time
 - ▶ Put and get messages from queues
- Reliable, assured delivery
- Sender and receiver can process messages at different rates
- Message servers can be networked together
 - ▶ Messages automatically arrive at named destination queue
- Mainframe supports messaging via WebSphere MQ and WebSphere Application Server (JMS)

Connect Applications Point-to-Point with WebSphere MQ

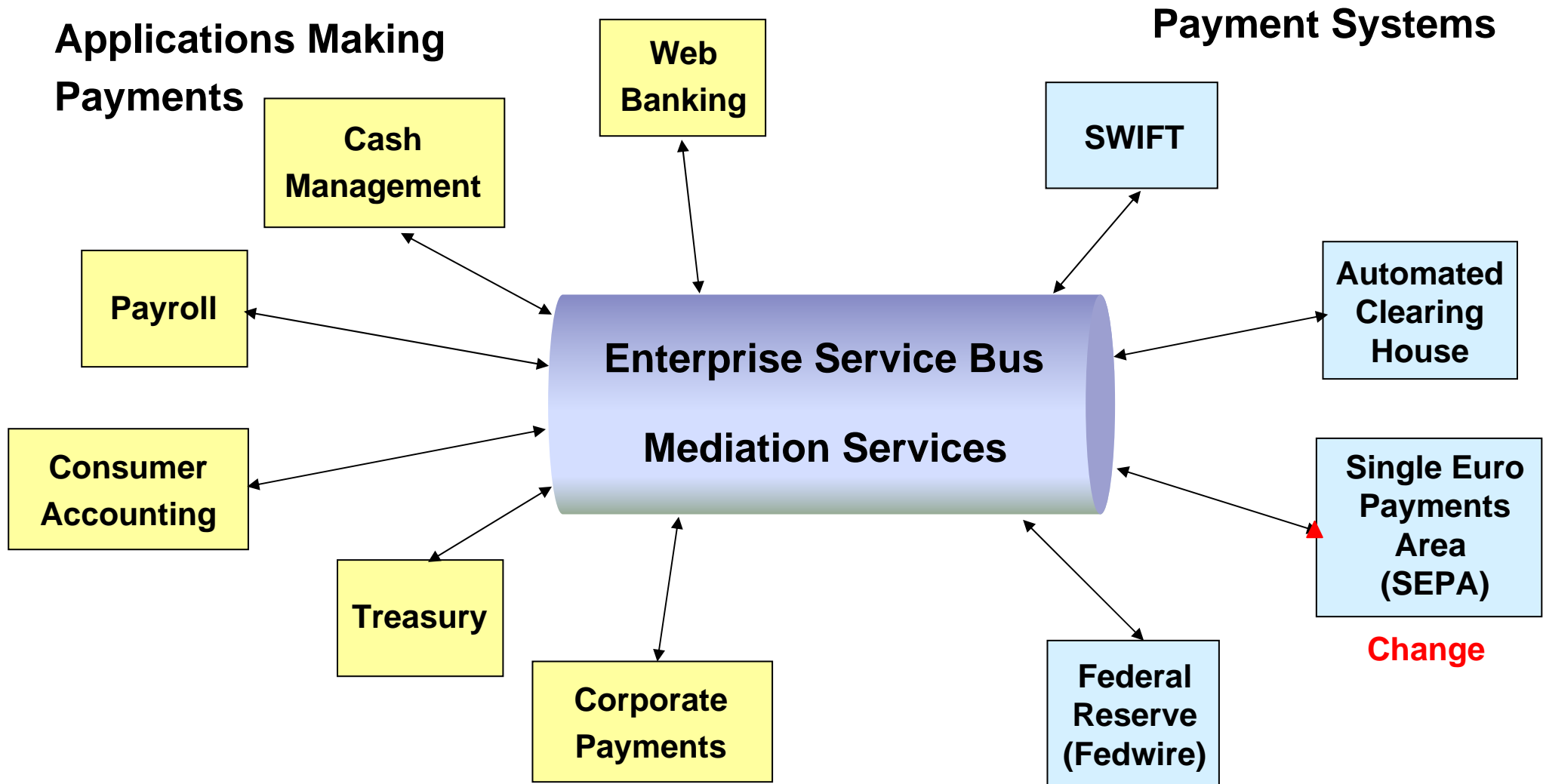
- Connects to virtually everything
 - ▶ Over 80 platform configurations
 - ▶ Uses IBM Message Queuing Interface (MQI), Java Message Service (JMS), or SOAP/JMS
 - ▶ Bridges Web 2.0 AJAX client applications to the WebSphere MQ queues using RESTful interfaces
- Very simple API (put/get) for all main programming languages: C++, C#, Visual Basic, .NET, COBOL, Java
- The de facto standard for asynchronous messaging
 - ▶ 42% of z/OS customers have WebSphere MQ
 - ▶ 90% of the Fortune 100 businesses have WebSphere MQ
 - ▶ Banking clients move transactions worth \$35 trillion/day
 - ▶ Government clients move 675+ million messages/day

However, Point-to-Point Connectivity Can Be Costly to Maintain



- Services are tightly coupled to one another
- One change requires many other changes

An Enterprise Service Bus Reduces Costs By Providing Centralized Mediation Services



- A change requires only one change in the ESB mediation services
- Services can be created and maintained independently

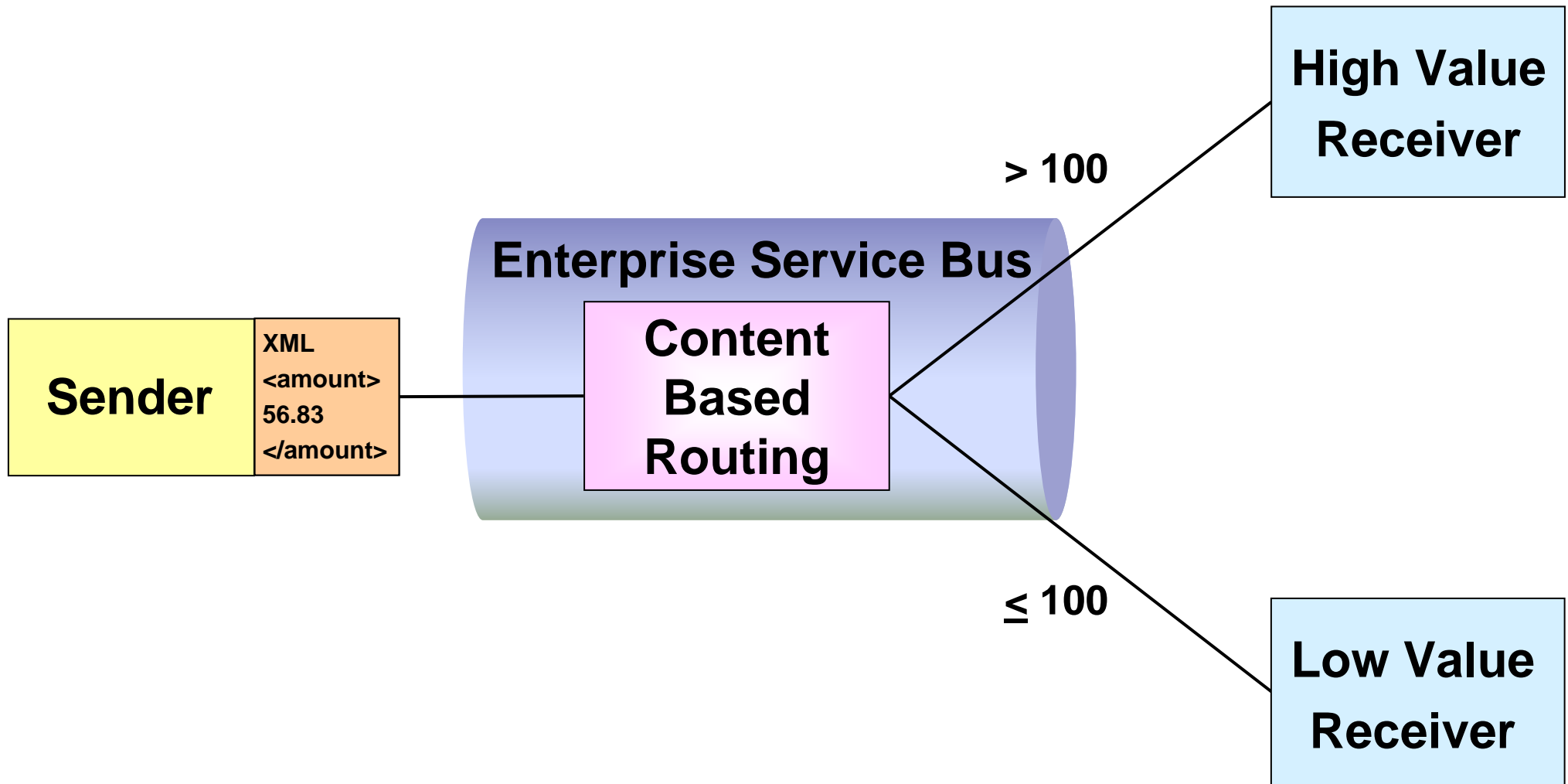
Health Insurance Company – Analysis Showed Benefit of Using WebSphere Message Broker for Enterprise Integration

- The ESB on z/OS solution offered these benefits over the custom point-to-point connection option over the 5-year period:
 - ▶ 62% reduction in solution build cost
 - ▶ 73% reduction in on-going code maintenance of the integration solution
 - ▶ 42% reduction in infrastructure administration
- For an investment of \$2.5M in WebSphere software, the company would realize a benefit of **\$165M** over a 5-year period
 - ▶ Resulting in an ROI of **6,715%**

Source: High-level analysis for a large U.S. Health Insurance Company using IBM's Business Value Assessment (BVA) model, 2006

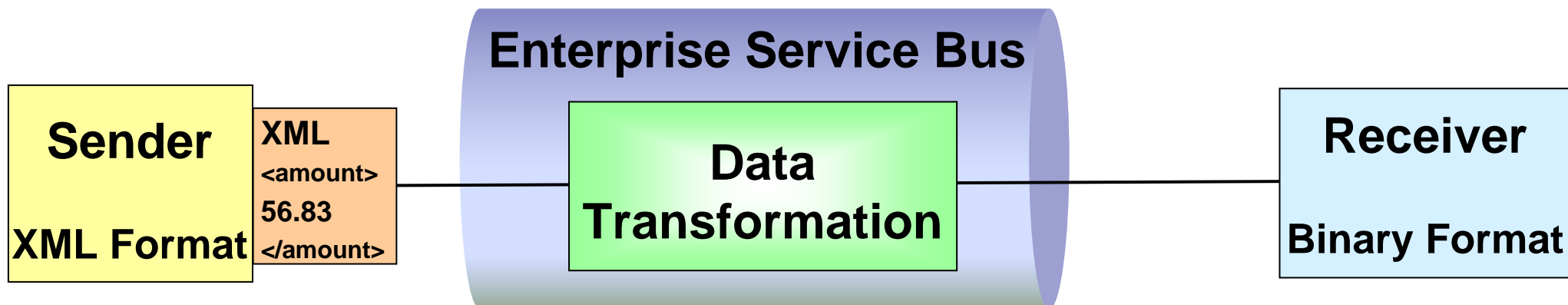
Mediation Service: Content-Based Routing

Example: Route payment based on payment amount



Mediation Service: Data Transformation

Example: Transform XML to binary format

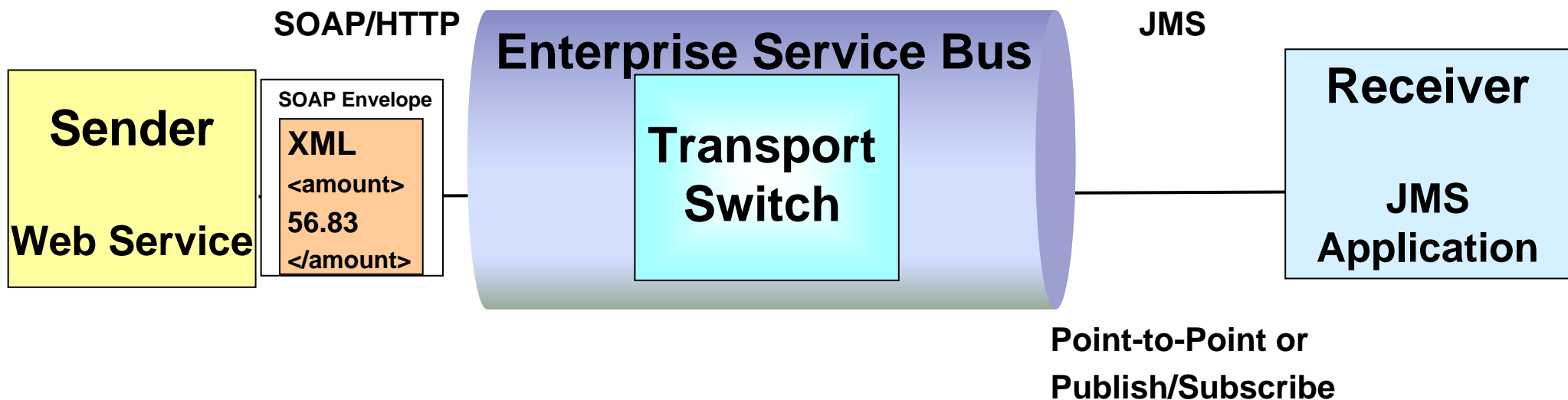


Other Common Transformations

- One XML schema to another XML schema
- Industry specific transformations, e.g., IFX to SWIFT

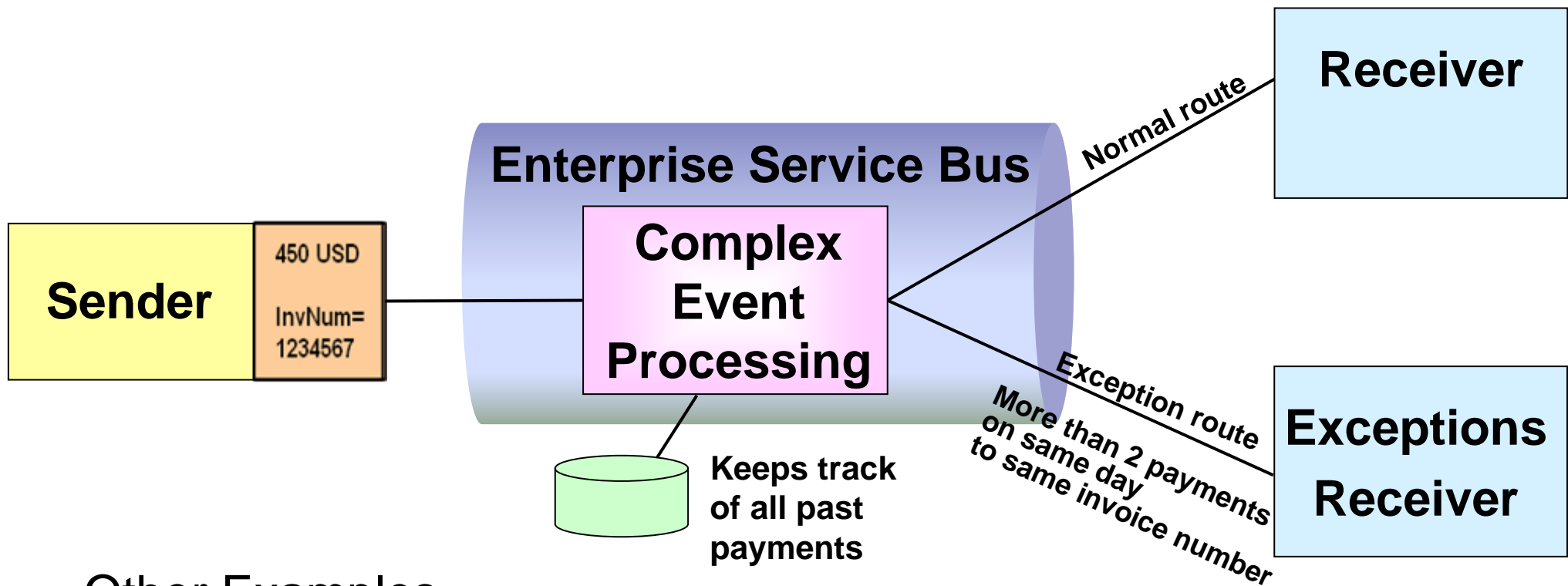
Mediation Service: Transport Switching

Example: Switch from SOAP/HTTP to a JMS message



Complex Event Processing

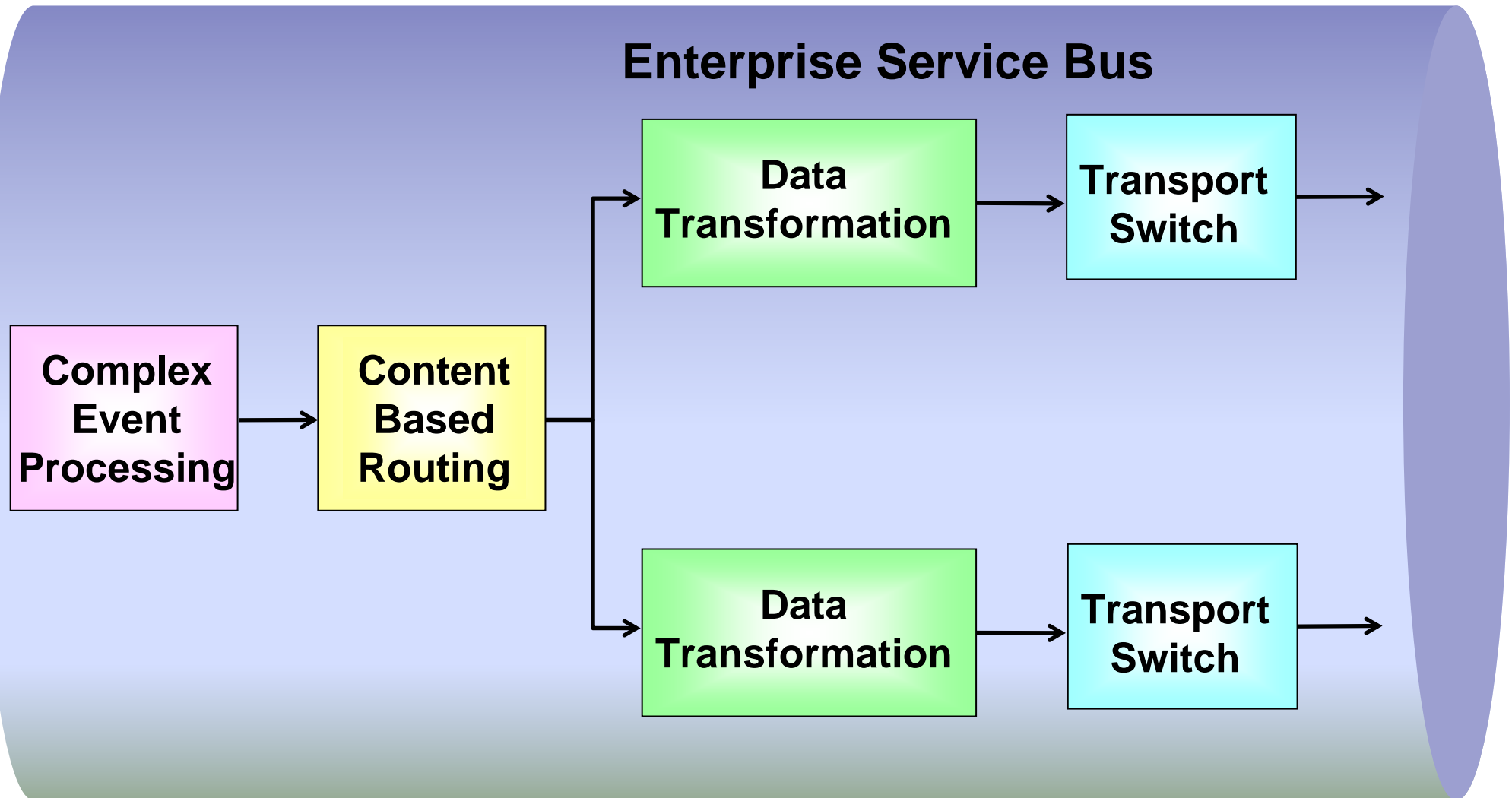
Example: Fraud detection and alerting



Other Examples

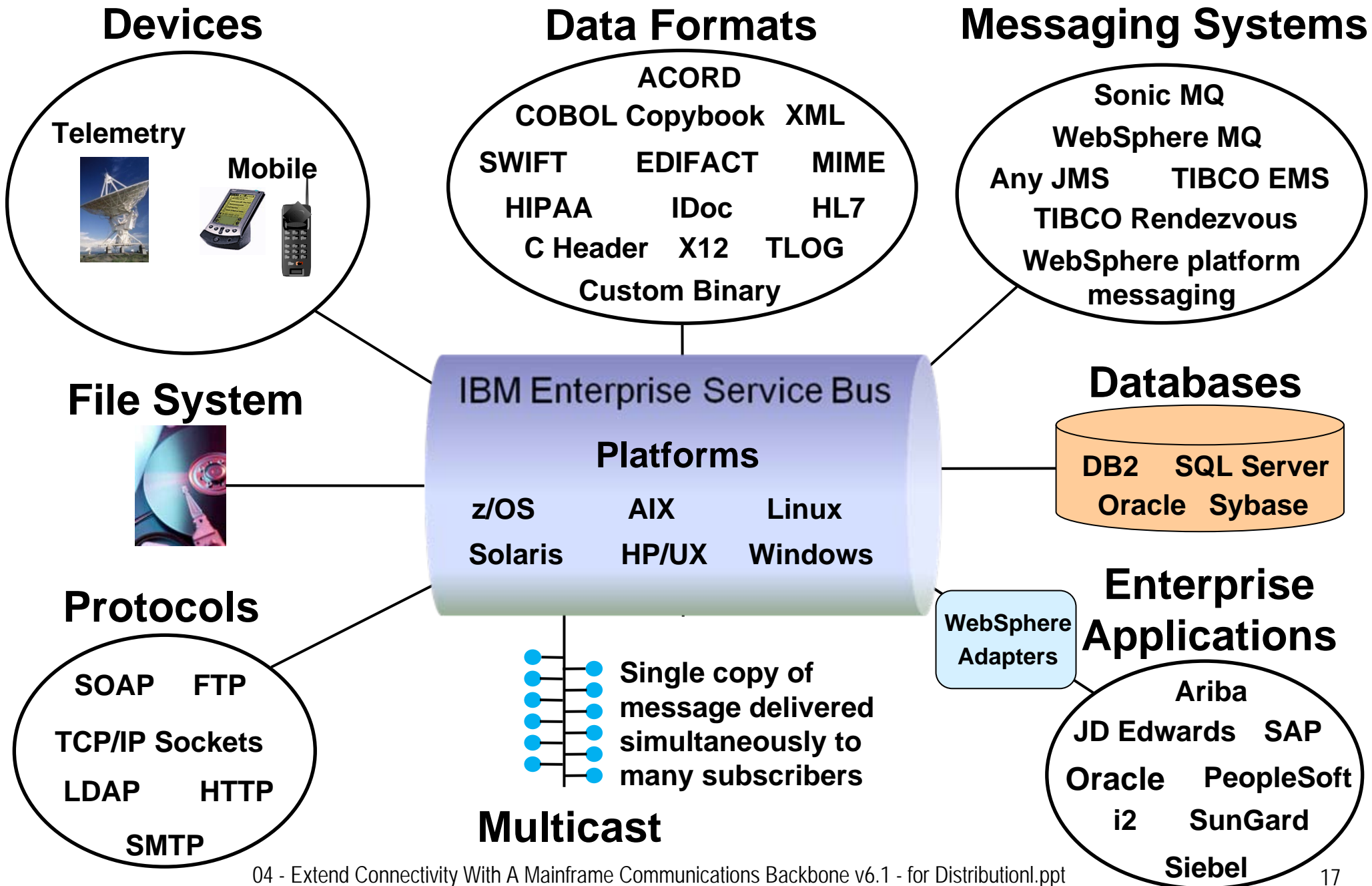
- Enforcement of regulatory constraints
- Periodically report aggregate payments
- Service level agreement monitoring and notification

Combine Mediation Services Together To Meet Connectivity Requirements


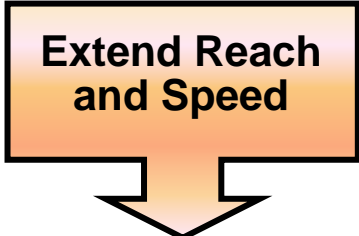


- Combine mediation services in any order
- Construct mediation flow to connect services

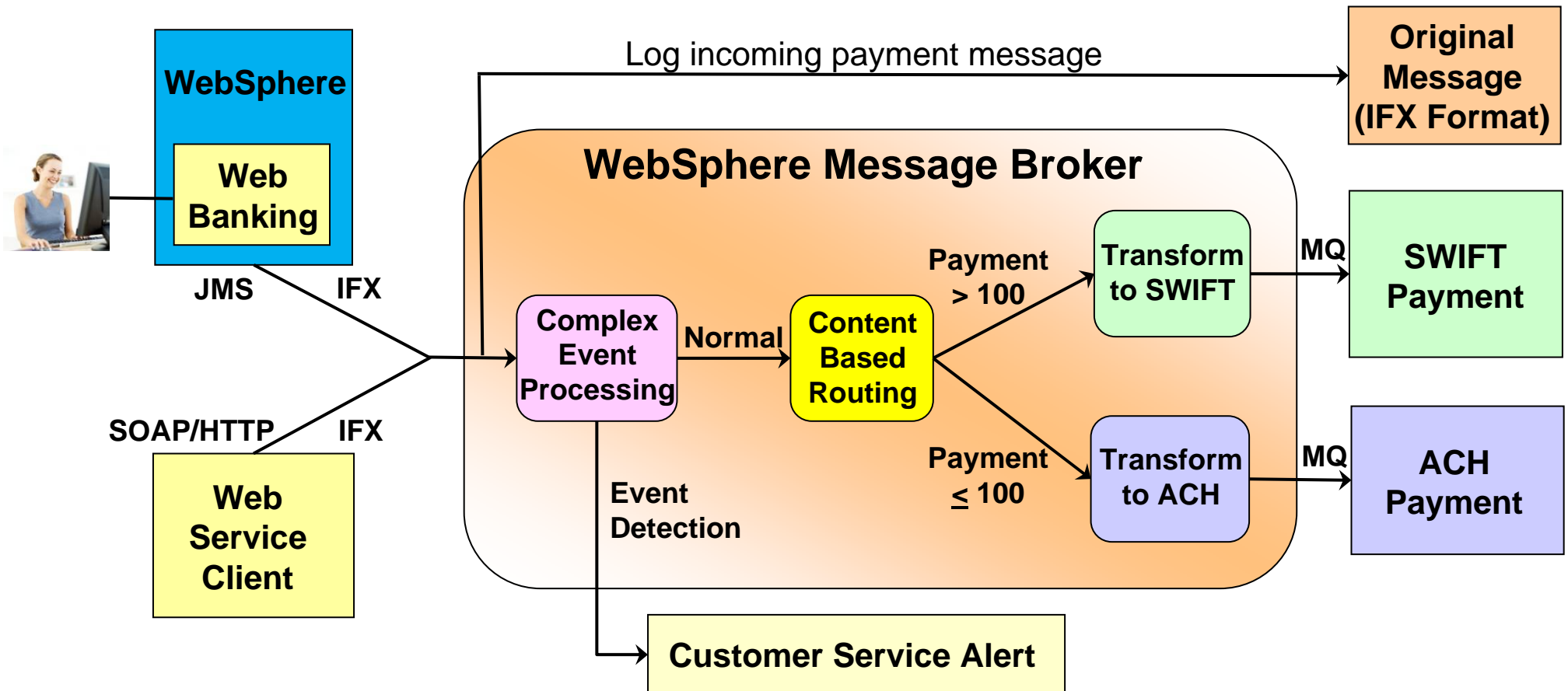
IBM Enterprise Service Bus Connects Almost Anything to Anything



Implementing Your Enterprise Service Bus Depends Upon Your Requirements

	 Web Services and Mediation	 Extend Reach and Speed
	WebSphere ESB (Runs on z/OS)	WebSphere Message Broker (Runs on z/OS)
Built on WebSphere Application Server	✓	
Wide Range of Platforms	✓	✓
Web Services (SOAP/HTTP)	✓	✓
Content-Based Routing & Transformation	✓	✓
Transport Switching & Database Support	✓	✓
Adapters for Enterprise Applications	✓	✓
XML Data Format	✓	✓
Non-XML Data Formats		✓
Complex Event Processing		✓
Content-Based Publish/Subscribe		✓
Mobile and Telemetry Devices		✓
Multicast		✓
Third Party Messaging Systems		✓

DEMO: Using WebSphere Message Broker For Payments



- Web banking payments routed to payment system based on amount
- Transformation from IFX to SWIFT and ACH formats
- 3rd payment on same invoice number on same day creates customer service alert
- Payments are processed exactly the same for a web service client

Run Your Communications Backbone on the Mainframe

What platform should I use to run my communications backbone?



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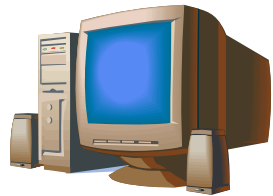
Extend your mainframe to provide a communications backbone with WebSphere MQ and WebSphere Message Broker on System z



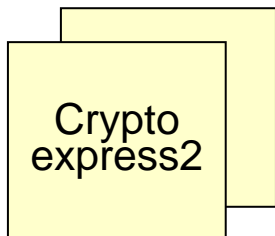
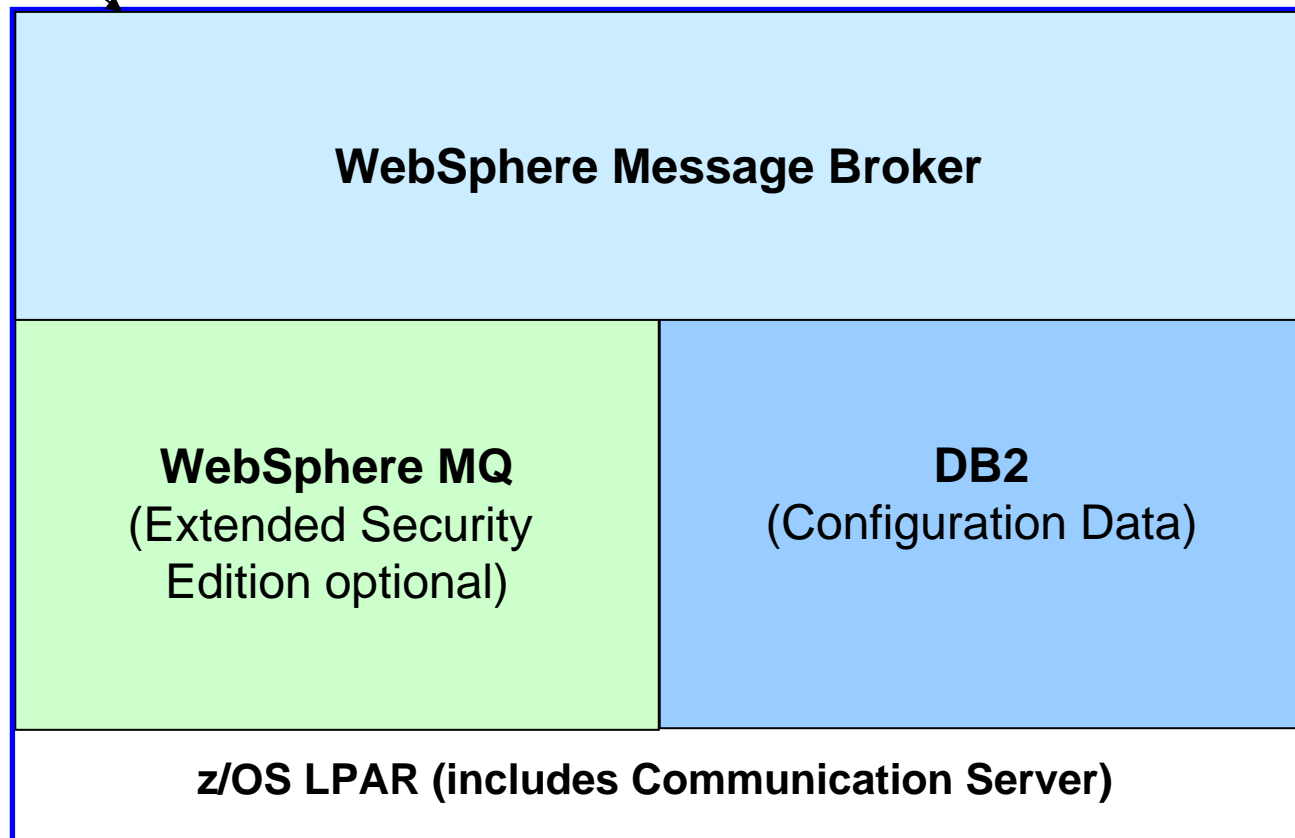
IBM

Communications Backbone

WebSphere Message Broker Includes three components installed in one LPAR with z/OS



WebSphere Message
Broker Developer
Toolkit
Windows or Linux



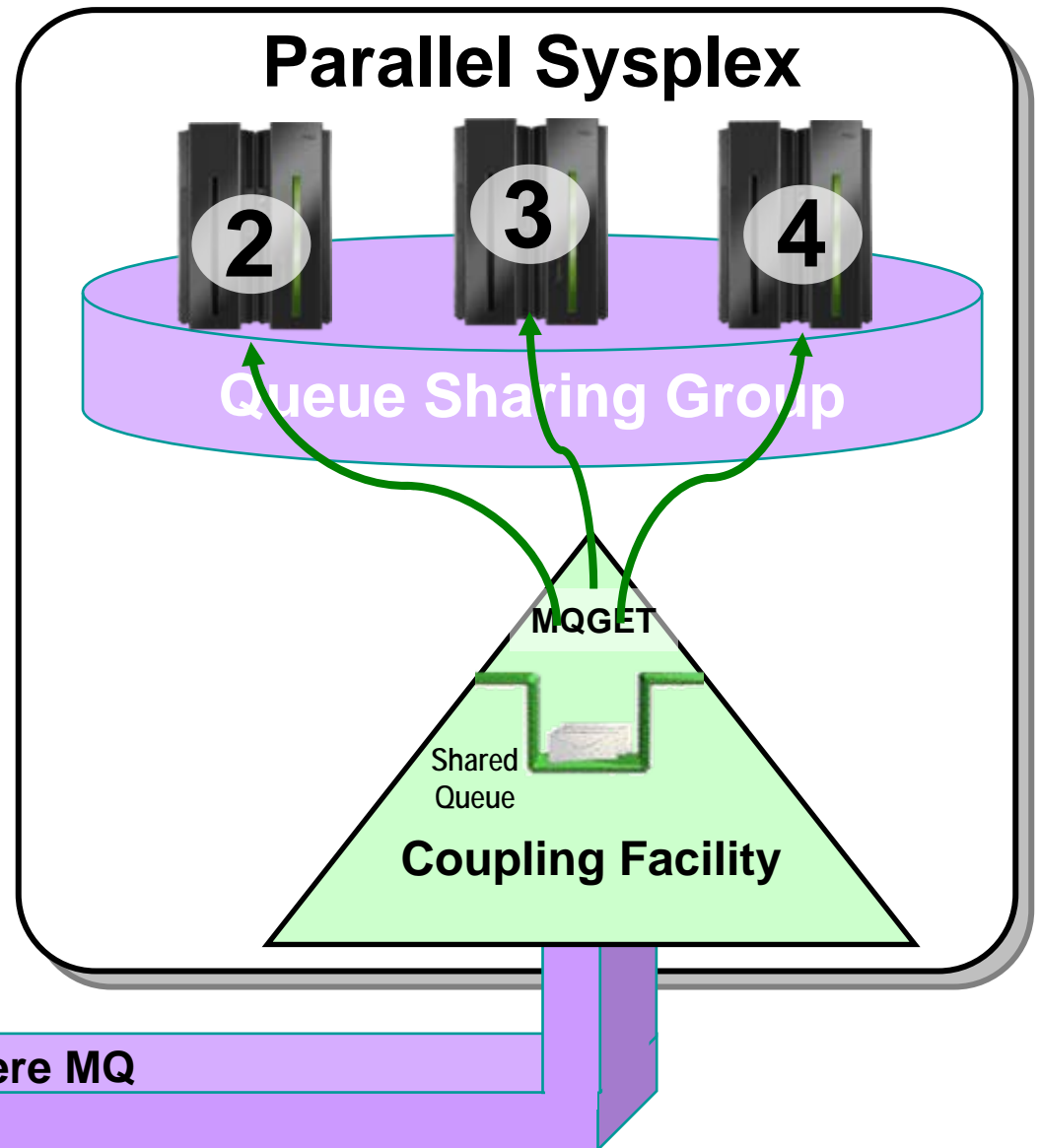
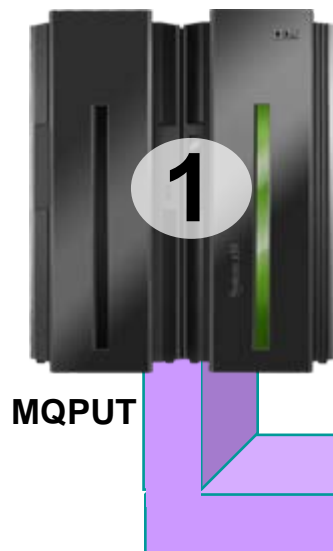
Optional hardware
cryptography assist

Communications Backbone Exploits z/OS Capabilities

- Exploits sysplex clustering to provide true 24X7 operations
 - ▶ WebSphere MQ takes advantage of Parallel Sysplex to enable MQ shared queues
- Leverage System z hardware advantages
 - ▶ Huge I/O bandwidth (z10 InfiniBand - 6 GBps)
 - ▶ Hipersocket in-memory networking eliminates latency
 - ▶ Unmatched hardware reliability
 - ▶ Crypto Cards accelerate encryption
- RACF security
- Disaster recovery via GDPS
- Capacity upgrade on-demand for unexpected peaks

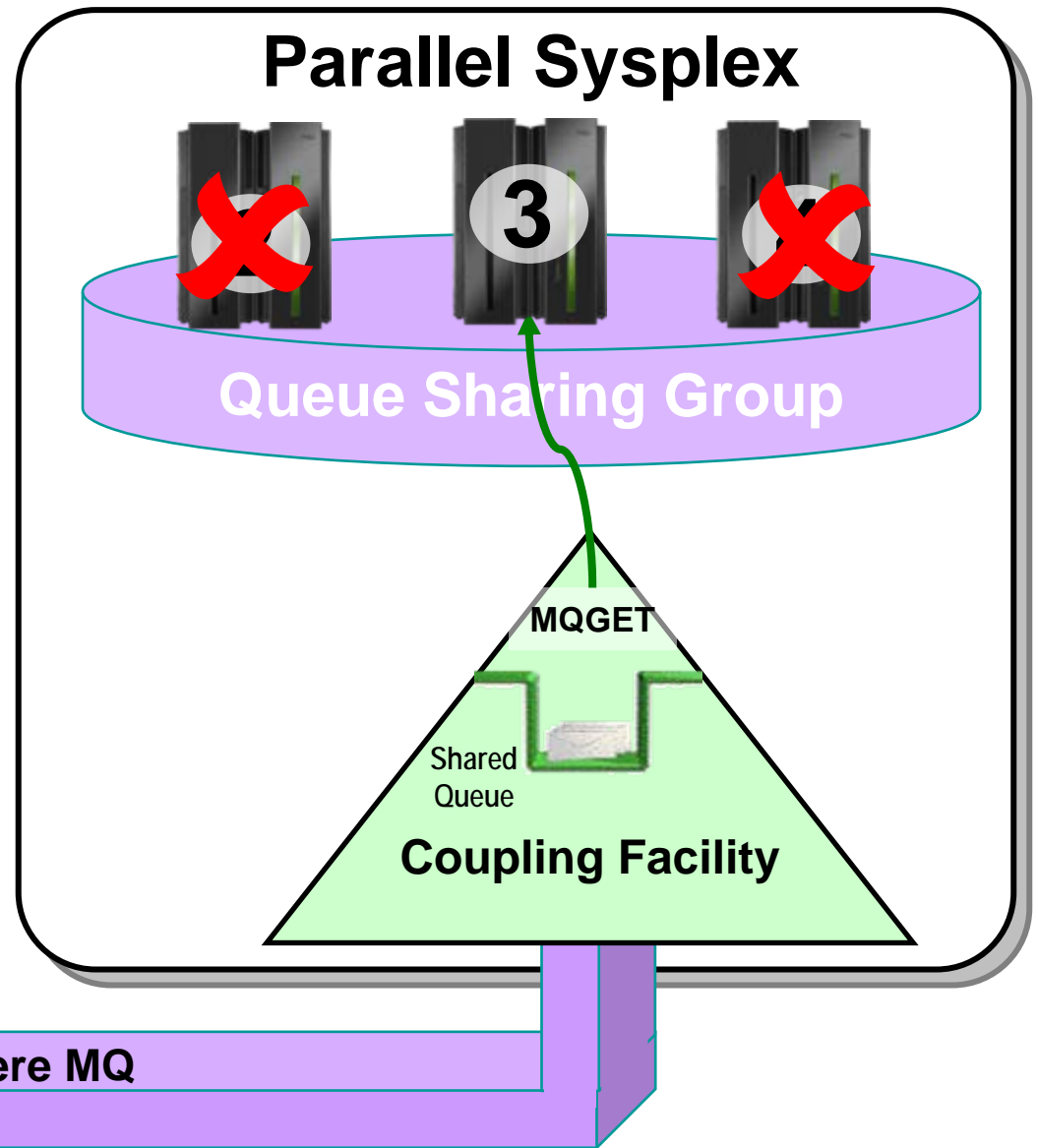
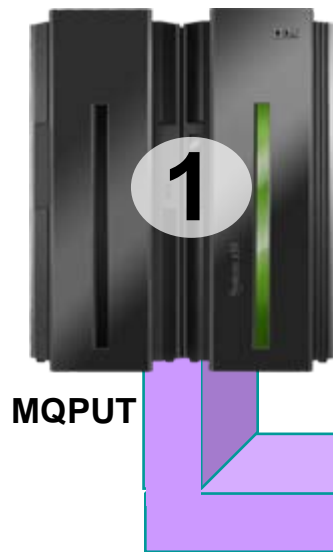
WebSphere MQ Shared Queues on z/OS

- Any processor can access the same queue
 - ▶ Queue sharing groups
- Exploits Parallel Sysplex
- Automatic load balancing
- Scalable throughput



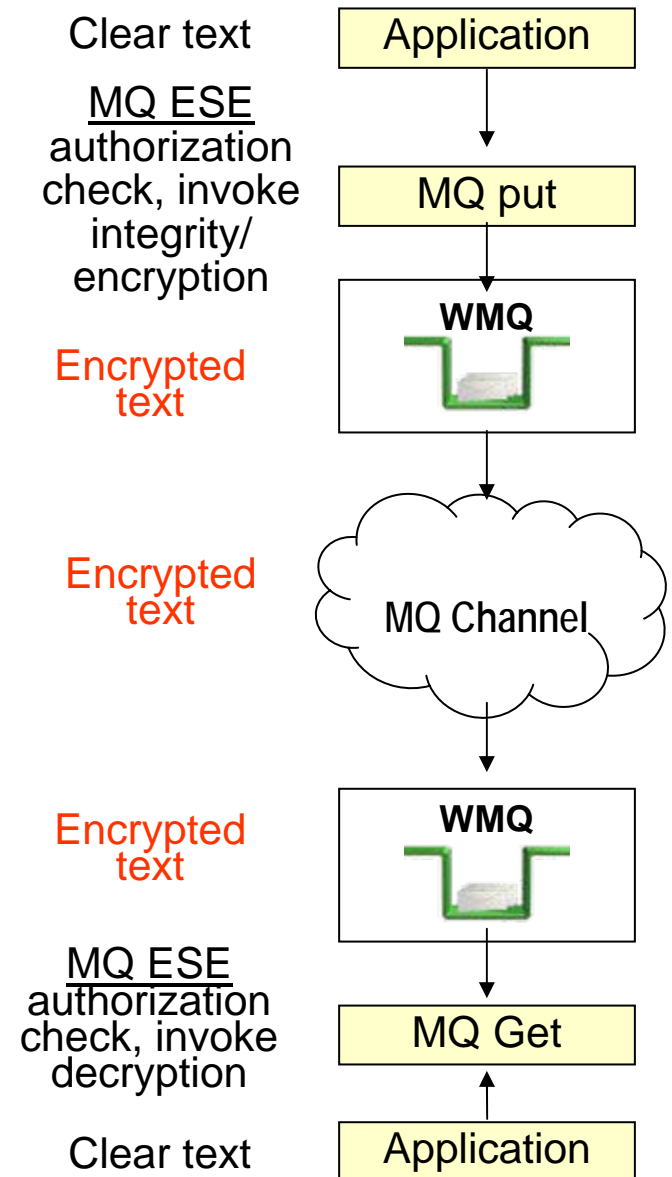
Shared Queues Enable High Availability

- Queue Manager failure
 - ▶ No messages marooned due to queue manager failure
- Leverages ARM (Automatic Restart Manager) for Queue Manager restart



WebSphere MQ Extended Security Edition for z/OS V6 Enhances Security and Compliance

- Protects message data end-to-end including when it resides in queues. 3 security levels:
 - ▶ None-authorization only
 - ▶ Integrity-attaches digital signatures to messages
 - ▶ Privacy-encrypt/decrypt
- Exploits System z cryptographic processor
- Simple upgrade on top of WebSphere MQ
 - ▶ Intercepts application message before it enters/leaves queues
- Provides key element of solution for Payment Card Industry (PCI) Data Security Standard (DSS)



Case Study: Mainframe Extension Solution – Communications Backbone

Existing Mainframe



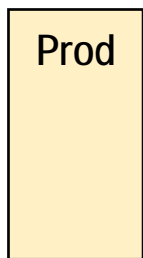
Existing z10:
2 GP 1,720 MIPS DB2
workload

Existing Disaster Recovery Site



Existing:
1 GP for hot disaster
switch-over
1 "dark" DR processors

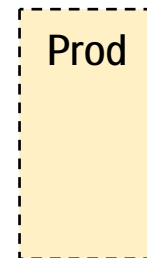
Add 1 LPAR for New WMB workload



1,132 MIPS
additional
workload

Incremental:
2 GP 1132 MIPS WMB, MQ, DB2
1 GB Memory

And Add Disaster Recovery

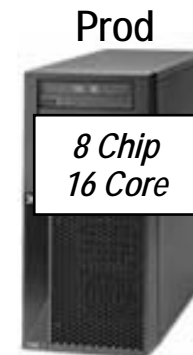


Capacity
Backup:
2 GP

3 year
cost of
acquisition
\$4.28M

Or add 2 HP 9000 rp7440 Servers With TIBCO BusinessWorks and Enterprise Message Service

And Add Disaster Recovery



3 year
cost of
acquisition
\$5.59M

HP DR solution is used in software and hardware

Communications Backbone Incremental Cost Breakdown

Mainframe Incremental Hardware

OTC		ANNUAL	
General Processor	\$1,981,000	Processor Maintenance * (For year 2, 3)	\$105,955
Memory (1 GB)	\$6,000		
DR Processors	\$42,000		
TOTAL	\$2,029,000	TOTAL	\$105,955 (year 2, 3)

Mainframe Incremental Software

OTC		ANNUAL	
WebSphere Message Broker	\$533,520	WebSphere Message Broker S&S	\$133,380
		DB2 MLC x12	\$145,176
		z/OS MLC x12	\$76,056
		MQ MLCx12	\$146,028
TOTAL	\$533,520	TOTAL	\$500,640

Distributed Incremental Hardware

OTC		ANNUAL	
HP Processors-Production	\$754,622	Processor Maintenance	\$86,935
HP Processors-DR	\$452,773	(prepaid in year 1 for 3 years)	
TOTAL	\$1,207,395	TOTAL	\$260,804 (year 1)

Distributed Incremental Software

OTC		ANNUAL	
Oracle SE	\$65,625	Oracle S&S	\$14,438
Unix	\$50,208	Unix S&S	\$18,774
TIBCO EMS & MQ Adapter	\$136,666	(Prepaid in year 1 for 3 years)	
TIBCO BusinessWorks	\$2,133,334	EMS/MQ Ada S&S	\$32,800
		TIBCO BusinessWorks S&S	\$512,000
TOTAL	\$2,385,833	TOTAL	\$615,560 (year 1)
			\$559,238 (year 2, 3)

* Mainframe Processor Maintenance includes the maintenance for general purpose processors and specialty engines

