IBM®

Session Title:
WebSphere MQ Series for z/VSE

Session ID: zDO04

Wilhelm Mild, IBM

Authorized
IBM | Training

Trademarks

The following are trademarks of the International Business Machines Corporation in the United States and/or other countries.

CICS*	System Storage
DB2*	System z
Enterprise Storage Server*	System z9
IBM*	TotalStorage*
IBM eServer	WebSphere*
IBM logo*	z/OS*
IMS	z/VSE
MQ*	zSeries*
OMEGAMON*	
Parallel Sysplex*	

* Registered trademarks of IBM Corporation

The following are trademarks or registered trademarks of other companies.

Intel is a trademark of Intel Corporation in the United States, other countries, or both.

Java and all Java-related trademarks and logos are trademarks of Sun Microsystems, Inc., in the United States and other countries

Linux is a registered trademark of Linus Torvalds in the United States, other countries, or both.

UNIX is a registered trademark of The Open Group in the United States and other countries.

Microsoft, Windows and Windows NT are registered trademarks of Microsoft Corporation.

Red Hat, the Red Hat "Shadow Man" logo, and all Red Hat-based trademarks and logos are trademarks or registered trademarks of Red Hat, Inc., in the United States and other countries.

* All other products may be trademarks or registered trademarks of their respective companies.

Notes:

Performance is in Internal Throughput Rate (ITR) ratio based on measurements and projections using standard IBM benchmarks in a controlled environment. The actual throughput that any user will experience will vary depending upon considerations such as the amount of multiprogramming in the user's job stream, the I/O configuration, the storage configuration, and the workload processed. Therefore, no assurance can be given that an individual user will achieve throughput improvements equivalent to the performance ratios stated here.

IBM hardware products are manufactured from new parts, or new and serviceable used parts. Regardless, our warranty terms apply.

All customer examples cited or described in this presentation are presented as illustrations of the manner in which some customers have used IBM products and the results they may have achieved. Actual environmental costs and performance characteristics will vary depending on individual customer configurations and conditions.

This publication was produced in the United States. IBM may not offer the products, services or features discussed in this document in other countries, and the information may be subject to change without notice. Consult your local IBM business contact for information on the product or services available in your area.

All statements regarding IBM's future direction and intent are subject to change or withdrawal without notice, and represent goals and objectives only.

Information about non-IBM products is obtained from the manufacturers of those products or their published announcements. IBM has not tested those products and cannot confirm the performance, compatibility, or any other claims related to non-IBM products. Questions on the capabilities of non-IBM products should be addressed to the suppliers of those products.

Prices subject to change without notice. Contact your IBM representative or Business Partner for the most current pricing in your geography.

Topics

- **Fundamentals of Message Queuing**

- **WebSphere MQ for z/VSE Version 3.0**

- **Modern Solutions with WMQ for z/VSE**

Topics

- **Fundamentals of Message Queuing**

  ► **What is message queuing**

  ► **Types of implementations**
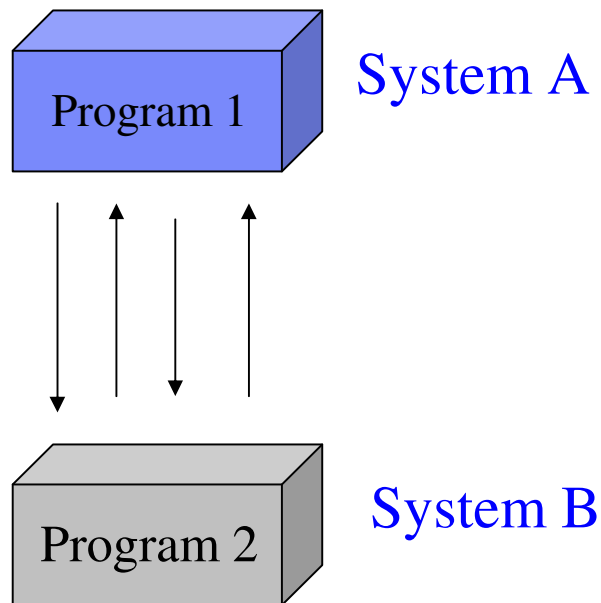
- **WebSphere MQ for z/VSE Version 3.0**

- **Modern Solutions with WMQ for z/VSE**
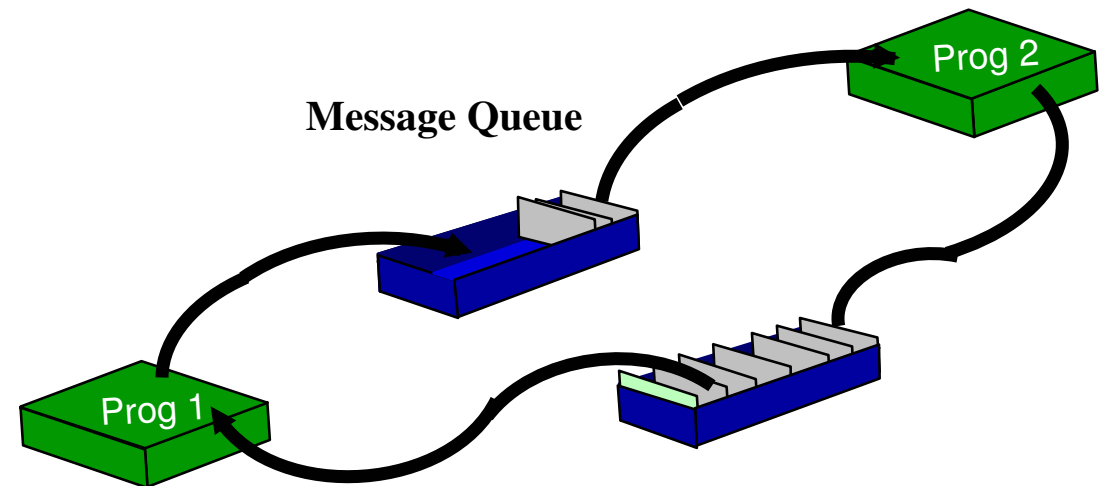
The Inter Program Communication Methods

Direct Communication

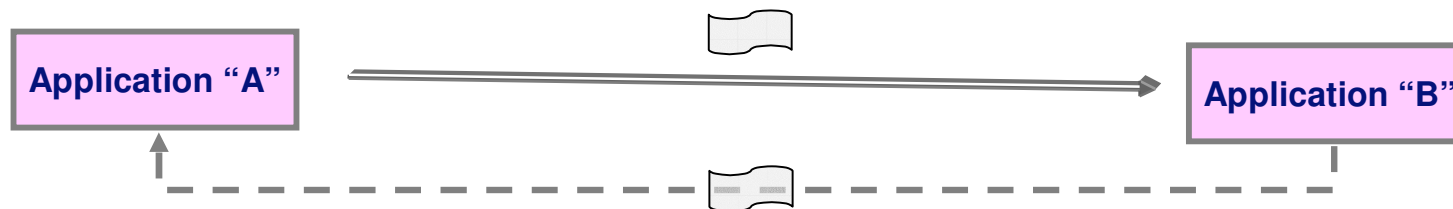- Program Call / Response
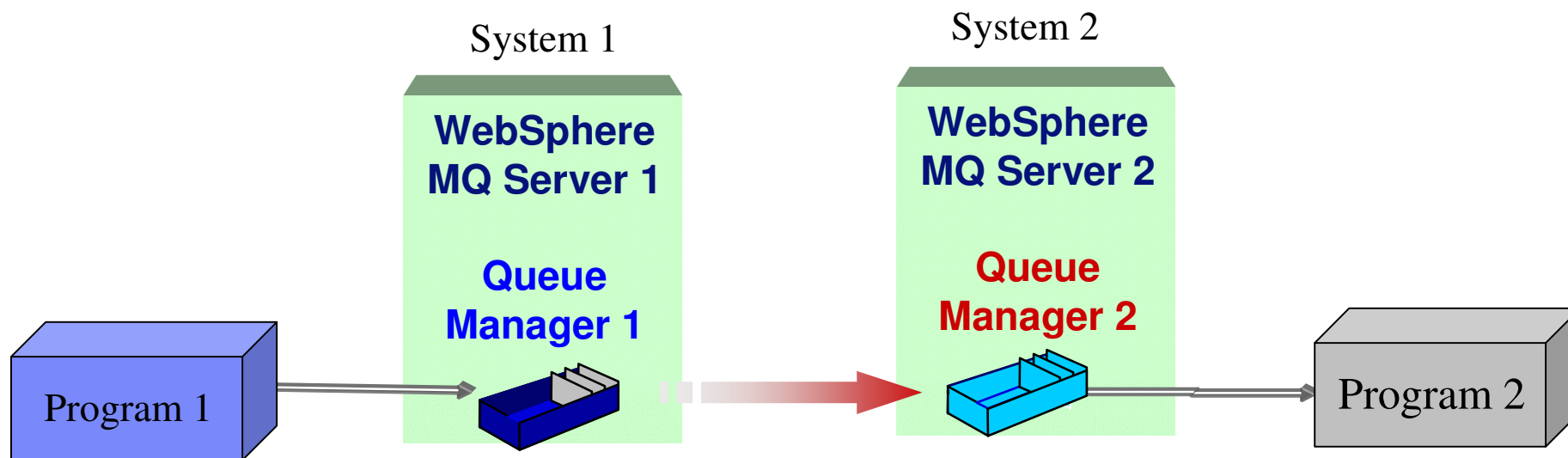- RPC Remote Procedure Call

Program 1

System A

System B

Program 2

Asynchronous Communication

- Using **Message Queuing**
  (no direct program invocation)

Message Queue

Prog 1

Prog 2

Message Queuing Overview
(1) WebSphere MQ Server – Server scenario

System 1

System 2

WebSphere
MQ Server 1

Queue
Manager 1

WebSphere
MQ Server 2

Queue
Manager 2

Program 1

Program 2

Application "A"

Application "B"

Message Queuing Overview
(2) WebSphere MQ Client – Server scenario

System 1

System 2

WebSphere
MQ Client

Remote
Queue 1
Definition

WebSphere
MQ Server 2

Queue
Manager

Program 1

Program 2
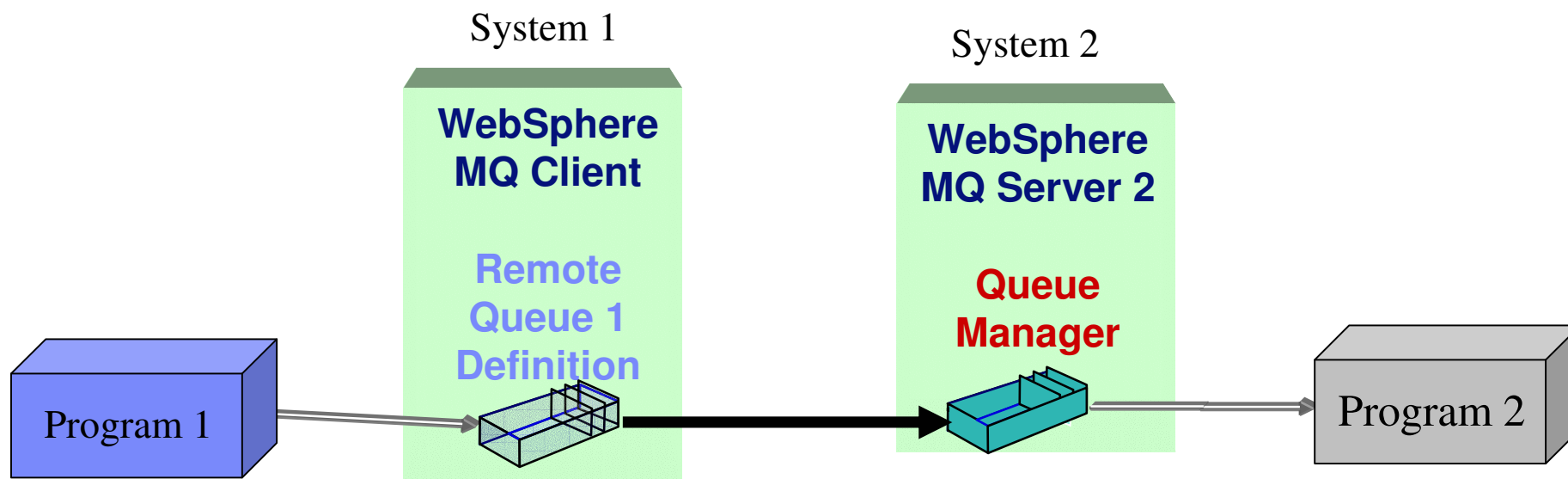
Why are interfaces so expensive to build and maintain?
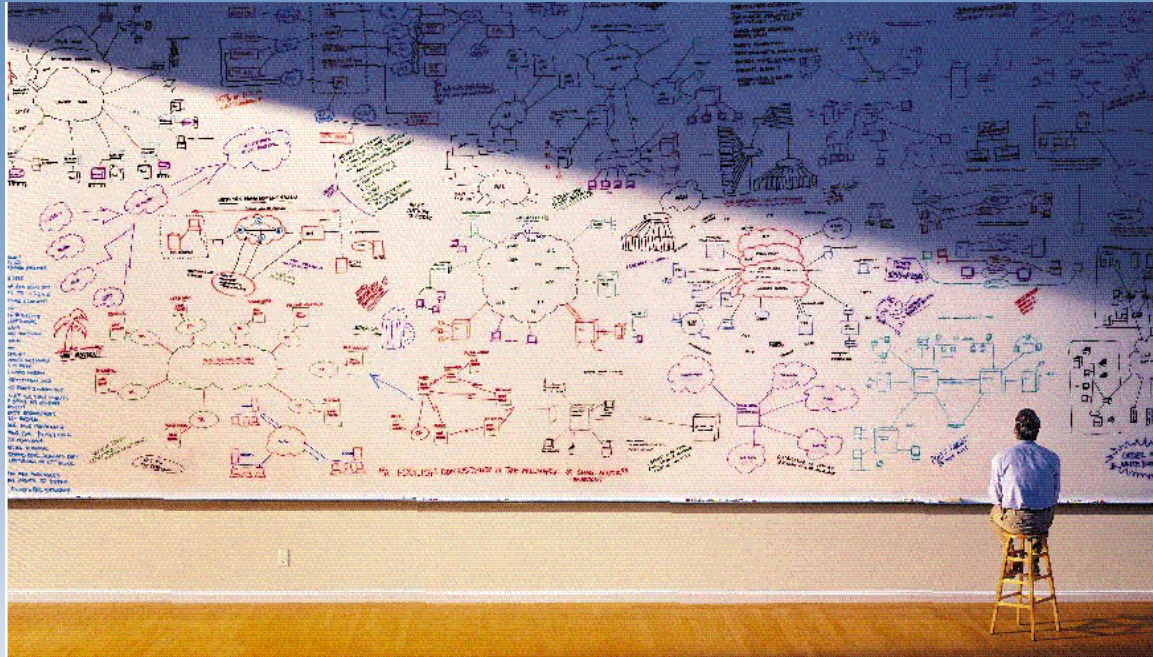
- Application interface logic is intertwined with business logic.

- The more tightly integrated the interface the more difficult the application is to change.

- The more interfaces that exist within a set of programs, the more complex the application becomes -- interface logic may, in many cases, exceed business logic.

- In such circumstances, re-use becomes difficult and impractical.

WebSphere MQ Series Characteristics.

- Helps to integrate platforms like CICS, DB2®, Microsoft® .NET and J2EE™ environments

- The most reliable method of program communications with:

  - ▶ asynchronous and synchronous communication mode

  - ▶ guaranteed delivery between WebSphere MQ Servers

  - ▶ ensured, only once delivery

- Support for more than 80 platform configurations, including native z/VSE and z/OS support
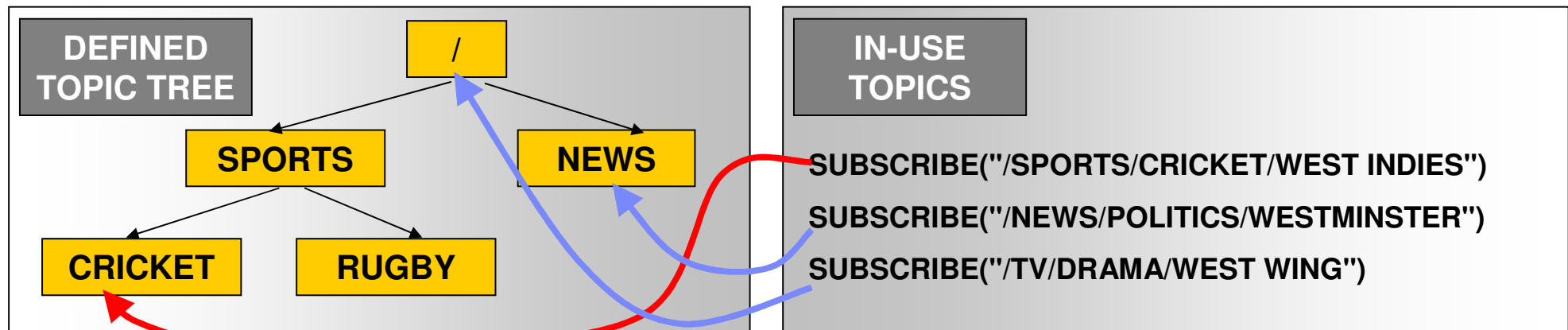
WebSphere MQ Series Characteristics.

- Supports both de facto standard interfaces for message queuing:

  ► Message Queue Interface (MQI) interface,

  ► Java Messaging Services (JMS) interface,

- Supports secure communication with standard Secure Sockets Layer (SSL)

- Integrated publish-and-subscribe support

- Includes Eclipse tooling to configure WebSphere MQ network remotely

- Integrated support for Web services, to bring reliability, visibility and audit ability to SOAP interactions

- Provides a messaging backbone for deploying an Enterprise Service Bus (ESB) as the connectivity layer of an Service Oriented Architecture (SOA)

Publish / Subscribe - Enabling Flexible Delivery

Publish-and-Subscribe

- ► **Dynamic and flexible way of determining where messages are sent**

- ► **Helps reduce the cost, time and skills when changes are required**

- ► **Helps define new paths of information flow in an ad hoc manner**

DEFINED TOPIC TREE	IN-USE TOPICS

```
              /
         /        \
     SPORTS        NEWS
     /    \
CRICKET    RUGBY
```

SUBSCRIBE("/SPORTS/CRICKET/WEST INDIES")

SUBSCRIBE("/NEWS/POLITICS/WESTMINSTER")

SUBSCRIBE("/TV/DRAMA/WEST WING")

Centralized Configuration & Administration

- **Logically centralized configuration of remote, distributed backbone**

- **Remotely view & configure entire backbone – including z/VSE**
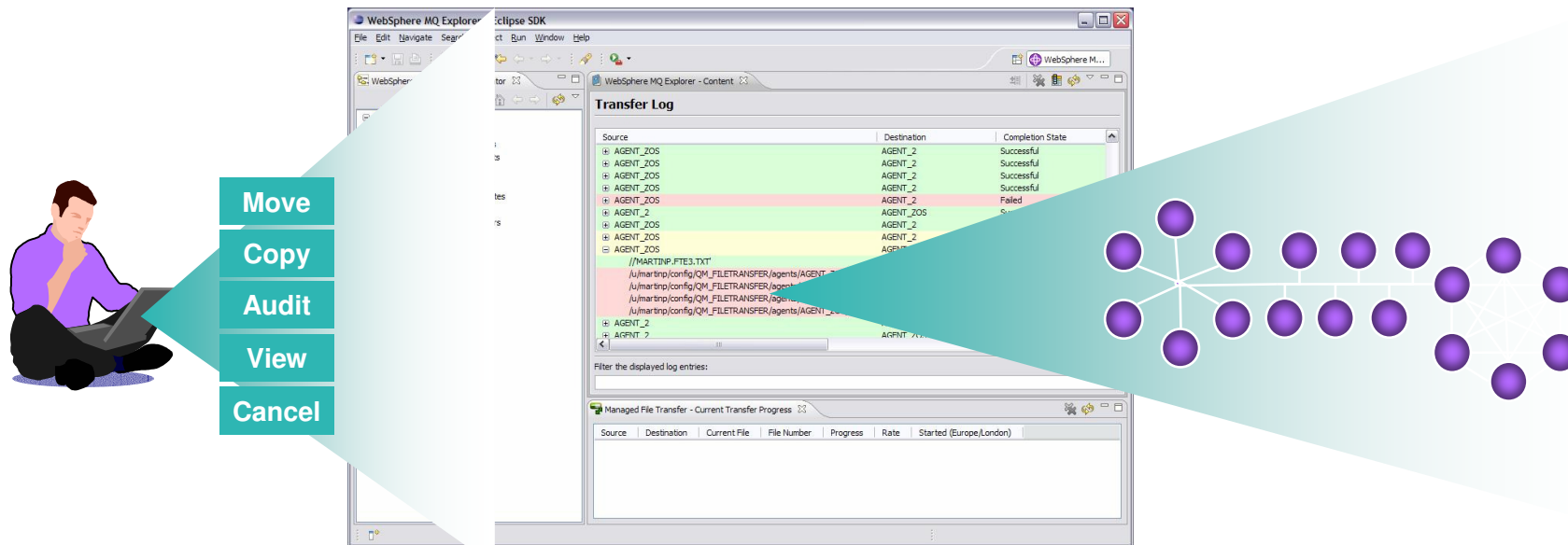
SOA MESSAGING BACKBONE

- **Visual display at a glance**

- **Eclipse-based environment**

- **Extensible and customizable**

- **Remote connection from Linux x86 and Windows**

- **SSL secured connections**

Topics

- **Fundamentals of Message Queuing**

→ - **WebSphere MQ for z/VSE Version 3.0**

- **Modern Solutions with WMQ for z/VSE**

What's new in WebSphere MQ for z/VSE V3R0

- **New Version:**
  - ▶ **available since 19 of December 2008**
  - ▶ **The program number is: 5655-U97-00-300**

- **Rebranded:**
  - ▶ **WebSphere MQ for z/VSE V3.0**

- **Compatibility**
  - ▶ WebSphere MQ for z/VSE V3.0 can participate in distributed queuing solutions with all currently supported V5, V6, and V7 WebSphere MQ products on all supported platforms, and with the existing MQSeries for VSE/ESA V2.1.2 product.

- **Hardware Requirements**
  - ▶ All Hardware for supported z/VSE Releases
    - IBM System z10 EC and BC
    - IBM System z9 EC and BC,
    - zSeries 890 and 990, zSeries 800 and 900,
    - S/390® Multiprise 3000
    - S/390 Parallel Enterprise Server™—Generation 5 and 6

What's new in WMQ for z/VSE V3R0

- **Software Requirements**

  ► z/VSE 4.1 or later

    - CICS/VSE 2.3 or CICS TS 1.1, or later
    - VTAM for z/VSE 4.2 or
    - TCP/IP for z/VSE 1.5F (or equivalent), or later
    - Language Environment for z/VSE 1.4.4 Runtime library, or later

  ► WebSphere MQ Clients:

    - WebSphere MQ for z/VSE V3.0 supports clients that connect using TCP/IP.

  Note:- The latest maintenance for these requirements is strongly recommended

  - As prerequisite software levels become out-of-service, it is strongly recommended that customers upgrade to supported levels of all prerequisite software.

What's new in WMQ for z/VSE V3R0

- Server and Requester channels

  ▶ **additional channel types to request messages from remote systems, rather than wait for those systems to activate the flow.**

The following combinations of channels are valid:

Sender	**->**	**Receiver**
Sender	**->**	**Requester**
Server	**->**	**Receiver**
Server	**->**	**Requester**
Requester	**->**	**Sender**
Requester	**->**	**Server**
Client	**->**	**Server-connection**

Server and Requester channels

Sender -> Receiver is unchanged
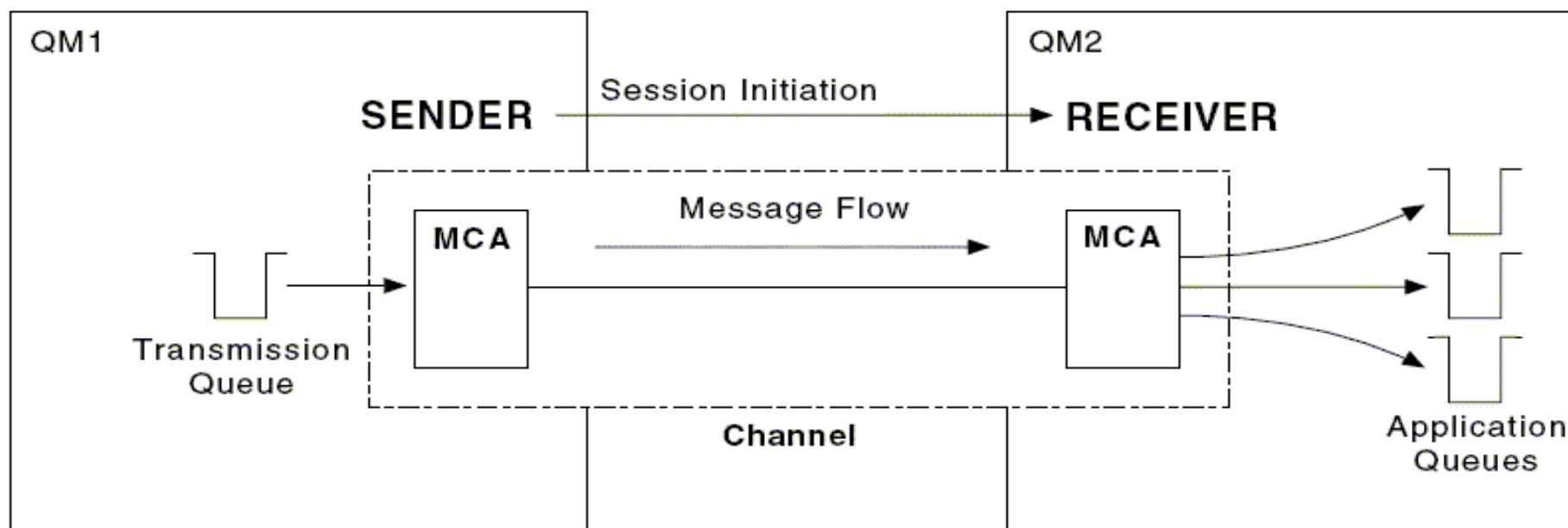
What's new in WMQ for z/VSE V3R0

Server and Requester channels

Server -> Requester can be started in either direction; the messages flow from server to requester
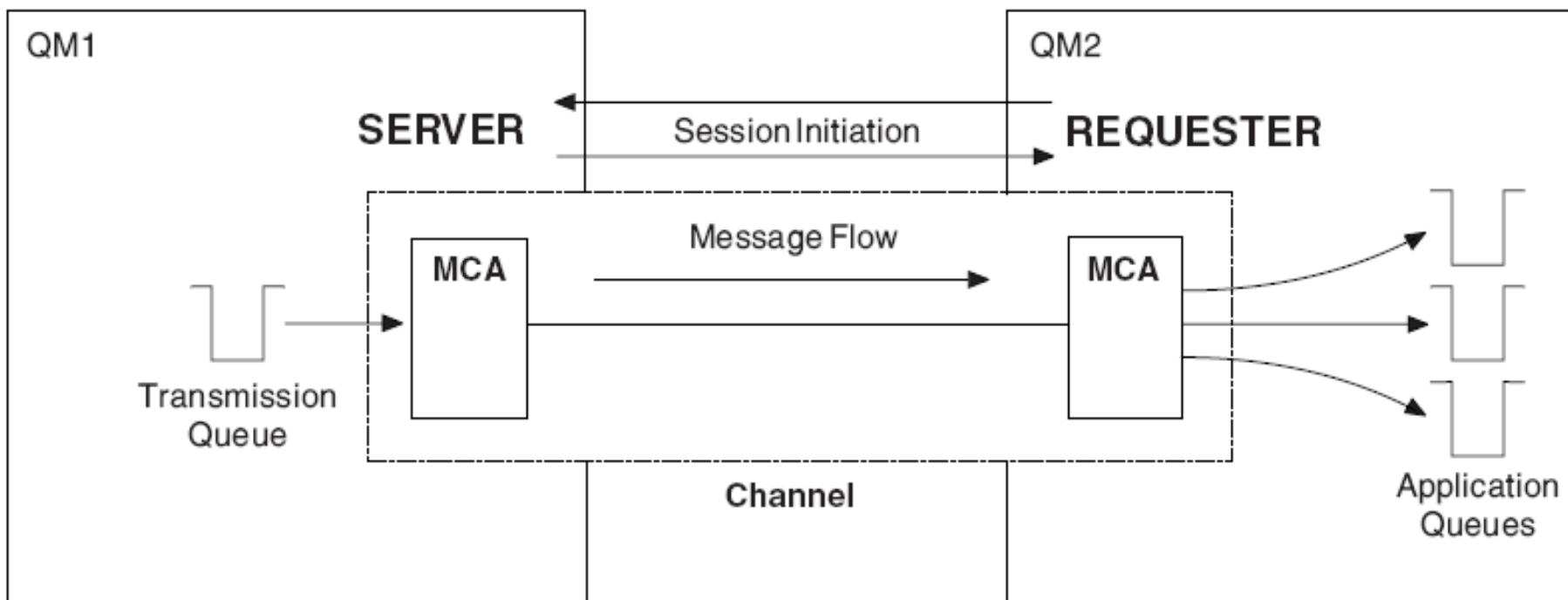
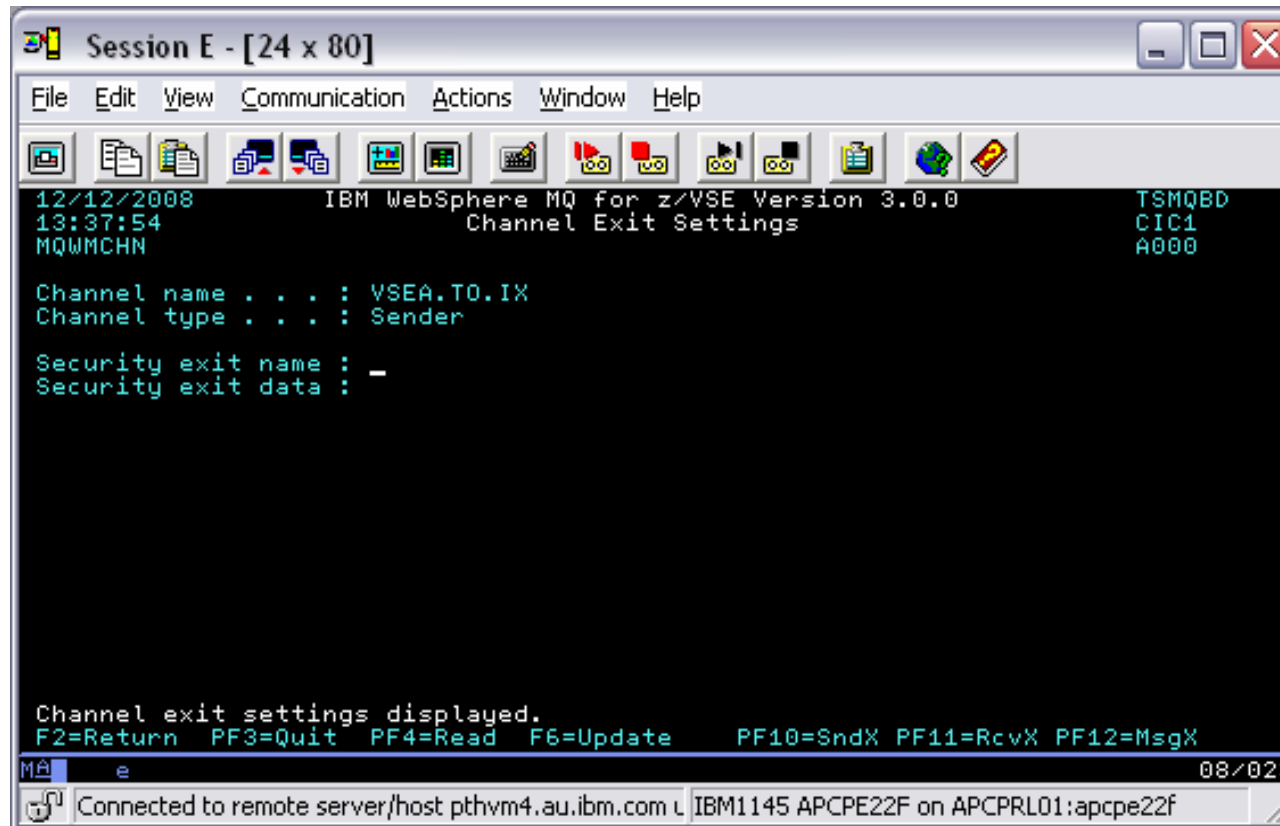# What's new in WMQ for z/VSE V3R0

Server and Requester channels

A Requester can start a Sender channel
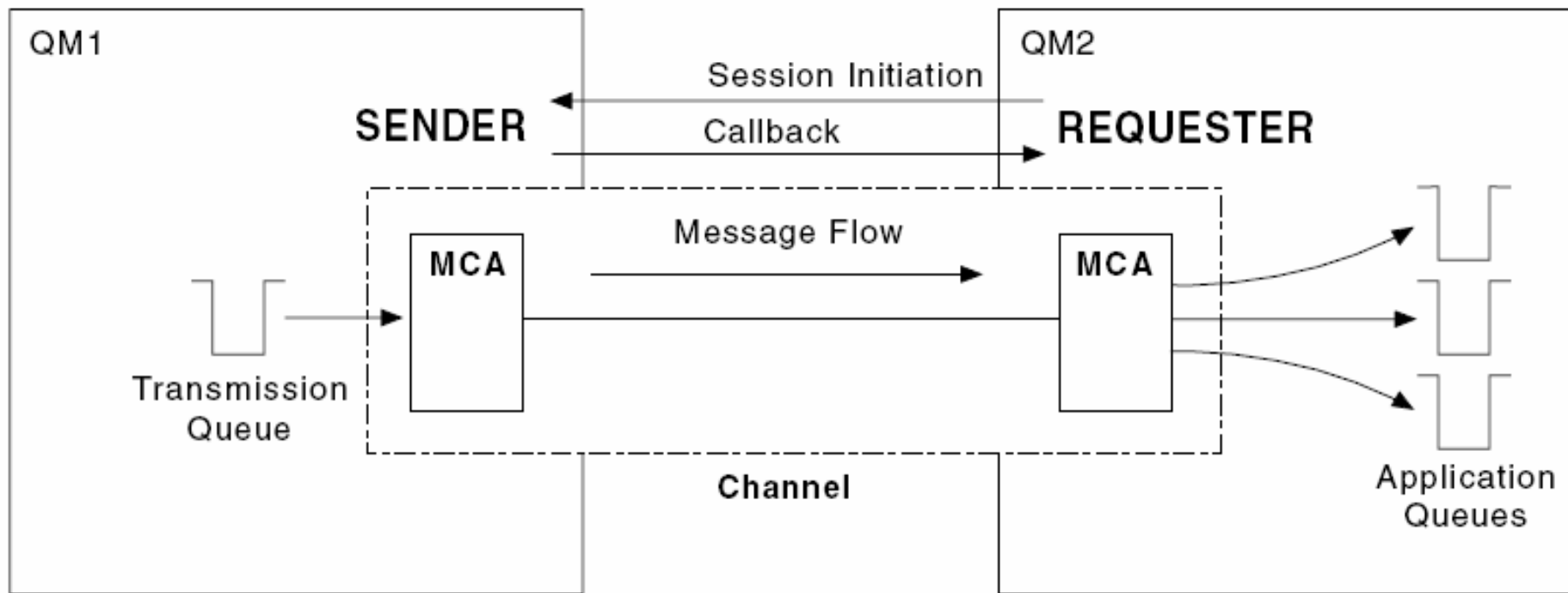
What's new in WMQ for z/VSE V3R0

- Chained channel exits

    ► Channel-exit programs for Message Channel Agent (MCA) programs. These communications facilitate remote queuing and client connectivity. WebSphere MQ for z/VSE supports a chain of up to eight send, receive, and message exits.

The channel definition screen now has additional PF key options to configure the chained exits

←

Chained channel exits

You can now configure up to 8 Send, receive and message exits with associated exit data.

What's new in WMQ for z/VSE V3R0

API exits

►Allow to change the behaviour of WebSphere MQ API calls, before or immediately after those calls. WebSphere MQ for z/VSE supports a chain of up to eight API exits.

API exits can be configured from the Global System Definition screen by using PF12

←

API exits

You can configure up to 8 API exits which are called in the order listed.
API exits are called when an application issues an MQCONN request.

What's new in WMQ for z/VSE V3R0

API exits

❖ Need to be configured in WMQ for z/VSE.

❖Are called when an application issues an MQCONN call

❖ Each exit is expected to use the supplied MQXEP() call to register functions that are to be called before and/or after relevant MQI calls.

❖ An API exit environment exists for each active connection and is released when the application issues an MQDISC call.

What's new in WMQ for z/VSE V3R0

- Channel batch interval
  - ► The batch interval is a period of time, in milliseconds, during which the channel will keep a batch open even if there are no messages on the transmission queue.

Batch interval is a new attribute on the channel definition screen.

←

What's new in WMQ for z/VSE V3R0

- Channel batch interval

  ▶ The batch interval is a period of time, in milliseconds, during which the channel will keep a batch open even if there are no messages on the transmission queue.

- Performance improvements

  ▶ Performance improvements were done specifically in the area of MQI operation. Logic paths and the use of resources have been reduced to improve message throughput.

- WMQ Explorer support

  ▶ A graphical tool to perform administration tasks. It is in an style based on the Eclipse framework. This interface support now remote administration of both MQSeries for VSE V2.1.2 and WebSphere MQ for z/VSE V3.0.

What's new in WMQ for z/VSE V3R0

Graphical administration of WebSphere MQ for z/VSE Queues with WMQ Explorer
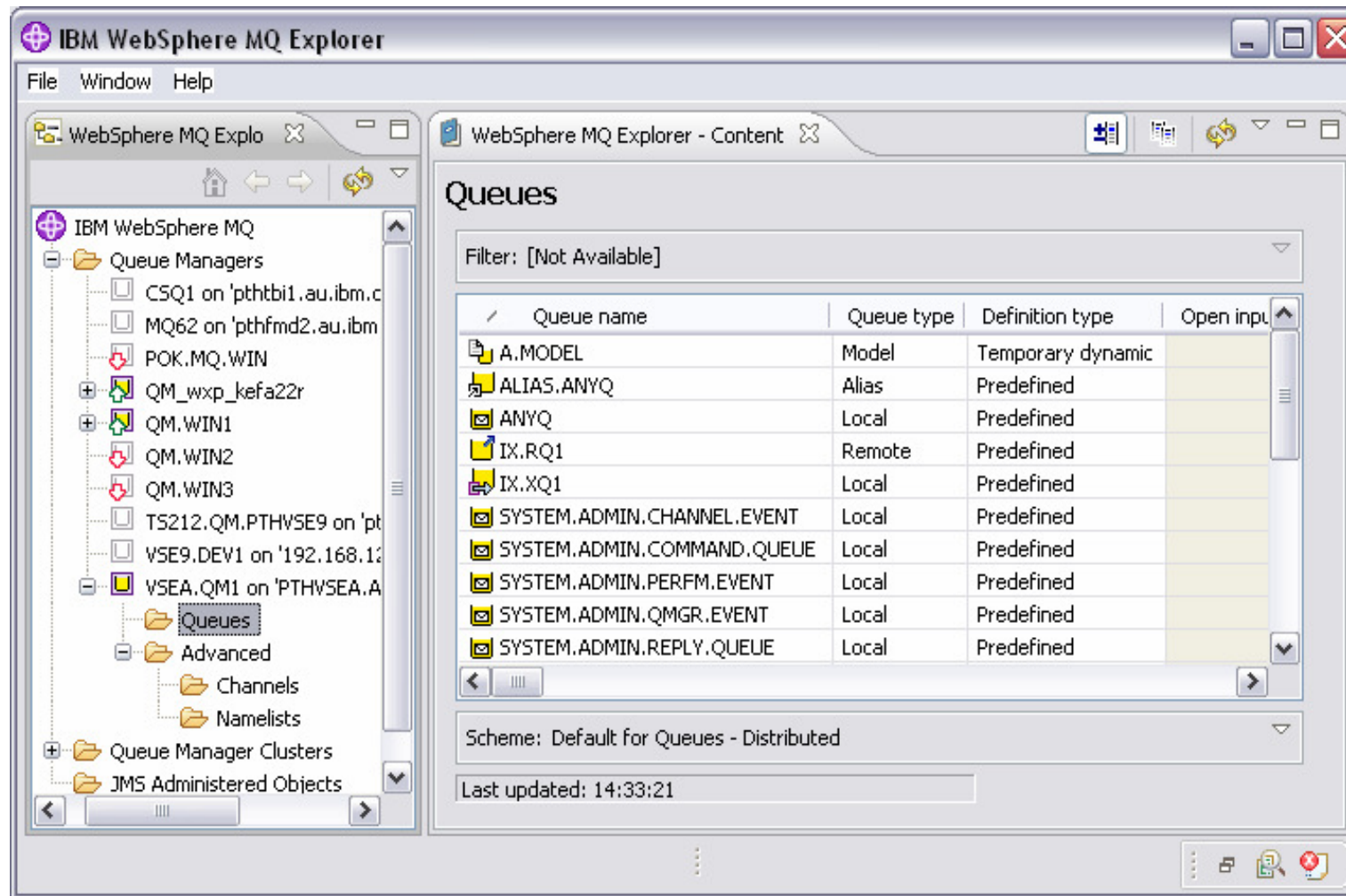
You can use Explorer to administer the z/VSE queue manager, its queues, channels and namelists, including create, delete, modify and display.

Secured communication

- **WMQ V3 for z/VSE can communicate secured via SSL connections**

WMQ for z/VSE Server or Client	SSL	T C P / I P		T C P / I P	SSL	MQ Server

MQ Channel
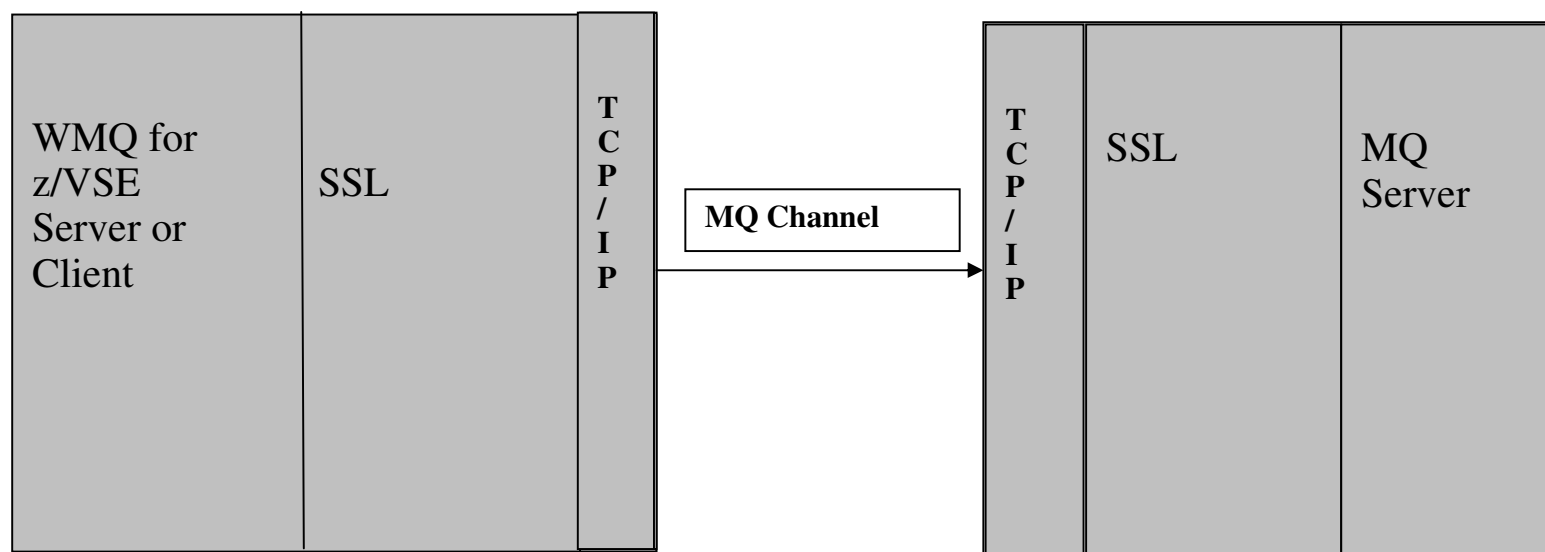
Compatibility and migration

WebSphere MQ for z/VSE V3.0 can participate in distributed message queuing solutions with all supported V5, V6, and V7 WebSphere MQ products and with the existing MQSeries for VSE V2.1.2 product.

WebSphere MQ interfaces for z/VSE applications:
- CICS MQI (this is the normal interface usable by CICS applications)
- Batch Interface (this is usable by applications running in a local non-CICS environment)
- MQ Client (this is usable by LE VSE applications running in CICS or non-CICS)
- MQ Client Bridge (this is for non-LE VSE applications running in a non-CICS environment)

Note:
- Applications from MQSeries for VSE/ESA V2.1.2 can be migrated without change.
- Configurations from V2.1.2 can be used with V3, however, you must run the MQJSETUP.Z job followed by the MQSU transaction after installation of the V3 product.

Integration of VSE Programs with MQ Series
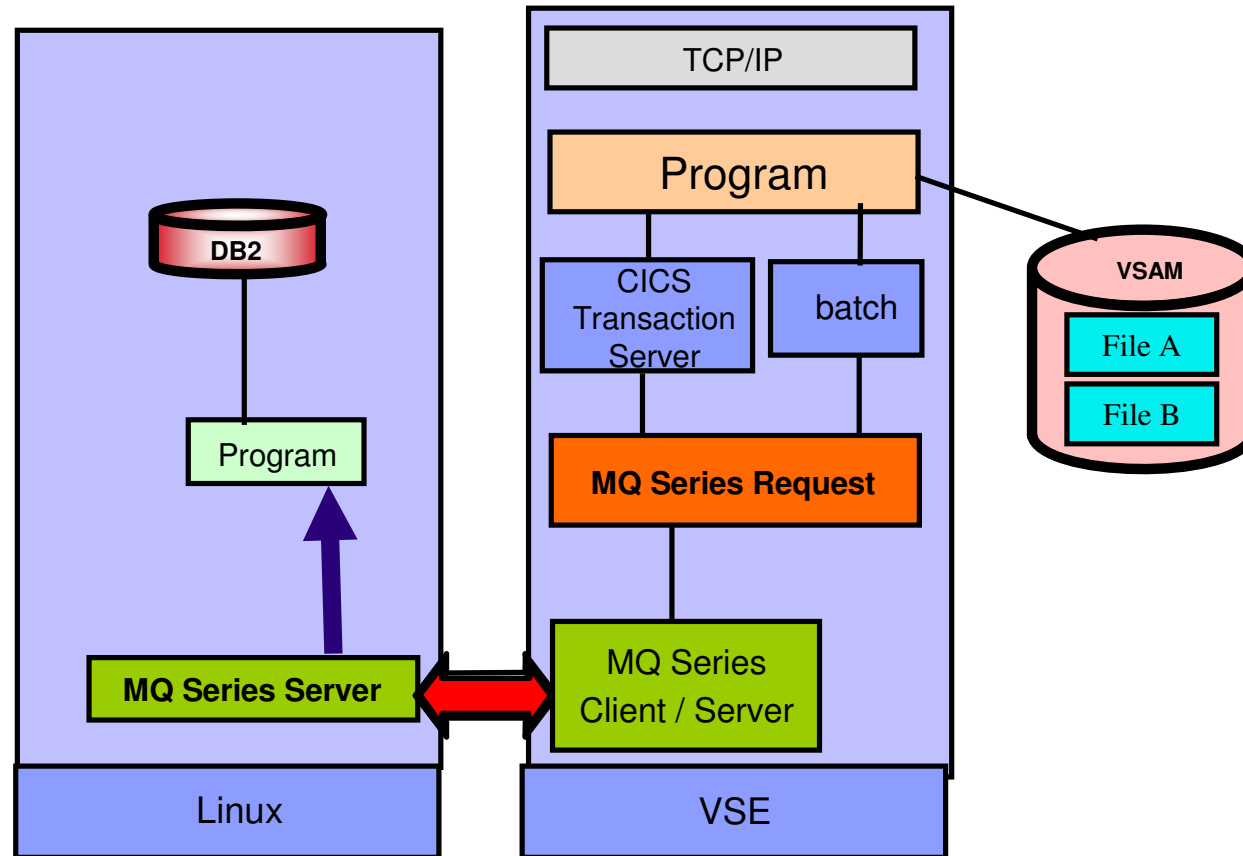
- ► Data distribution via MQ Series technology
- ► VSE programs have to write MQ messages
- ► WebSphere MQ Series Client for VSE – cost effective enablement for MQ environments and modern solutions

Topics

- **Fundamentals of Message Queuing**

- **WebSphere MQ for z/VSE Version 3.0**

- **Modern Solutions with WMQ for z/VSE**

  - ► **DB2 Replication**

  - ► **VSAM Replication with WebSphere MQ**

  - ► **SOA Backbone solutions**

Application Integration with WebSphere MQ Series Solutions
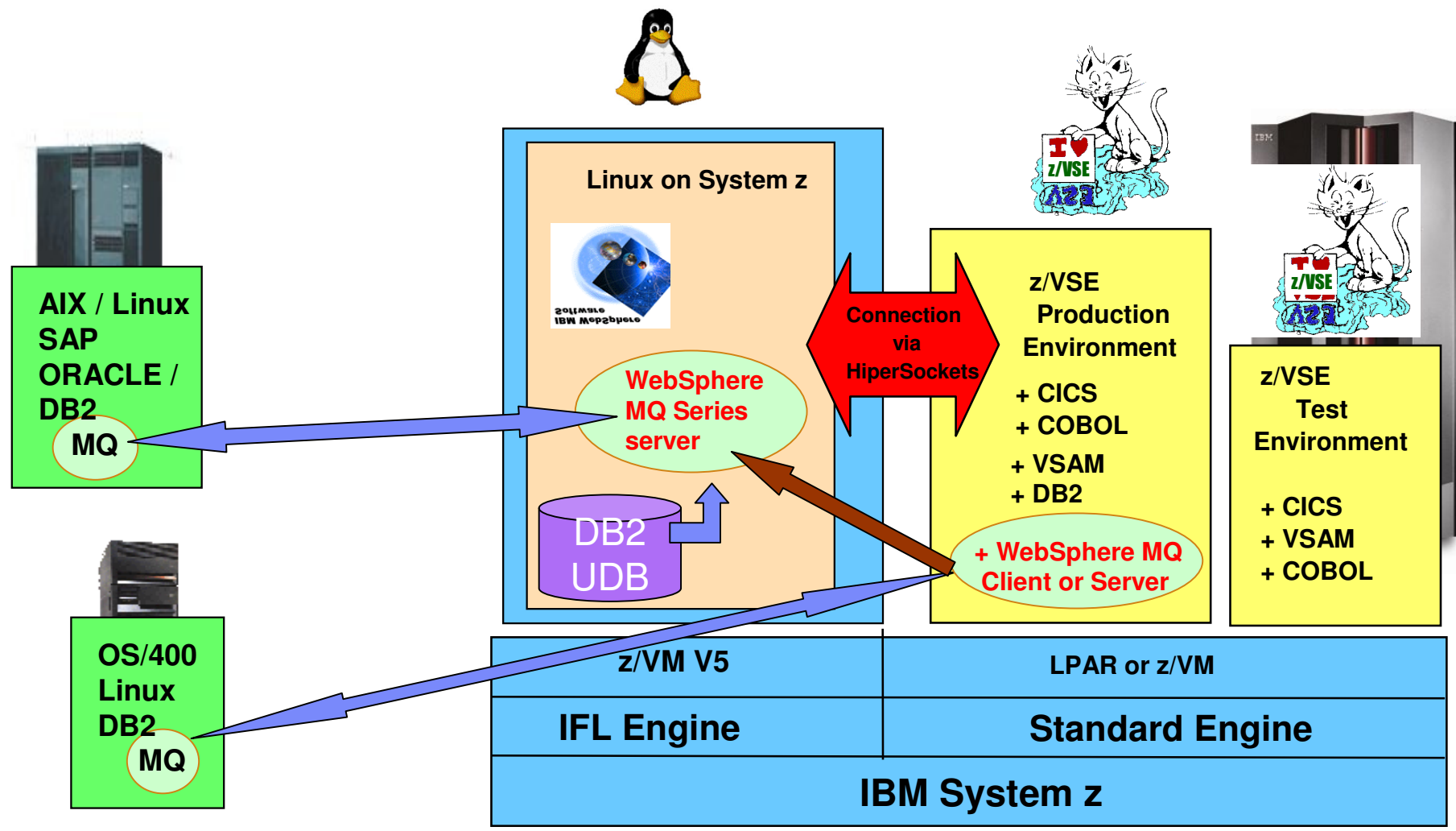
Solution 1:
DB2 Replication with WMQ using Queue Subscription
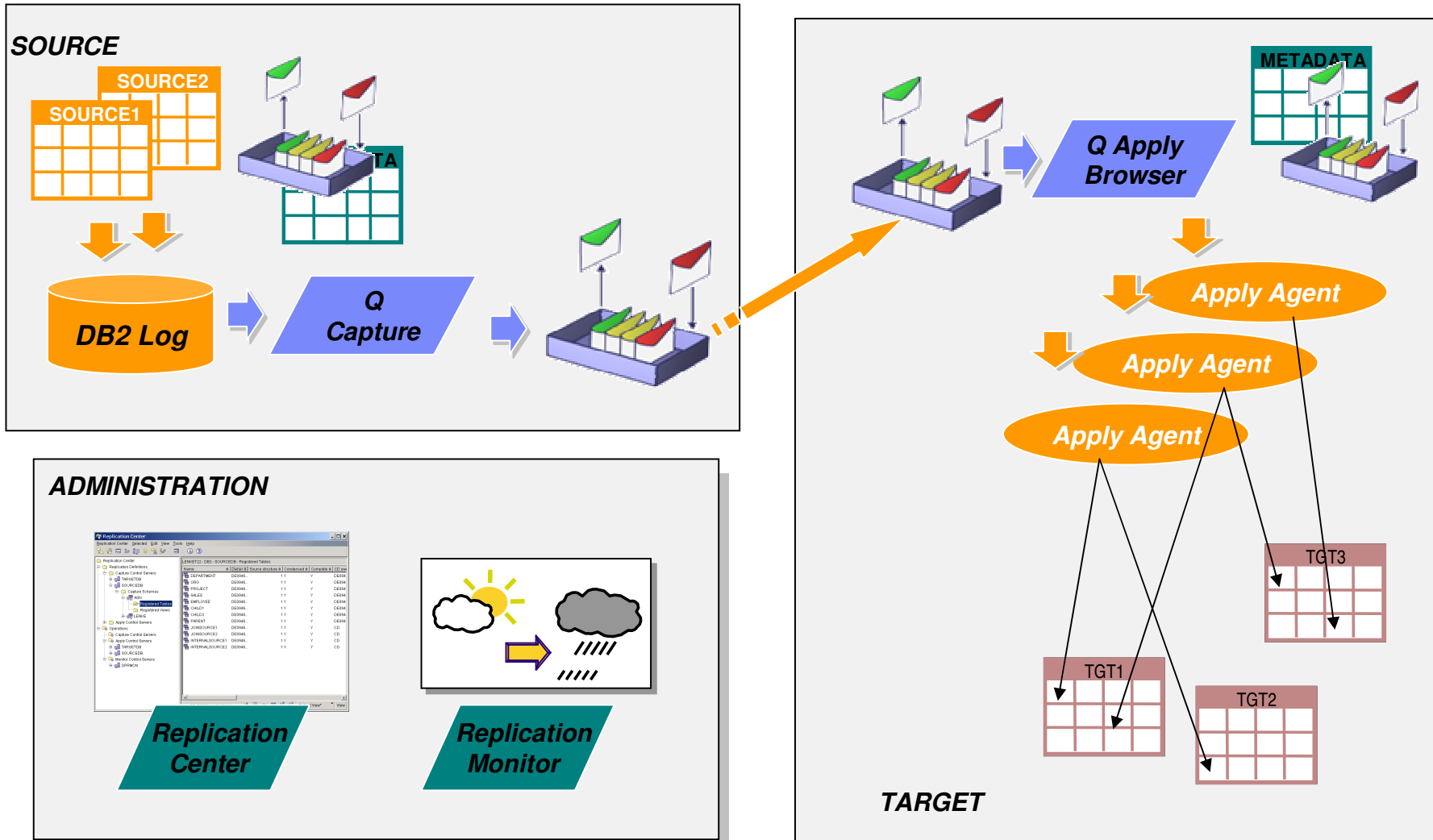
Implementation for ‚Q Replication' in VSE
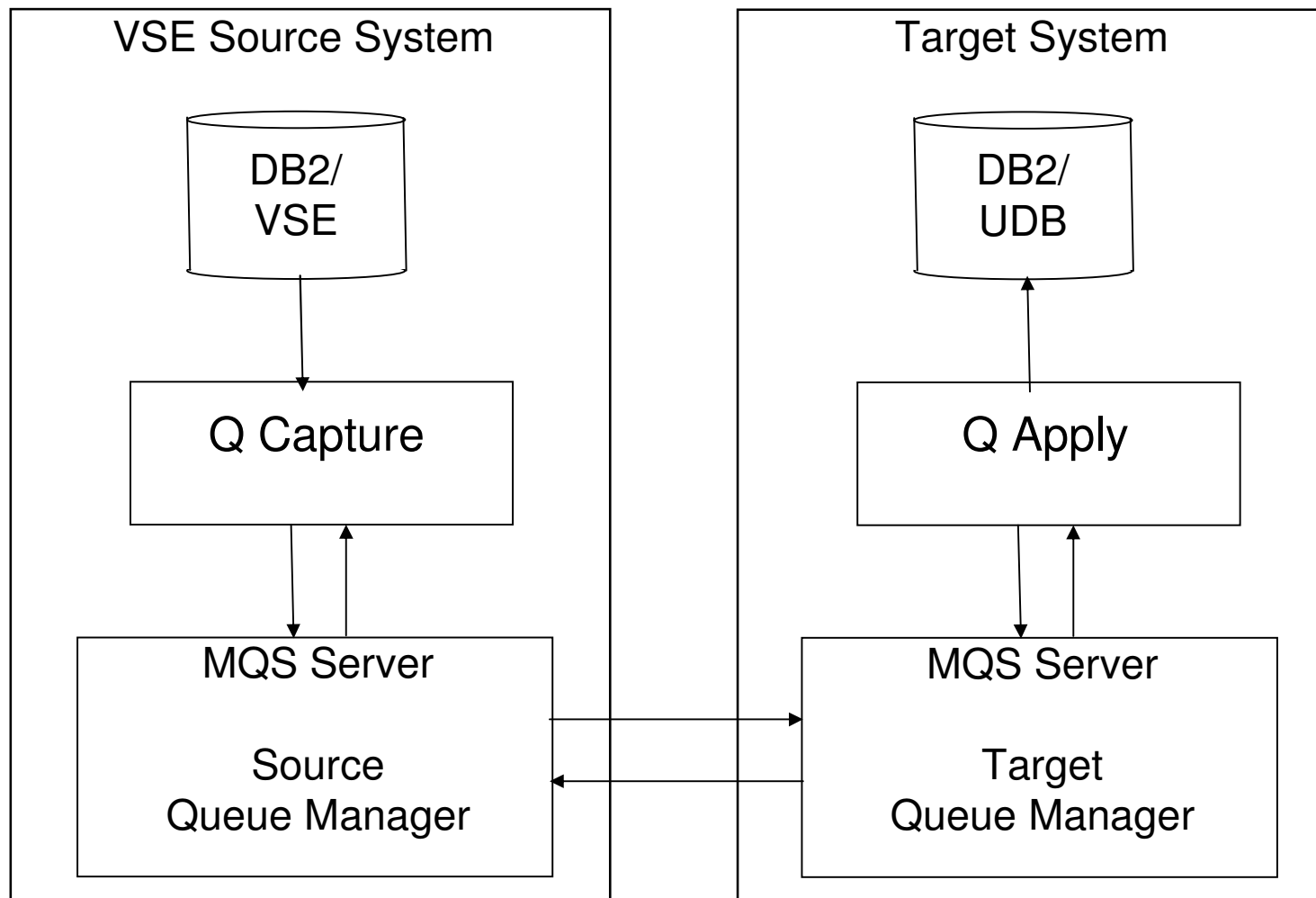
Implementation of 'Q Replication' in VM & VSE
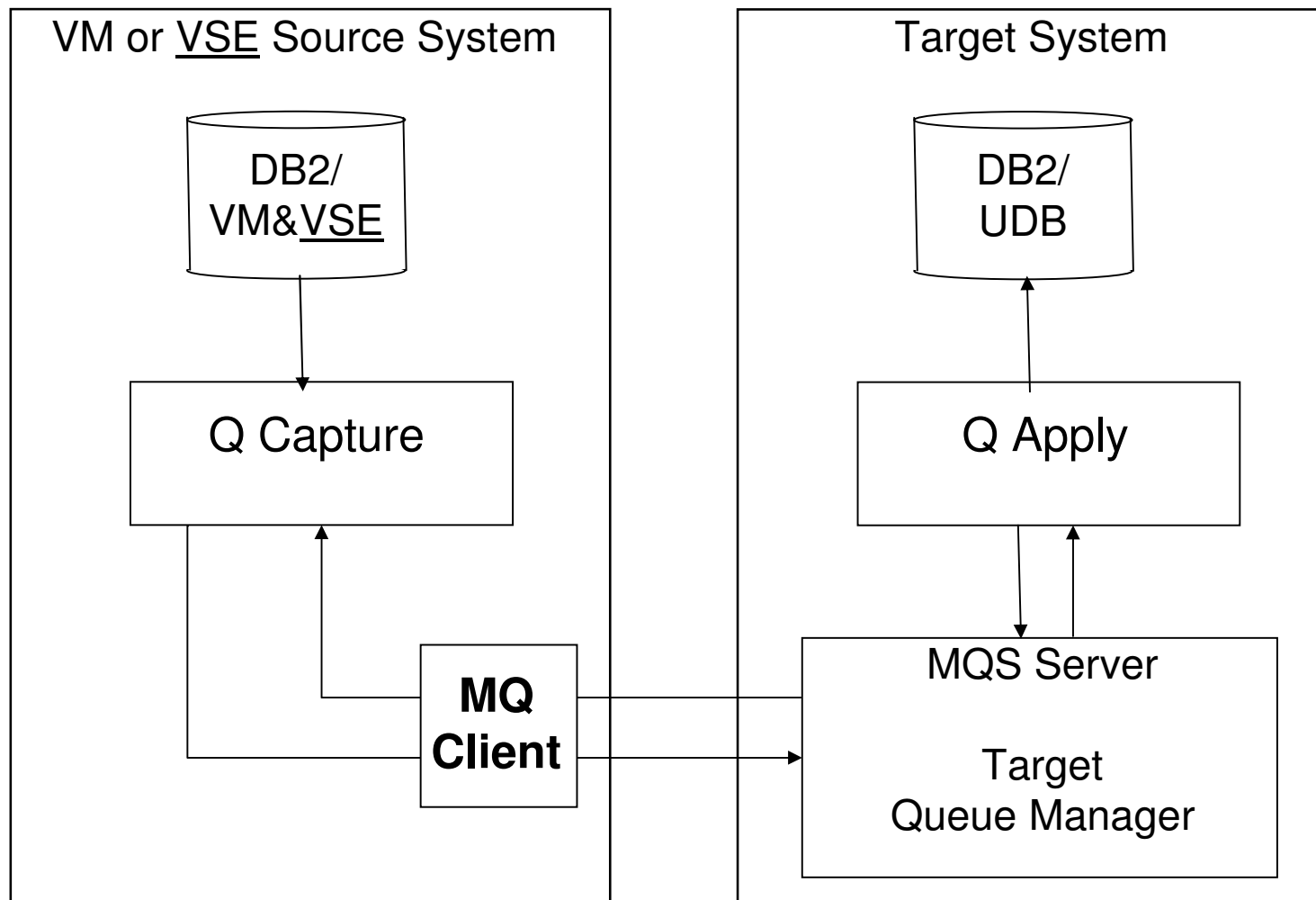
Solution 2: VSAM programs enablement for MQ solutions

System p

AIX / Linux SAP

MQ

DB2

System i

OS/400 Linux

MQ

DB2

Linux on zSeries

WebSphere MQ Series server

Connection via HiperSockets

z/VSE Production Environment
+ CICS
+ COBOL
+ VSAM

+ VSAM Redirector*

MQ Exit

WebSphere MQ Client or Server

z/VSE Test Environment

+ CICS
+ VSAM
+ COBOL

LPAR or z/VM

IFL Engine | Standard Engine

IBM System z
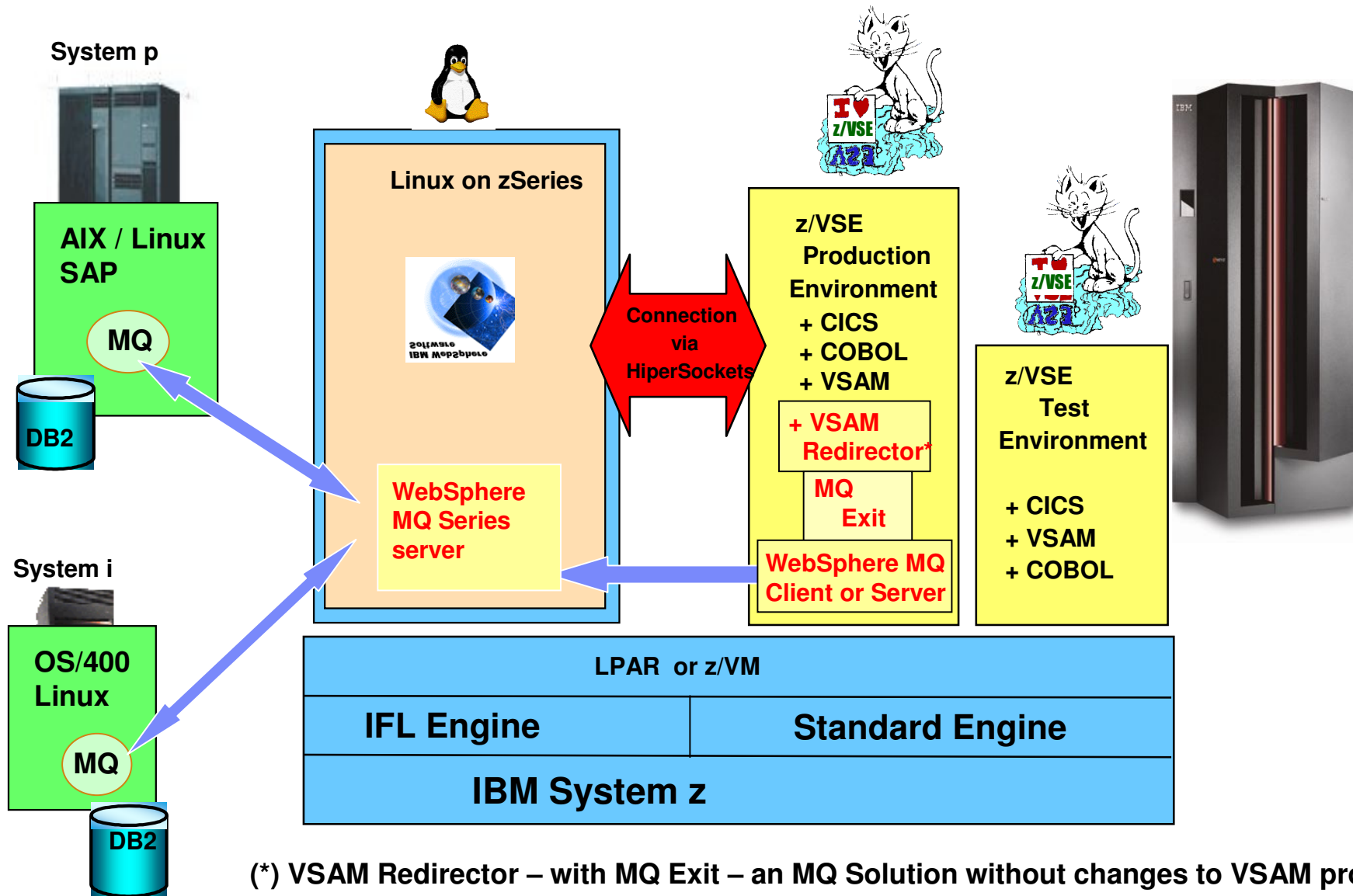
(*) VSAM Redirector – with MQ Exit – an MQ Solution without changes to VSAM programs

SOA Solutions:
IBM delivers *the* SOA Messaging Backbone

- **Via messaging portfolio of standalone and embedded services**

  - ► **Core is WebSphere MQ family**

  - ► **Continually evolving and expanding**

  - ► **Extensive IT environment coverage**

  - ► **Provides "MQ inside" SOA portfolio**

  - ► **Offers an integrated JEE experience**

  - ► **Shared within stack of SOA products**

WebSphere MQ
- *for z/OS*
- *for z/VSE*
- *Extended Security*
- *Everyplace/Mobile*
- *Telemetry Transport*
- *Low Latency Messaging*

WebSphere Transformation Extender

WebSphere ESB

WebSphere Application Server

WebSphere MQ family ◄► **Embedded Messaging**

SOA MESSAGING BACKBONE
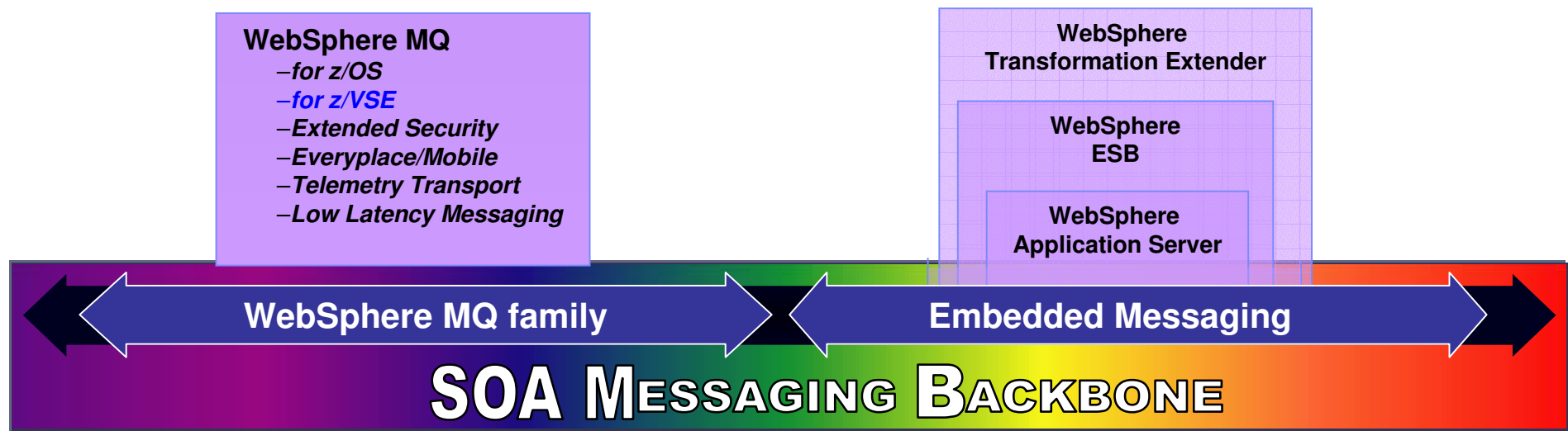
- **Seamless bridging and native links within messaging portfolio**

  - ► **Preserving reliability, transactionality and publish-and-subscribe spaces**

IBM's Vision – Messaging Backbone

- **Addressing the full spectrum of transport requirements**

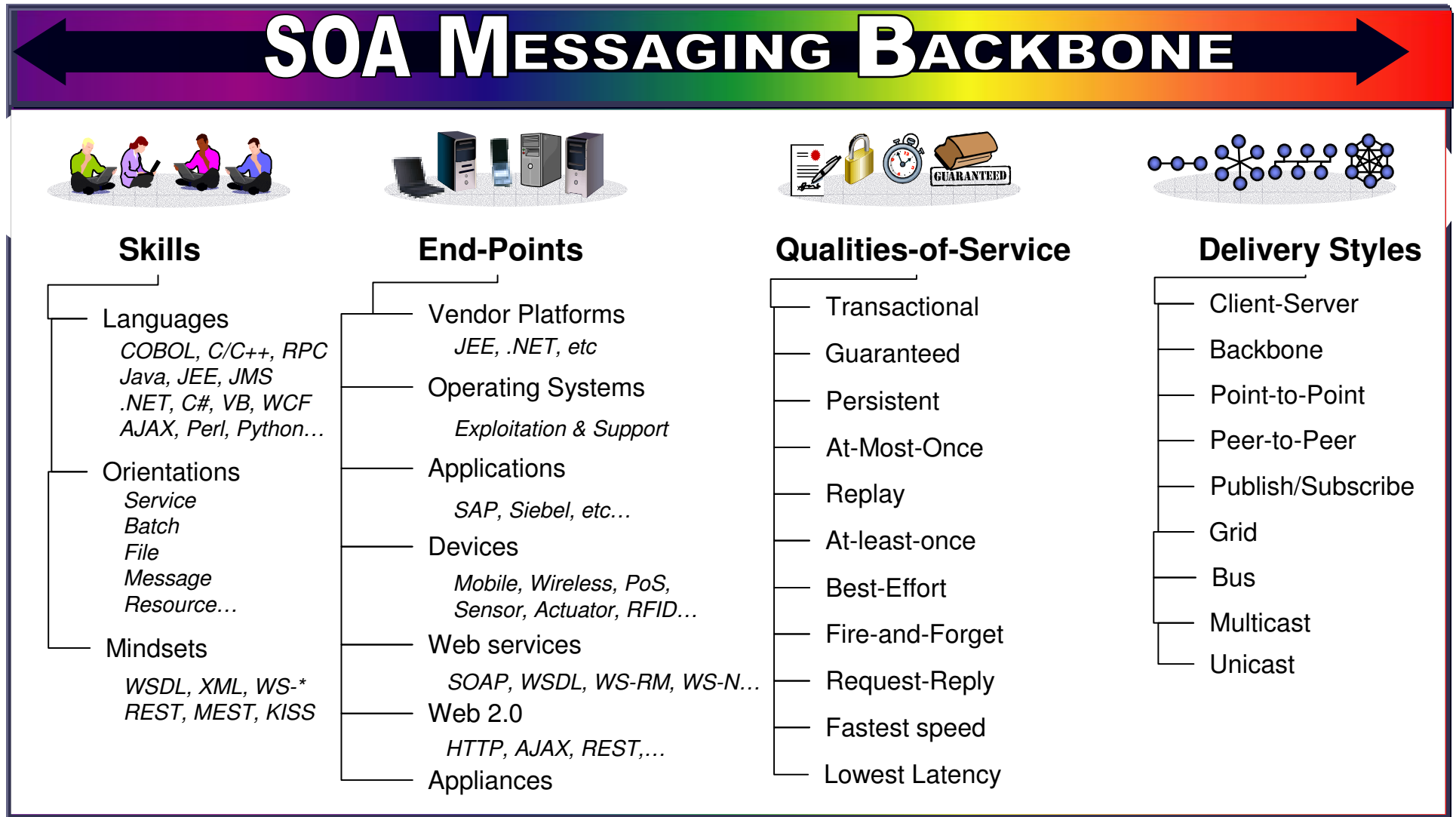## SOA MESSAGING BACKBONE

Skills

Languages
- COBOL, C/C++, RPC
- Java, JEE, JMS
- .NET, C#, VB, WCF
- AJAX, Perl, Python…

Orientations
- Service
- Batch
- File
- Message
- Resource…

Mindsets
- WSDL, XML, WS-*
- REST, MEST, KISS

End-Points

Vendor Platforms
- JEE, .NET, etc

Operating Systems
- Exploitation & Support

Applications
- SAP, Siebel, etc…

Devices
- Mobile, Wireless, PoS, Sensor, Actuator, RFID…

Web services
- SOAP, WSDL, WS-RM, WS-N…

Web 2.0
- HTTP, AJAX, REST,…

Appliances

Qualities-of-Service

- Transactional
- Guaranteed
- Persistent
- At-Most-Once
- Replay
- At-least-once
- Best-Effort
- Fire-and-Forget
- Request-Reply
- Fastest speed
- Lowest Latency

Delivery Styles

- Client-Server
- Backbone
- Point-to-Point
- Peer-to-Peer
- Publish/Subscribe
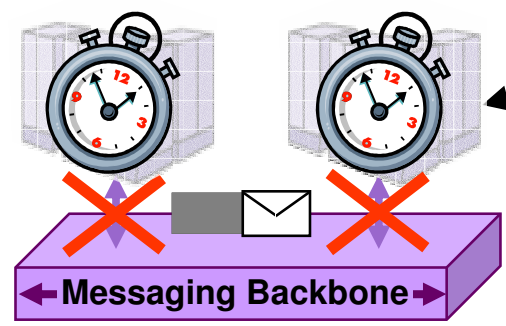- Grid
- Bus
- Multicast
- Unicast

SOA Messaging Backbone supporting range of Qualities-of-Service

SOA MESSAGING BACKBONE

Guaranteed delivery helps overcome availability losses and helps free up busy resources

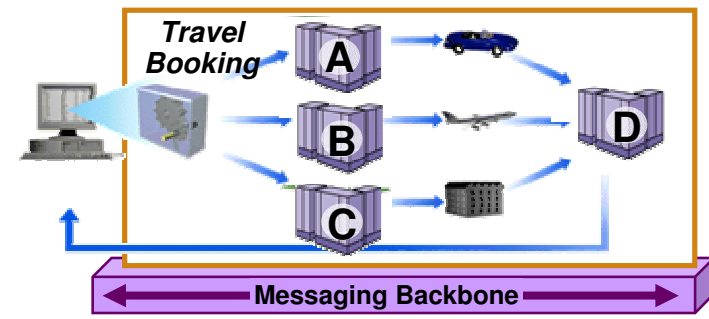*Time-Independent (Asynchronous) Delivery helps overcome all these situations*

Messaging Backbone

Qualities-of-Service

- Transactional
- Guaranteed
- Persistent

At Most Once

Delivery Styles

Client-Server

Backbone

Point-to-Point

Peer-to-Peer

Transactionality preserves the integrity of applications and data

Travel Booking

A

B

C

D

Messaging Backbone

Solution 3: Message Workflow handling
The Message Broker

- Distributes information and data generated by business events in real time to applications, and devices throughout your enterprise and beyond.

- Using WebSphere Message Broker decouples the applications.

  ► Application A writes a message into a queue QA.

  ► Application B reads its messages from the queue QB and application C reads its messages from the queue QC.

  ► These applications do not have to be aware of each other and their used format. The message mediation, routing and transformation is done by the WebSphere Message Broker.
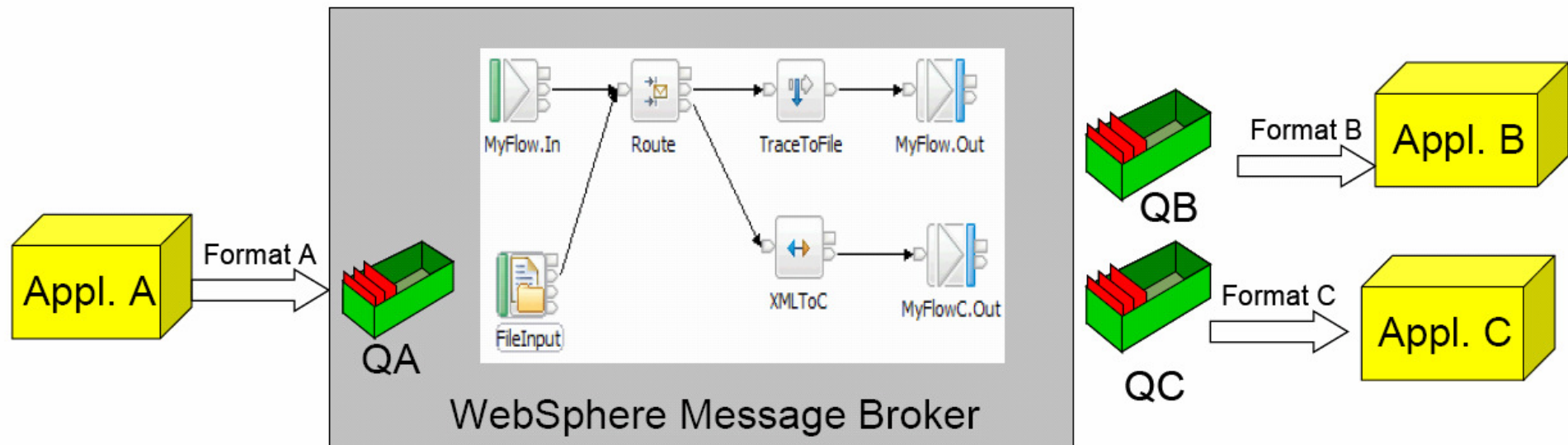
WebSphere Message Broker Flow
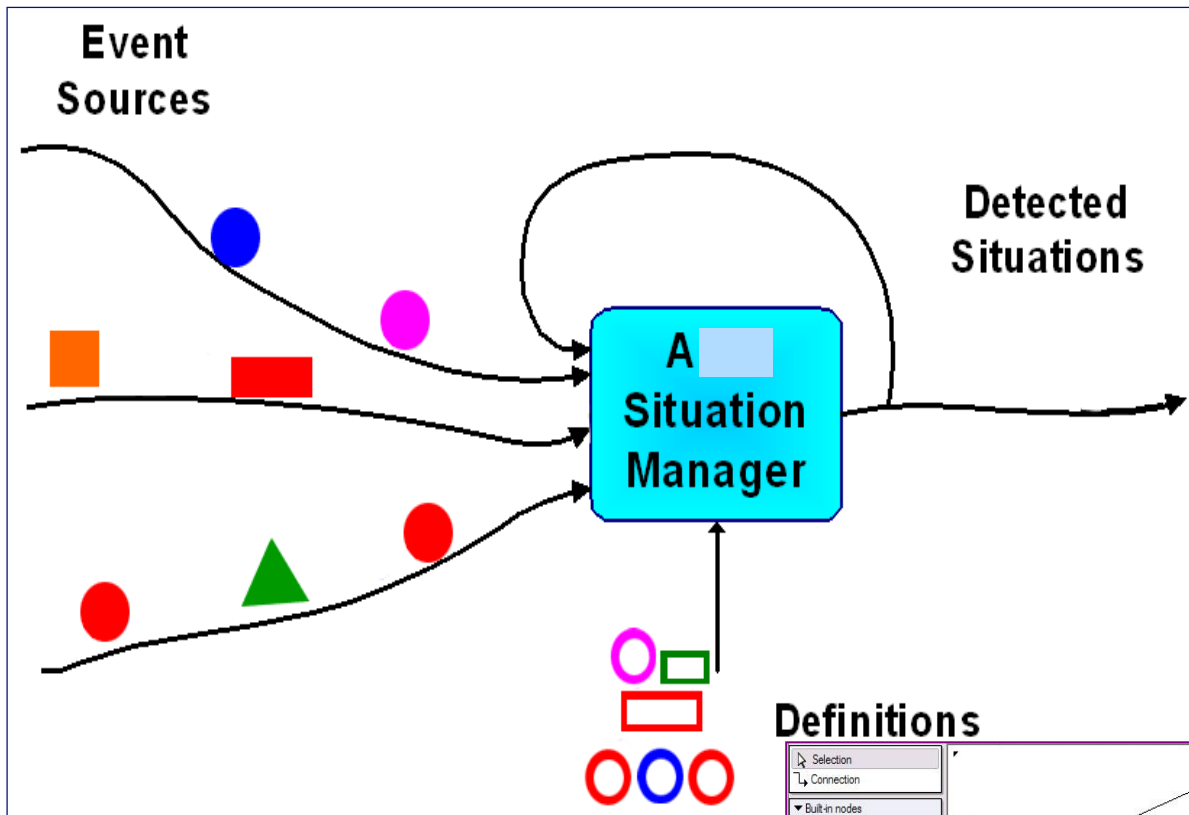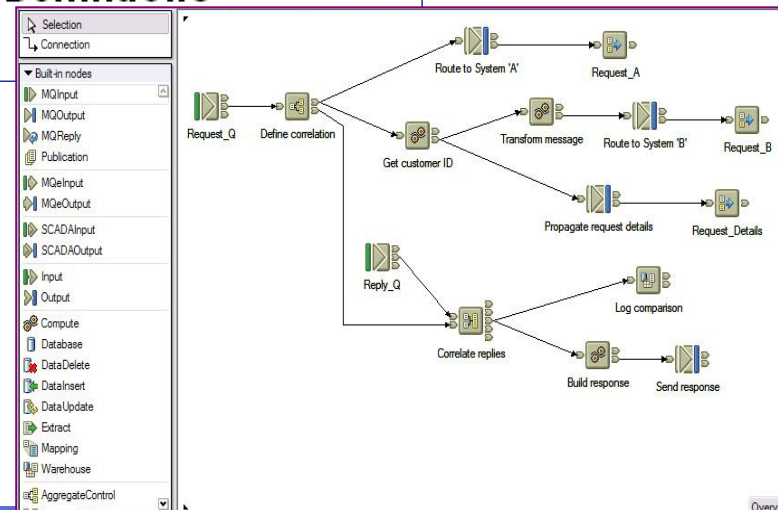

1. **A framework for processing MQ messages**

2. **A robust hosting environment for:**
   - ✓ Transforming data
   - ✓ Enriching data
   - ✓ Interacting with databases
   - ✓ Routing messages based on content
   - ✓ Detecting complex combinations of messages
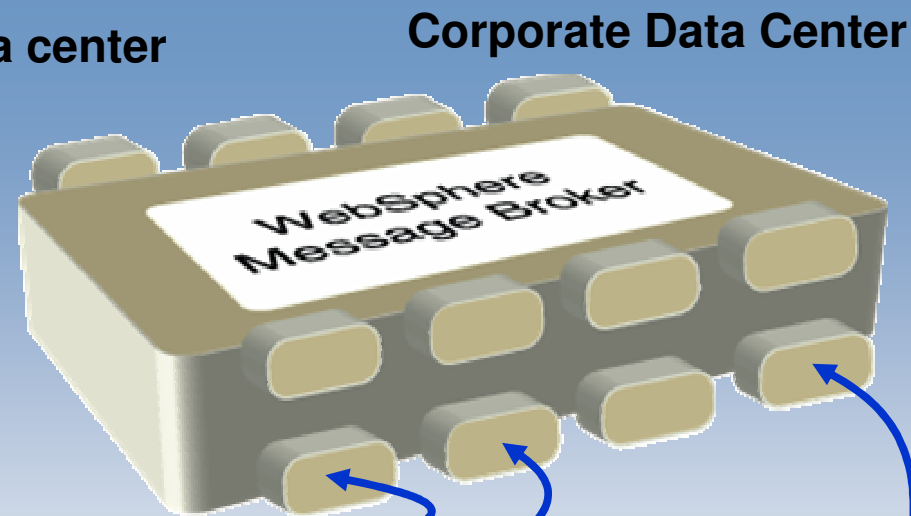   - ✓ Interacting existing applications with Web Services

Solution 4: WebSphere ESB and WebSphere Message Broker

Challenge: Retail Stores, Inc. faced three integration headaches:
- Integration efforts at the corporate data center,
- a new store system scheduled for introduction required integration at the store level,
- each of the over 500 store locations had to be seamlessly linked to the corporate data center.

Corporate Data Center

WebSphere Message Broker at corporate data center
- Connectivity hub for distributing information to the store locations
- Transforms messages between various applications and systems

WebSphere ESB at each store location
- Links multiple J2EE applications in addition to linking to Point of Sale terminals
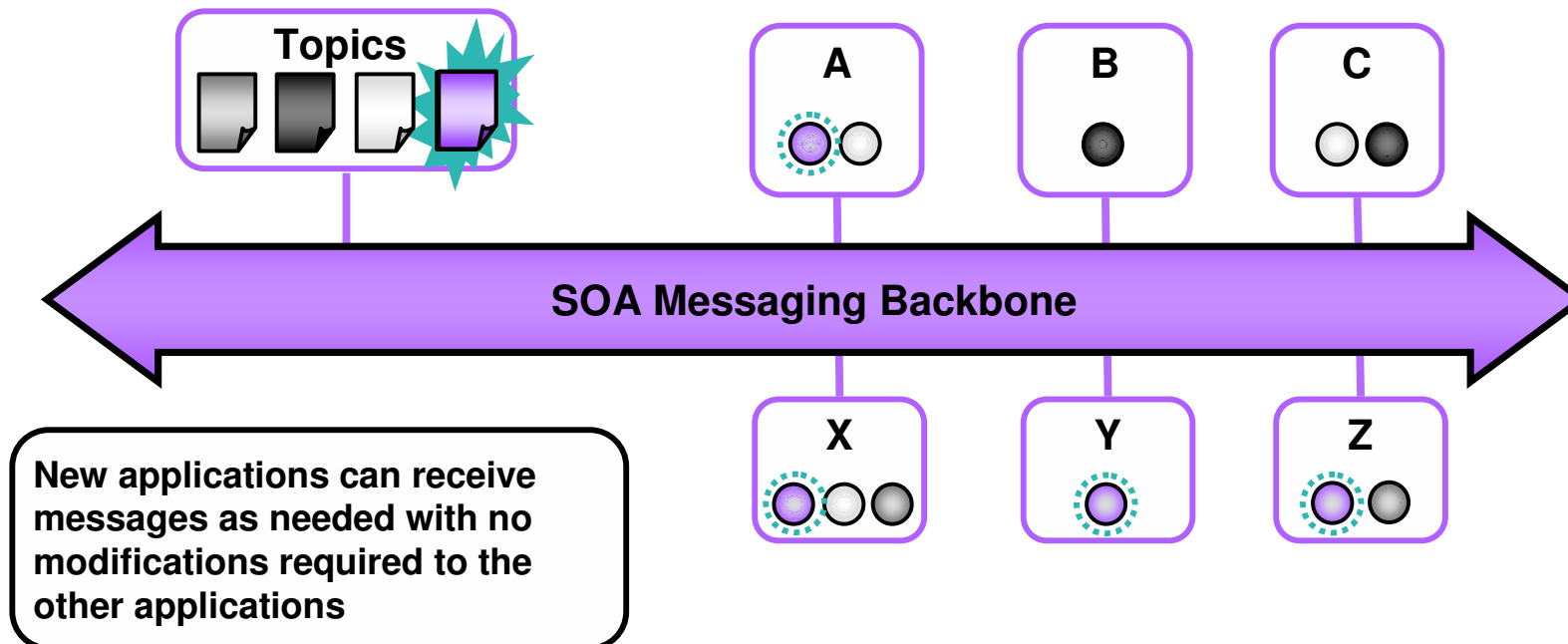
Store Location 1

Store Location 2

Store Location 3

Solution 5: Publish / Subscribe - Enabling Flexible Routing and Delivery on IBM's SOA Messaging Backbone

4. Publish-and-Subscribe

  ► **Dynamic and flexible way of determining where messages are sent**

  ► **Helps reduce the cost, time and skills when changes are required**

  ► **Helps define new paths of information flow in an ad hoc manner**

Topics

A **B** **C**

SOA Messaging Backbone

New applications can receive messages as needed with no modifications required to the other applications
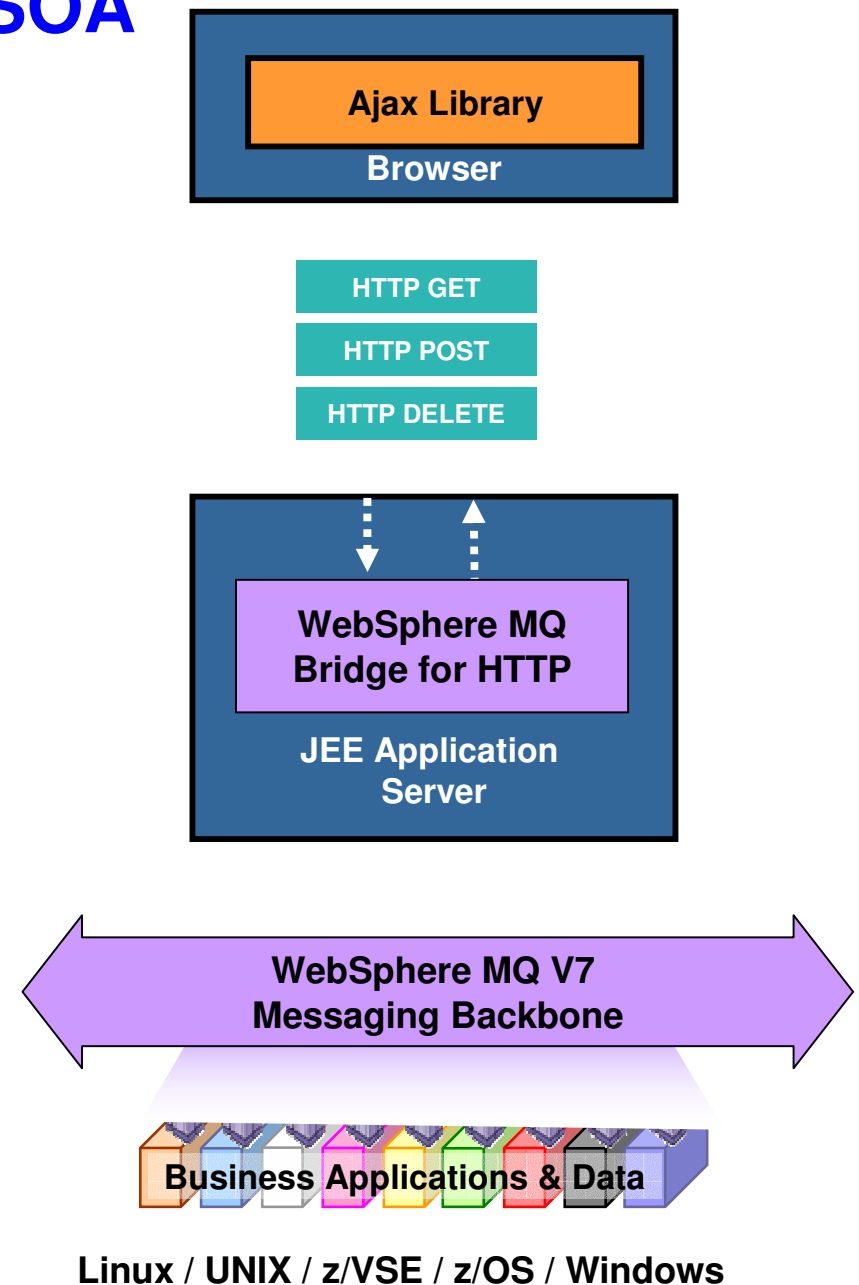
X **Y** **Z**

Web 2.0 Connectivity for IBM's SOA

WebSphere MQ goes Web 2.0!

► **Helps enrich Web 2.0 applications with real business data**

- ● **Distributed and z/VSE platforms**

► **Developer needs no MQ skills**

- ● **Uses Ajax and simple interface to access data by URIs**

► **Helps simplify deployment and maintenance of large scale distributed applications**

- ● **Enables simple access to MQ without need to install MQ clients**

Ajax Library

Browser

HTTP GET

HTTP POST

HTTP DELETE

WebSphere MQ Bridge for HTTP

JEE Application Server

WebSphere MQ V7 Messaging Backbone

Business Applications & Data

Linux / UNIX / z/VSE / z/OS / Windows

More Information

➤WebSphere MQ Application Integration

   ➤http://www-01.ibm.com/software/websphere/products/appintegration/

➤How to install and setup WebSphere MQ for z/VSE with Security

   ➤ftp://ftp.software.ibm.com/systems/z/os/zvse/pdf3/How_to_setup_SSL_with_MQ.pdf

➤Product Documentation for WMQ for z/VSE V3:

   ➤   WMQ for z/VSE System Management Guide (GC34-6981-00)

   ➤   Using MQSeries for VSE Redbook (SG24-5647-01)

   ➤   PSP Bucket (WMQVSE 300)

Note: WMQ for z/VSE V3.0 does not have a Program Directory. Chapter 2 of the System Management Guide contains installation instructions, and is shipped with the V3 product.