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e business software

Integrating CICS with the Web:
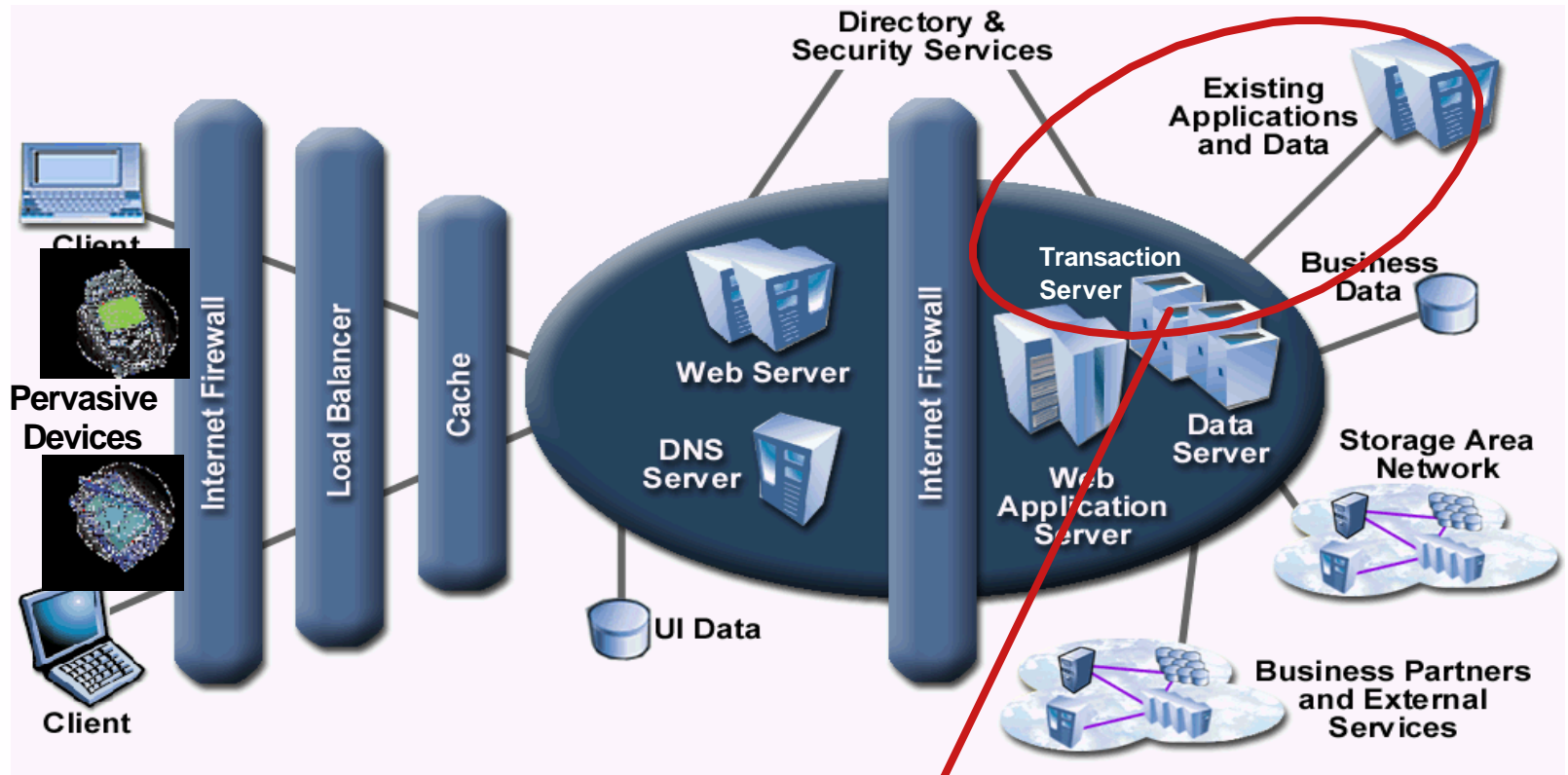# Using the CICS Transaction Gateway
21/01/03

Geoff Sharman
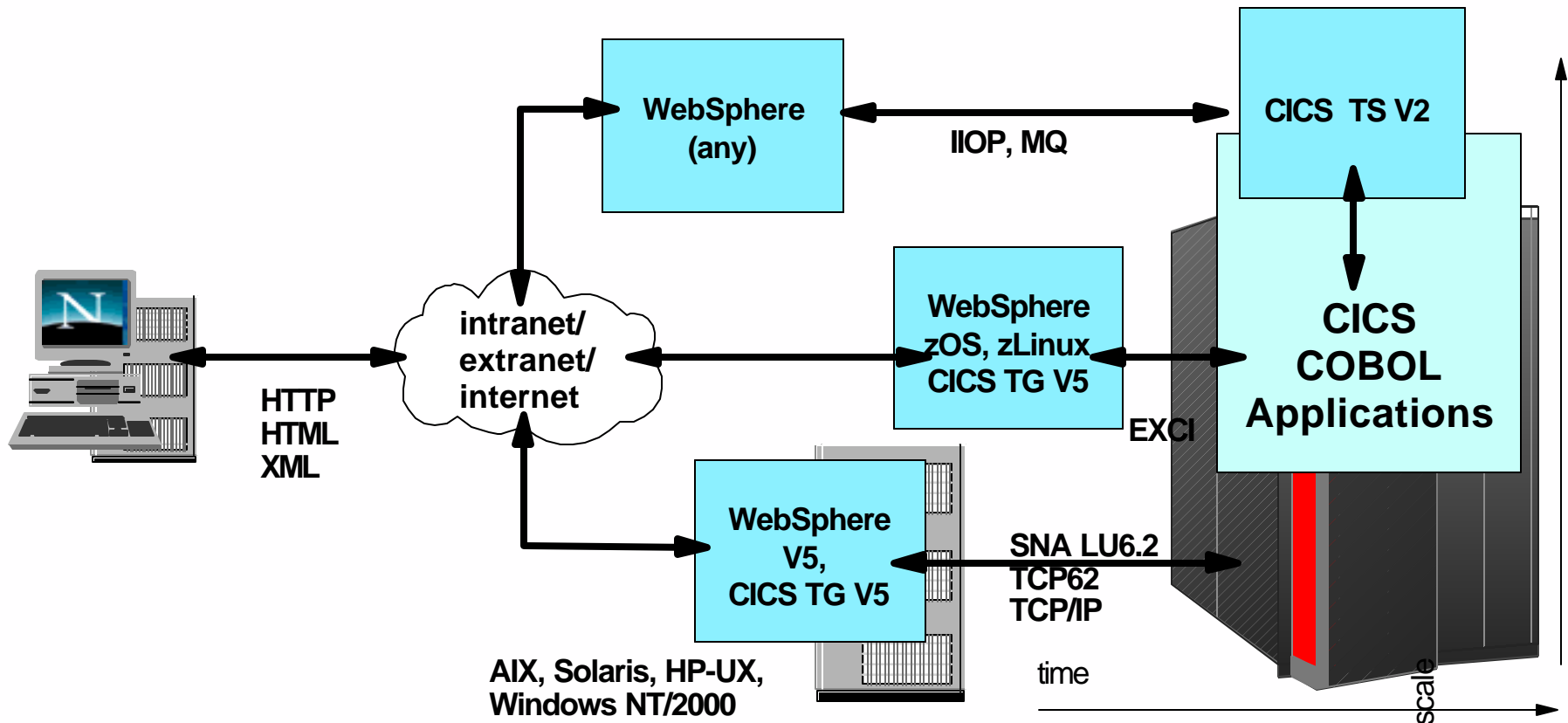geoff_sharman@uk.ibm.com

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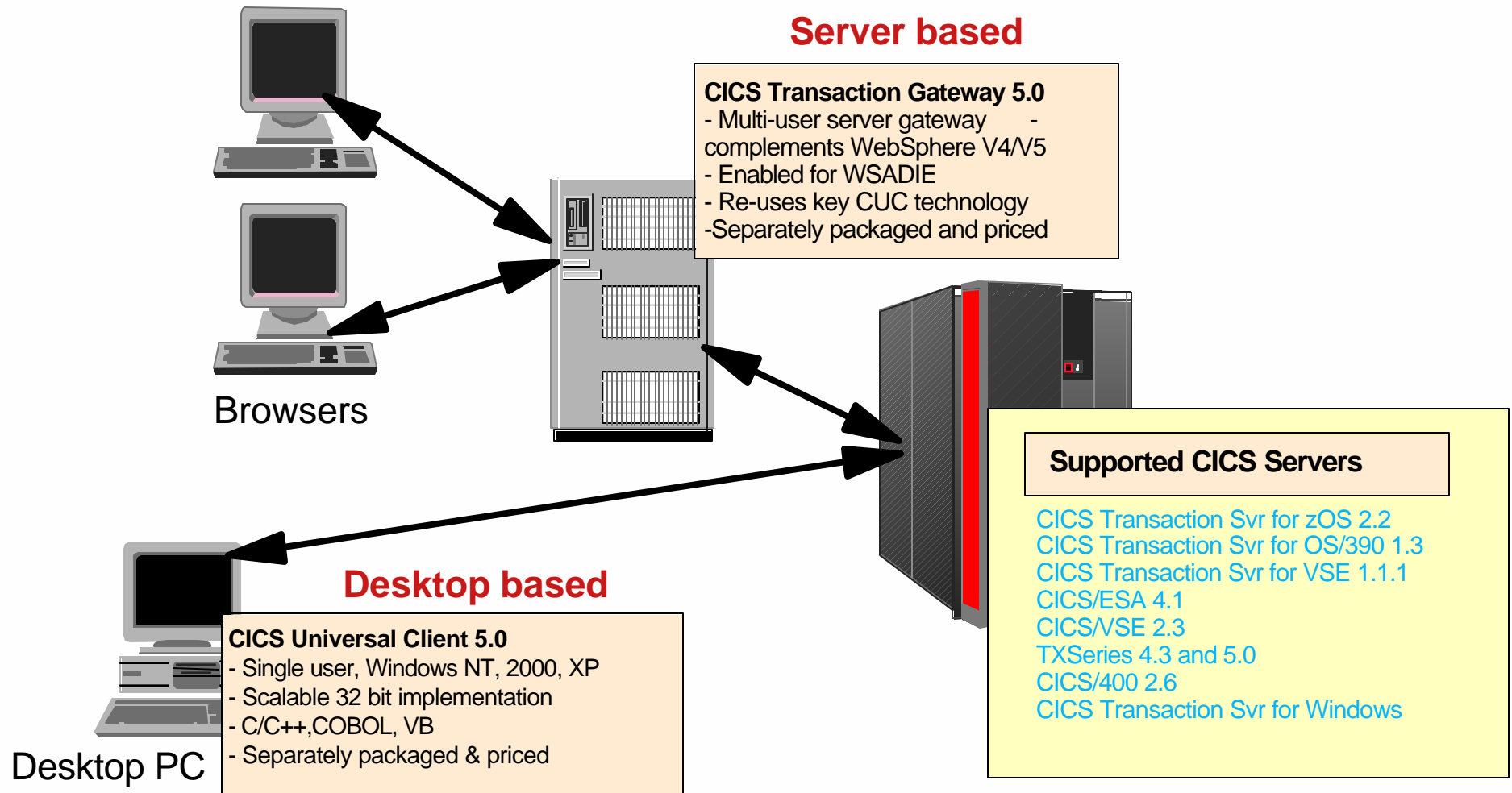
Positioning in e-business Infrastructure

CICS fits here

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Using CICS Transaction Gateway

WebSphere (any)

IIOP, MQ

CICS TS V2

intranet/ extranet/ internet

HTTP HTML XML

WebSphere zOS, zLinux CICS TG V5

EXCI

CICS COBOL Applications

WebSphere V5, CICS TG V5

SNA LU6.2 TCP62 TCP/IP

AIX, Solaris, HP-UX, Windows NT/2000

time

scale

- *CICS Transaction Gateway is the primary option for connecting Web app servers to CICS applications*
  - ‣ *using J2EE Connector Architecture*

- *Other options will be discussed*

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CICS TG & CICS UC Positioning

Server based

CICS Transaction Gateway 5.0
- Multi-user server gateway -
complements WebSphere V4/V5
- Enabled for WSADIE
- Re-uses key CUC technology
-Separately packaged and priced

Browsers

Desktop based

CICS Universal Client 5.0
- Single user, Windows NT, 2000, XP
- Scalable 32 bit implementation
- C/C++,COBOL, VB
- Separately packaged & priced

Desktop PC

Supported CICS Servers

CICS Transaction Svr for zOS 2.2
CICS Transaction Svr for OS/390 1.3
CICS Transaction Svr for VSE 1.1.1
CICS/ESA 4.1
CICS/VSE 2.3
TXSeries 4.3 and 5.0
CICS/400 2.6
CICS Transaction Svr for Windows

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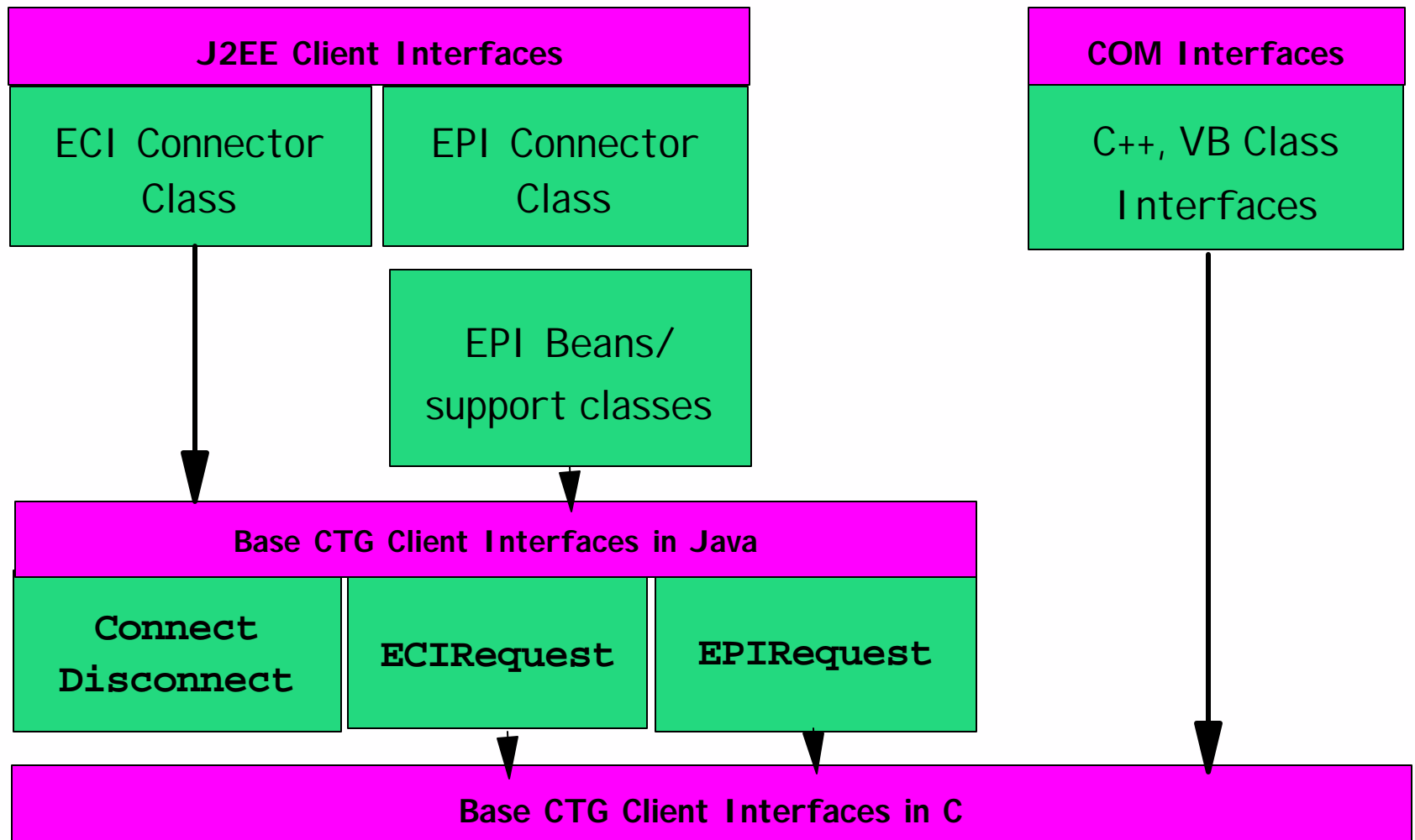CICS and the Web Jan 21 Webcast Presentation.PRZ

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Customers using CICS TG

- ► KeyBank Corp, USA
- ► TransAmerica Corp, USA
- ► Heritage Mutual Insurance, USA
- ► Local Government of Bologna, Italy
- ► RaboBank, Netherlands
- ► CenE Bankiers, Netherlands
- ► Revenue Canada
- ► Zurich Insurance, UK
- ► Union Central Insurance, Switzerland
- ► Kyushu Cellular Phone, Japan
- ► Scottish Equitable, UK
- ► Quelle, Germany
- ► Hewitt Associates, USA
- ► SOGO, Japan
- ► Government of Luxembourg
- ► Embratel, Brazil
- ► Receivable Management Services (formerly Dun & Bradstreet), USA
- ► and many others ...

See:
ibm.com/cics/case studies/
ibm.com/cics/library/ts390/vol1iss12/article4.html

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Using CICS TG: Basic Functions

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CICS TG Basics: Supported Interfaces

Can work with any App Server, even Microsoft ...

J2EE Client Interfaces		COM Interfaces
ECI Connector Class	EPI Connector Class	C++, VB Class Interfaces

EPI Beans/ support classes

Base CTG Client Interfaces in Java		
Connect Disconnect	ECIRequest	EPIRequest

Base CTG Client Interfaces in C

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Examples of using CICS TG - Trader Application

CICS region

z/OS

TRAD

3270 users

TRADERPL
Presentation logic

1. EXEC CICS RECEIVE MAP

2. EXEC CICS LINK PROGRAM(TRADERBL) COMMAREA(abcde)

3. EXEC CICS SEND MAP

C O M M A R E A

LINK

C O M M A R E A

TRADERBL
Business logic

1. EXEC CICS ADDRESS COMMAREA

2. EXEC SQL UPDATE TABLE(xxx)

3. EXEC CICS RETURN COMMAREA(vwxyz)

DB2 Tables or VSAM Files

CUSTFILE

COMPFILE

TRAD

(EPI)

ECI

Java clients e.g Servlet
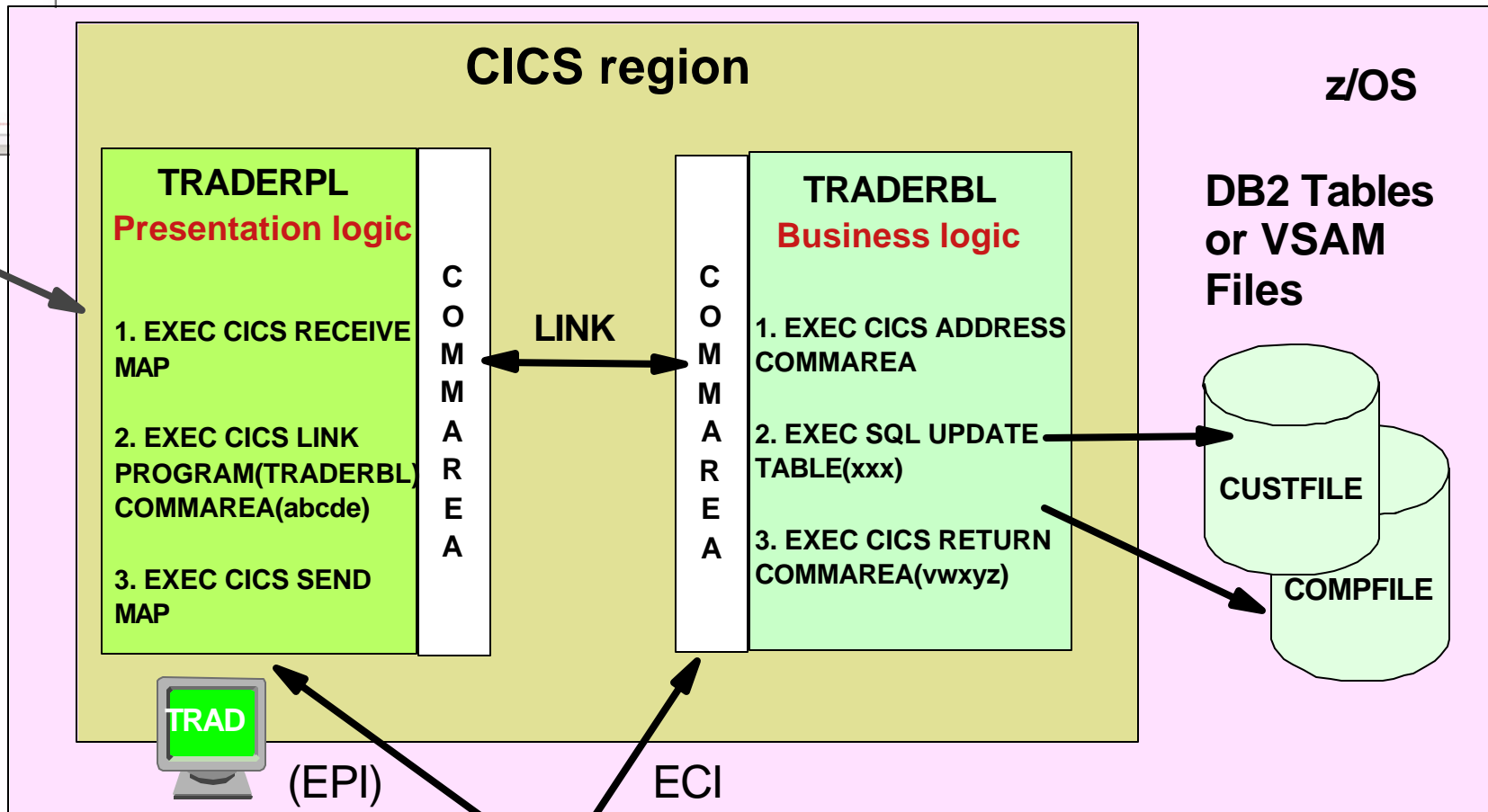
ECI (External Call Interface)
EPI (External Presentation Interface)
     (Use the ECI whenever possible)

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CICS TG Basics: Operation on Distributed Server

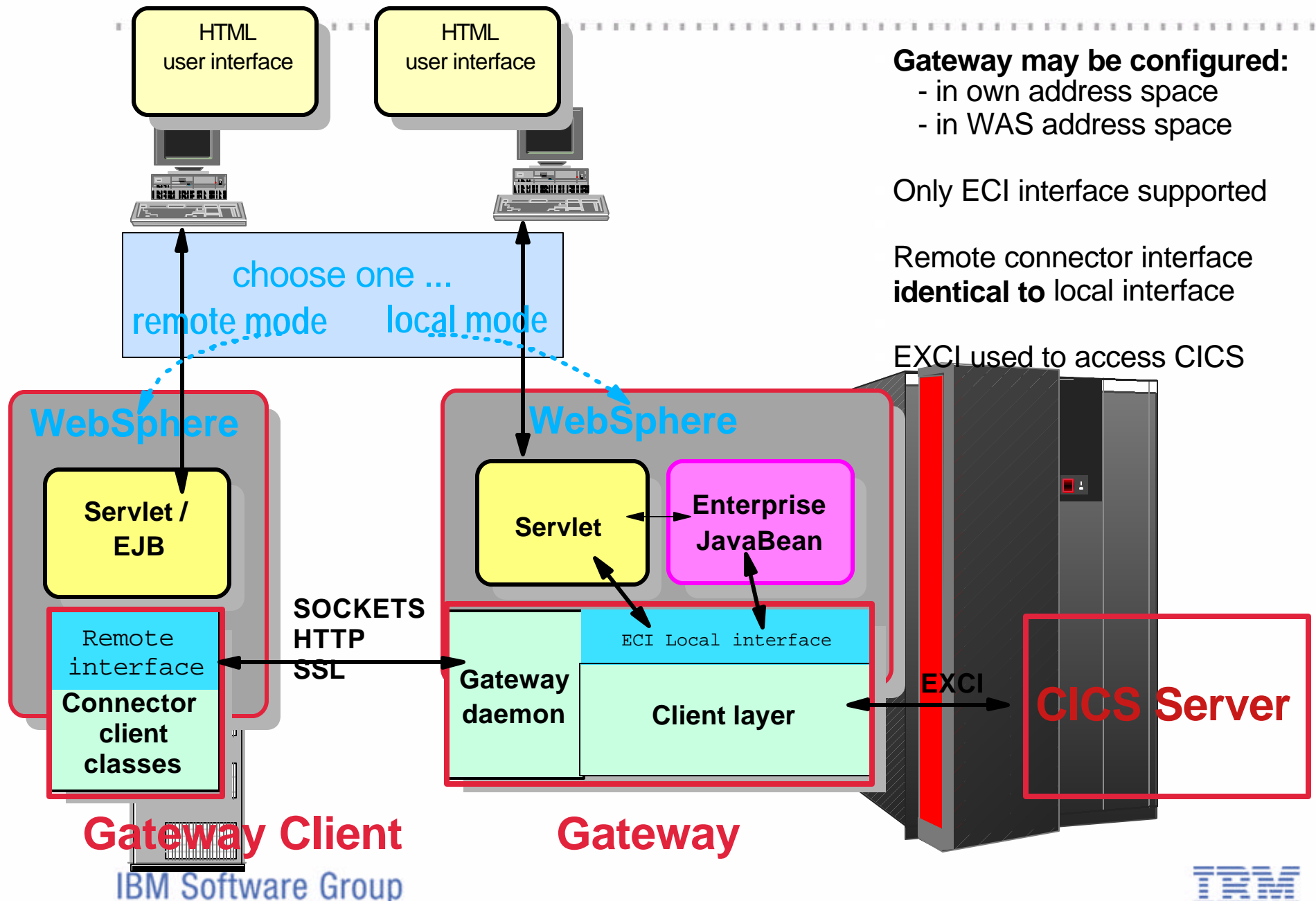HTML user interface

HTML user interface
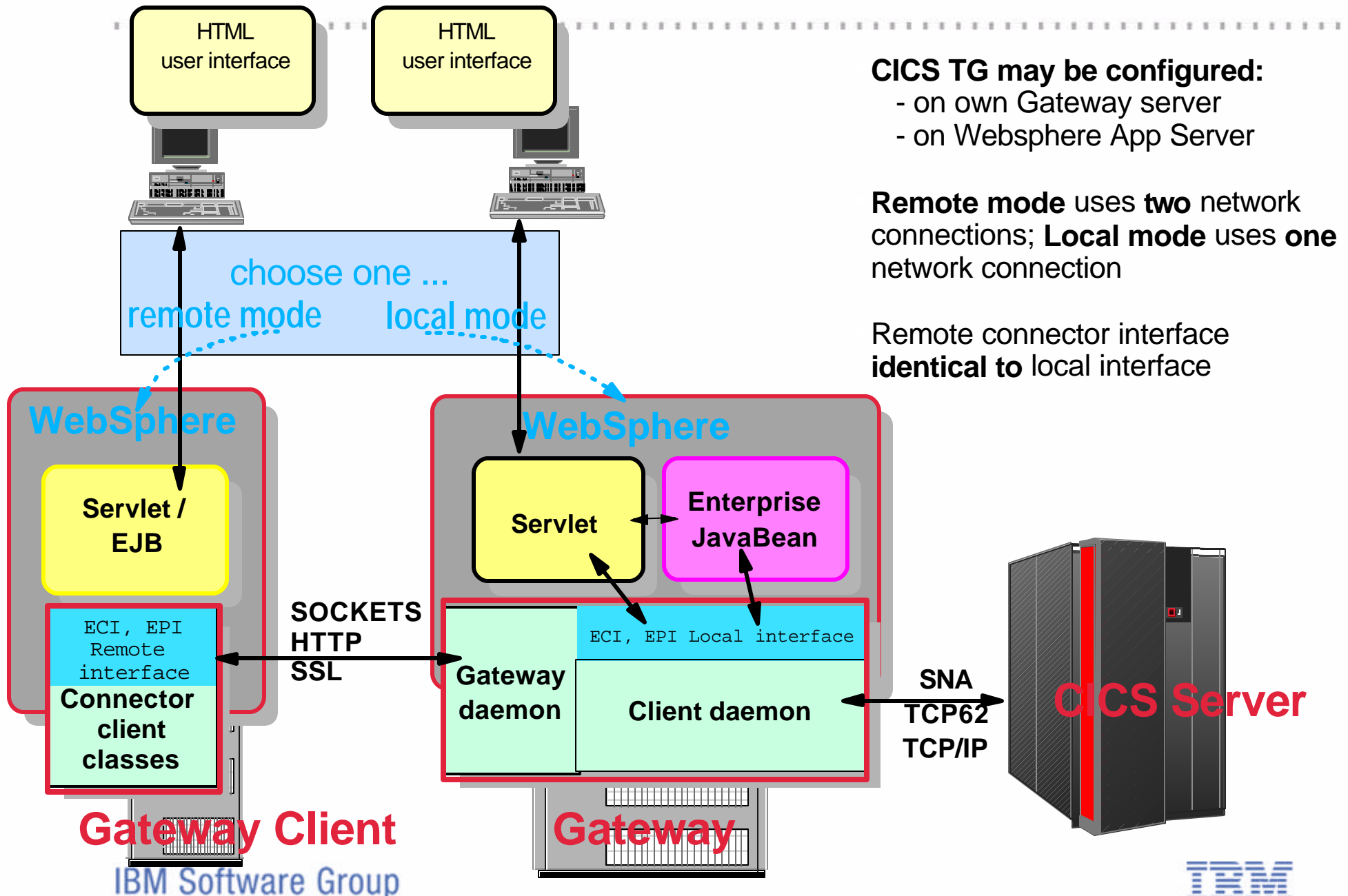
CICS TG may be configured:
- on own Gateway server
- on Websphere App Server

Remote mode uses **two** network connections; **Local mode** uses **one** network connection

Remote connector interface **identical to** local interface

choose one ...
remote mode   local mode

WebSphere

WebSphere

Servlet / EJB

Servlet

Enterprise JavaBean

ECI, EPI Remote interface

Connector client classes

SOCKETS HTTP SSL

ECI, EPI Local interface

Gateway daemon

Client daemon

SNA TCP62 TCP/IP

CICS Server

Gateway Client

Gateway

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CICS TG Basics: Operation on zOS Server

HTML user interface

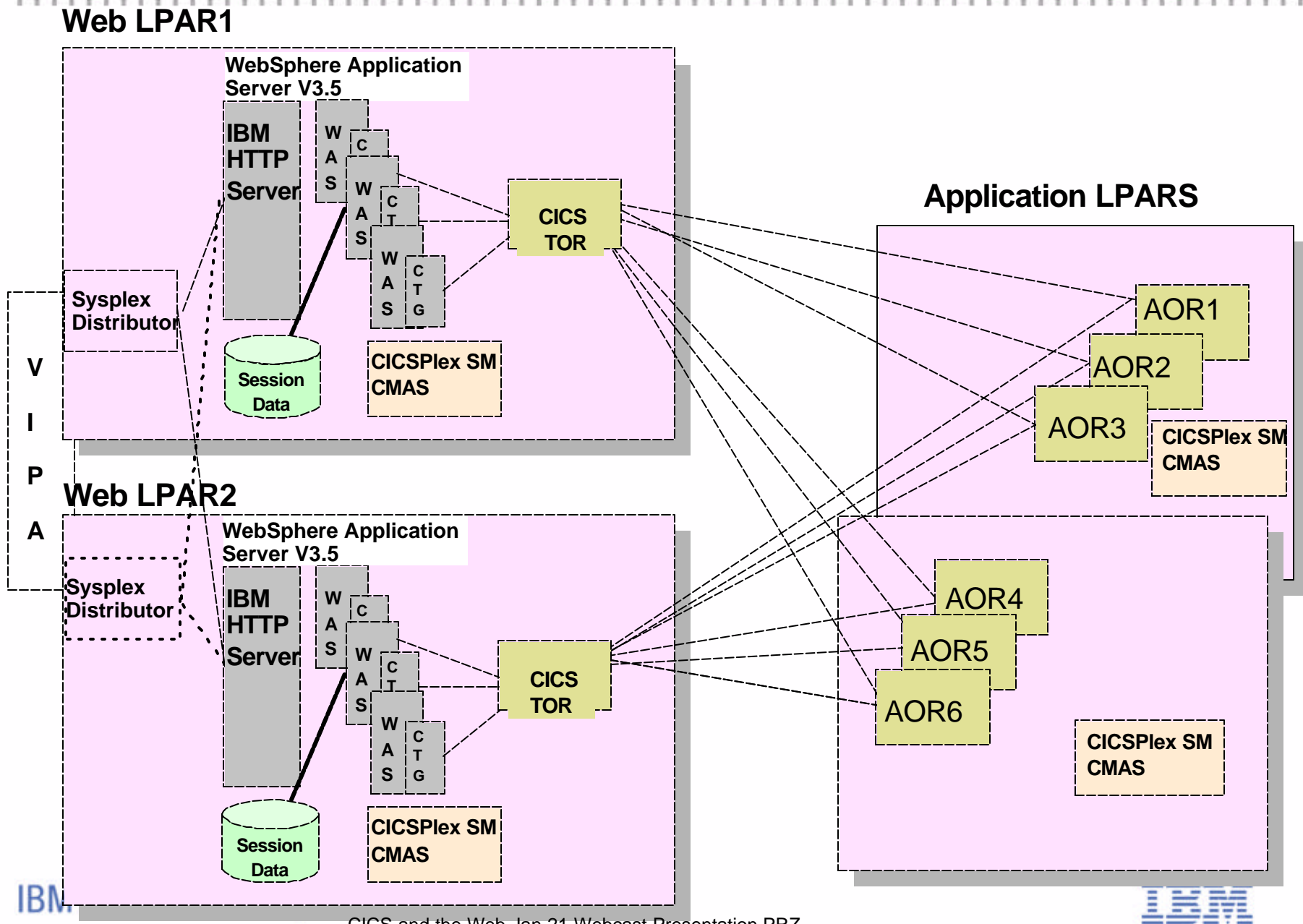HTML user interface

Gateway may be configured:
- in own address space
- in WAS address space

Only ECI interface supported

Remote connector interface **identical to** local interface
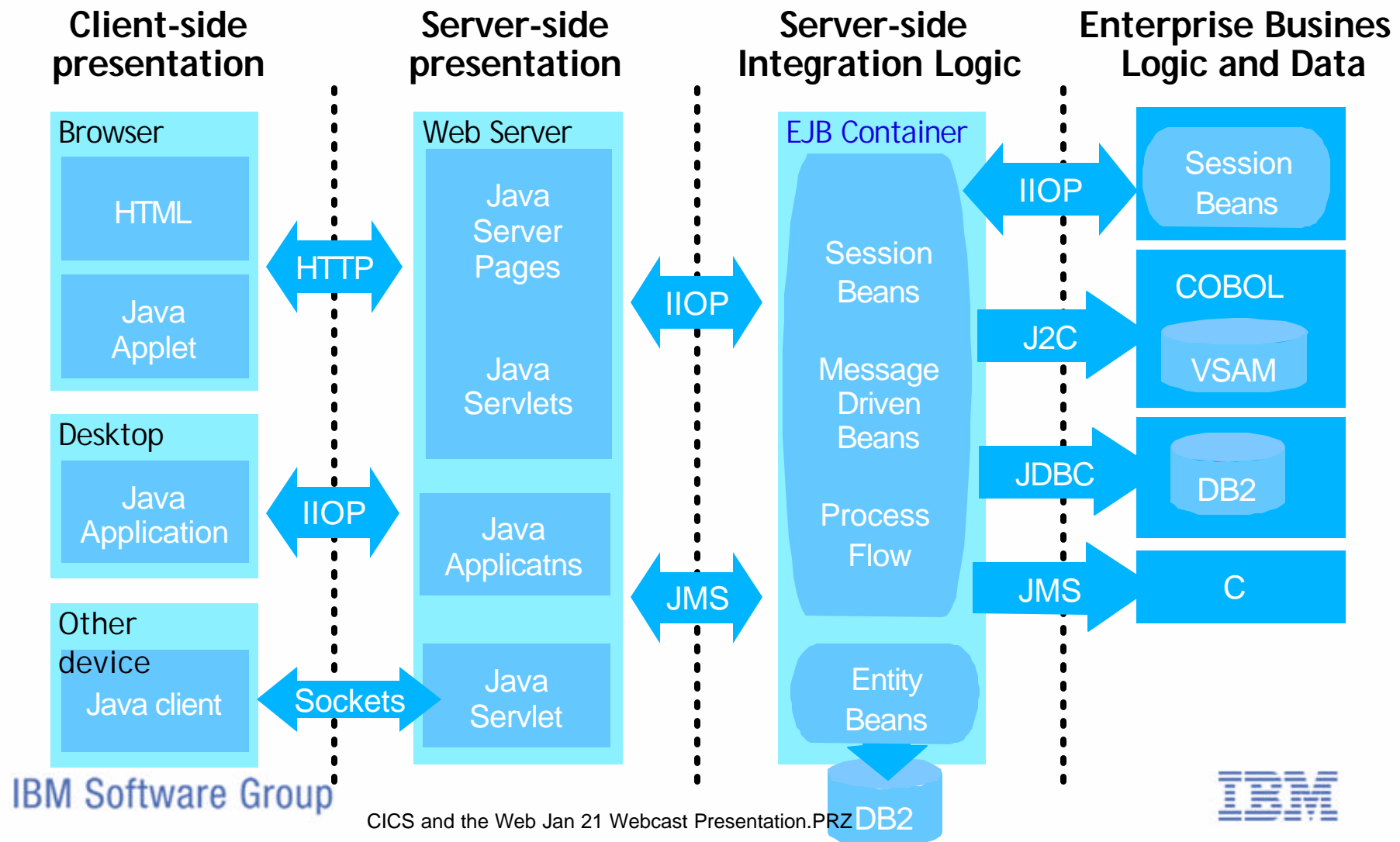
EXCI used to access CICS

choose one ...
remote mode   local mode

WebSphere

WebSphere

Servlet / EJB

Servlet

Enterprise JavaBean

Remote interface

Connector client classes

ECI Local interface

SOCKETS HTTP SSL

Gateway daemon

Client layer

EXCI

CICS Server

Gateway Client

Gateway

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Customer Scenario - Luxembourg Government

Web LPAR1

WebSphere Application Server V3.5

IBM HTTP Server

WAS
C
WAS
CT
WAS
CT
WAS
CTG

Sysplex Distributor

Session Data

CICS TOR

CICSPlex SM CMAS

Web LPAR2

WebSphere Application Server V3.5

IBM HTTP Server

WAS
C
WAS
CT
WAS
CT
WAS
CTG

Sysplex Distributor

Session Data

CICS TOR

CICSPlex SM CMAS

V I P A

Application LPARS

AOR1

AOR2

AOR3

CICSPlex SM CMAS

AOR4

AOR5

AOR6

CICSPlex SM CMAS

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See **www.ibm.com/eserver/zseries/zbulletin/pdf/issue30/cieproject.pdf**

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CICS TG V5 - New Function

- Supports JDK 1.3
  - including JSSE (Java Secure Sockets Extension) for 128-bit encryption

- Supports J2EE Connector Architecture (JCA)
  - ECI & EPI (AIX, Solaris, HP-UX, Windows NT/2000, Linux/390)
  - ECI only, 2PC transactions & enhanced security (OS/390)
  - async ECI calls also supported (all platforms)

- Enhanced support for TCP62 (all platforms ex. OS/390)
  - Removes SNA dependency for connection to CICS

- Improved performance for ECI data transfers
  - datastreams truncated to application data length

- Improved availability, serviceability, manageability
  - Support for ARM (Automatic Restart Manager) on OS/390
  - enhanced logging; logging of EXCI return codes on OS/390
  - dynamic control of tracing level; management infrastructure for JMX (Java Management eXtensions)

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Support for J2EE Connectors in CICS TG

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Software Architecture for e-business

An end-to-end architecture ... based on Java 2 Enterprise Edition

Client-side presentation		Server-side presentation		Server-side Integration Logic		Enterprise Busines Logic and Data
Browser		**Web Server**		**EJB Container**		
HTML		Java Server Pages		Session Beans	IIOP	Session Beans
Java Applet	HTTP		IIOP	Message Driven Beans	J2C	COBOL / VSAM
Desktop		Java Servlets		Process Flow	JDBC	DB2
Java Application	IIOP	Java Applicatns	JMS		JMS	C
Other device				Entity Beans		
Java client	Sockets	Java Servlet				
				DB2		

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What do JCA Connectors do?

- **_Provide Common Client Interface for all back end servers_**
  - ▶ standard call interface hides connection details from Java applications
  - ▶ each back end server still requires unique data format

- ▶ **_Enable Service Provider Interface for Application Server_**
  - ▶ operate in "managed" or "unmanaged" environments
  - ▶ managed environment enables connection pooling, transactions & security

- **_Leverage tool technology:_**
  - ▶ Connectivity to specific backend may be encapsulated in an "adapter" bean
  - ▶ WSAD/IE automates construction of interactivity/navigation & data format logic

- A **_Connector_** is generic runtime code, such as a J2EE architected connector, that transforms one calling interface into another

- An **_Adapter_** is runtime code, *possibly generated by a tool*, that converts one data format to another (e.g. converts a bean format into a CICS COMMAREA)

- Many solutions will use *both* connectors and adapters

Java command bean

Common Client Interface

middleware connector

Service Provider Interface

Application server eg. WebSphere

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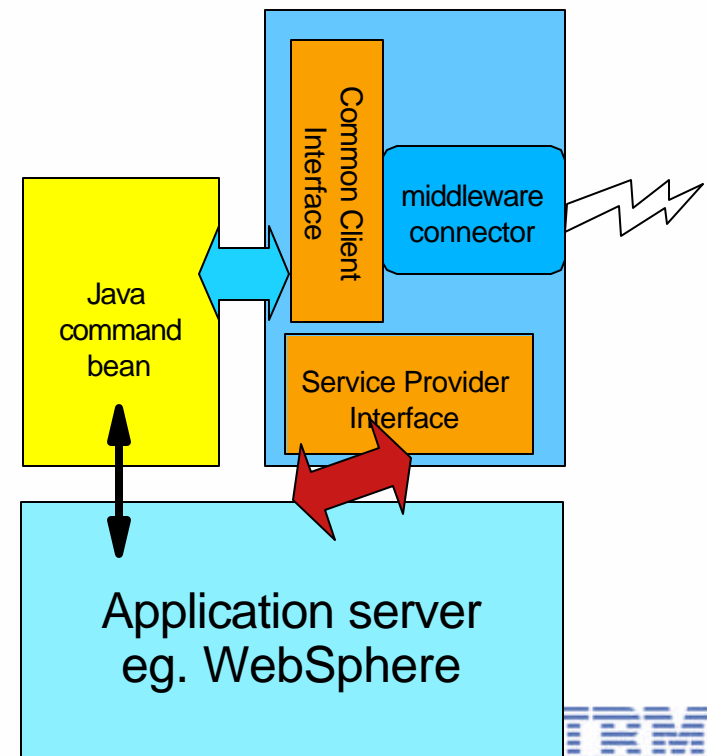
JCA Connection Pooling with CICS TG

HTML
user interface
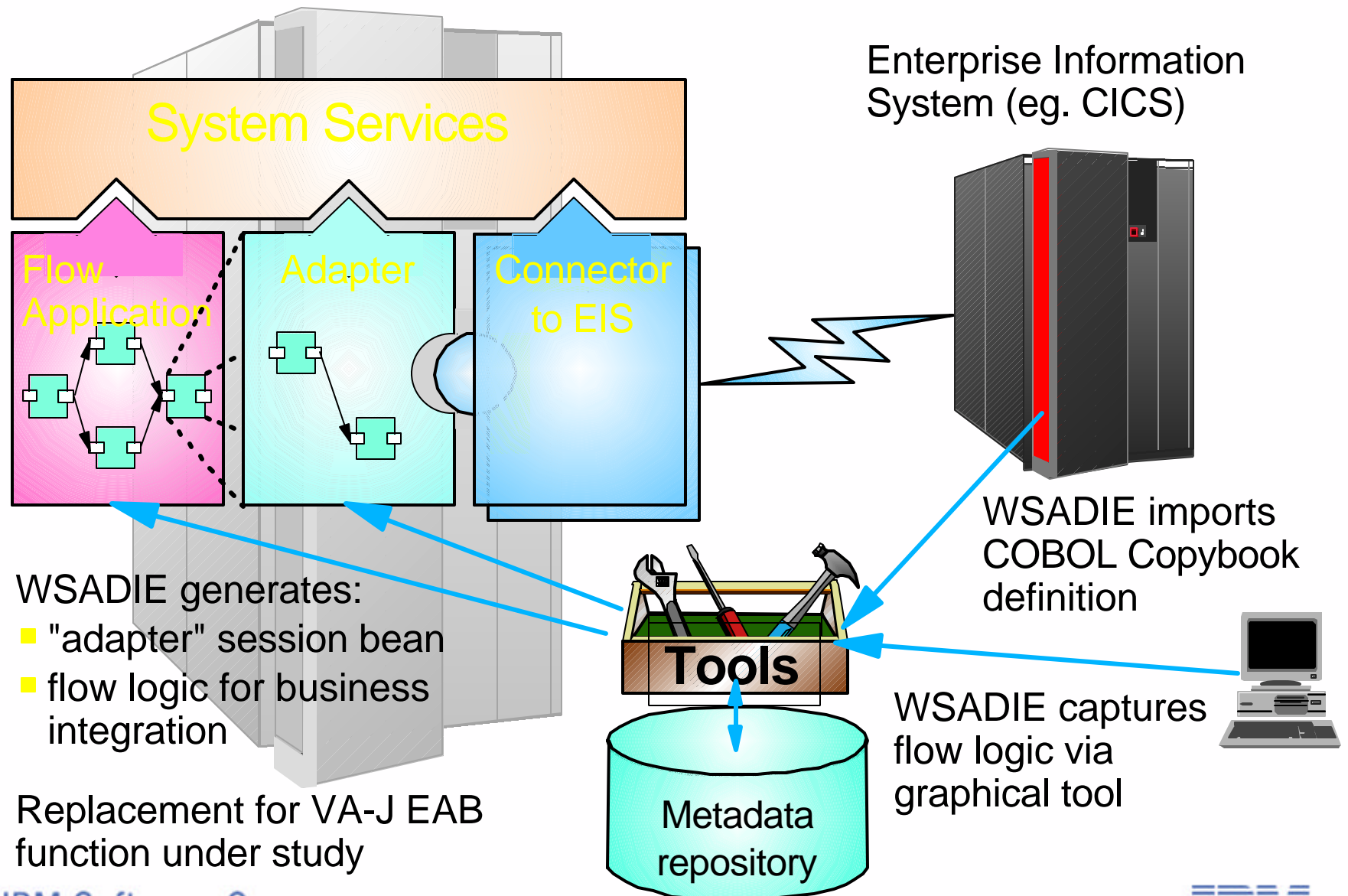
HTML
user interface

Java application
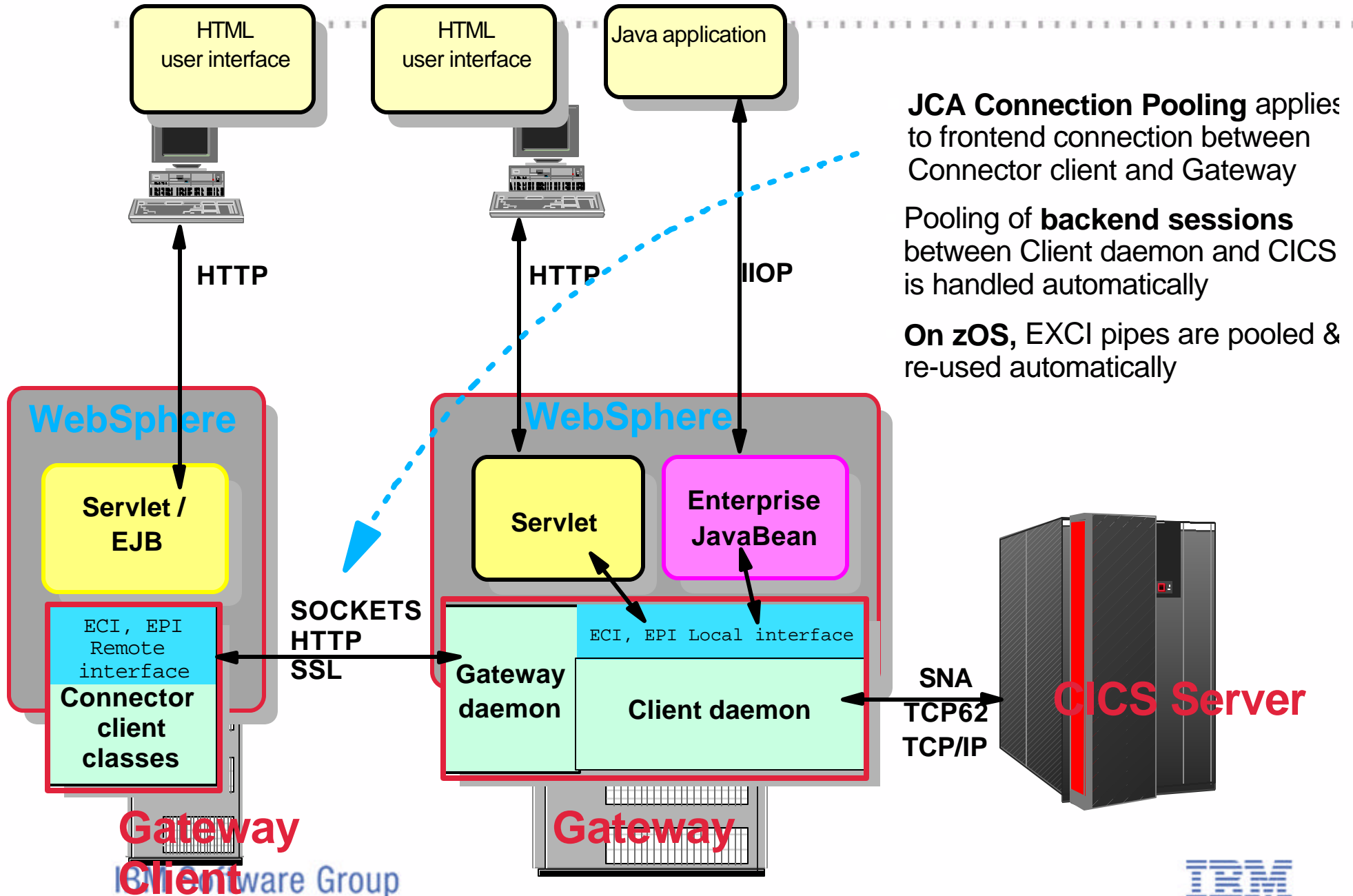
JCA Connection Pooling applies to frontend connection between Connector client and Gateway

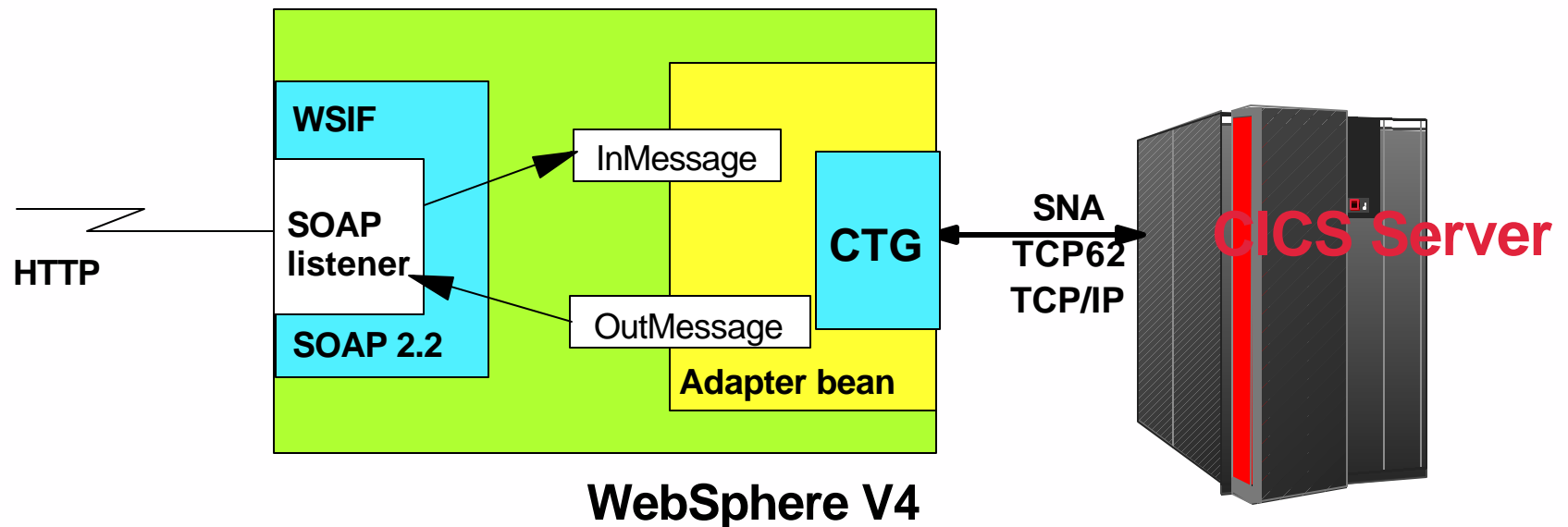Pooling of **backend sessions** between Client daemon and CICS is handled automatically

On zOS, EXCI pipes are pooled & re-used automatically
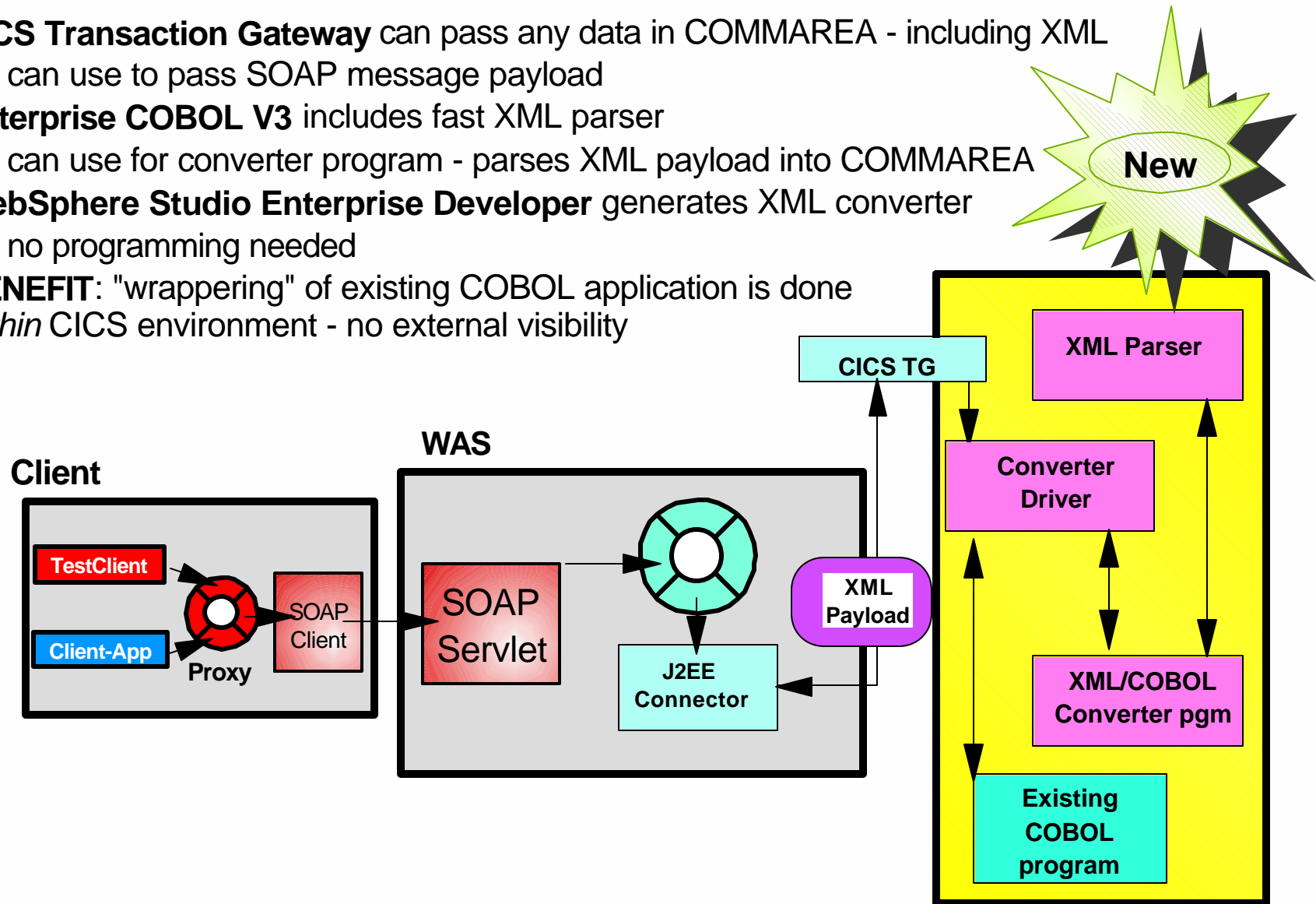
HTTP

HTTP

IIOP

WebSphere

WebSphere

Servlet /
EJB

Servlet

Enterprise
JavaBean

```
ECI, EPI
Remote
interface
```
**Connector
client
classes**

```
ECI, EPI Local interface
```

SOCKETS
HTTP
SSL

**Gateway
daemon**

Client daemon

SNA
TCP62
TCP/IP

CICS Server

**Gateway
Client**

Gateway

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JCA Tooling with WSADIE and WebSphere EE

System Services

Flow Application

Adapter

Connector to EIS

Enterprise Information System (eg. CICS)

WSADIE generates:
- "adapter" session bean
- flow logic for business integration

Replacement for VA-J EAB function under study

Tools

Metadata repository

WSADIE imports COBOL Copybook definition

WSADIE captures flow logic via graphical tool

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SOAP Support with WebSphere, CICS TG and CICS

HTTP

WSIF

SOAP listener

SOAP 2.2

InMessage

OutMessage

Adapter bean

CTG

SNA TCP62 TCP/IP

CICS Server

WebSphere V4

- *Uses WSIF (Web Services Invocation Framework) and SOAP 2.1 supplied with WebSphere EE*

- *WSADIE (WebSphere Studio Application Developer Integration Edition) generates "adapter" bean*

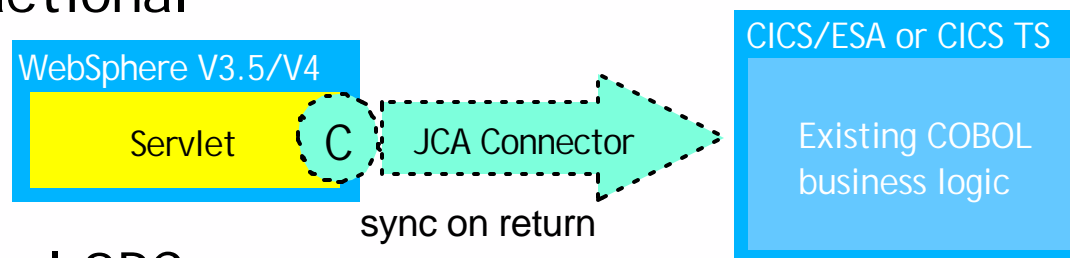- *Uses JCA Connector with CICS TG for access to CICS*

Creating Web Services with XML Converters

- **CICS Transaction Gateway** can pass any data in COMMAREA - including XML
  - can use to pass SOAP message payload
- **Enterprise COBOL V3** includes fast XML parser
  - can use for converter program - parses XML payload into COMMAREA
- **WebSphere Studio Enterprise Developer** generates XML converter
  - no programming needed
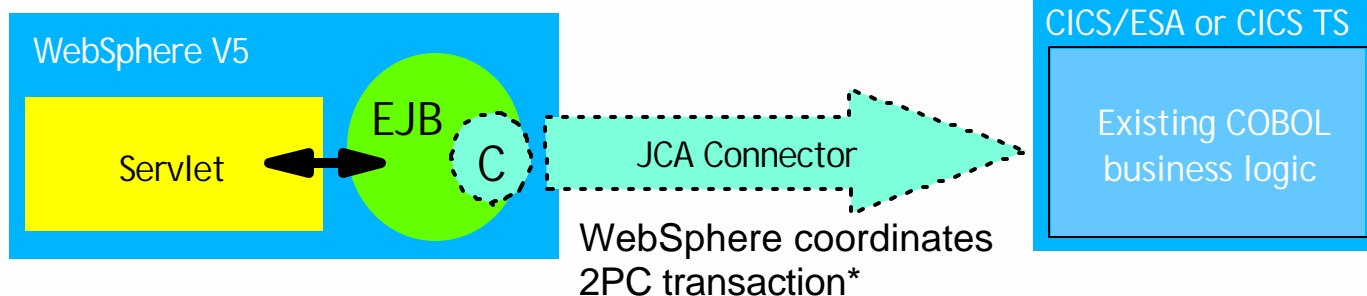- **BENEFIT**: "wrappering" of existing COBOL application is done *within* CICS environment - no external visibility

New

WAS

Client

TestClient

Client-App

Proxy

SOAP Client

SOAP Servlet

J2EE Connector

CICS TG

XML Payload

XML Parser

Converter Driver

XML/COBOL Converter pgm

Existing COBOL program

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Other Options

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Using Bean-to-Bean Communication with IIOP

Non-transactional

WebSphere V3.5/V4

Servlet — C — JCA Connector →

sync on return

CICS/ESA or CICS TS

Existing COBOL business logic

Transactional 2PC

WebSphere V5

Servlet ↔ EJB — C — JCA Connector →

WebSphere coordinates 2PC transaction*

CICS/ESA or CICS TS

Existing COBOL business logic

Alternative 2PC scenario

WebSphere V4/V5

Servlet ↔ EJB

IIOP →

OMG 2PC transaction: either party may coordinate

CICS TS V2.2

EJB — C

JCA Connector

Existing COBOL business logic
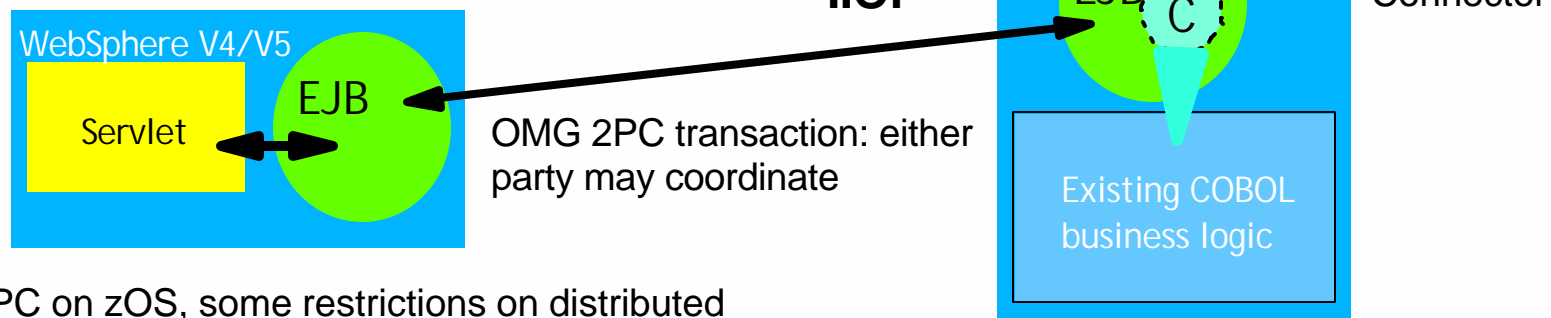
*Full 2PC on zOS, some restrictions on distributed

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Using WebSphere MQ

Transactional 2PC

WebSphere V5

Servlet ⟷ EJB / C

JCA Connector ➡

CICS/ESA or CICS TS

Existing COBOL business logic

WebSphere coordinates 2PC transaction*
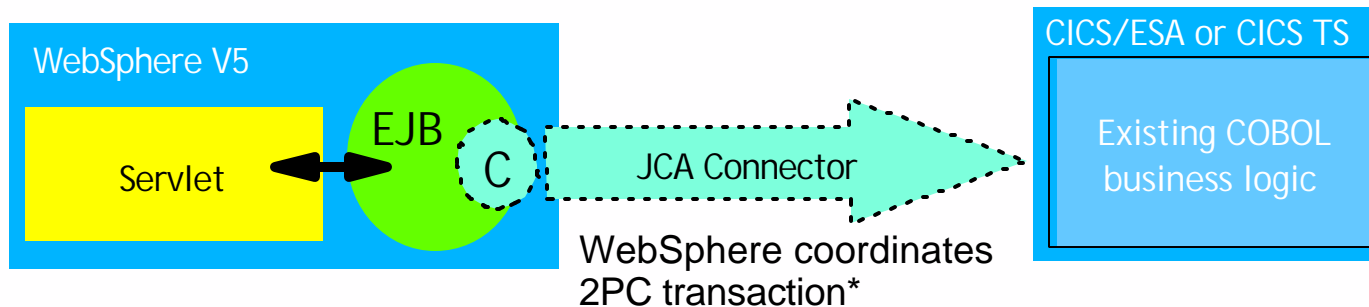
Alternative MQ scenario

WebSphere V4/V5

Servlet ⟷ EJB

MQSeries

JMS call: 3 transactions

CICS TS

MQ DPL Bridge

Existing COBOL business logic

*place msg on Q, tranport msg, take msg off Q

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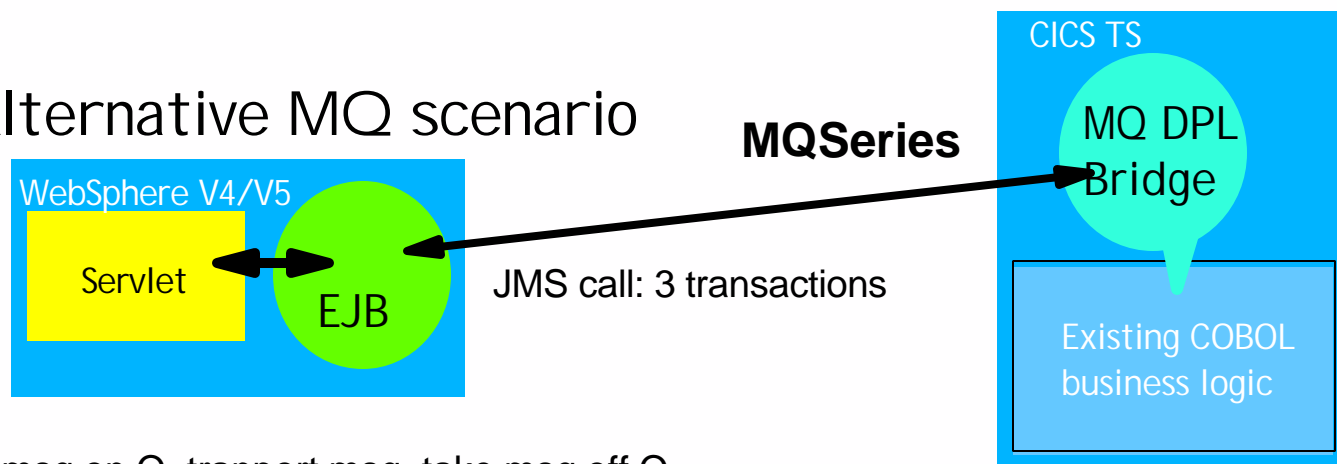
From Host Integration to CICS Transaction Gateway

1. Host on Demand provides a JCA Connector for 3270 applications only
   - ► Can connect to any 3270 application on CICS, IMS, TSO etc.
   - ► Supports "generic screenable record" interface with J2EE, ie. a data record containing a field for each field on 3270 containing application data
   - ► WSADIE contains tool to generate connector flows
   - ► Limited by 3270 datastream architecture, eg. 1920 byte data transfer

2. CICS TG provides an improved connector for 3270 CICS applications
   - ► Can connect to most CICS applications
   - ► Uses LU6.2, TCP62 or TCP/IP networking rather than LU2 or TN3270
   - ► Supports "generic screenable record" interface with 3270 applications and connector flows
   - ► Will support "custom screenable record" interface in future
   - ► Custom screenable record interface will be mapped to ECI call to Link3270 Bridge provided by CICS TS 2.2 (no 3270 datastream flows)

3. CICS TG *also* provides a connector for COMMAREA applications
   - ► Preferred design point for new CICS applications
   - ► Enables re-use of application modules in many different contexts
   - ► Currently limited to 32,500 byte data transfer, but limit will be relieved in future

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Where is CICS Transaction Gateway going?

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CICS Transaction Gateway ... beyond V5

- *Our strategy is to **enhance** the CICS Transaction Gateway and support the CICS Universal Client*

- *CICS TG V5 became available July 26th 2002*
  - *CTG V5.01 will be available in 2003*

- *Medium term, we'll continue to provide the strategic "connector into CICS" and integrate with the latest technologies:*
  - *support for J2EE spec. enhancements*
  - *support for Linux/Intel and 64 bit platforms*
  - *JCA exploitation of LINKable 3270 Bridge in CICS TS 2.2*
  - *easier programming for ECI returned data > 32K*
  - *good integration with IBM tools offerings*
  - *enhanced manageability via JMX (Java Management eXtensions)*

- *As an alternative, customers may wish to consider using IIOP with CICS TS V2.2 and later releases:*
  - *must have CICS TS 2.2 in production*
  - *must have implemented Java and EJB under CICS*
  - *must have existing apps in LINKable form (COMMAREA or Bridge)*

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Additional information

- Other sources of planning information:
  - ► SG24-5243 CICS Transaction Server for OS/390: Web Interface and 3270 Bridge
  - ► SG24-5275 Java Application Development for CICS
  - ► SG24-5277 Revealed! CICS Transaction Gateway with more CICS Clients Unmasked
  - ► SG24-5466 Revealed! Architecting Web Access to CICS
  - ► SG24-5748 A Performance Study of Web Enabling CICS
  - ► SG24-5756 Securing Web Access to CICS
  - ► SG24-6118 Workload Managing Access to CICS
  - ► SG24-6133 CICS Transaction Gateway V5: The WebSphere Connector for CICS
  - ► SG24-6401 Java Connectors for CICS Featuring the J2EE Connector Architecture
  - ► REDP0206 From code to deployment: Connecting to CICS from WebSphere V4.01 for zOS
  - ► SR23-9720-00 Java for S/390® and AS/400® Cobol Programmers
  - ► Designing & Programming CICS Applications, O'Reilly ISBN 1-56592-676-5
  - ► http://www.ibm.com/cics/
  - ► http://www.redbooks.ibm.com/

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Thank you for joining us today!

If you would take a few moments to fill out the feedback form which will display when you close out of this session, it would be greatly appreciated. Your comments are very important to us.

If you have questions regarding the topics we have covered in this webcast today, you may submit them via the email hotlinks below:

Dr Geoff Sharman, Senior Consultant, Transaction Systems
Lead Strategist, CICS Portfolio
geoff_sharman@uk.ibm.com

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