Integrating CICS with the Web: Using the CICS Transaction Gateway

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Geoff Sharman
geoff_sharman@uk.ibm.com

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Positioning in e-business Infrastructure

CICS fits here
Using CICS Transaction Gateway

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

- **Other options will be discussed**
CICS TG & CICS UC Positioning

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

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

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
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
Using CICS TG: Basic Functions
CICS TG Basics: Supported Interfaces

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

Diagram:
- J2EE Client Interfaces
  - ECI Connector Class
  - EPI Connector Class
  - EPI Beans/support classes
- Base CTG Client Interfaces in Java
  - Connect
  - Disconnect
  - ECIRequest
  - EPIRequest
- Base CTG Client Interfaces in C
- COM Interfaces
  - C++, VB Class Interfaces
Examples of using CICS TG - Trader Application

TRADERPL
Presentation logic
1. EXEC CICS RECEIVE MAP
2. EXEC CICS LINK PROGRAM(TRADERBL) COMMAREA(abcde)
3. EXEC CICS SEND MAP

TRADERBL
Business logic
1. EXEC CICS ADDRESS COMMAREA
2. EXEC SQL UPDATE TABLE(xxx)
3. EXEC CICS RETURN COMMAREA(vwxyz)

ECI (External Call Interface)
EPI (External Presentation Interface)
(Use the ECI whenever possible)

Java clients
e.g. Servlet

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CICS TG Basics: Operation on Distributed Server

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
CICS TG Basics: Operation on zOS Server

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
Customer Scenario - Luxembourg Government

Web LPAR1

Web LPAR2

Application LPARS

IBM HTTP Server

WebSphere Application Server V3.5

CICS TOR

CICSPlex SM CMAS

Session Data

Sysplex Distributor

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)
Support for J2EE Connectors in CICS TG
Software Architecture for e-business

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

Client-side presentation
- Browser
  - HTML
  - Java Applet
- Desktop
  - Java Application
- Other device
  - Java client

Server-side presentation
- Web Server
  - Java Server Pages
  - Java Servlets
- Other device
  - Java Servlet

Server-side Integration Logic
- EJB Container
  - Session Beans
  - Message Driven Beans
  - Process Flow
  - Entity Beans

Enterprise Business Logic and Data
- Session Beans
- COBOL
- VSAM
- JDBC
- DB2
- C

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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

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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

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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.
JCA Tooling with WSADIE and WebSphere EE

System Services

Flow Application

Adapter

Connector to EIS

Enterprise Information System (eg. CICS)

WSADIE imports COBOL Copybook definition

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

Replacement for VA-J EAB function under study

Tools

Metadata repository

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SOAP Support with WebSphere, CICS TG and CICS

- 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
Other Options
Using Bean-to-Bean Communication with IIOP

Non-transactional

- **WebSphere V3.5/V4**
  - Servlet
  - JCA Connector
  - Existing COBOL business logic

Transactional 2PC

- **WebSphere V5**
  - Servlet
  - EJB
  - 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**
  - Existing COBOL business logic

*Full 2PC on zOS, some restrictions on distributed
Using WebSphere MQ

Transactional 2PC

WebSphere V5
Servlet
EJB
C
JCA Connector
Existing COBOL business logic

CICS/ESA or CICS TS
WebSphere coordinates 2PC transaction*

Alternative MQ scenario

WebSphere V4/V5
Servlet
EJB
MQSeries
MQ DPL Bridge
Existing COBOL business logic

CICS TS

JMS call: 3 transactions

*place msg on Q, transport msg, take msg off Q
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
Where is CICS Transaction Gateway going?
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)
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
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