CICS and the Web: Web-enable your CICS Applications

Leigh Compton
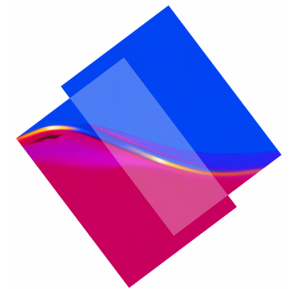CICS Technical Support
IBM Dallas Systems Center

Webcast
30 July 2002

Session Agenda

- **CICS e-business Strategy**
- **Which web-enabling option?**
  - Server considerations
  - Application Interfaces
- **Web-enabling options**
  - CICS Web Support
  - Web Bridge (CWS with 3270 Bridge)
  - CICS Transaction Gateway
  - CICS Native IIOP and EJB Support
- **Summary**

CICS e-Business Strategy

- **Allow our customers to grow their business by**
  - Multiplying the return on investment
  - Extending use of existing applications
  - Exploiting appropriate new technologies
- **Transform CICS into a powerful application server by**
  - Providing evolutionary path to e-business
  - Making it easy to write new e-business applications

COBOL

3270

CICS

WWW

EJB

COBOL

3270

JAVA

CICS

Evolution! ....NOT Revolution
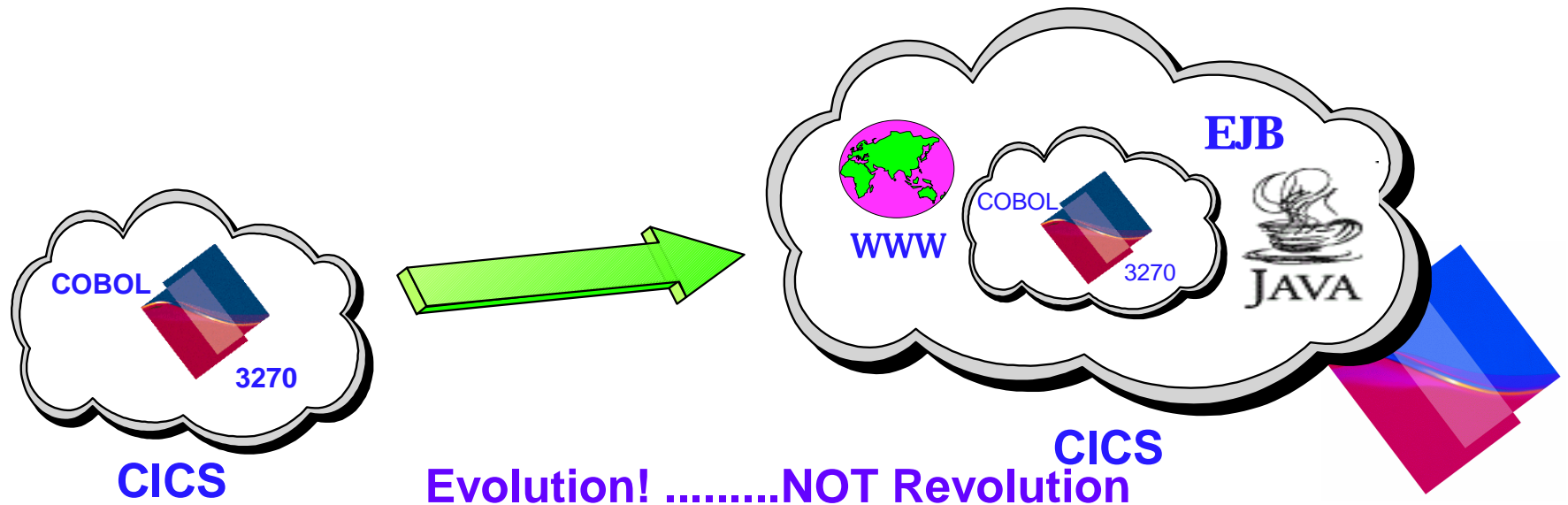
CICS e-business Strategy

- **Extending existing investments**
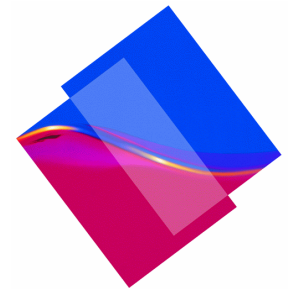 - Objectives
    - ➤ Open up existing CICS applications to new opportunities
    - ➤ Access from HTML, Java, GUI desktops
  - Business benefits
    - ➤ Fast, low cost, low risk
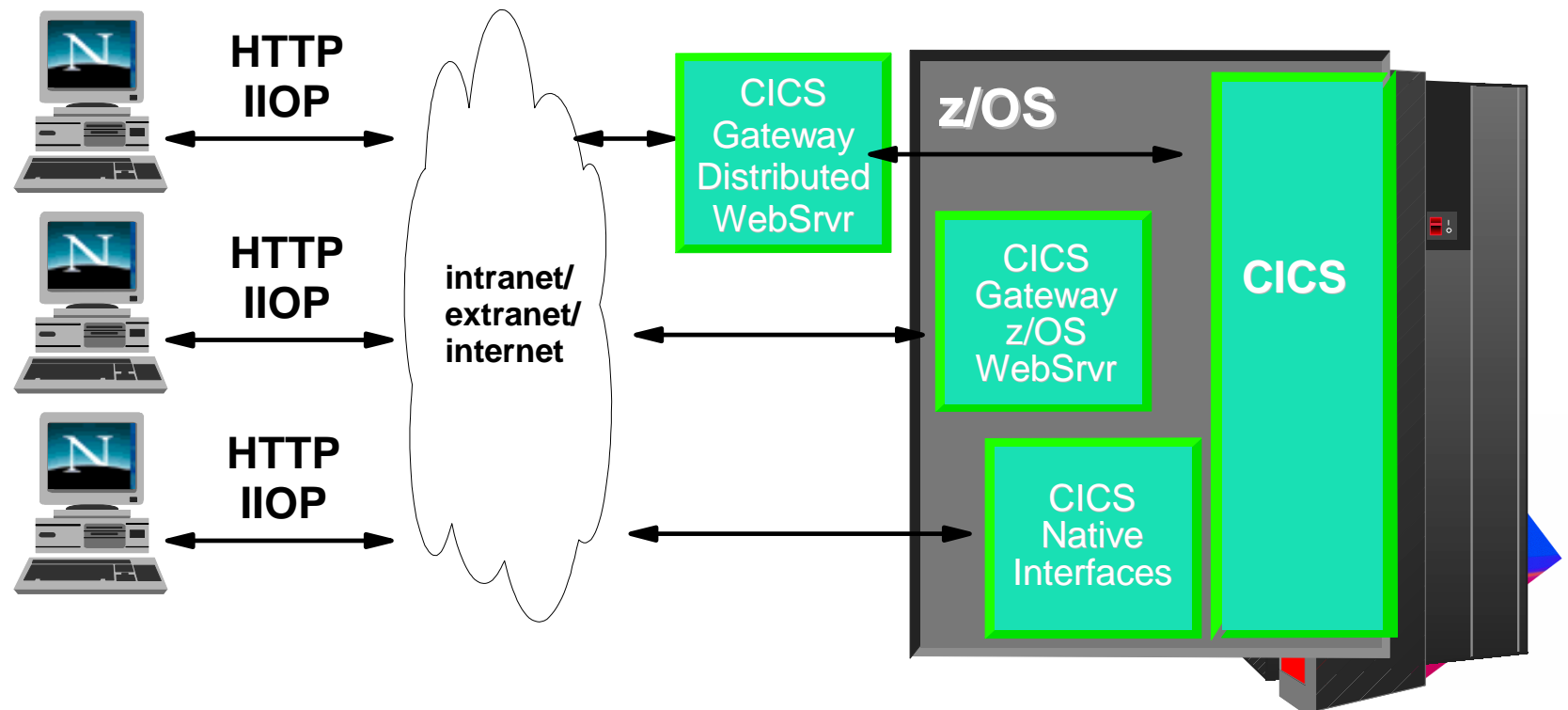   - ➤ You can do it now, tools available
- **CICS and WebSphere**
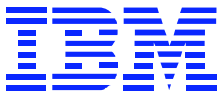 - Best intersection point between worlds of the existing and the new

CICS web-enabling strategy

- Enable Web Browsers to invoke CICS applications
- Use standard HTTP and IIOP protocols
- Support both gateways and native access to CICS
- Enable Java as programming environment
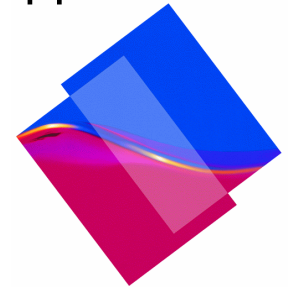
Factors to Consider

- **General**
  - Corporate Internet strategy
  - Cost: long and short term
  - 2 tier or 3 tier
  - Capacity and scalability
  - Response time
  - Reliability and availability
  - Security
  - Skills and resources
  - Implementation effort
 - Users: Internal or public
  - Administration

- **Server Platform**
  - Non z/OS web server
    - CICS Transaction Gateway
    - CICS IIOP/EJB Support
  - z/OS web server
    - CICS Transaction Gateway
    - CICS Web Support
    - CICS IIOP/EJB Support
  - Direct connection
    - CICS Web Support
    - CICS IIOP/EJB Support

Factors to Consider

- **CICS Application Interfaces**
  - COMMAREA (LINK/DPL/ECI/EXCI)
    - ► CICS Web Support (CWS)
    - ► CICS Transaction Gateway
  - 3270 (BMS or data stream)
    - ► CICS Transaction Gateway
    - ► Web Bridge (CWS with 3270 Bridge)
    - ► CICS Link Bridge
    - ► WebSphere Host Integration Products
      - ▪ *Host On-Demand*
      - ▪ *Host Publisher*
  - Object (CORBA or EJB)
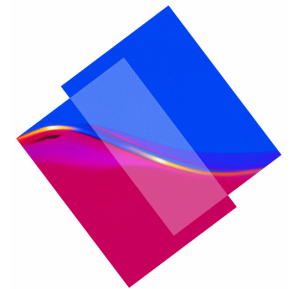   - ► CICS Native IIOP Interface
    - ► CICS EJB Support
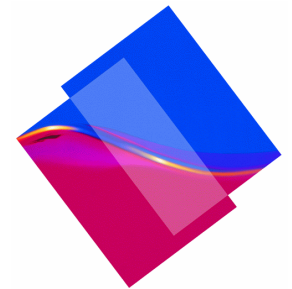
Commarea-based applications

- **Recommended model for CICS application development**

- **Linkable program modules**
  - Enabled for ECI, EXCI, RPC, CWS, etc.
- **Business logic only**
  - Separation of presentation and business logic
  - Positions application for use from varying environments
- **Web-enabling passes COMMAREA inputs and outputs**
  - ECIRequest with CICS Transaction Gateway
   - ECIInteractionSpec using J2EE Connectors
  - CICS Web Support

3270-based applications

- 3270 applications require a terminal (principal facility)
- BMS or Terminal Control
- Web-enabling must provide terminal emulation
  - EPIRequest classes and EPI beans with CICS Transaction Gateway
  - Web Bridge (CWS with 3270 Bridge)
  - WebSphere Host Integration Products
    - Host On-Demand
    - Host Publisher
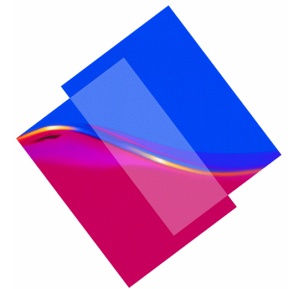
Object-based applications

- **CORBA IDL**
  - Standards defined by Object Management Group
- **Enterprise JavaBeans**
  - Java2 Standards
- **Remote method invocation**
  - CICS Java applications
  - 'Wrapper' applications
- **JCICS class library for access to CICS resources**
- **Web-enabling using IIOP transport**
  - CICS native IIOP interface
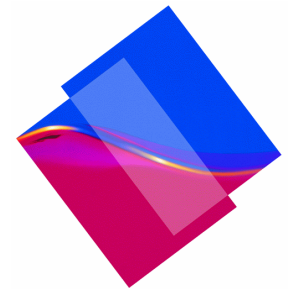 - RMI/IIOP to Enterprise JavaBeans
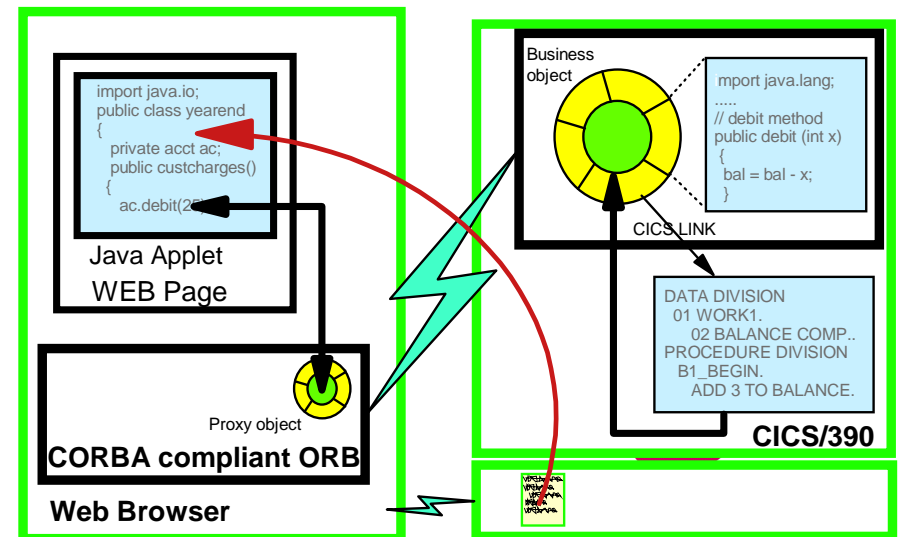
CICS Web Support

- **Allows a standard Web Browser to invoke a CICS application program**
  - The standard HTTP protocol is used
- **Direct network connection**
  - No intermediate gateways or servers
    - Optional interface through IBM HTTP Server with supplied ICAPI DLL module
- **Output management**
  - HTML Template Manager and DOCUMENT API
    - Merge fixed and variable parts of response document
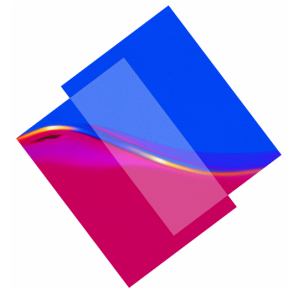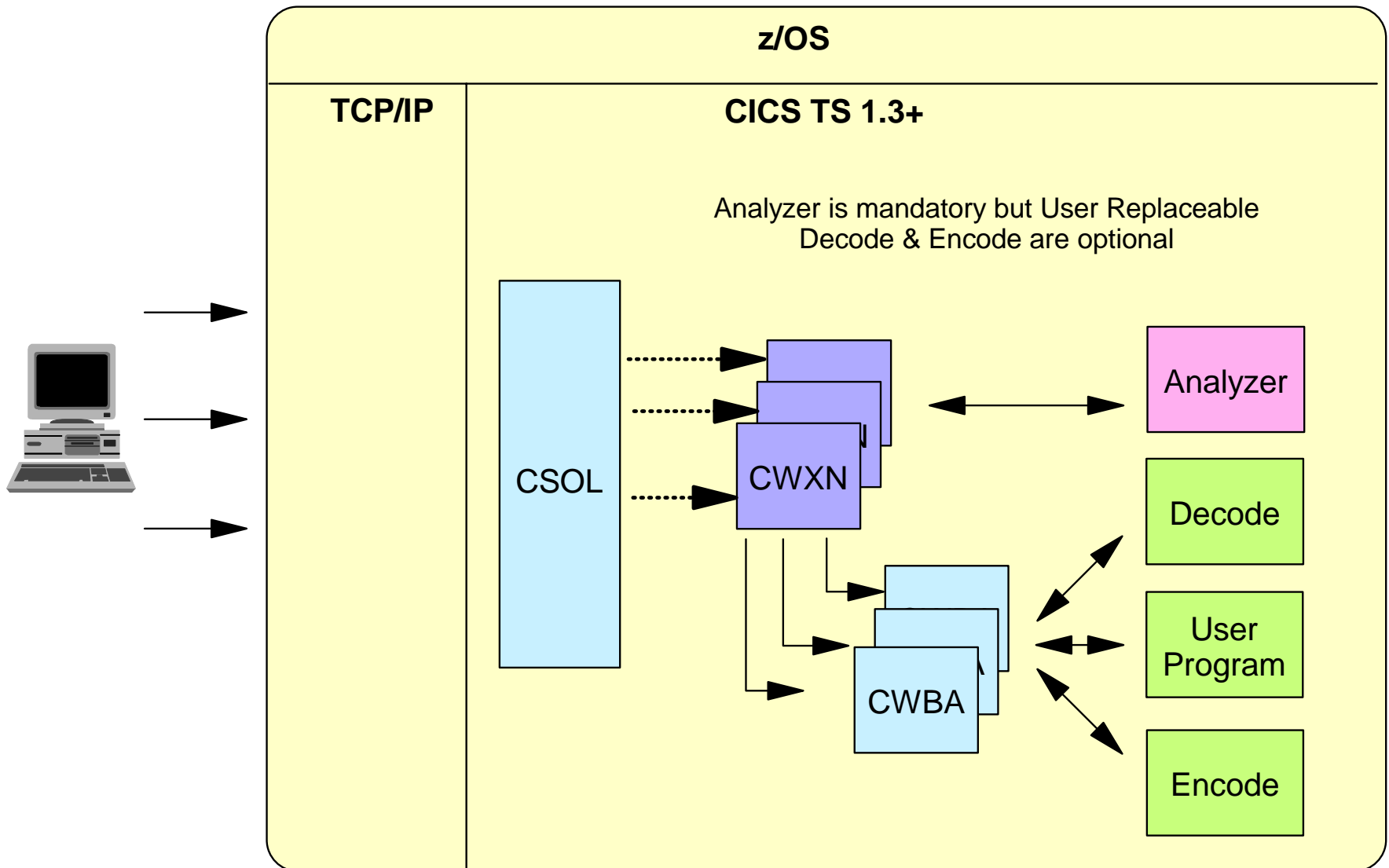 - Output in HTML, XML, or other formats

Why use CICS Web Support?

- **Gives direct access to Web Browsers**
  - using HTTP for connectivity
  - using HTML as the presentation
- **Provides 2-tier model with no gateways**
- **Allows writing new web applications using CICS skills**
  - samples and aids provide for ease of use
- **Provides access to existing applications**
  - Commarea-based applications
 - With the Web Bridge, 3270-based BMS and TC applications

CICS Web Support request flow

z/OS

TCP/IP

CICS TS 1.3+

Analyzer is mandatory but User Replaceable
Decode & Encode are optional

CSOL

CWXN

CWBA

Analyzer

Decode

User
Program

Encode

3270 Bridge

- **Function provided by CICS TS 1.2 and above**
- **Bridge exit program**
  - creates 3270-like environment for user application
  - intercepts BMS and TC requests
- **Bridge monitor program**
  - interfaces with external communication and message formats
  - starts user application running under bridge exit program
- **Supplied bridge programs**
  - Web bridge (object only) - both exit & monitor
  - MQ bridge (object only) - both exit & monitor
  - Bridge sample (DFH0CBRE, source) - exit only
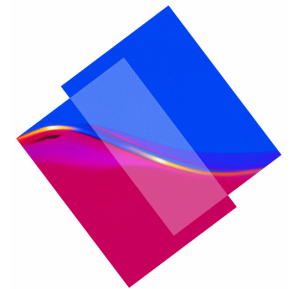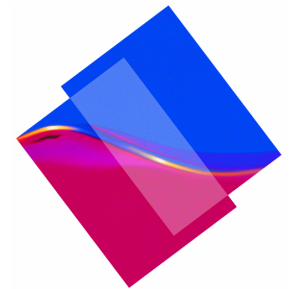
CICS Web Support with Web Bridge
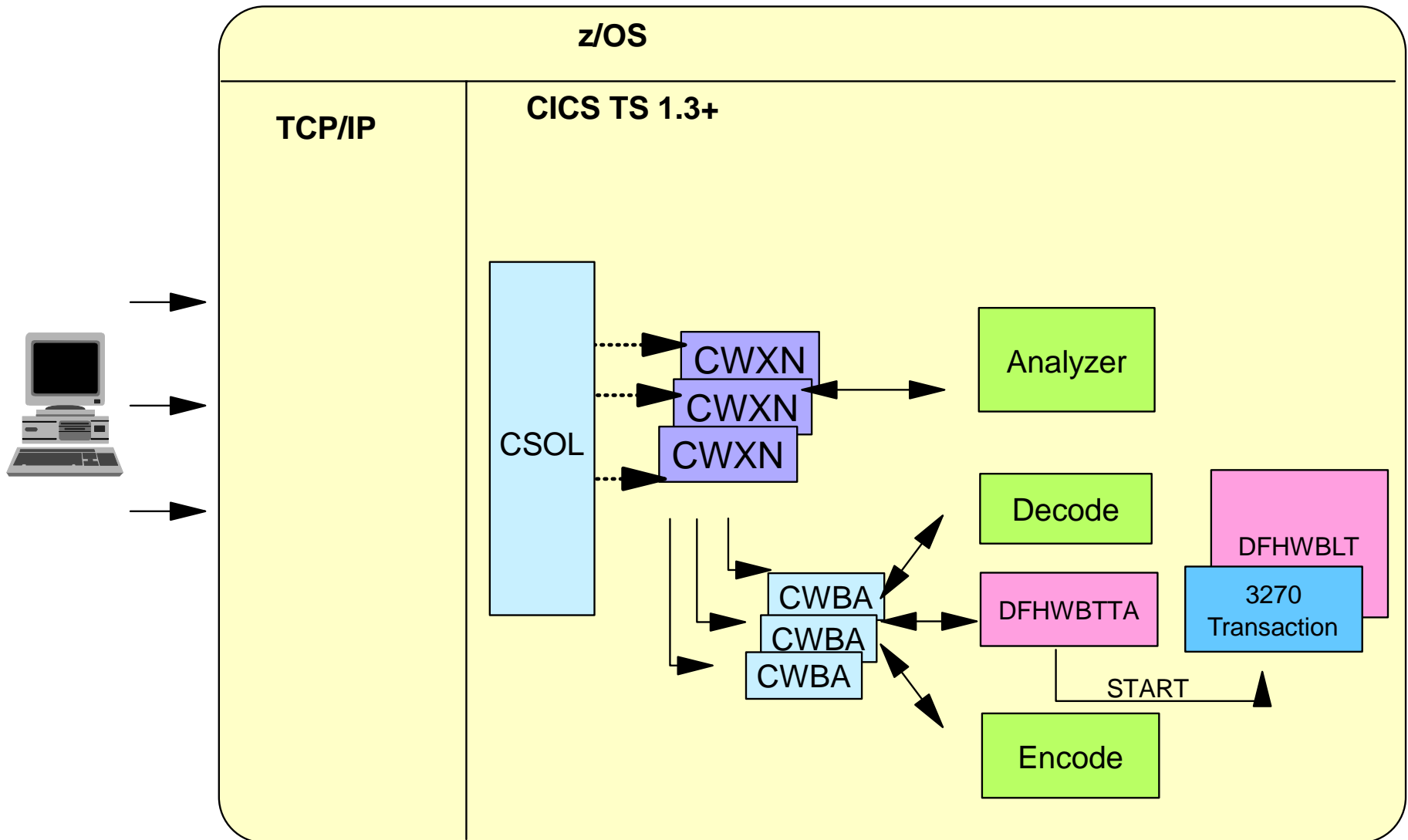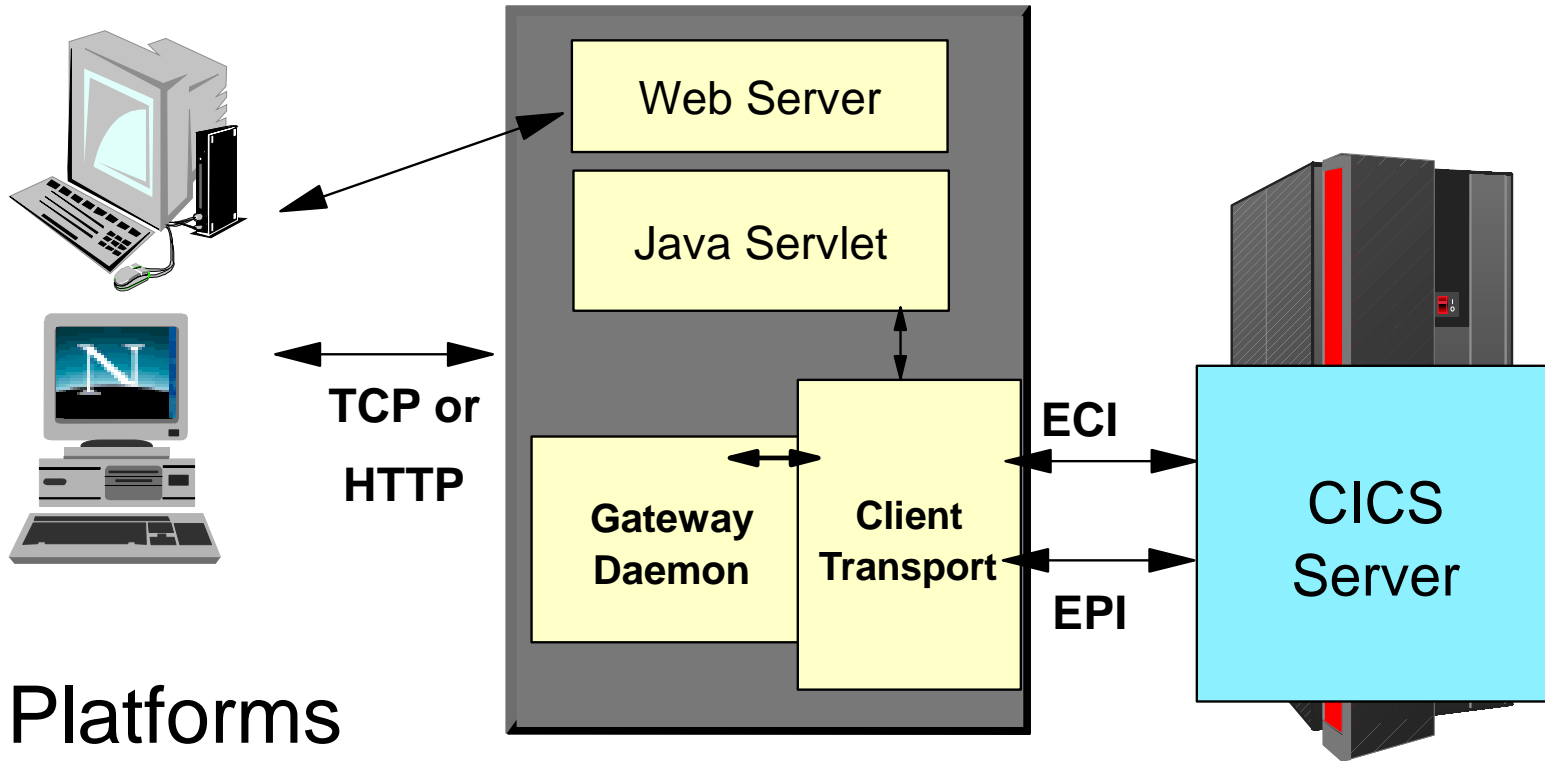
CICS Transaction Gateway

- **Java programs using CICS client protocols**
  - Applets or servlets
  - JGATE class library
    - ➤ ECIRequest and EPIRequest
  - Java beans for ECI and EPI
  - CCF and J2EE Connector Architecture
    - ➤ Extensions built on CTG client classes
- **Terminal servlet**
  - Dynamic conversion of 3270 to HTML
  - Customizable presentation
  - HTML templates
- **C, C++, Visual Basic programs using CICS client protocols**
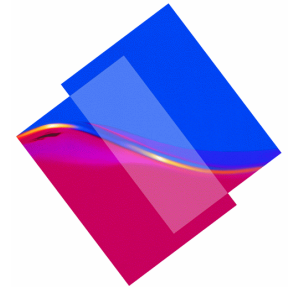 - Allows integration from non-Java web servers
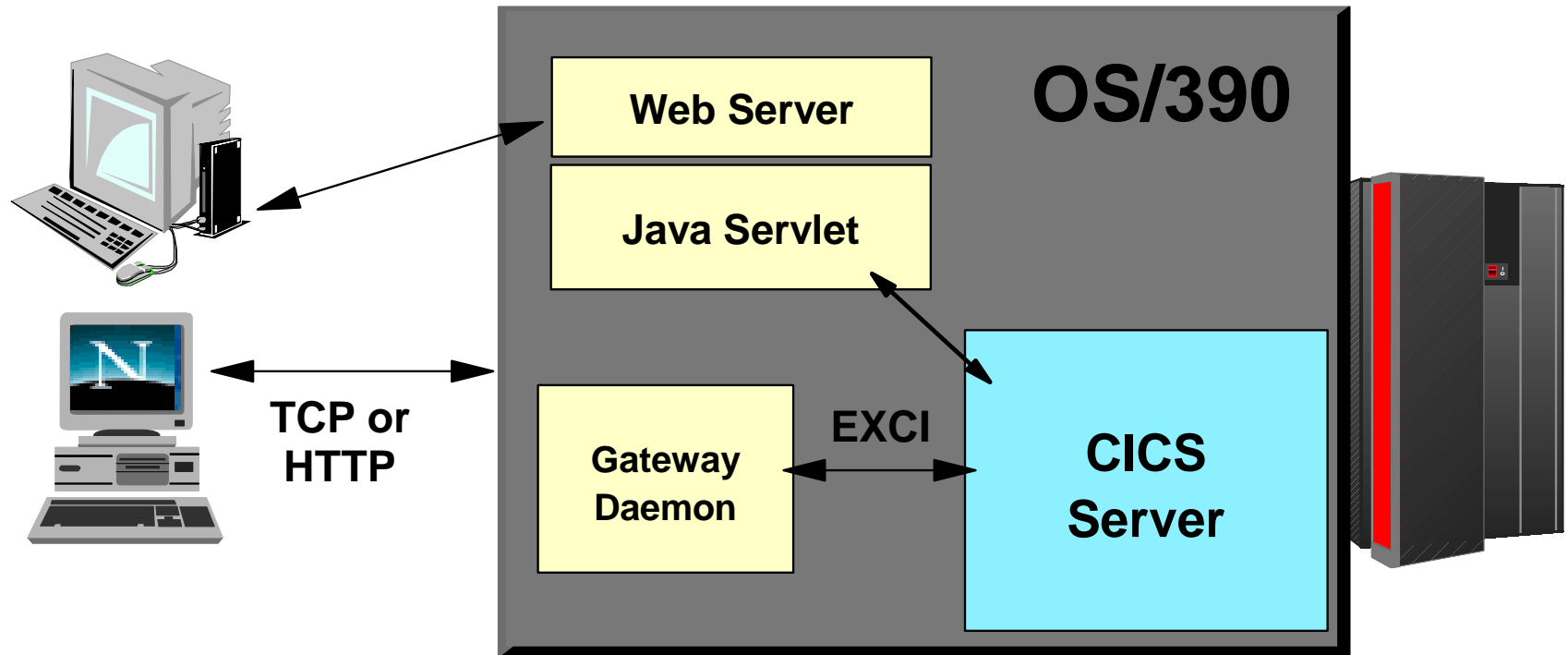
CICS Transaction Gateway

Platforms
- AIX
- OS/2
- Windows NT/2000
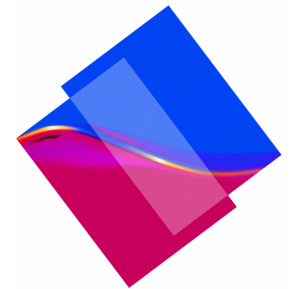- Sun Solaris
- HP-UX
- Linux/390

CICS Transaction Gateway for OS/390

- Same Java code as non-OS/390 platforms
- Runs as separate region or integrated into WebSphere Application Server
- Connects to CICS via EXCI
  - Therefore, only ECIRequests handled
  - Error returned for EPIRequest usage
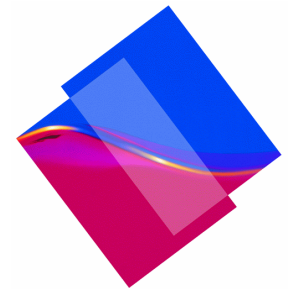 - Call Bridge module for 3270 applications

IBM Host Integration Products

- **Java access to 3270 applications**
- **Host on Demand**
  - Supplied Applets
    - ➤ Terminal emulation via telnet server
    - ➤ Terminal emulation via CICS Transaction Gateway
  - Screen Customizer
    - ➤ Separate product
    - ➤ Additional applet classes to modify appearance
- **Host Publisher**
  - Runs as servlet to generate HTML output
- **Class Library**
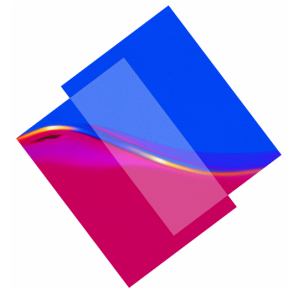 - Write your own 3270 terminal emulators
  - Applets
  - Servlets

CICS Native IIOP Interface

- **Object client access to CICS applications**
  - Applets, servlets, Enterprise JavaBeans
  - CORBA-compliant clients
  - IDL, ORB, RMI
- **TCP/IP connectivity**
  - Internet Inter-ORB Protocol, IIOP
  - CICS listener
  - SSL available
- **CICS applications**
  - CORBA-conforming Java (HPJ-compiled)
    - CICS TS 1.3
  - Enterprise JavaBeans
    - CICS TS 2.2
  - Java in CICS can LINK to non-Java programs

CICS as an EJB Server

- **CICS provides partial support for V1.1 of the Enterprise JavaBeans specification**
    - http://java.sun.com/products/ejb
- **CICS provides a run-time environment where requests for EJB services are mapped to existing or enhanced CICS services**
- **Enterprise beans can give Java clients access to existing CICS applications and data**
    - JCICS API
    - CICS Connector for Java
- **Install enterprise beans into CICS via deployment**
    - Use the WebSphere Application Assembly Tool
- **As usual, enterprise beans execute in a Java Virtual Machine (JVM)**
    - CICS will manage JVMs along with other system resources

Other options

If your application needs are not met by the recommended solutions, CICS supports a wide range of connectivity options

- **CICS Family**
  - ECI, EPI, EXCI, FEPI
- **Messaging**
  - MQSeries
- **TCP/IP Interfaces**
  - RPC - DCE/RPC and ONC/RPC
  - Sockets
- **Terminal Interfaces**
  - 3270 terminal emulators, HLLAPI
- **Peer-to-Peer**
  - APPC, LU6.2
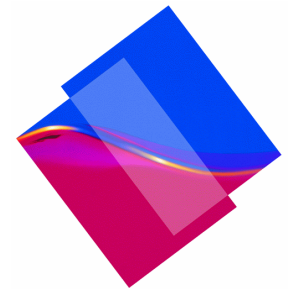
Planning Information

- **Redbooks**
  - CICS TG V3.1: The WebSphere Connector for CICS, SG24-6133
  - Java Connectors for CICS: Featuring the J2EE Connector Architecture, SG24-6401
  - CICS TS 1.3 Web Support and 3270 Bridge, SG24-5480
  - CICS TS for VSE: CICS Web Support, SG24-5997
  - Revealed: Architecting Web Access to CICS, SG24-5466
  - Securing Web Access to CICS, SG24-5756
  - A Performance Study of Web Access to CICS, SG24-5748
  - Workload Management for Web Access to CICS, SG24-6115
  - Enterprise JavaBeans for z/OS and OS/390: CICS TS V2.2, SG24-6284
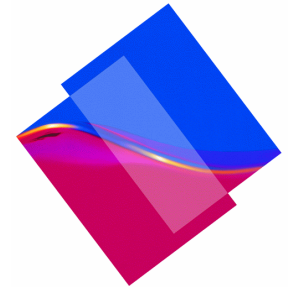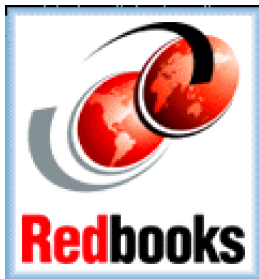
Summary

- **CICS provides strategic solutions for easy access to CICS applications from web browsers.**
  - Choice of 3-tier or 2-tier
  - Choice of programming environment
  - Solutions for any application type

- **CICS has connectivity options which allow use of any web server and web application programming model.**