CICS and e-business on z/OS:

Web-Enabling Existing and New CICS/IMS Applications

Session B12

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Java

Agenda

- **CICS e-business Strategy**
- **CICS e-business Support**
  - ► **Web Support**
  - ► **CICS Java and EJB Support**
  - ► **e-business infrastructure**
- **CICS 'Classic' Enhancements**
- **CICS Futures**
- **Customer References**
- **Business Partner Support**
- **Summary**

CICS **e**-business Strategy

- **Add further value to our customer's investment**
  - ► Exploit appropriate new technology
  - ► Extend use of existing applications
  - ► Help reduce the cost of computing

- **CICS - a powerful Enterprise e-business application server**
  - ► Provide evolutionary path to e-business
  - ► Make it easy to write new e-business applications

3270
CICS
COBOL
etc.

Evolution

WWW

CICS

WebSphere
Application Server

JAVA
COMPATIBLE
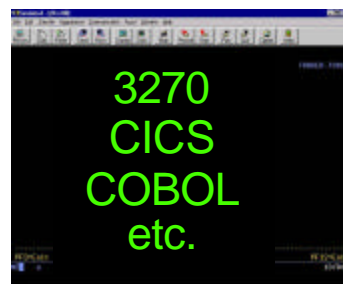
Evolution not Revolution

Why CICS Transaction Server for Enterprise e-business?

- **Our customers' *huge investment* in CICS**
  - ▶ An investment in skills - from Application Development through to operational skills
  - ▶ An investment in applications - estimated at $1 trillion
- **Scalability, performance and throughput**
  - ▶ Ability to handle 150,000+ concurrent connections
  - ▶ Reliability, security, data integrity
- **Function to *evolve* from where we are today**
  - ▶ Functional Java, HTML, workstation interfaces
  - ▶ Coexistence with existing applications
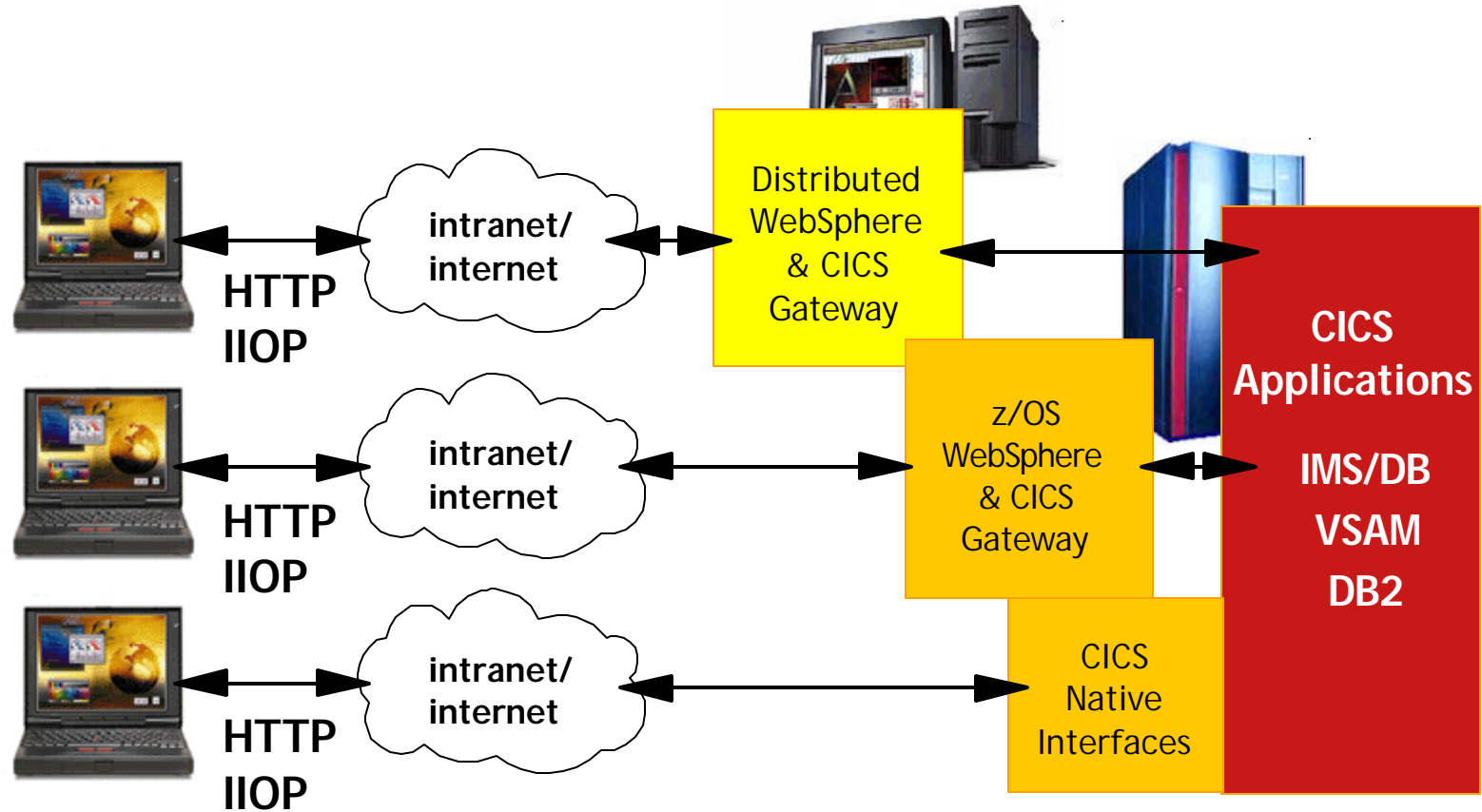 - ▶ Tools, services and education
  - ▶ ISV support

Already well along the path with CICS TS 1.3

- **e-business technologies**
  - ► CICS Web Support
  - ► CICS Transaction Gateway
  - ► CICS Java and IIOP support
- **High-productivity** AD Support
  - ► CICS Connectors and Common-Connector-Framework
  - ► VisualAge Java support for CICS Java
  - ► Other members for the VisualAge family
- **Loads of useful traditional CICS function**

CICS e-business Support

|		
HTTP IIOP	intranet/ internet	Distributed WebSphere & CICS Gateway
HTTP IIOP	intranet/ internet	z/OS WebSphere & CICS Gateway
HTTP IIOP	intranet/ internet	CICS Native Interfaces

CICS Applications

IMS/DB
VSAM
DB2

- Enable web clients to invoke CICS applications
- Use internet standards of HTTP and IIOP
- Enable both Gateway and Native routes

Available Today
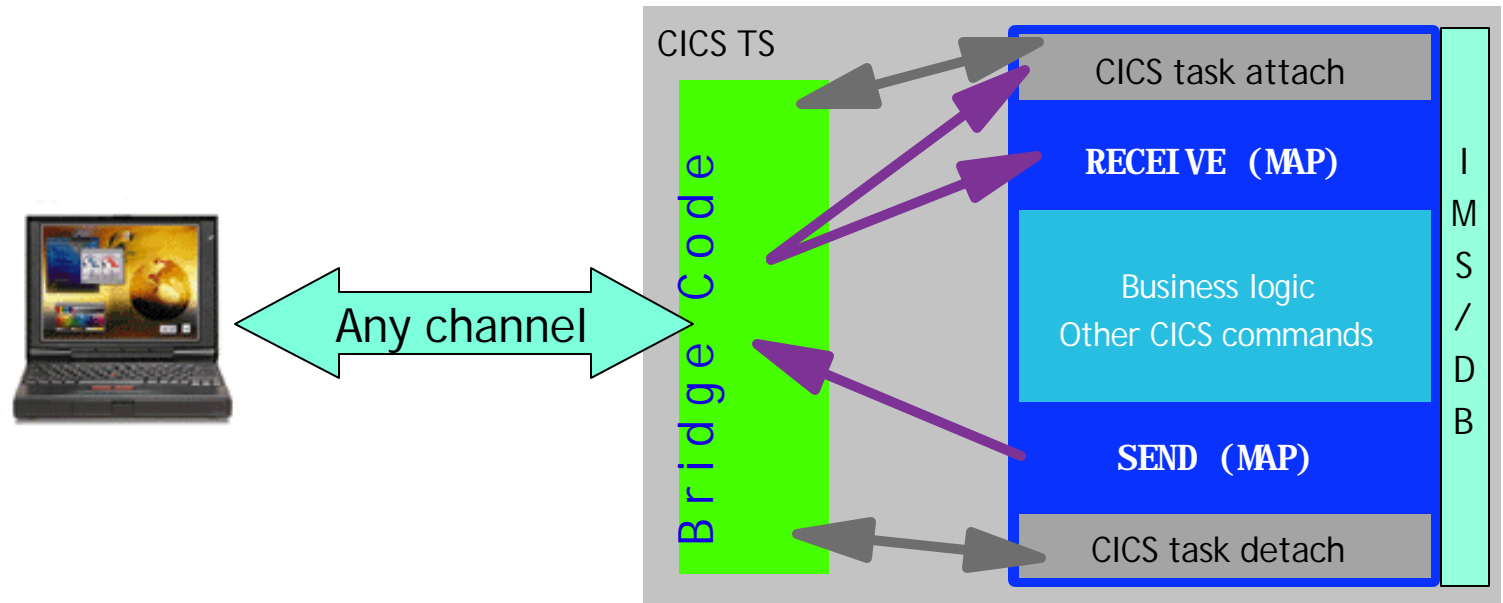
Native **CICS** **W**eb **S**upport
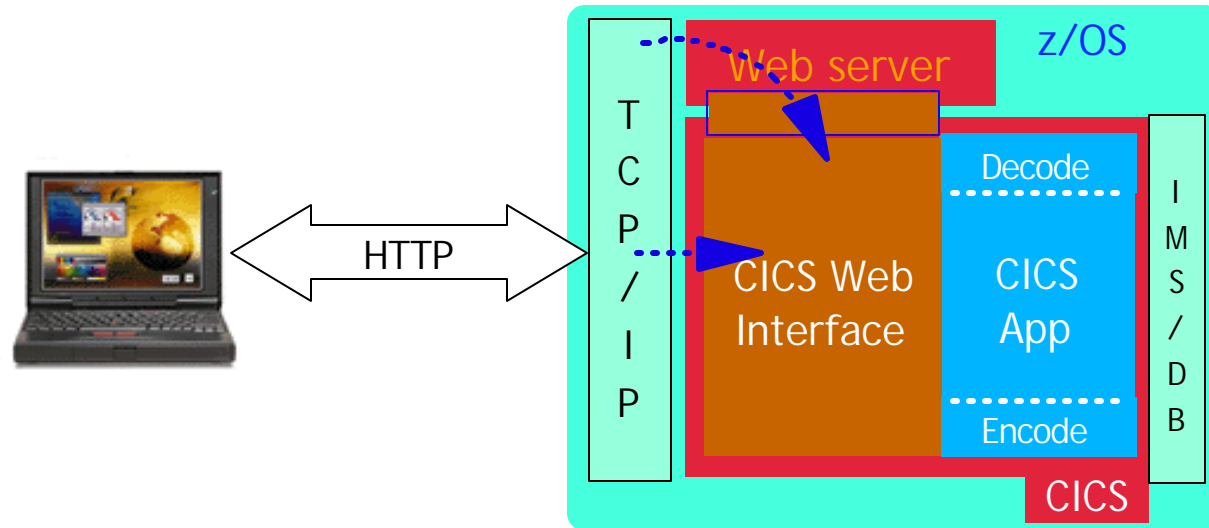
- HTTP received and sent by CICS ...
  - ► Directly via CICS *HTTP listener* - CICS 4.1 & CICS TS
  - ► Redirected via CICS *Web server plug-in* - CICS TS 1.3
- Target applications ...
  - ► *COMMAREA* based supported in CICS 4.1 & CICS TS
  - ► Terminal-based supported since CICS TS 1.2 via 3270 bridge
  - ► CICS TS 1.3 adds new *document API* and SSL support

3270 Bridge Technology

CICS TS

Bridge Code

CICS task attach

RECEIVE (MAP)

Business logic
Other CICS commands

SEND (MAP)

CICS task detach
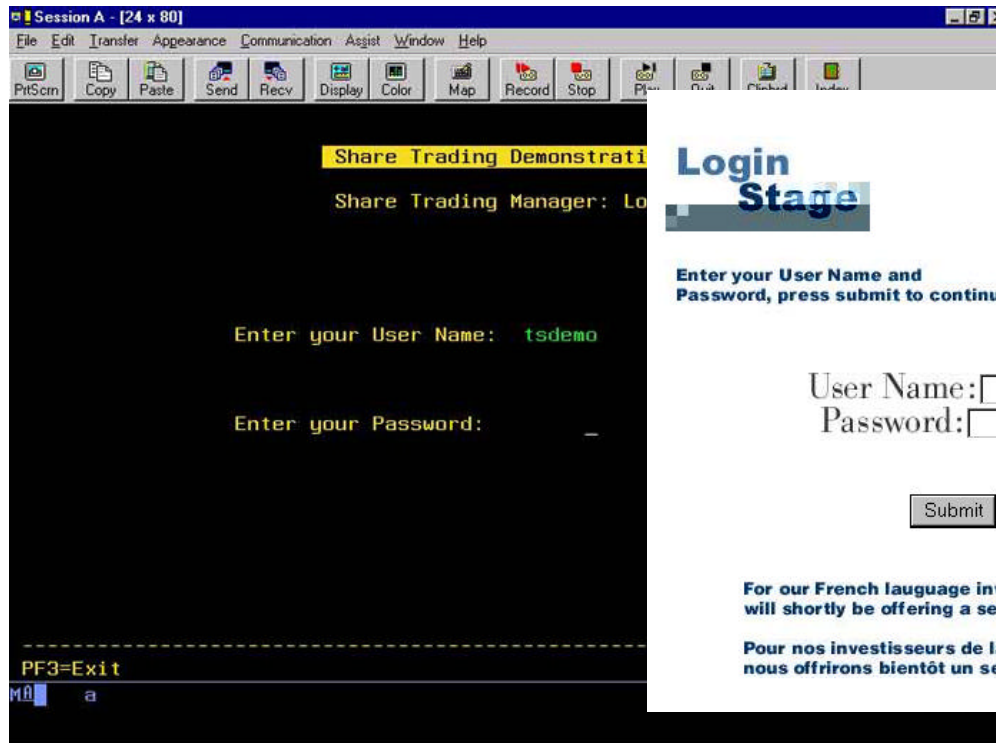
I M S / D B

Any channel

- The 3270 Bridge technology makes it possible to replace the **standard** CICS terminal support with new code
  - ► That code can then communicate outwards via whatever channel it wants
    - – Channel options include HTTP and HTML, MQSeries, CICS TS or TD

3270 Web-bridge

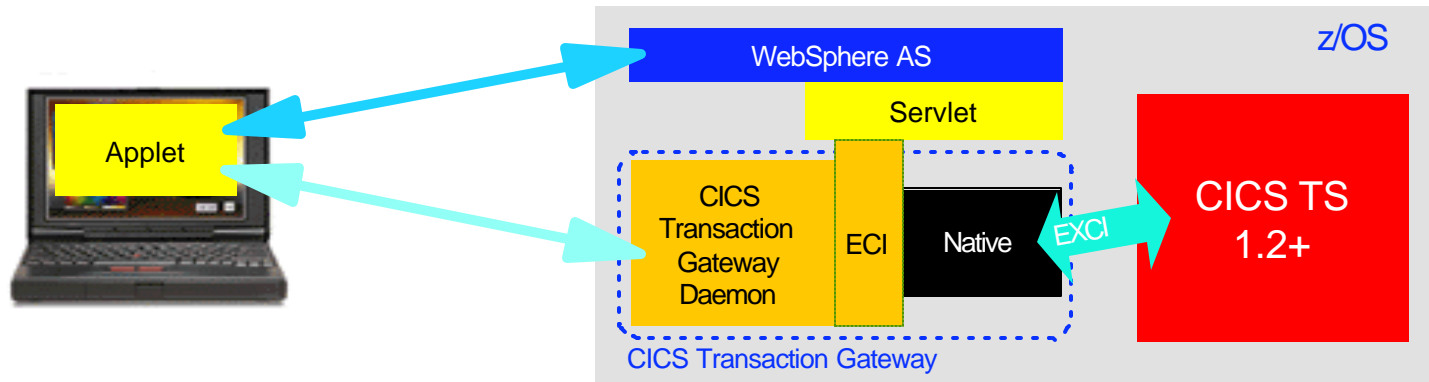- CWS with 3270 Web-bridge give ***turnkey*** Web-access to 3270 applications
  - ► *Customized* mapping of BMS applications to HTML

CICS Transaction Gateway 4.0

- Provides *CICS Universal Client*-style services to world of Java
  - Same CTG Daemon code on all supported platforms
    - z/OS, Linux/390, Windows 2000/NT, AIX, Solaris, HP-UX and OS/2
      - On z/OS uses EXCI into CICS TS 1.2+ ..
      - .. and integral CICS Universal Client on other platforms
- The middleware that enables the *CICS Connector*
- *Supports J2EE Connector Architecture*
- *Separately priced product*

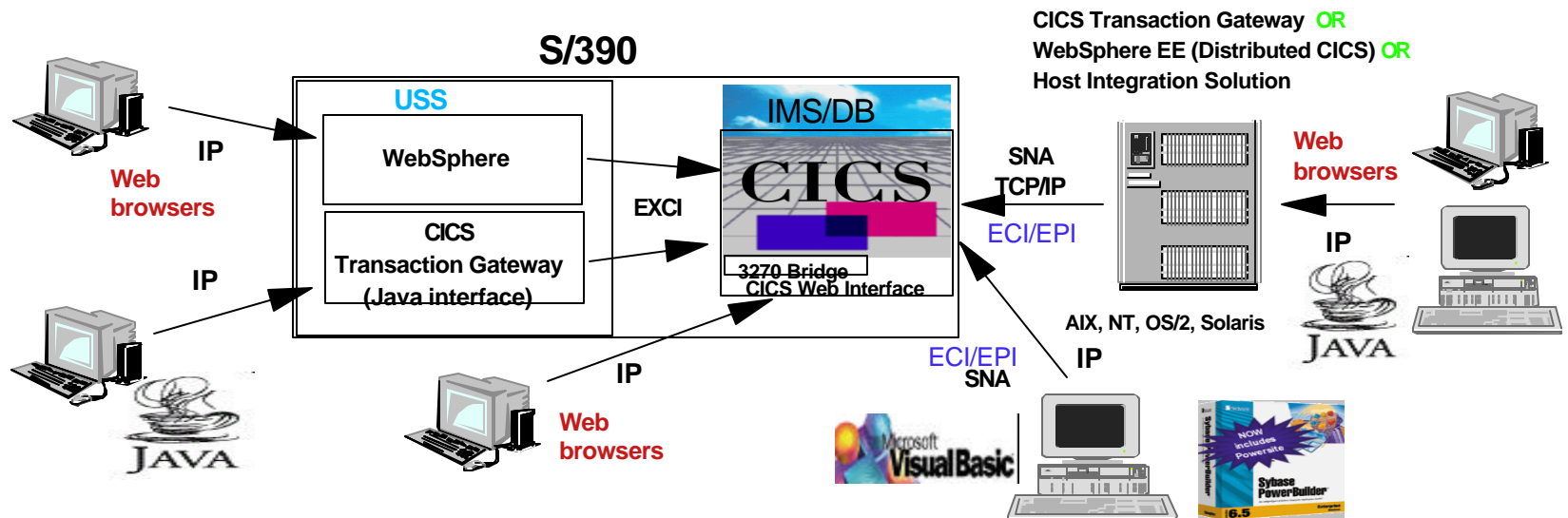# CICS: Extending Existing Investment

- **Objectives**
  - ➤ **Open existing CICS investment to new opportunities**
  - ➤ **No mainframe changes, exploit what you have**
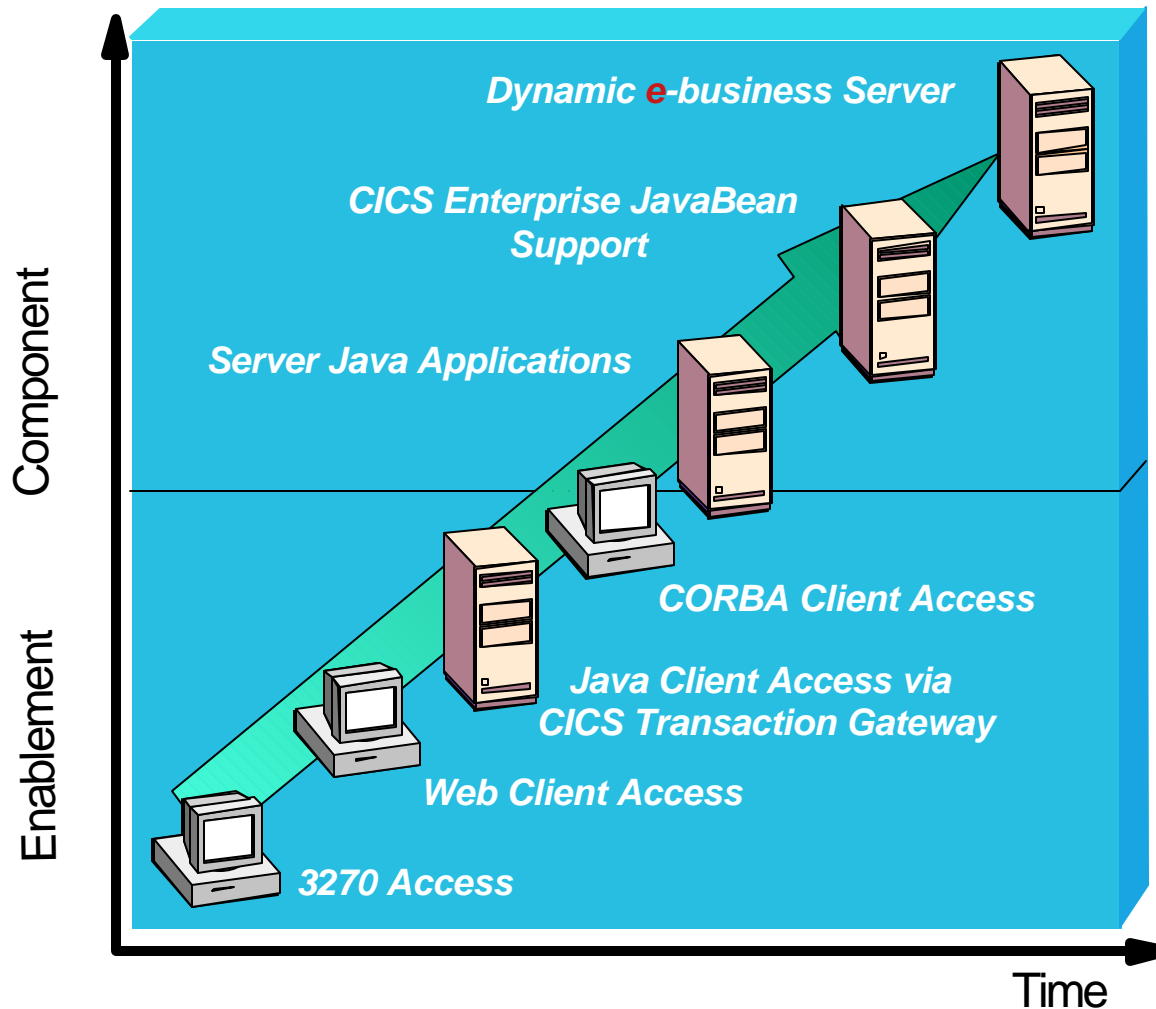 - ➤ **Access from HTML, Java, GUI desktops**

- **Business Benefits**
  - ➤ **Fast, Low cost, Low risk**
  - ➤ **You can do it now, tools available to help**
    - ★ **Both IBM and Business Partners**
  - ➤ **References available**

S/390

USS

WebSphere

CICS
Transaction Gateway
(Java interface)

EXCI

IMS/DB

CICS

3270 Bridge
CICS Web Interface

Web browsers

IP

IP

Web browsers

IP

CICS Transaction Gateway OR
WebSphere EE (Distributed CICS) OR
Host Integration Solution

SNA
TCP/IP

ECI/EPI

Web browsers

IP

AIX, NT, OS/2, Solaris

ECI/EPI
SNA

IP

Microsoft Visual Basic

Sybase PowerBuilder

JAVA

CICS e-business: Java roadmap

Dynamic e-business Server

CICS Enterprise JavaBean Support

Server Java Applications

Component

Enablement

CORBA Client Access

Java Client Access via CICS Transaction Gateway
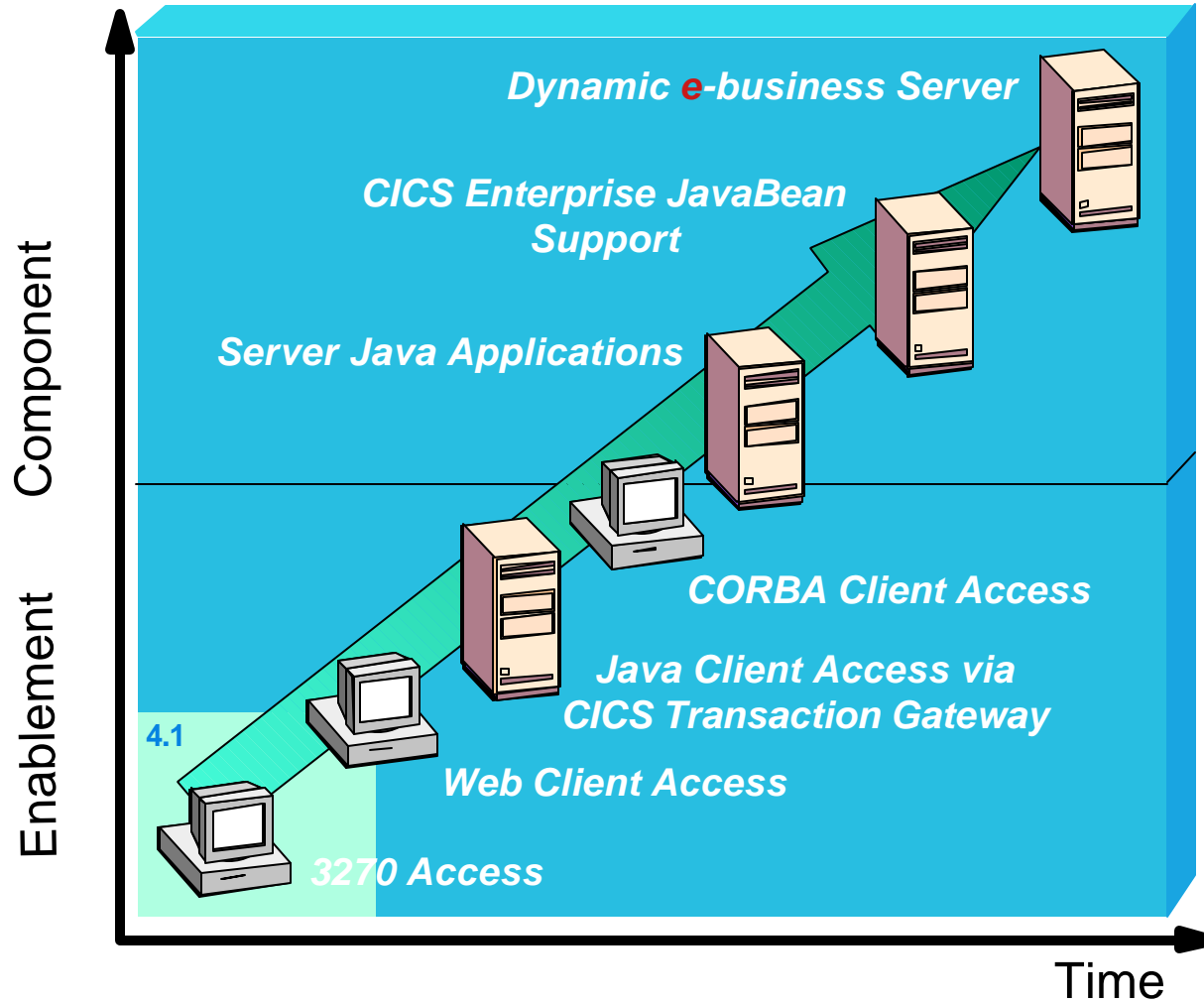
Web Client Access

3270 Access

Time

Why Java?
- **Improves AD Productivity**
  - Simpler and faster to program
  - Visual AD tools
  - Strong component model
  - Easier application deployment and manageability
- **Robust, Portable, Ubiquitous**
- **Quickly becoming the preferred language**

- **Why CICS on S/390?**
  - Exploit existing infrastructure
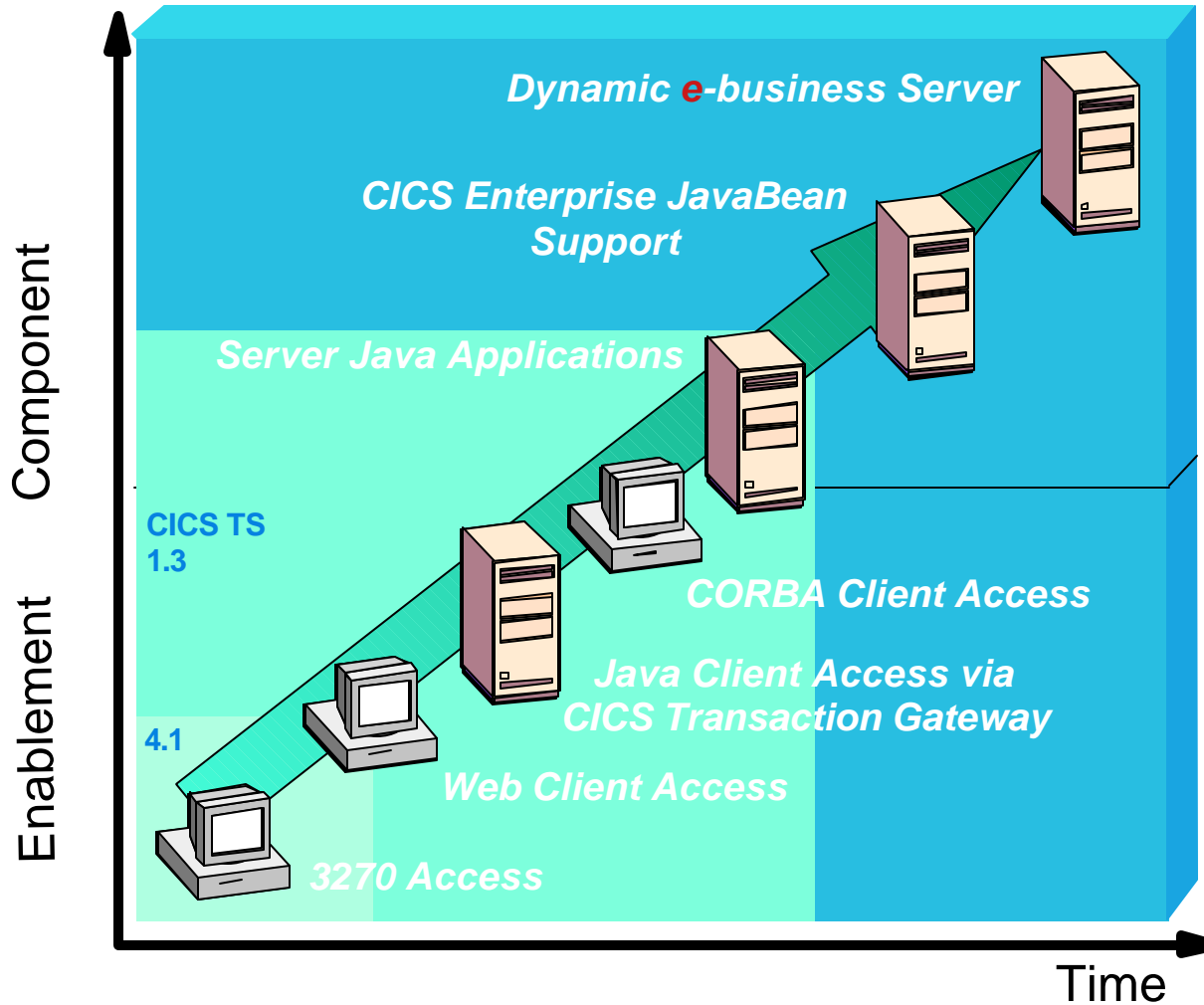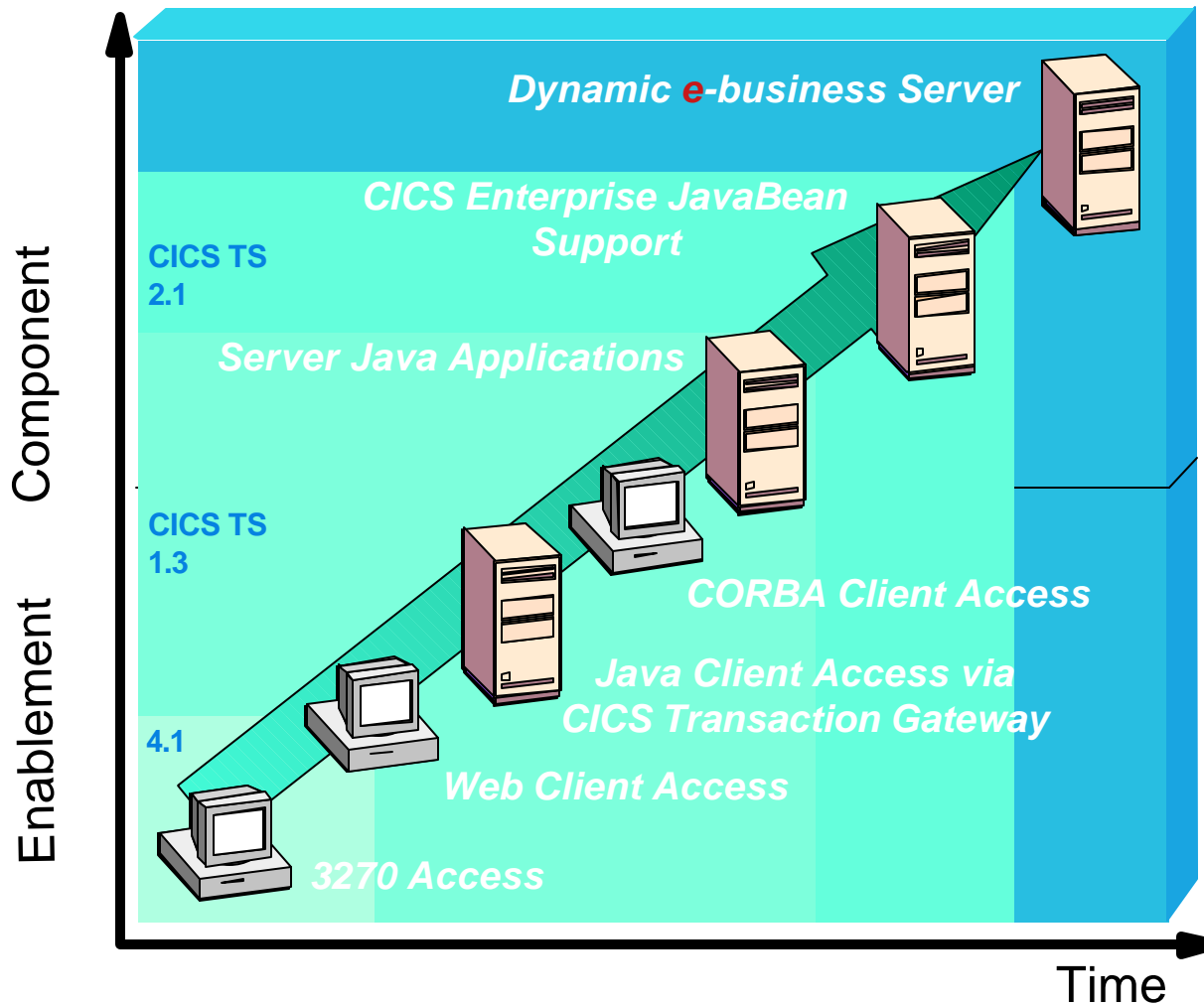 - Exploit CICS Strengths

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CICS e-business: Java roadmap

- **Dynamic e-business Server**
- **CICS Enterprise JavaBean Support**
- **Server Java Applications**
- **CORBA Client Access**
- **Java Client Access via CICS Transaction Gateway**
- **Web Client Access**
- **3270 Access**

4.1

Component / *Enablement* (vertical axis)

Time (horizontal axis)

CICS e-business: Java roadmap

Dynamic e-business Server

CICS Enterprise JavaBean Support

Server Java Applications

CICS TS 1.3

CORBA Client Access

Java Client Access via CICS Transaction Gateway

4.1

Web Client Access

3270 Access

Component

Enablement

Time

15

CICS e-business: Java roadmap

Component

Enablement

CICS TS 2.1

CICS TS 1.3

4.1

Dynamic e-business Server

CICS Enterprise JavaBean Support

Server Java Applications

CORBA Client Access

Java Client Access via CICS Transaction Gateway

Web Client Access

3270 Access

Time

CICS Java Program Support

Objectives
- Support Java as a first class CICS programming language

Benefits
- CICS services from the Java language
- The new wave of programmers

CICS Java classes

File Control	Interval control
Program Control	Task Control
Temporary Storage	Transient Data
APPC	Abend Handling

Support for
- Java Virtual Machine (JVM) for OS/390
  - OS/390 JVM can run under CICS OTE TCB
- High Performance Java Compiler
  - *Java Hot Pooling*
- DB2 JDBC Support

CORBA IIOP

CICS Java program

```
import java.lang;
.....
// debit method
public debit (int x)
{
  bal = bal - x;
}
```
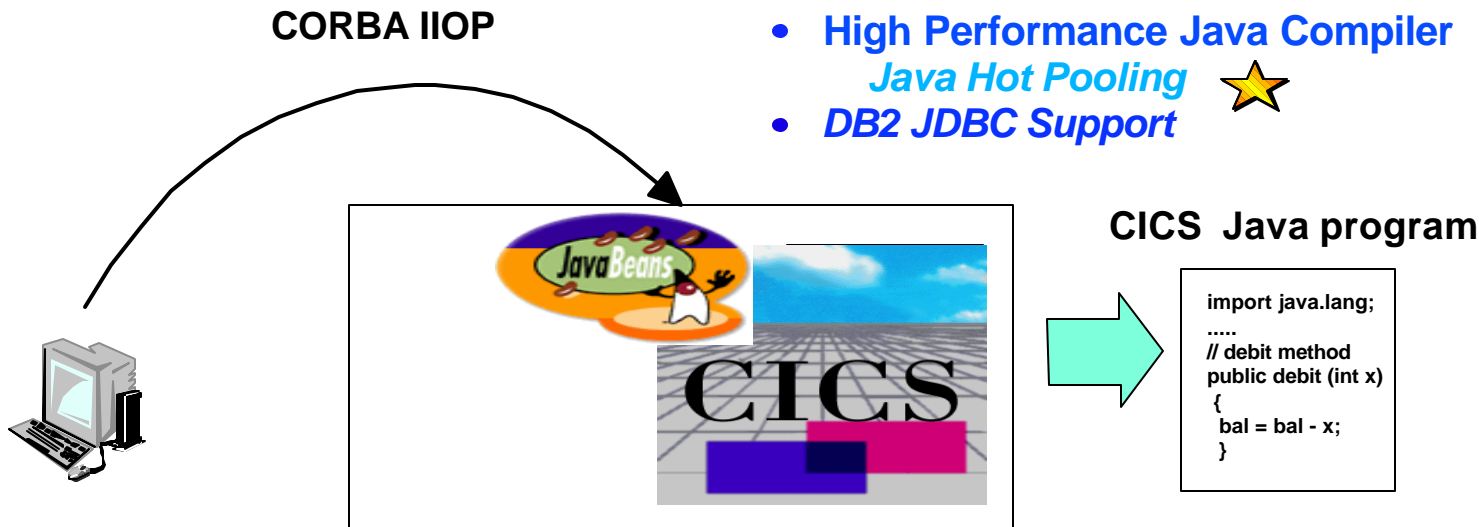
New Java Application Book
- Java for S/390 and AS/400 Programmes by P Coulthard and G Farr. - IBM Press ISBN 1-58347-011-5

And now we have CICS TS V2.1

- **Brand new version - became available on 29th March 2001**

- **Delivers major new function ...**

Support for Enterprise JavaBeans

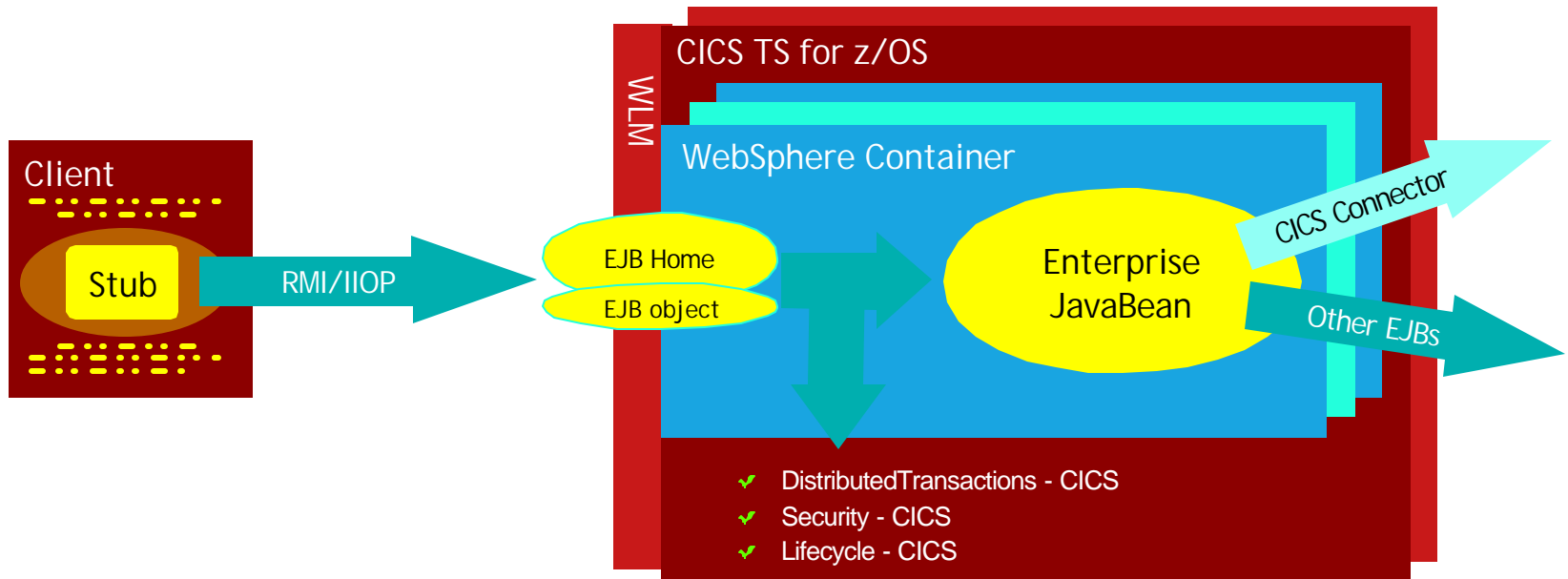**Enterprise JavaBeans**

CICS Enterprise JavaBean Support

- **CICS acts as an Enterprise Java Server**
  - Whilst **continuing** to support **all existing** CICS applications
  - Optimized access to existing applications from EJBs
- **Supports most natural EJB type = Session Beans**
- **Highlights include ...**
  - Exploits IBM's new persistent reusable JVM
  - EJB V1.1 Spec
  - Sysplex and MVS/WLM enabled
  - Updated SPI, CEMT, CICSPlex SM for system management
  - CICS-specific deployment tooling aimed at CICS system programmer skill set
- **Commonality and partnership with IBM WebSphere platform is key benefit**
  - Common AD, Common Connectors, Common Framework
  - Shared Common Container implementation

CICS Architecture for EJBs

- **CICS's Enterprise Java support makes use of the standard Container from the WebSphere platform**
- **Container calls on CICS for key services**
 **.. including distributed transaction management**

Client
Stub
RMI/IIOP

CICS TS for z/OS
WLM
WebSphere Container
EJB Home
EJB object
Enterprise JavaBean
CICS Connector
Other EJBs

- ✔ DistributedTransactions - CICS
- ✔ Security - CICS
- ✔ Lifecycle - CICS

z/OS - next generation JVM

- **High-performance Java support is provided using new next-generation z/OS JVM**
- **New design - called the persistent reusable JVM model**
  - ► Multiple heaps to reduce initialization costs
  - ► Classes are classified and separated into different heaps - application versus middleware versus system classes
  - ► Separated heaps can be cleaned up and reset as appropriate
- **JVM can detect "badly behaved" classes and take action**
  - ► JVM can provide full Bean isolation
  - ► JVMs appear short lived to Bean

JVMs

| Mw | Appl | | Mw | Appl |

System Heap

| Mw | Appl | | Mw | Appl |

Shared
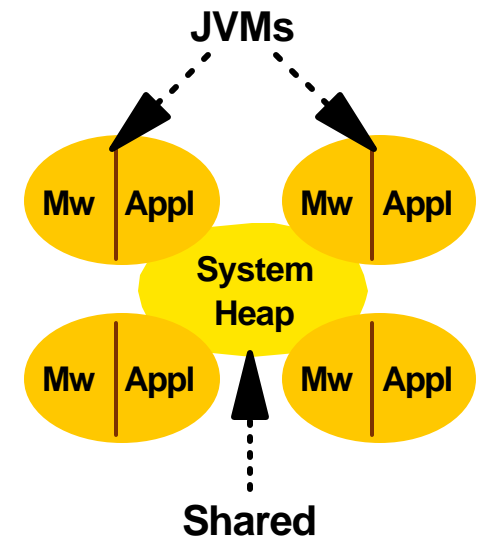
Accessing Data

- **JDBC 1.2**
  - Includes SQLJ
  - Uses CICS-DB2 adapter

- **JDBC for IMS**

- **Data Access Beans**
  - Encapsulate access to relational data
  - Simple local-only access
  - Supported by VisualAge for Java

- **JCICS API give access to ..**
  - VSAM files, Temporary Storage, Transient Data

- **Access to CICS programs via**
  - JCICS
  - CICS Connector

✓ **Parallel Sysplex Data Sharing fully supported for IMS/DB, DB2, VSAM**

CICS EJB AD Tools

- **Any EJB AD tools can be used ..**
  - ► **But VisualAge for Java (will) includes integrated tools for WebSphere container**
    - – Unit-test in local EJS enviroment
    - – Seamless unit-test deployment into target WebSphere EJS environment
    - – End-to-end remote debug

- **Deployment - split into two logical parts**
  1. **AD driven code generation of WebSphere container specific classes**
  2. **CICS deployment tool directed at CICS sys-progs**
     - – Auto-install for enterprise beans

Why do EJBs in CICS make sense?

It is an obvious progression in the CICS programming model:

- **Benefits of Enterprise JavaBeans match benefits given by CICS environment**
  - ► Hides the complexities of transactions, concurrency, security from the programmer
  - ► Allows deployment time configuration
  - ► Supports the scalability and robustness needs of real e-business
- **Enterprise JavaBeans model exposes all of CICS existing strengths via open Java Enterprise APIs**
  - ► CICS takes its appropriate place in the Application Framework for e-business
  - ► Adds CICS to the value proposition of EJBs on z/OS
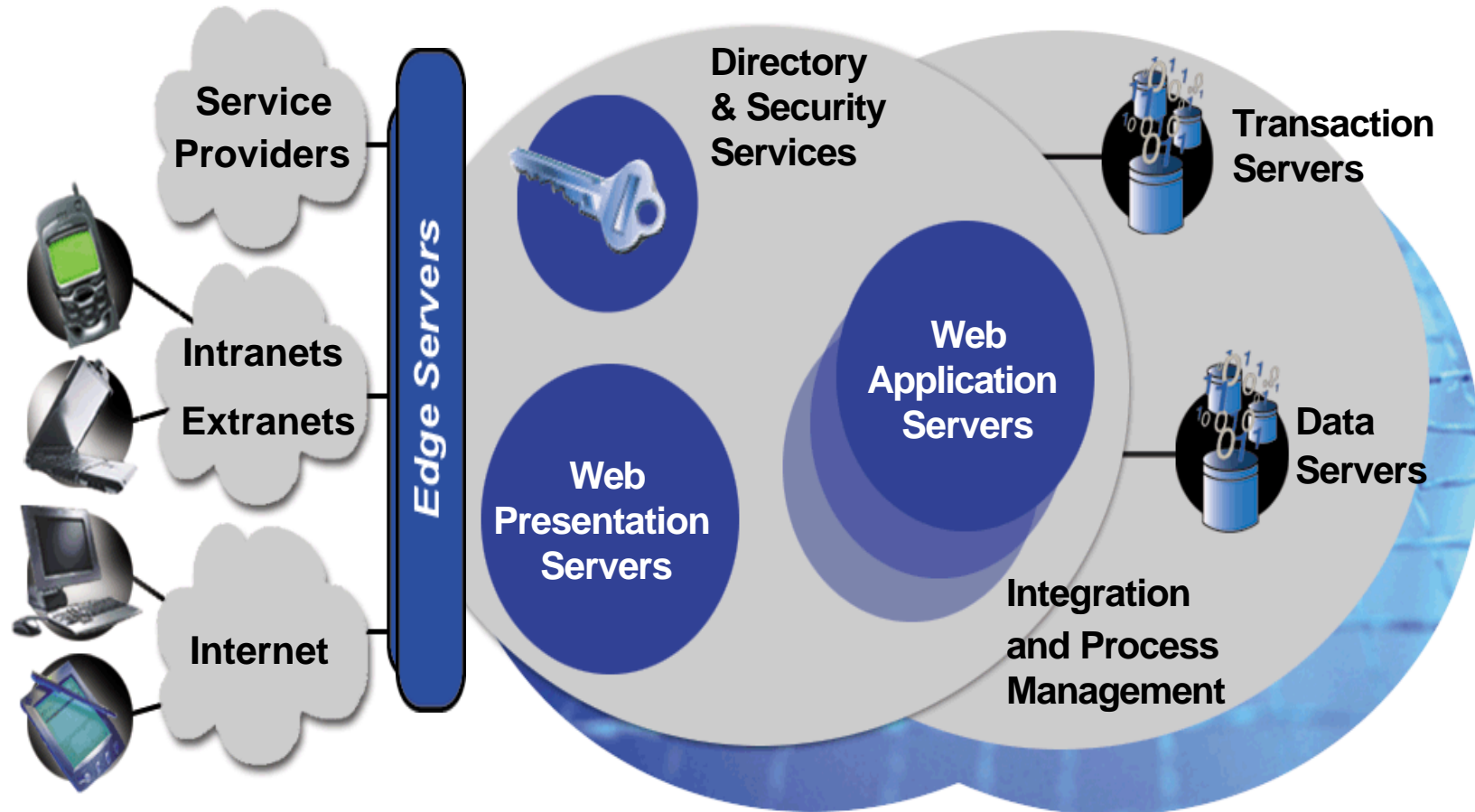
e-business software infrastructure

e-business software infrastructure

z/OS

Service Providers

Intranets
Extranets

Internet

Edge Servers

Directory & Security Services

Presentation Servers

Web Application

WebSphere platform

Integration and Process Management

MQSeries family

Transaction Servers

CICS

IMS TM DB

Data Servers

DB2
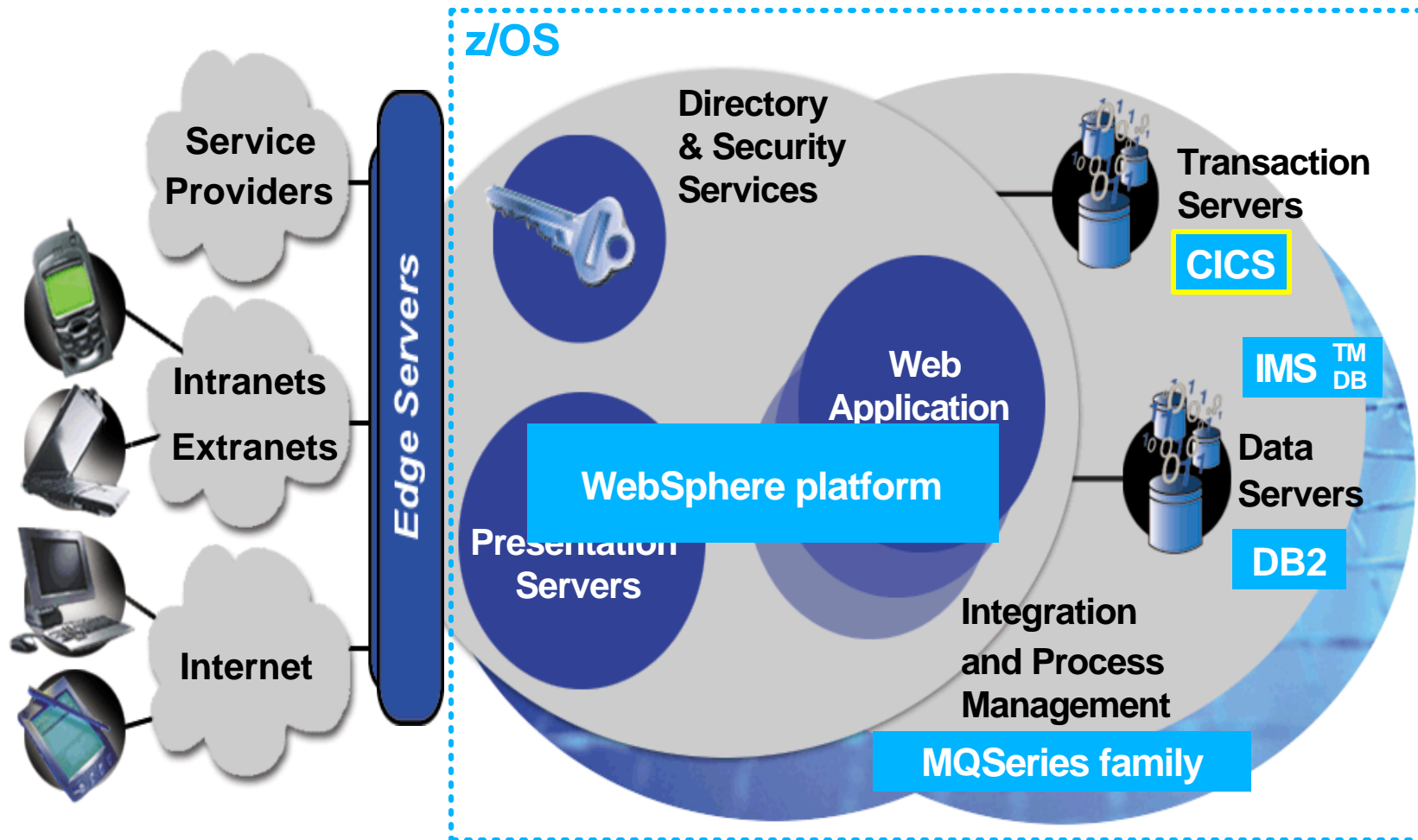
Integration using CICS and WebSphere
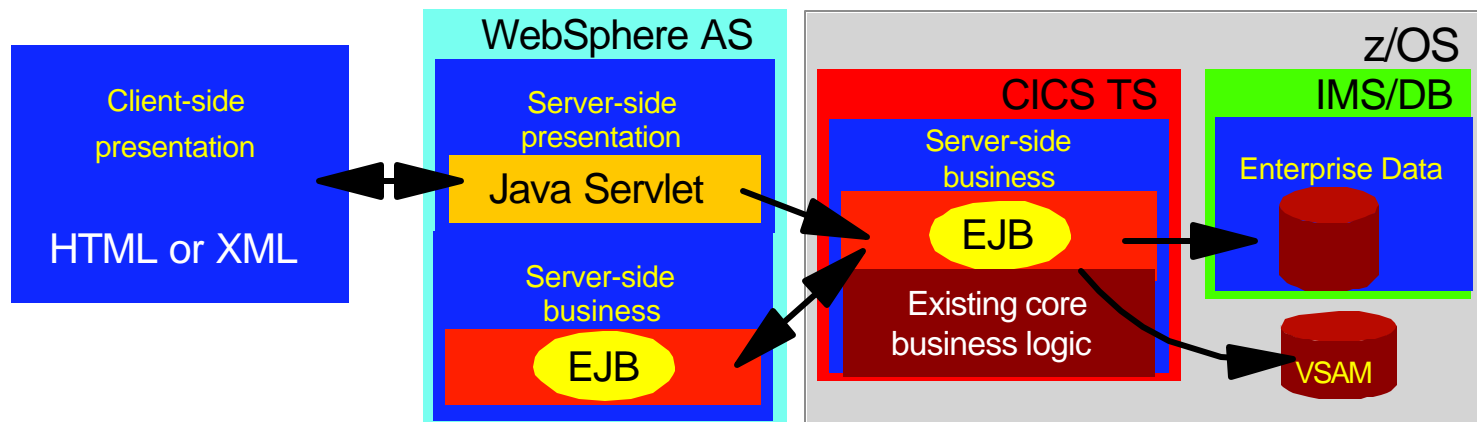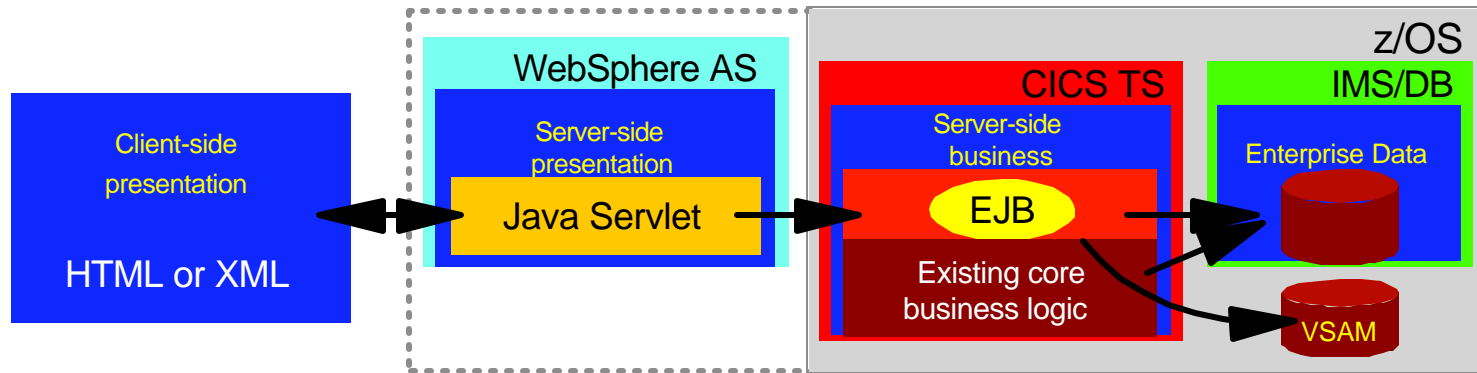
CICS TS V2 Classic Enhancements

- **Automatic restart of CICS data sharing servers**
- **Coupling Facility auto-rebuild**
- **Enhanced TCP/IP support**
- **Support for VTAM dynamic alias**
- **SNA sign-on retention for persistent sessions**
- **Integrated CICS translator**
  - ► IBM COBOL and PL/I compilers include integrated CICS translation step
- **Documentation**
  - ► New CICS Information Center
- **ECI over TCP/IP**
  - ► New TCPIPSERVICE using Sockets domain
- **Linkable 3270 Bridge**
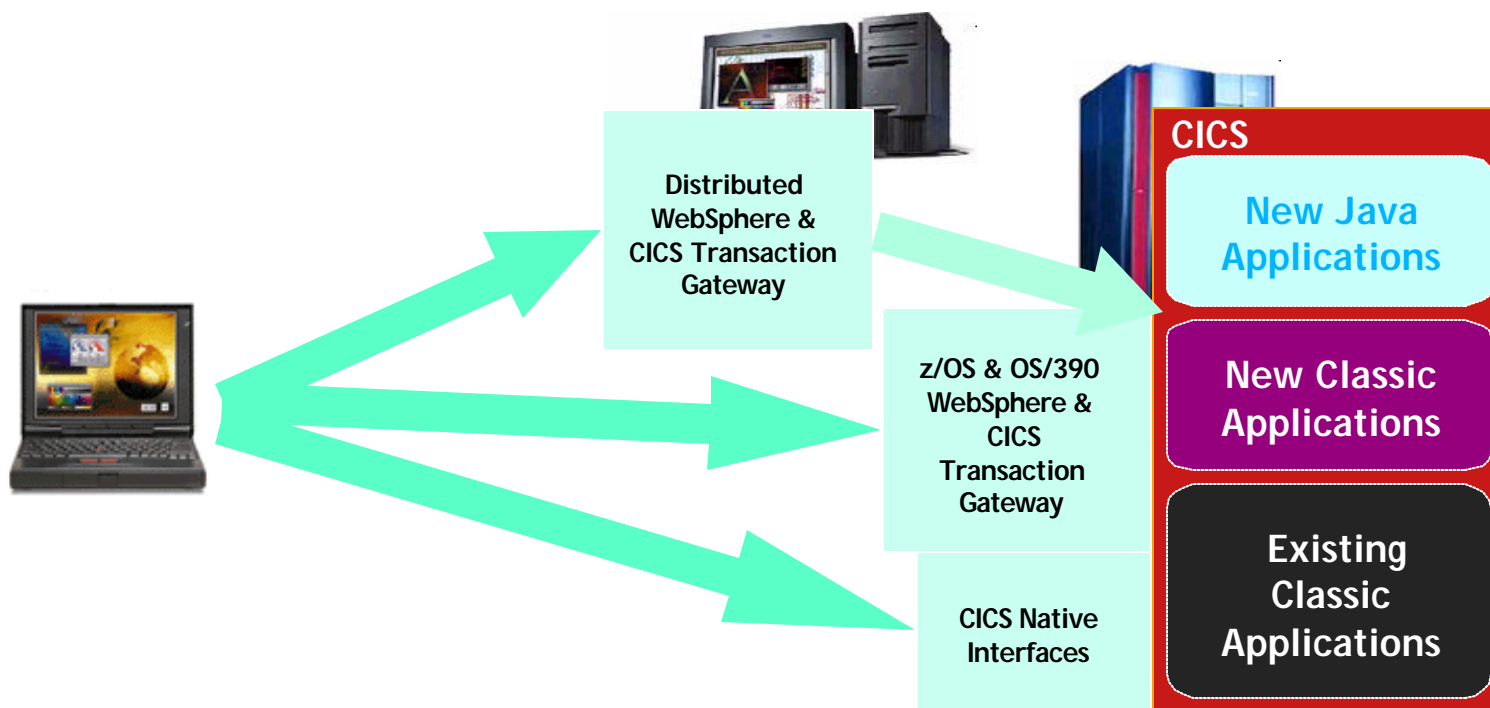 - ► Directly callable 3270 applications

CICS Futures...

Some Key Enhancements:

- **Enterprise Java**
  - ►Improved scalability
  - ►Enhanced secure interoperability
  - ►Further EJB performance improvements
- **Application Mining**
  - ►**XML Support**
  - ►**SOAP Listener**
- **Continued improvements in Availability and System Management**

Is Our Strategy Working ?

Just ask some of our customers …

Large number of customers are seeing value in appropriate pragmatism in their e-business solutions

Distributed WebSphere & CICS Transaction Gateway

z/OS & OS/390 WebSphere & CICS Transaction Gateway

CICS Native Interfaces

CICS

New Java Applications

New Classic Applications

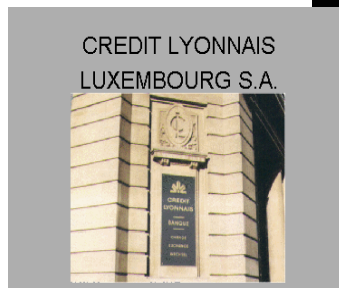Existing Classic Applications

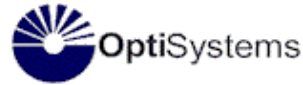*Customer Case Studies on CICS Home page* ibm.com/cics

Some customer gaining these benefits today!

See Case Studies on the CICS Home page:
ibm.com/cics

Some CICS Business Partners supporting our latest products

CICS for e-business: Summary

✪ **Multiple ways to Web-enable your CICS/IMS Applications**

✪ **Access directly or via web servers**
  - ▸ **CICS Web Interface + CICS 3270 Bridge**
  - ▸ **CICS Transaction Gateway**

✪ **Brand new programming choices with Java and Enterprise JavaBeans (EJBs)**

✪ **Every CICS Application can NOW be accessed from the Web!**

✪ **Future support for IBM's Web Services Strategy**