



IBM System z

Technical University 2011

z/VSE and CICS application integration with the Web for 24X7

zDO03

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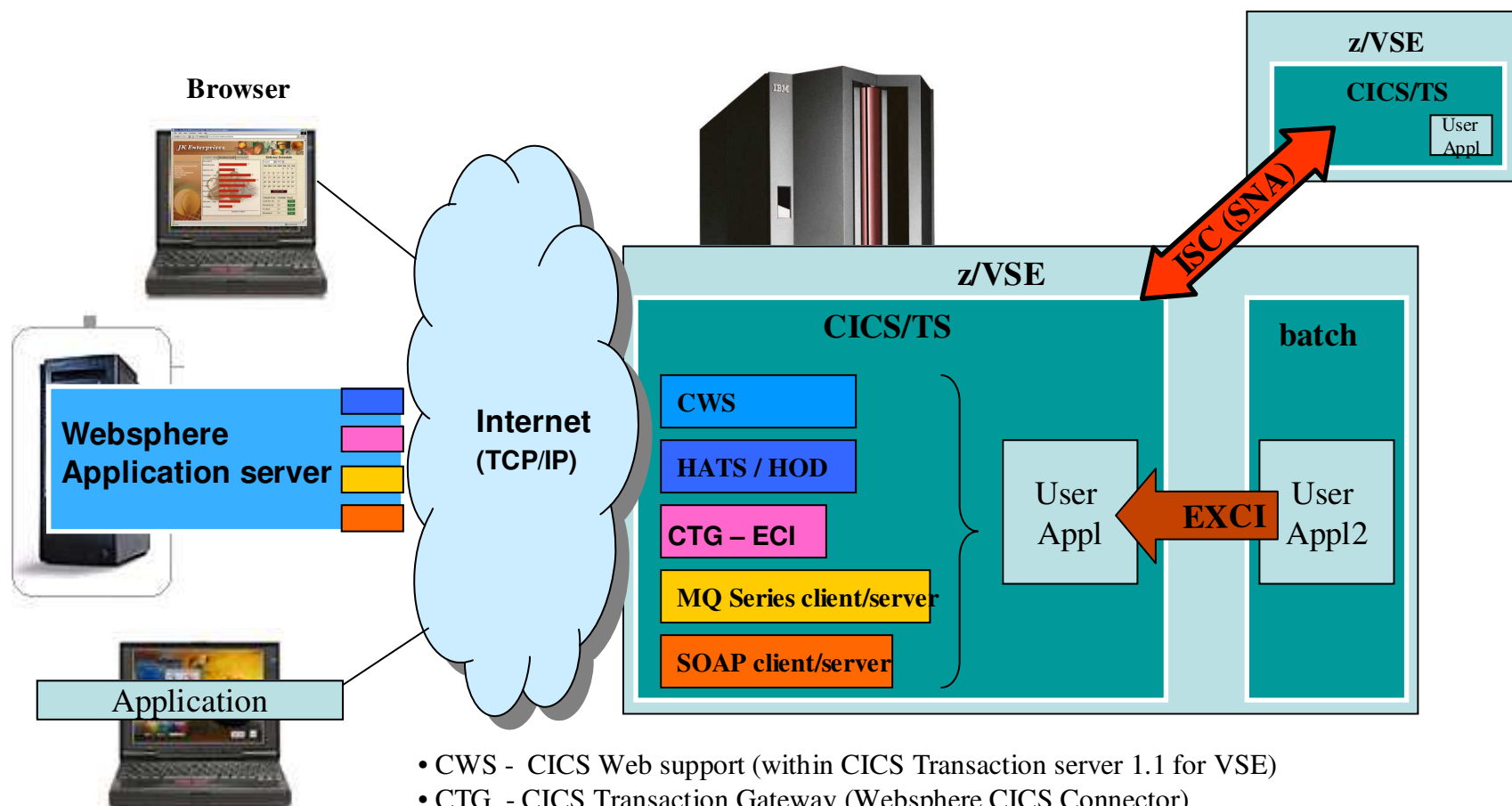
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Agenda



- **Integrating CICS with the Web**
- **Options for a 24X7 online operation**

Inter-Communication with z/VSE Transactions

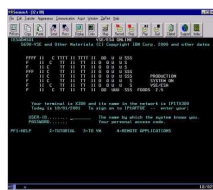


- CWS - CICS Web support (within CICS Transaction server 1.1 for VSE)
- CTG - CICS Transaction Gateway (Websphere CICS Connector)
- HATS – Host Access Transformation Server (no VSE software component required)
- HOD - Host OnDemand (Websphere Host Integration software)
- SOAP - Simple Object Access Protocol (Web Services based with XML data)

CWS (CICS Web Support)

From 3270 screens to browser interaction

3270 Terminal

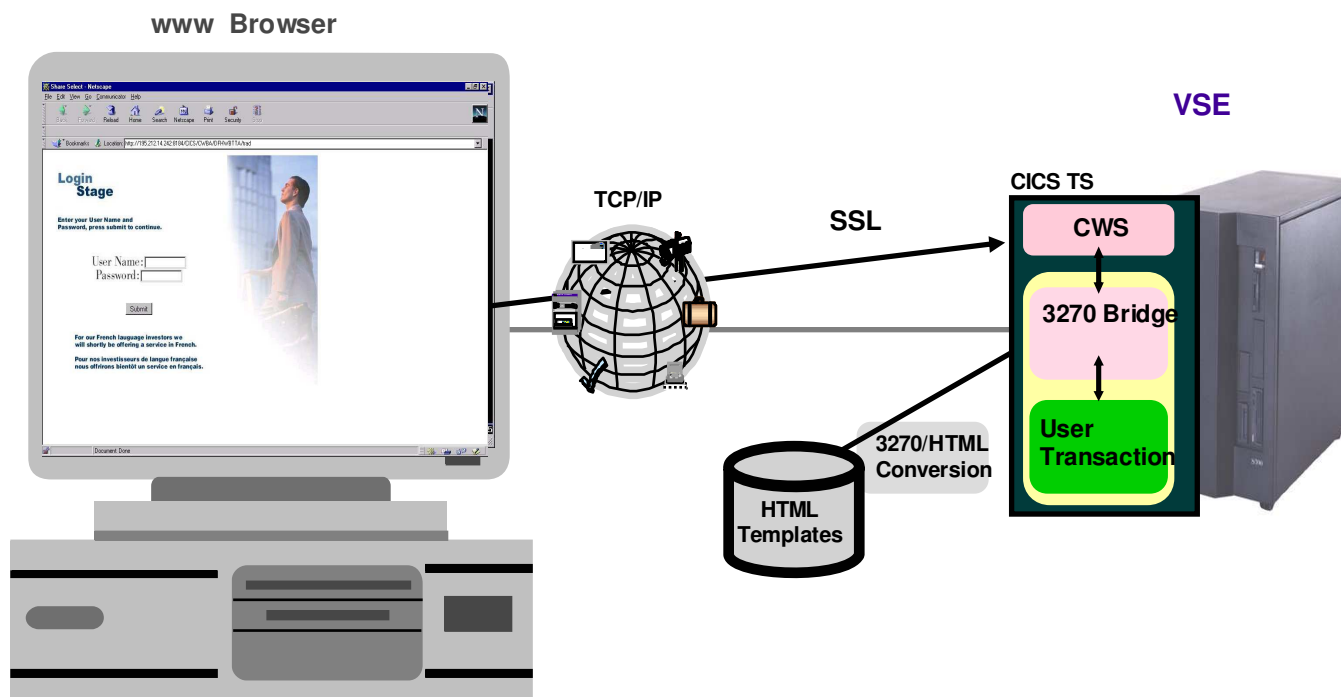


Browser



Direct access to z/VSE transactions via browser

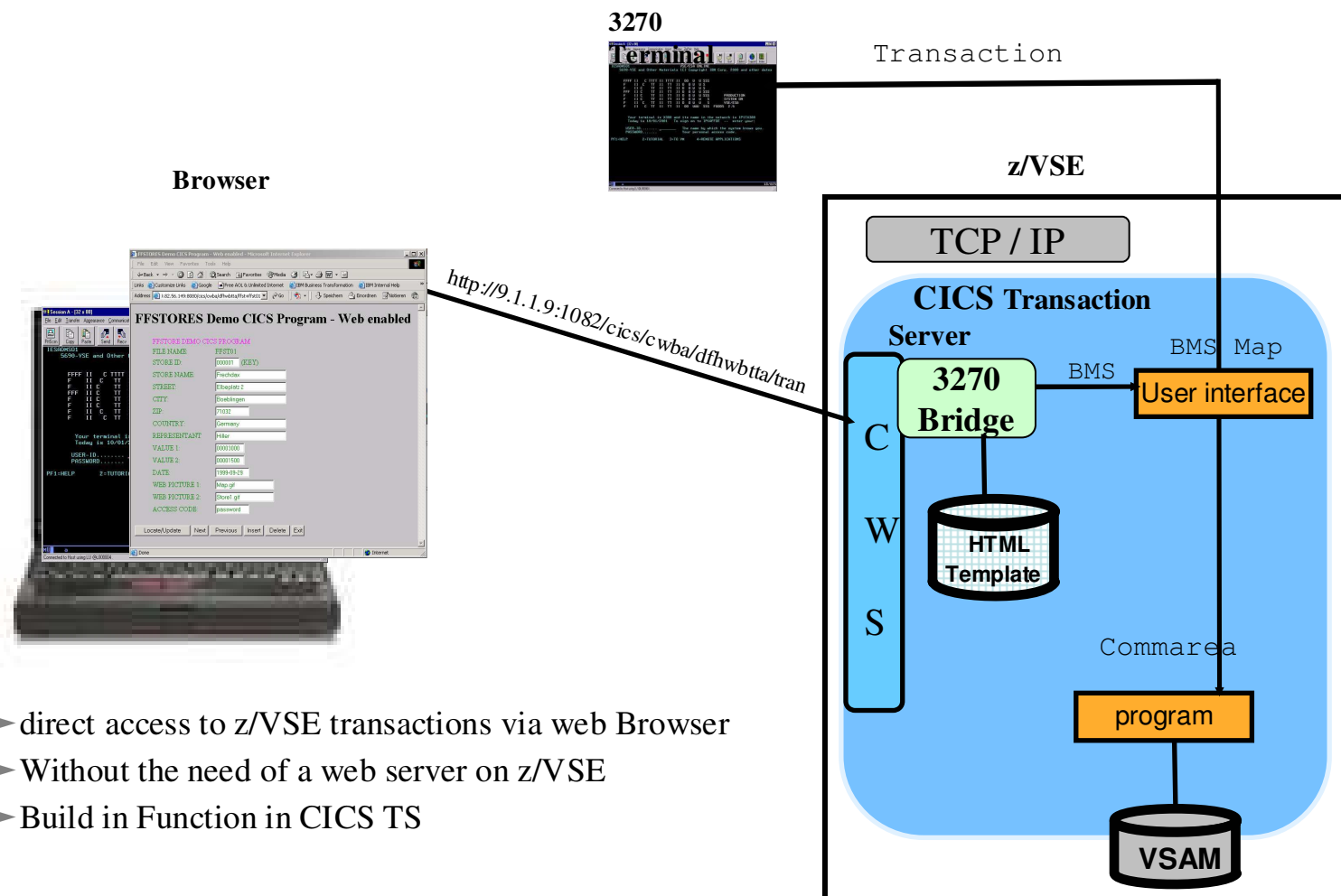
IBM CICS Web Support - Components



- ▶ direct access to VSE transactions via web Browser
- ▶ Without the need of a web server on VSE
- ▶ Build in Function in CICS TS

CICS Web Support (CWS)

From 3270 screens to Browser interfaces for CICS transactions



- ▶ direct access to z/VSE transactions via web Browser
- ▶ Without the need of a web server on z/VSE
- ▶ Build in Function in CICS TS

IBM CICS Web Support

- functional characteristics
 - ▶ direct access to VSE CICS transactions via a simple web browser
 - ▶ transaction security for the called transaction
 - ▶ secured connections (SSL)

- requirements
 - ▶ VSE CICS Transaction Server

Enable CWS (CICS Web support) for CICS Transaction server

•Properties

- CICS Web Support is a function of CICS Transaction Server in VSE.
- It is accessible via a TCP/IP Service that has to be defined (in CICS).
- For each separate CICS partition in your system the CICS Web support can be enabled
- CWS is prerequisite for other CICS access methods (like CTG, SOAP) .

•Required System changes to enable CWS:

- Following parameters in **DFHSITxx** for the corresponding CICS TS partition (i.e. **DBDCCICS**), have to be set to enable CWS.
 - Intersystem communication enabled **ISC=YES**
 - TCP/IP protocol enabled **TCPIP=YES**
- Build of a Conversion table **DFHCNV** (skeleton in **ICCF Lib 59**)

Enable CWS (CICS Web support) for CICS Transaction server

•Required System changes to enable CWS (continued):

- The BMS maps for the transaction have to be compiled with option
SYSPARM='TEMPLATE'
// OPTION NOLIST,ALIGN,DECK, SYSPARM='TEMPLATE'
- Update of the **LIBDEF** statement in *CICS startup job* with **PRD2.DFHDOC** for the HTML
Templates used
- Define a **TCPIP Service** (i.e. CWSxx, and a **port** for CWS))
CEDA DEF TCPIPS(CWSxx)
- Access the transaction via web browser:
<http://a.b.c.d:port/cics/cwba/dfhwbttta/tran>


CICS Web Interface 3270 screen emulation - CEMT - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Forward Stop Home Search Favorites History Print

Links Customize Links Free AOL & Unlimited Internet Free Hotmail IBM Business Transformation IBM Internal Help

Address http://9.152.210.25:8081/cics/CWBA/dfhwbttta/cemt Go Speichern Einordnen Notieren



CICS Web Support

CICS Web Interface 3270 screen emulation

STATUS: ENTER ONE OF THE FOLLOWING

Discard
Inquire
Perform
Set

SYSID=CIC1 APPLID=DBDCCICS

PF 1 HELP 3 END 9 MSG

PF1	PF2	PF3	PF4	PF5	PF6	PF7	PF8	PF9	PF10	PF11	PF12
PF13	PF14	PF15	PF16	PF17	PF18	PF19	PF20	PF21	PF22	PF23	PF24
PA1	PA2	PA3	Clear	Enter	Pen	Reset					

Done Internet

FFSTORES Demo CICS Program - Web enabled - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Forward Stop Home Search Favorites Media Print

Links Customize Links Google Free AOL & Unlimited Internet IBM Business Transformation IBM Internal Help

Address 3.82.56.149:8080/cics/cwba/dfhwbtta/ffst+ffst01 Go Speichern Einordnen Notieren

FFSTORES Demo CICS Program - Web enabled

FFSTORE DEMO CICS PROGRAM

FILE NAME: FFST01

STORE ID: 000001 (KEY)

STORE NAME: Frechdax

STREET: Elbeplatz 2

CITY: Boeblingen

ZIP: 71032

COUNTRY: Germany

REPRESENTANT: Hiller

VALUE 1: 00003000

VALUE 2: 00001500

DATE: 1999-09-29

WEB PICTURE 1: Map.gif

WEB PICTURE 2: Store1.gif

ACCESS CODE: password

Locate/Update Next Previous Insert Delete Exit

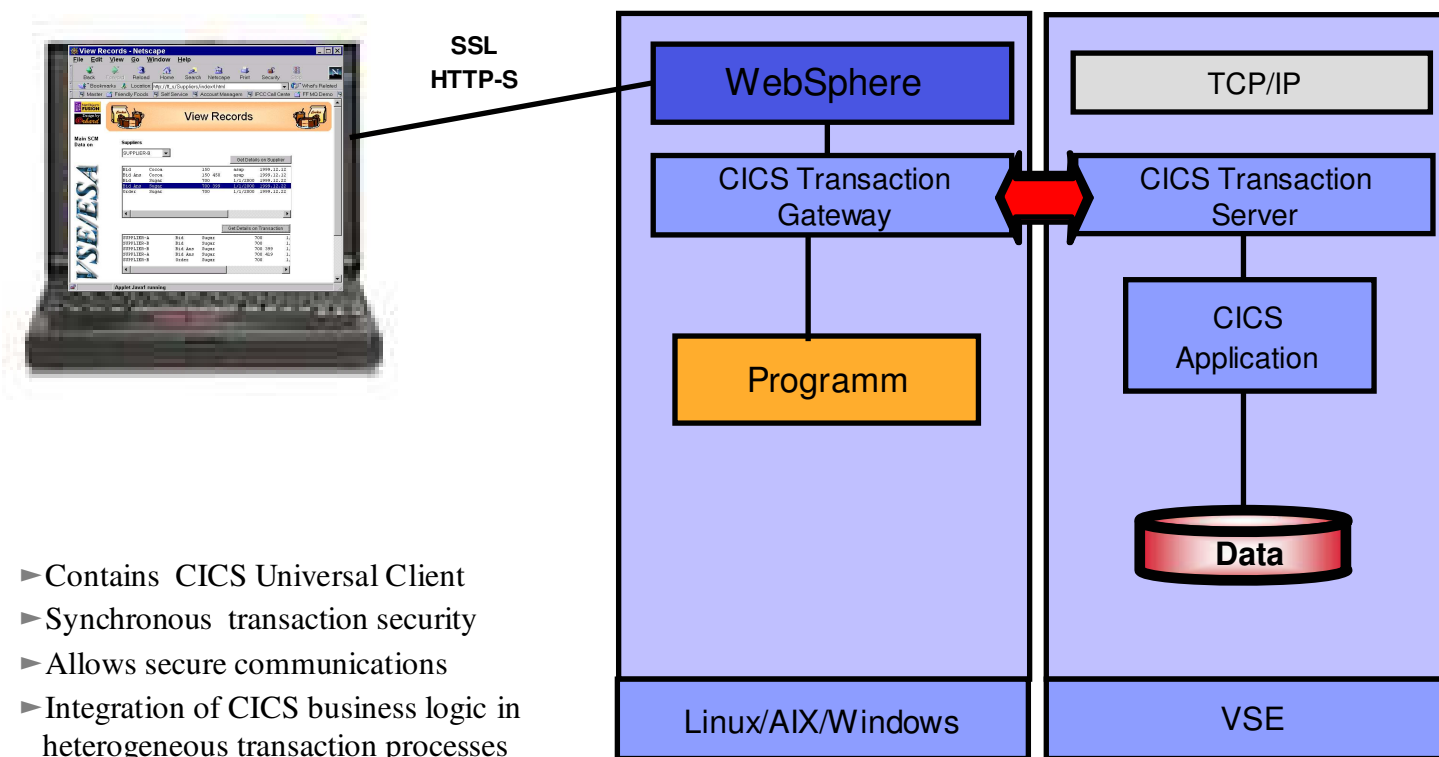
Done Internet

CTG (CICS Transaction Gateway)

Access to VSE transactions from remote

Integration of z/VSE transaction processes

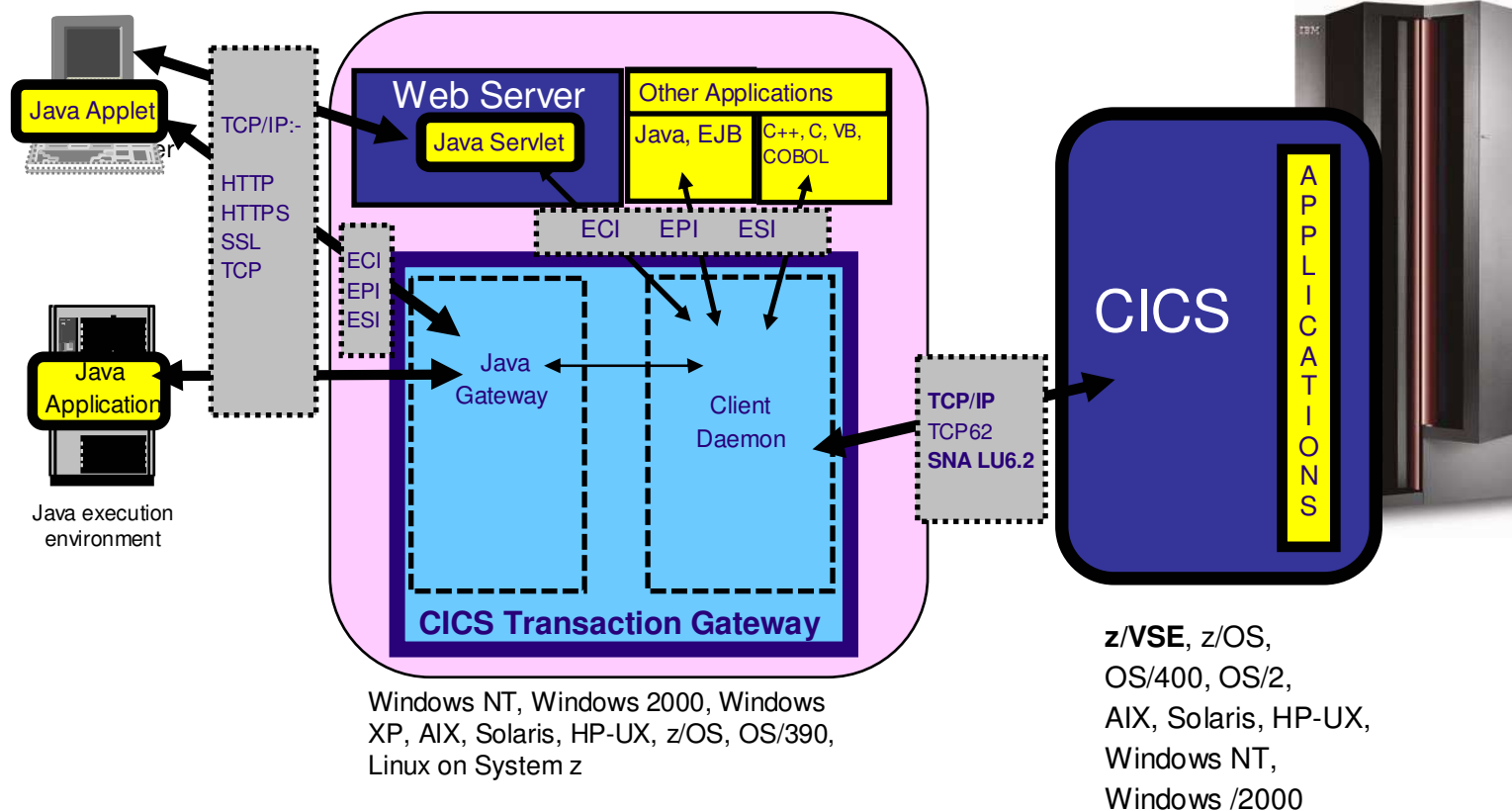
CICS Transaction Gateway - Implementation



- ▶ Contains CICS Universal Client
- ▶ Synchronous transaction security
- ▶ Allows secure communications
- ▶ Integration of CICS business logic in heterogeneous transaction processes

Integration of VSE transactions in distributed processes

CICS Transaction Gateway (CTG) - Components

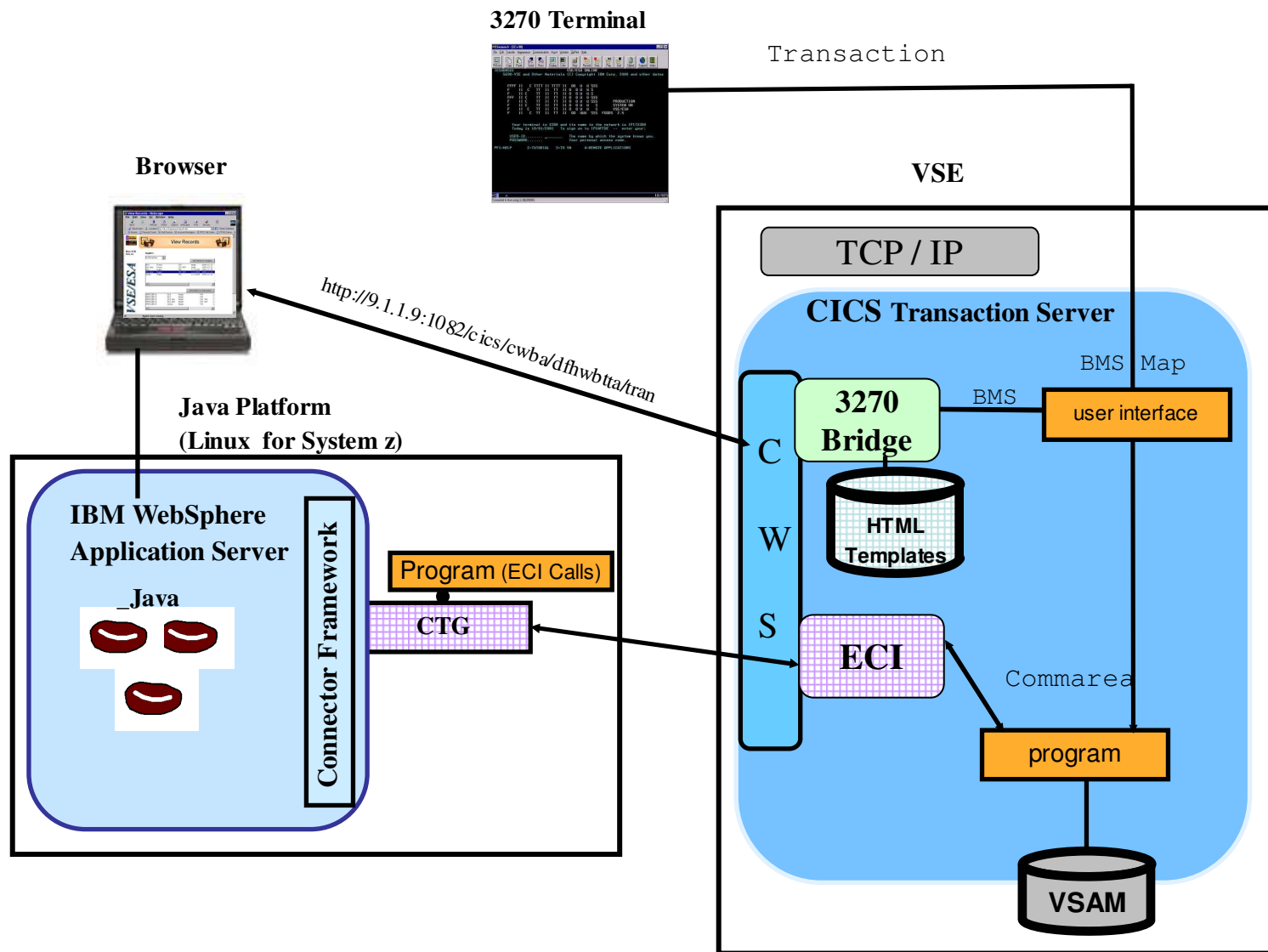


CICS Transaction Gateway

- functional characteristics
 - ▶ access to z/VSE transactions from a remote platform (program communication)
 - ▶ transaction security for the called transaction therefore, good integration in e-business Processes and WebSphere Application Server.
 - ▶ secured connections (SSL) to CICS Transaction Gateway

- requirements
 - ▶ z/VSE and the Product: CICS Transaction Gateway (CTG)
 - ▶ for External CICS Interface (ECI) with TCP/IP, CICS TS is required and CICS Transaction Gateway

From 3270 screens to Browser interfaces for CICS transactions

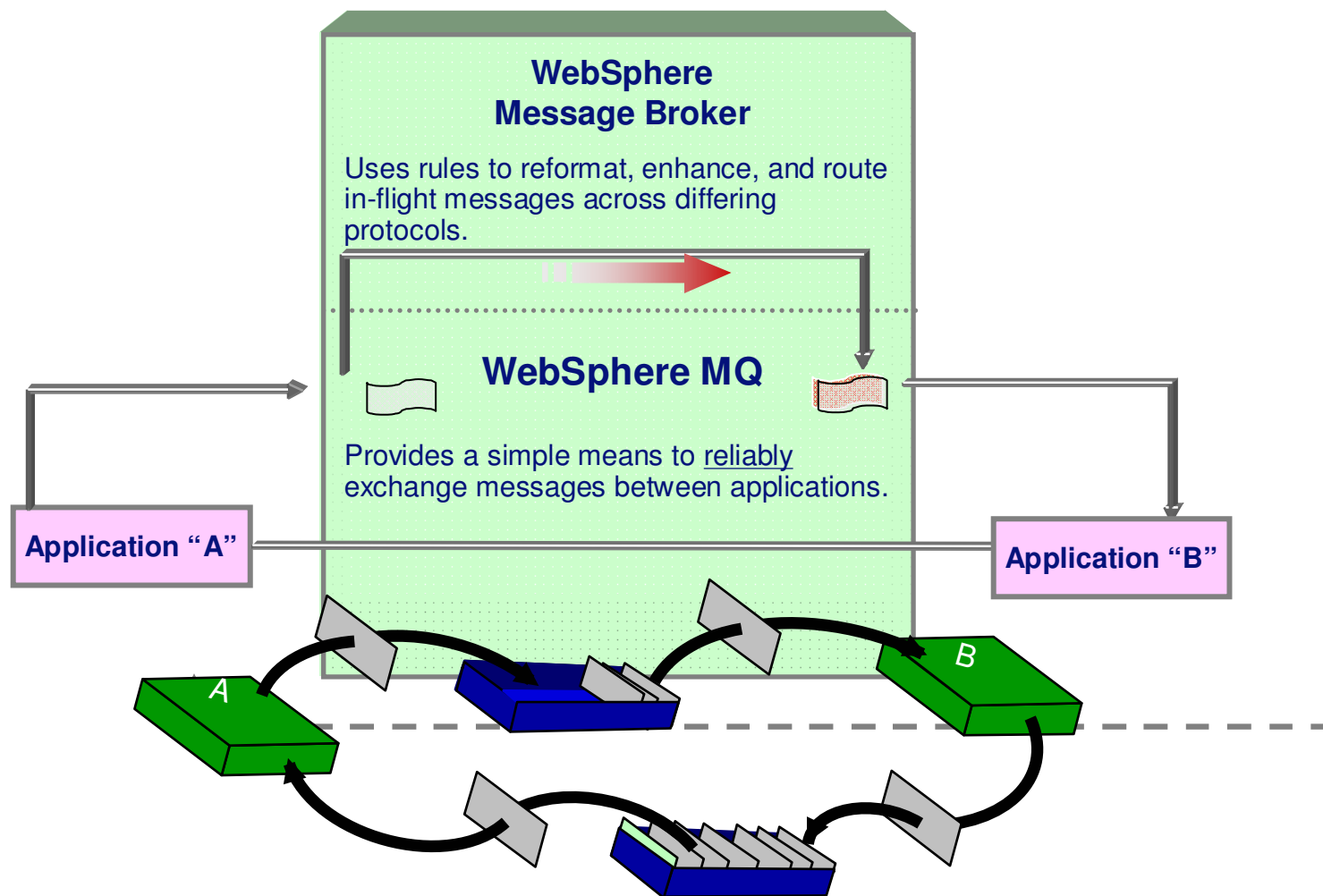


MQ Series

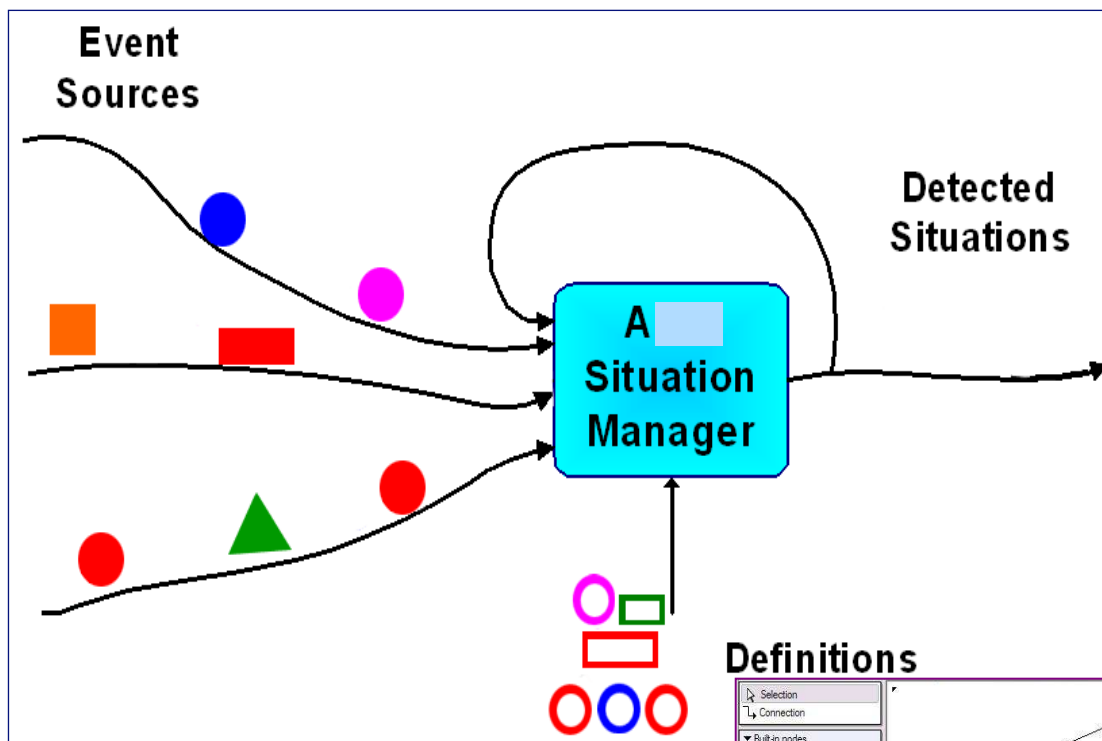
**Synchronous/Asynchronous
program communication
and data transfer or distribution**

Messaging Overview

Event Notification (1 way communication), Request / Response (2 way communication)

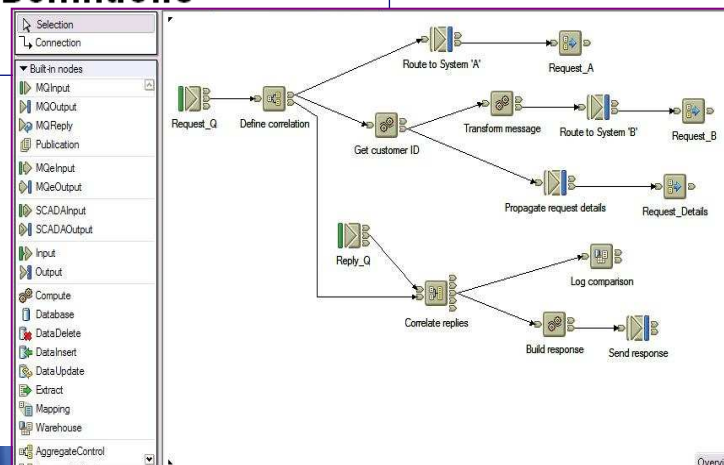


What is WebSphere Message Broker?

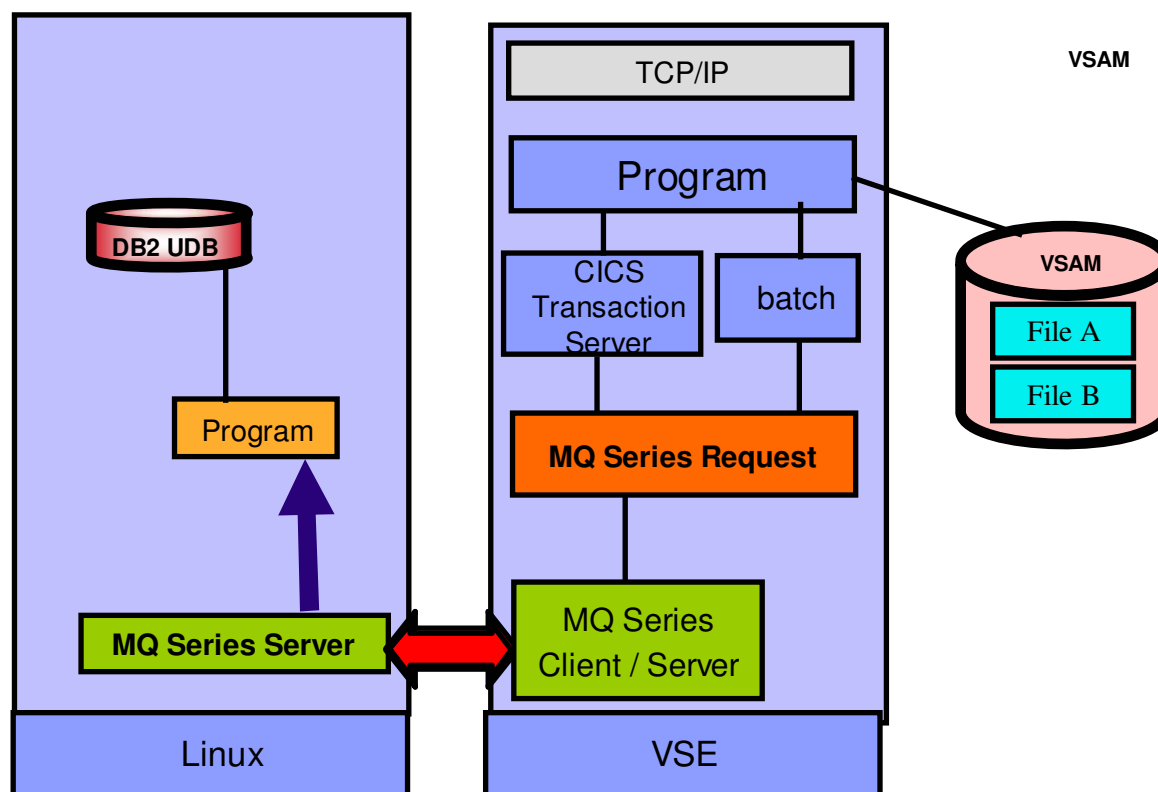


1. A framework for processing MQ messages
2. A robust hosting environment for:
 - ✓ Transforming data
 - ✓ Enriching data
 - ✓ Interacting with databases
 - ✓ Routing messages based on content
 - ✓ Detecting complex combinations of messages
 - ✓ Interacting existing applications with Web Services

Definitions

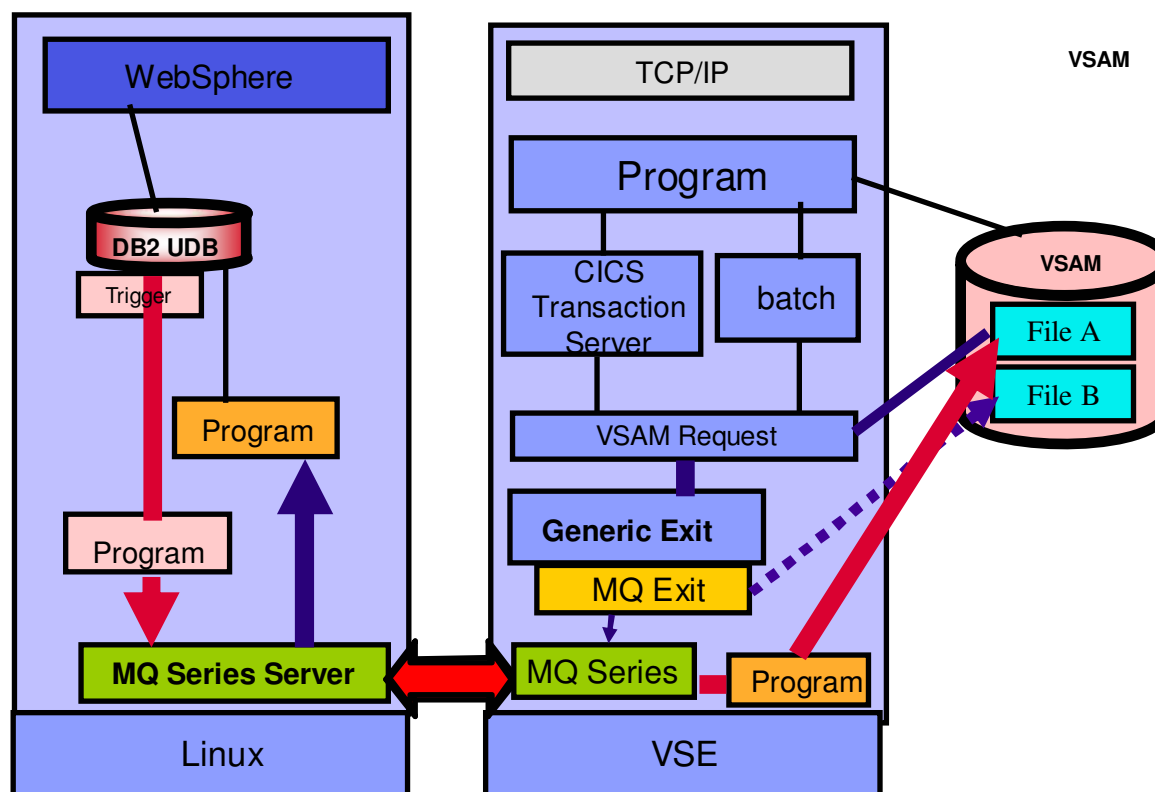


Integration of VSE Programs with MQ Series



- ▶ Data distribution via MQ Series technology
- ▶ VSE programs have to write MQ messages – requires changes to existing applications
- ▶ WebSphere MQ Series Client for VSE – free of charge – enablement for MQ environments and modern solutions

Integration of unchanged VSE Programs with MQ Series



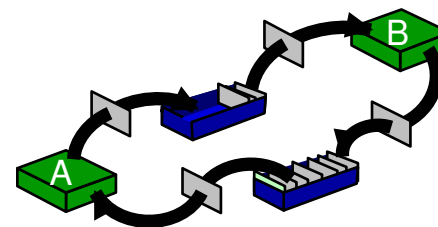
- ▶ Data distribution via MQ Series technology
- ▶ NO changes to VSE programs – using MQ Exit and VSE VSAM Redirector
- ▶ WebSphere MQ Series Client for VSE – free of charge – enablement for MQ environments and modern solutions

MQ Series - asynchronous transactions

- **functional characteristics**
 - ▶ guaranteed, secured asynchronous data access for remote systems
 - ▶ same API for all supported MQ Series platforms
 - ▶ transaction security, therefore appropriate for e-business processes
 - ▶ integration with WebSphere Application Server
 - ▶ works well for Business-to-Business (B2B) environments

- **software requirements**
 - ▶ For z/VSE:
 - ▶ MQ Series Client or Server
 - ▶ Program that interfaces with MQ on VSE or VSAM Redirector

 - ▶ On the remote system:
 - ▶ MQ Series Client / Server
 - ▶ Program that interface with MQ Series



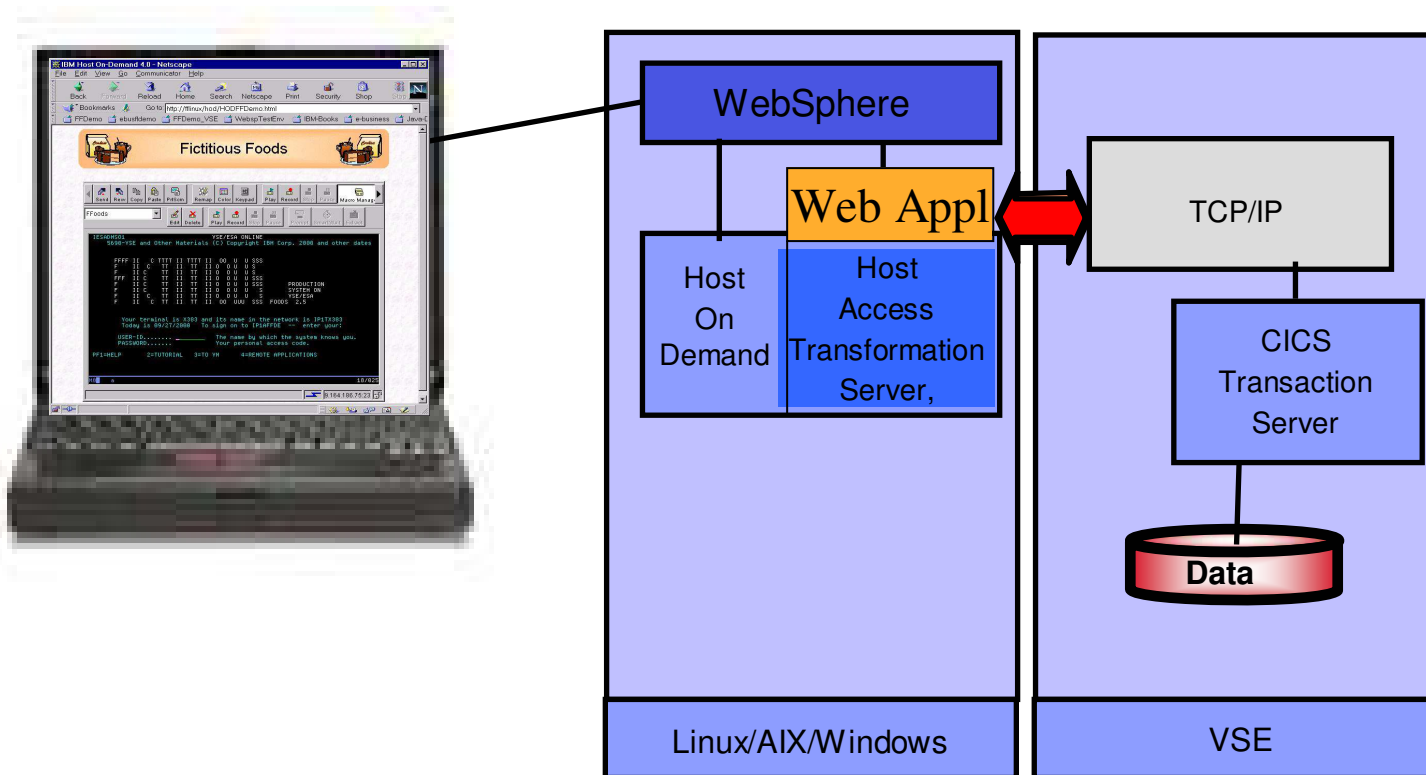
HOD, HATS

(Host OnDemand, Host Access Transformation Server)

Create graphical interfaces for existing Applications

General access to z/VSE via browser

Websphere Host Integrator - Implementation



- ▶ Access to VSE using a browser
- ▶ NO 3270 Software needed for client
- ▶ No changes in z/VSE required

Host Access Transformation Server

- functional characteristics
 - ▶ access to z/VSE via browser
 - ▶ the access is similar with a local access via 3270 emulator
 - ▶ can be used in Intranet or Internet and /or
 - ▶ integrated with WebSphere Application Server
 - ▶ support for secured connections (SSL) to the HostOnDemand Server and a redirector to mask the real IP addresses
 - ▶ Host Access Transformation Server – for 3270 screen scraping
 - ▶ Host Publisher - a bean generator to create the Java Beans (Integration Objects), to provide legacy access for new Web applications.

- Requirements
 - ▶ WebSphere Host Integration products on middle tier
 - ▶ NO additional software on z/VSE required

Benefit: Easily extend existing applications to the web

Application Integration with Host Access Transformation Services (HATS)

```

Display Report

Width . . . : 213
Column . . . : 1
Control . . . :

Line .....1.....2.....3.....4.....5.....6.....7.....
PART_NUMBER PART_NAME INVENTORY PRODUCT_CATEGORY
-----
000001      80 Baseball glove      35 Sports
000002      81 Catcher's mit      20 Sports
000003      82 Baseballs - 1 doz.  40 Sports
000004      83 Baseball bat      46 Sports
000005      84 Football      33 Sports
000006      85 Basketball      25 Sports
000007      86 Tennis balls - 1 doz.  41 Sports
000008      87 Golf balls - 1 doz.  27 Sports
000009      88 Ice Skates      17 Sports
***** END OF DATA *****

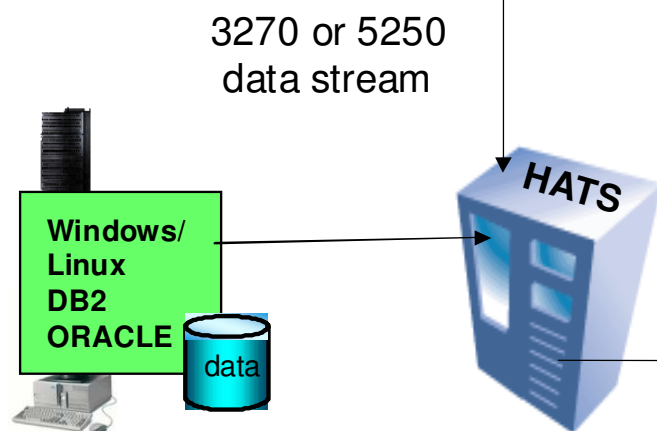
Bottom

F3=Exit F12=Cancel F19=Left F20=Right F21=Split

MA* a 04/021

PF1 PF2 PF3 PF4 PF5 PF6 Enter PA1 Alt Insert BackTab NewLine
PF7 PF8 PF9 PF10 PF11 PF12 Clear PA2 SysReq Delete F10Exit NextPad
  
```

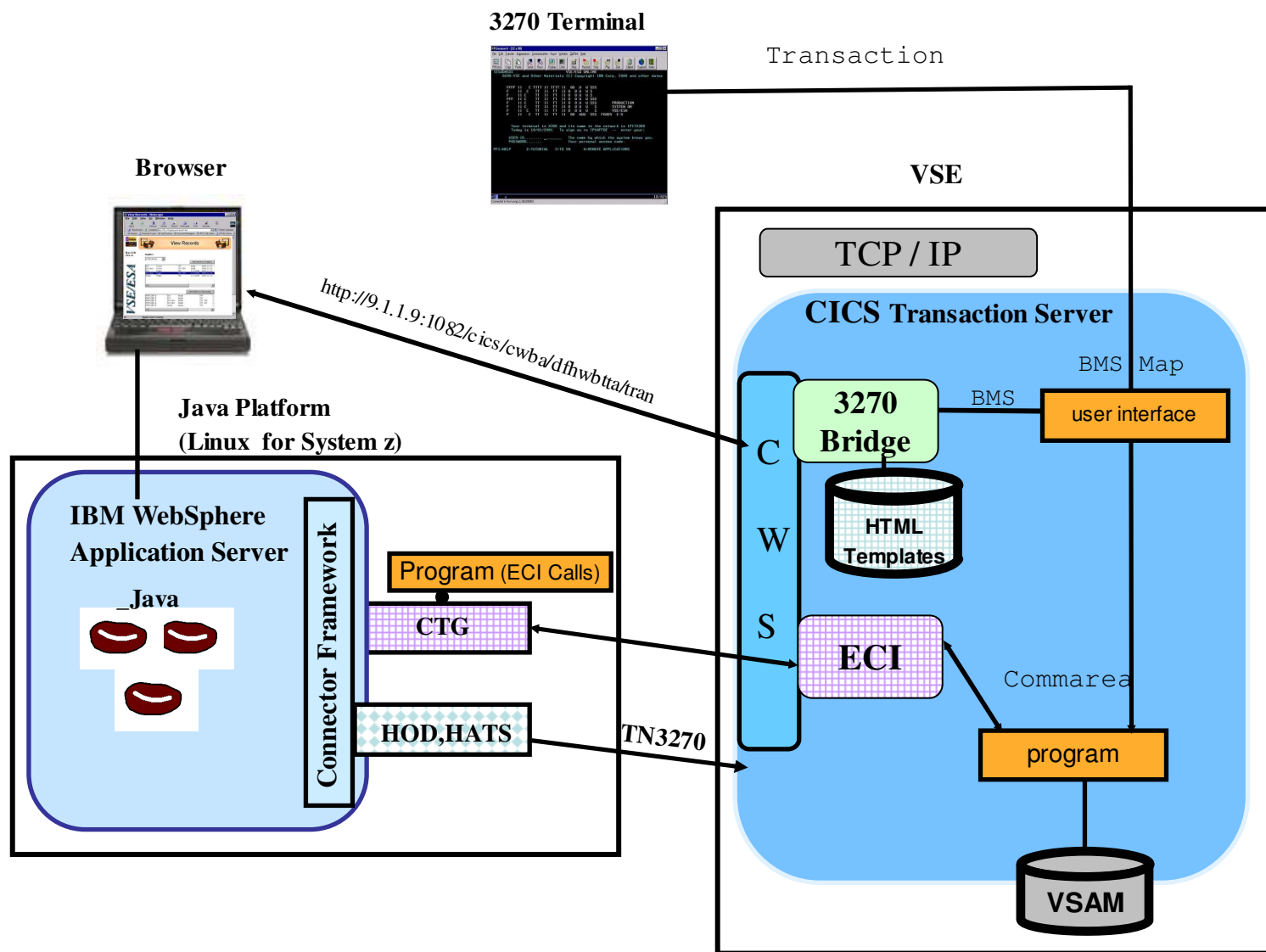
- No software download to the client
- Converts **green screens to GUI**
- **Integration with distributed applications**
- improves ease of use of host applications
- **Web Service** on the fly



Screen transformation rules running on
WebSphere Application Server

HTML in a Browser

From 3270 screens to Browser interfaces for CICS transactions



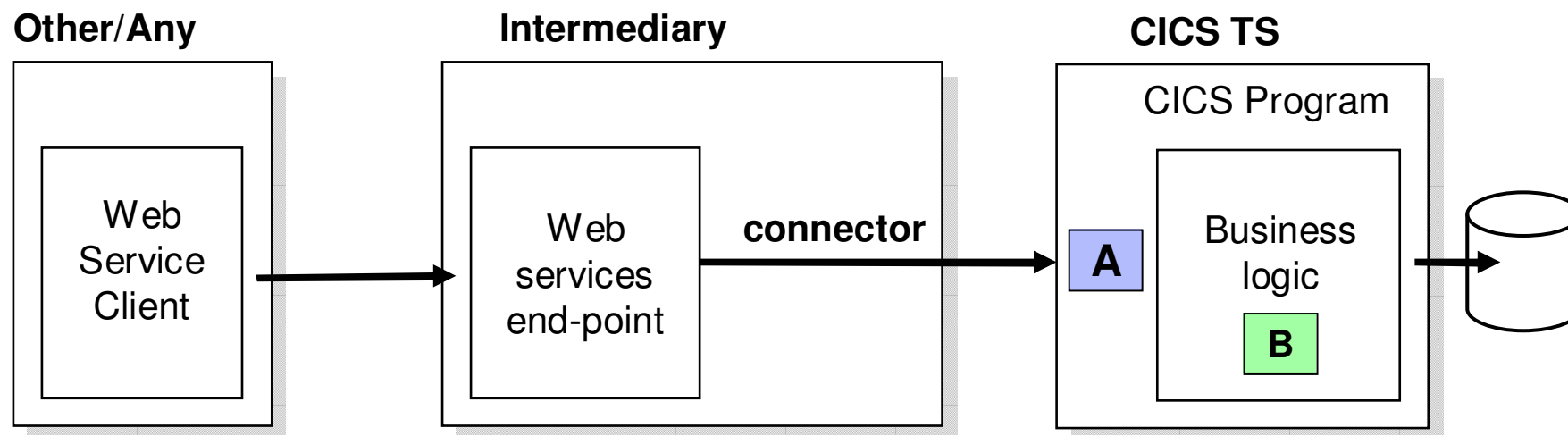
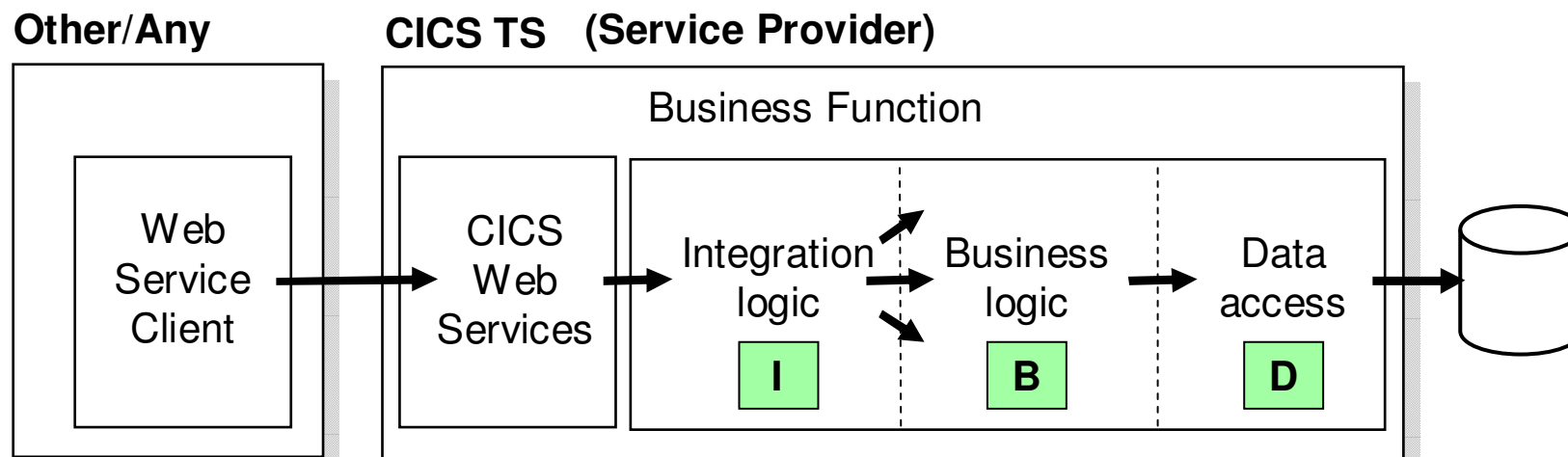
SOA Web Services

**Modern architecture of program communication
using XML data and the SOAP protocol**

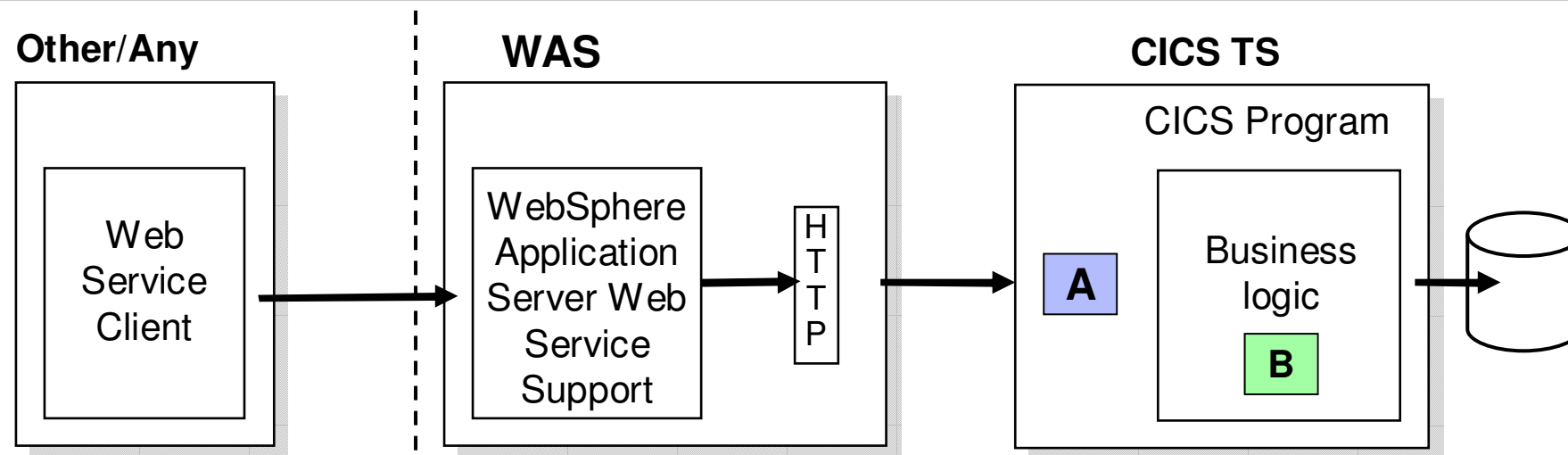
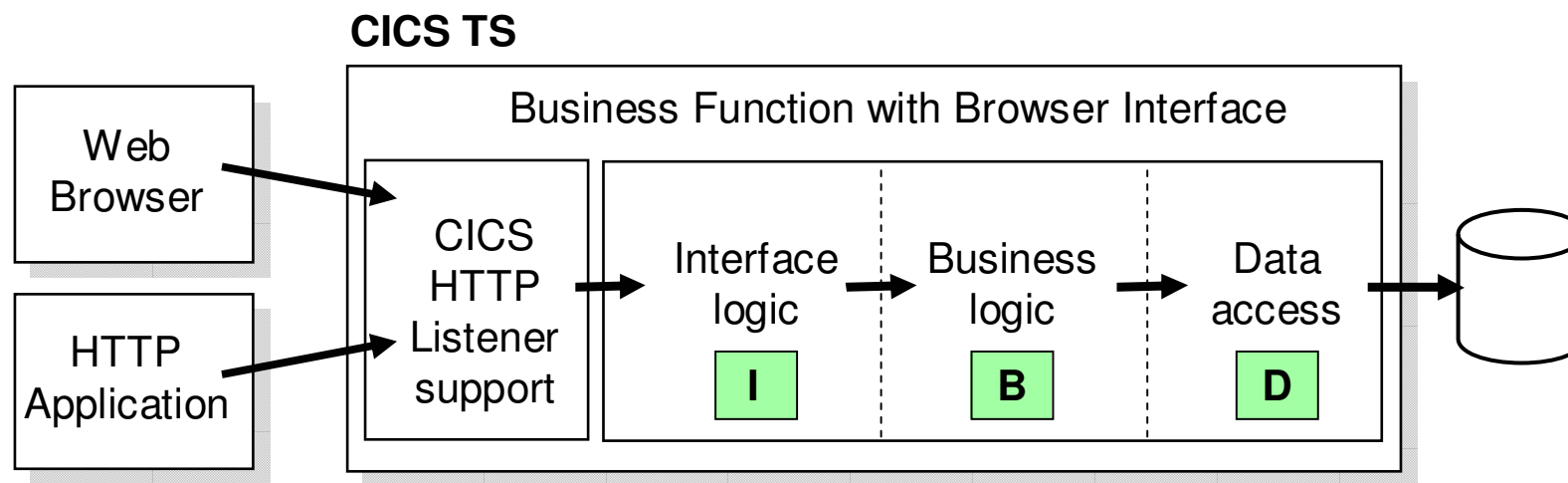
Why should VSE customers consider SOA?

- **SOA is modern (hype) and strategic**
 - It is mentioned in all IT journals and newspapers
- **Easy integration of existing VSE programs and processes**
 - Reducing the interface complexity
 - Reuse of existing application logic as services
 - Use of standard protocols (XML, SOAP, HTTP)
- **Integration is platform independent**
 - independent of application programming language
 - independent of the data involved
- **Integration of VSE into a Microsoft .Net environment**
 - without the use of Java
 - the most incompatible environments can be integrated
- **SOA enables the extension of VSE applications**
 - to other platforms and architectures
 - to partners and open world

The Two CICS Models of SOA Integration

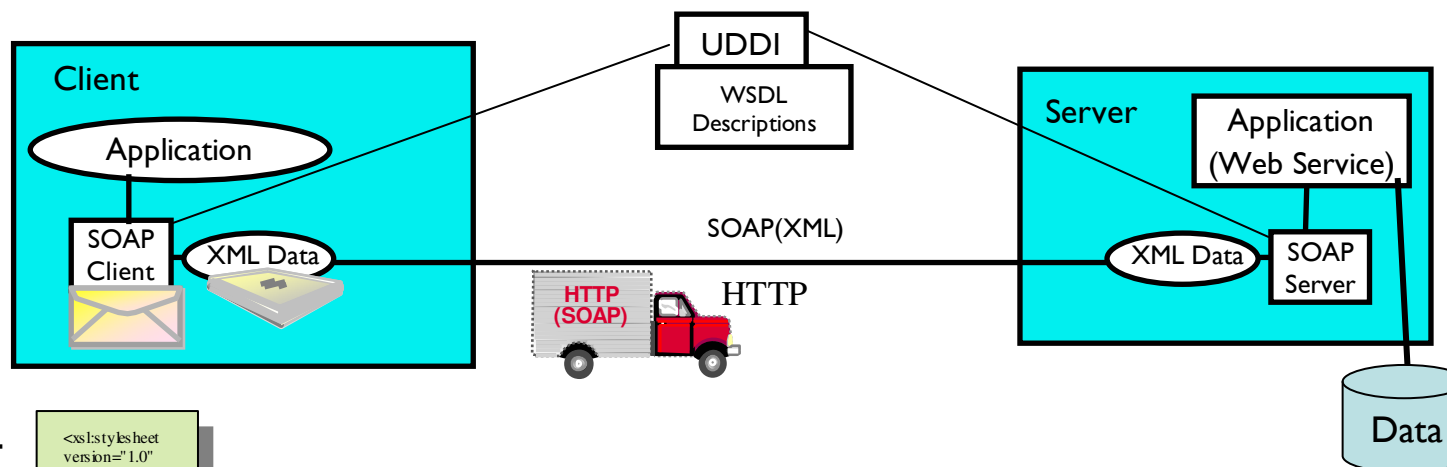


HTTP (aka CICS Web Support)

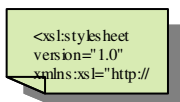


Web Services in action

XML Document + SOAP Protocol = Web Services



XML -



SOAP -



HTTP - Carrier

TCP/IP - Street

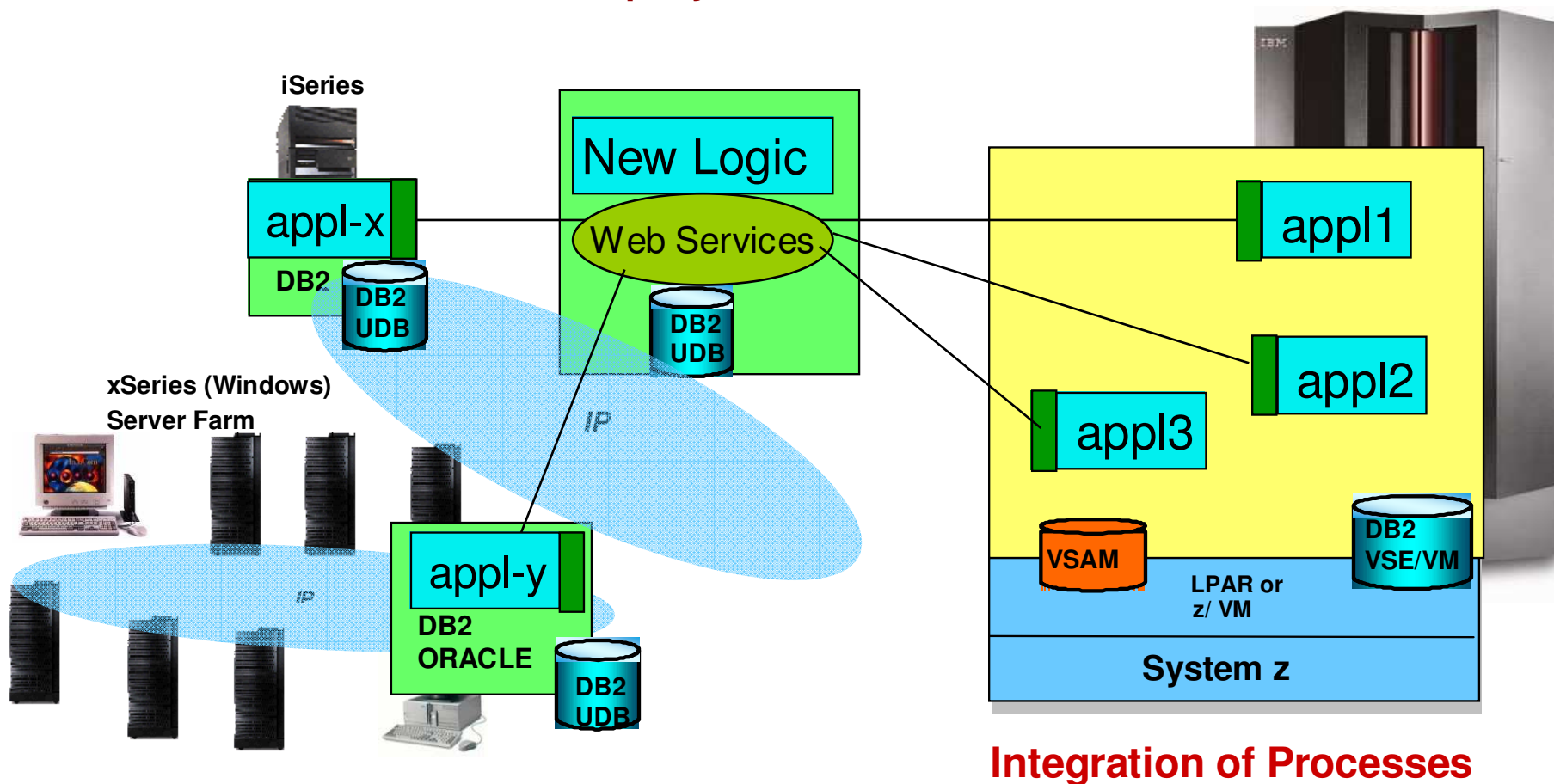
A web service

- ☞ implements a business, application or system functionality
- ☞ is intended for application communication
- ☞ is useable in internet, intranet, extranet
- ☞ is useable for browser-based solutions up to the B2B integration between companies
- ☞ uses only standard internet technologies

SOA – the way to New applications and processes

- Applications look the same for all users
- Core applications can be enhanced (independent of their language, COBOL, ASM, PL/I)
- New business logic is built

Increased success for the Company



Integration of Processes

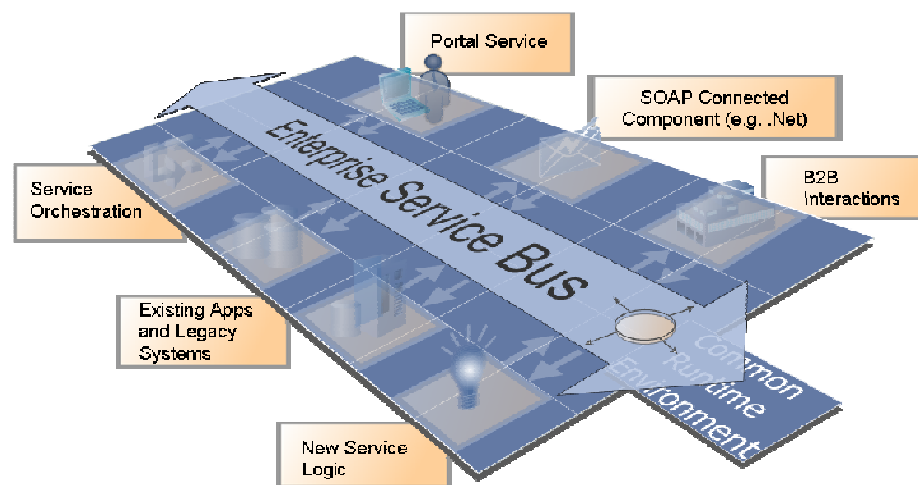
What is an Enterprise Service Bus?

An Enterprise Service Bus (ESB) is a flexible Infrastructure for services and application integration

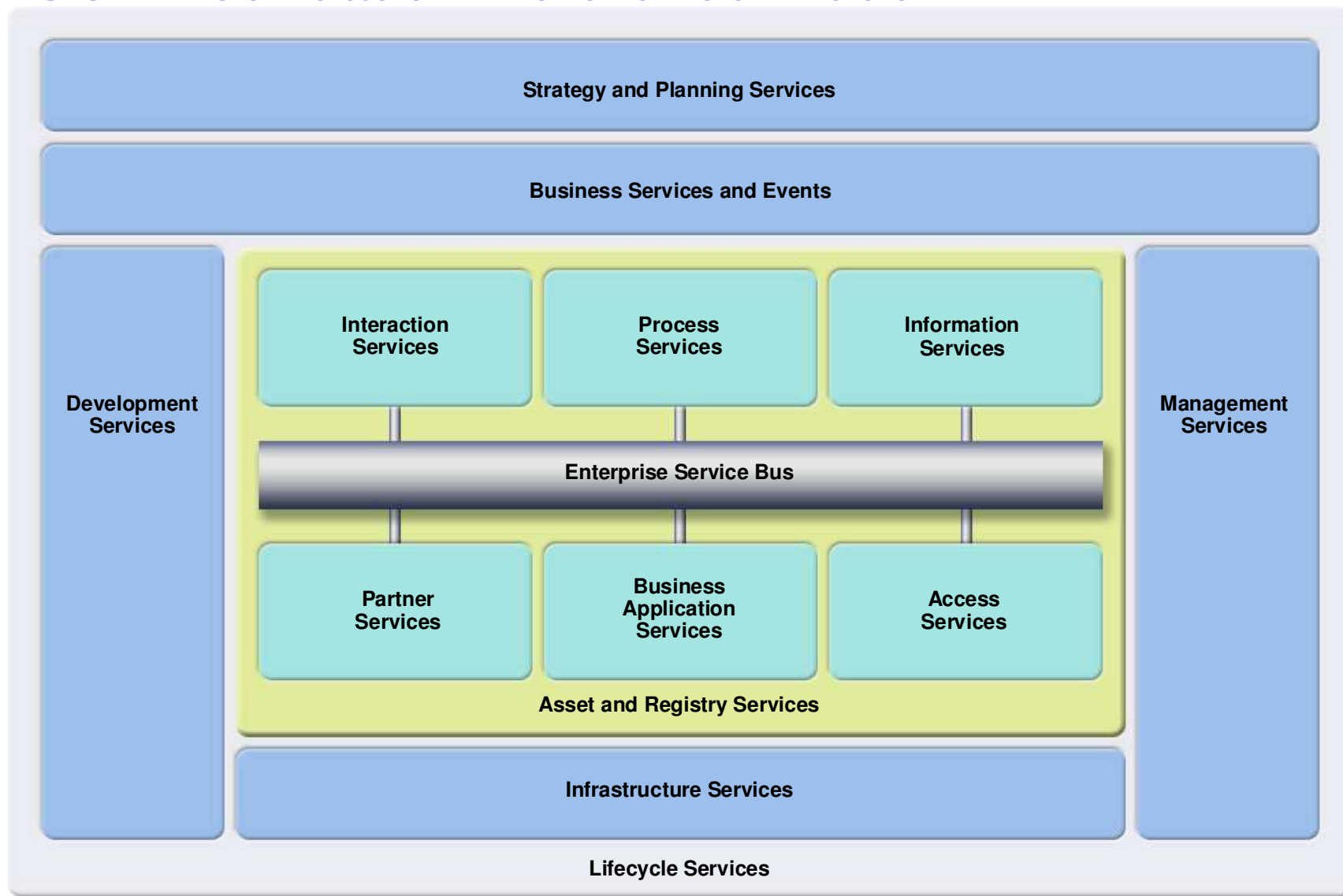
An ESB reduces the number, size and complexity of your interfaces in a SOA solution.

An ESB realizes following tasks between requestor and service

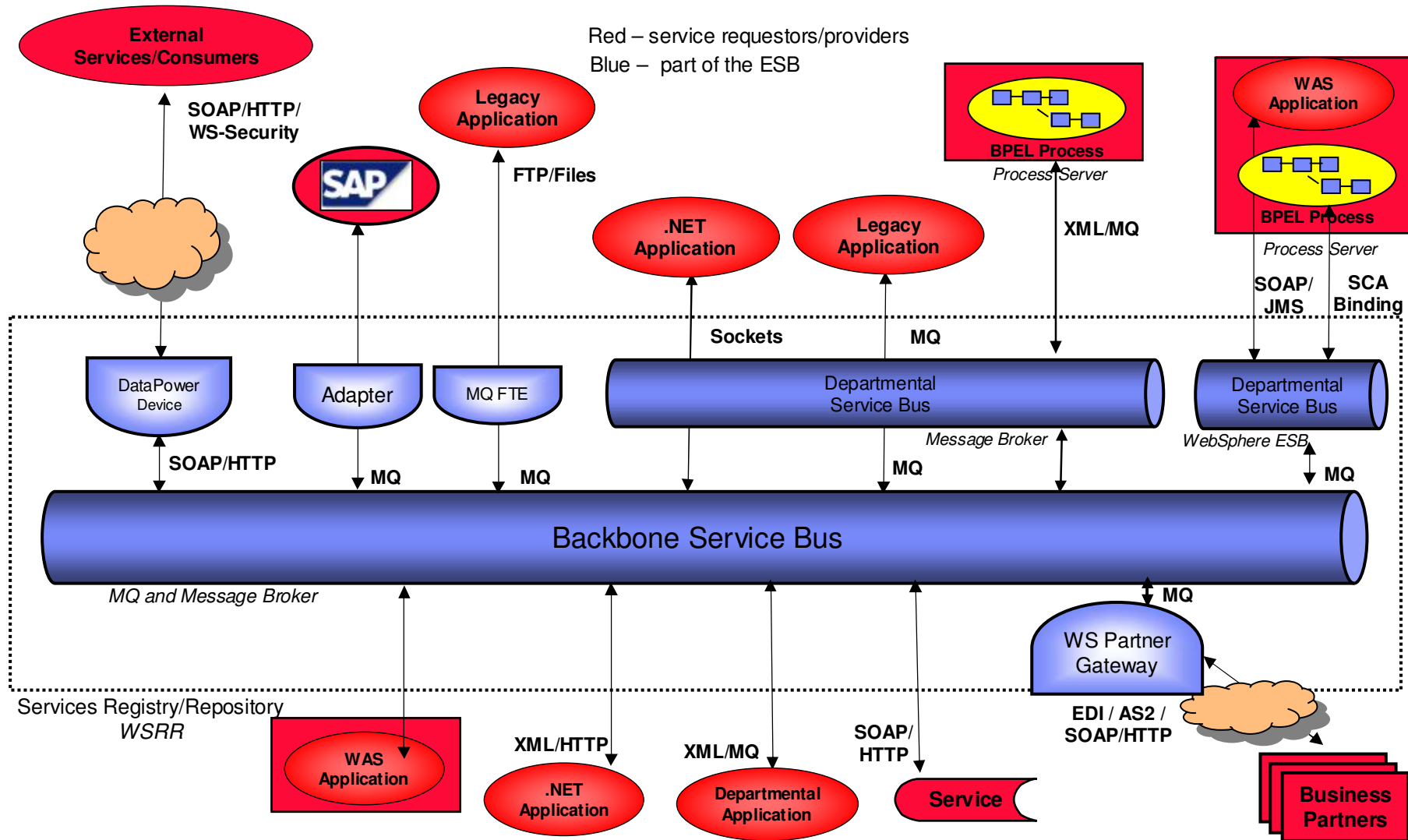
- **ROUTING** of messages between Services
- **CONVERTING** the transport protocol between requestor and service
- **TRANSFORMING** message formats between requestor and service
- **HANDLING** of business events between different types of services



SOA Foundation Reference Model

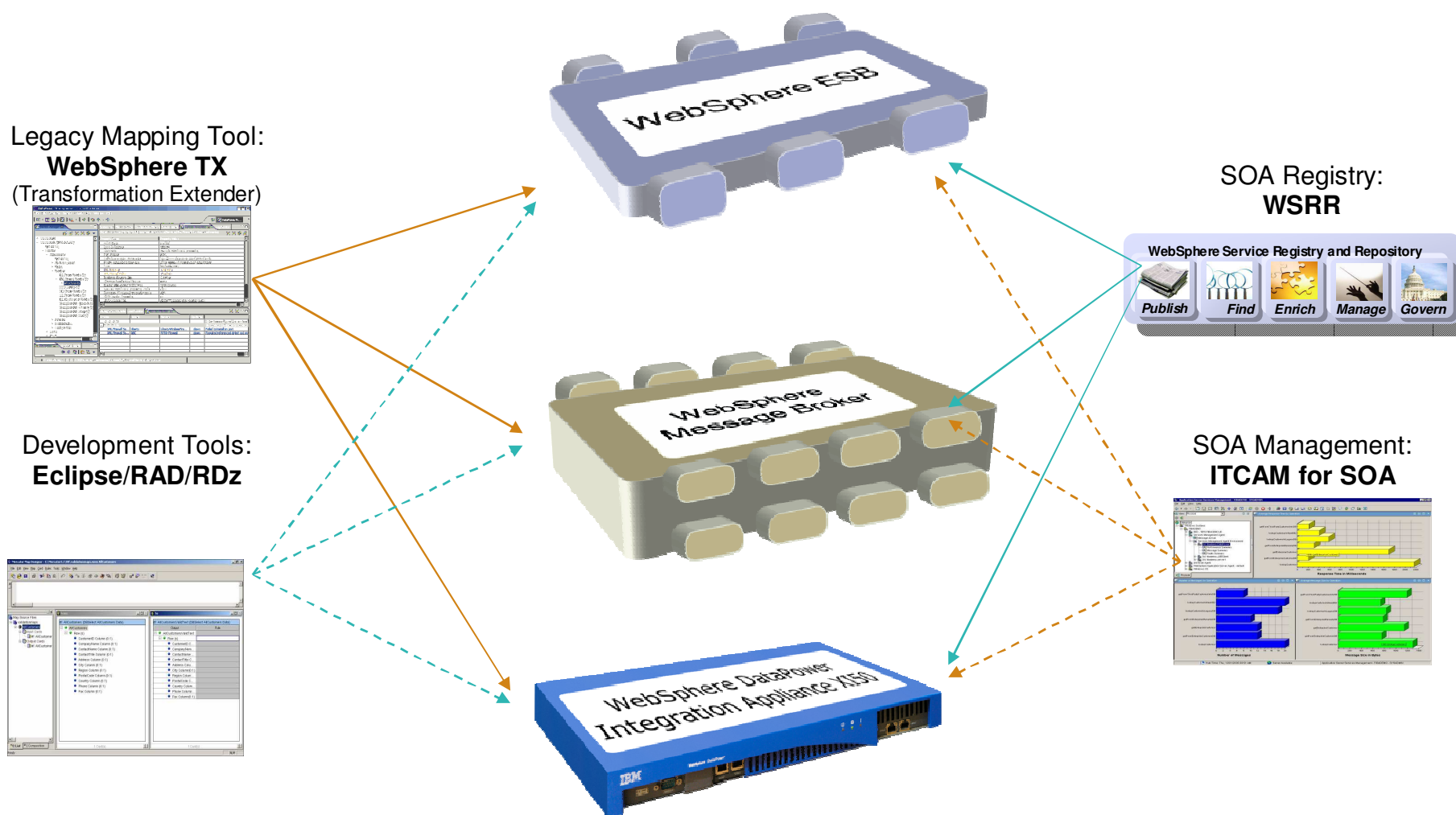


Connectivity in a Federated ESB

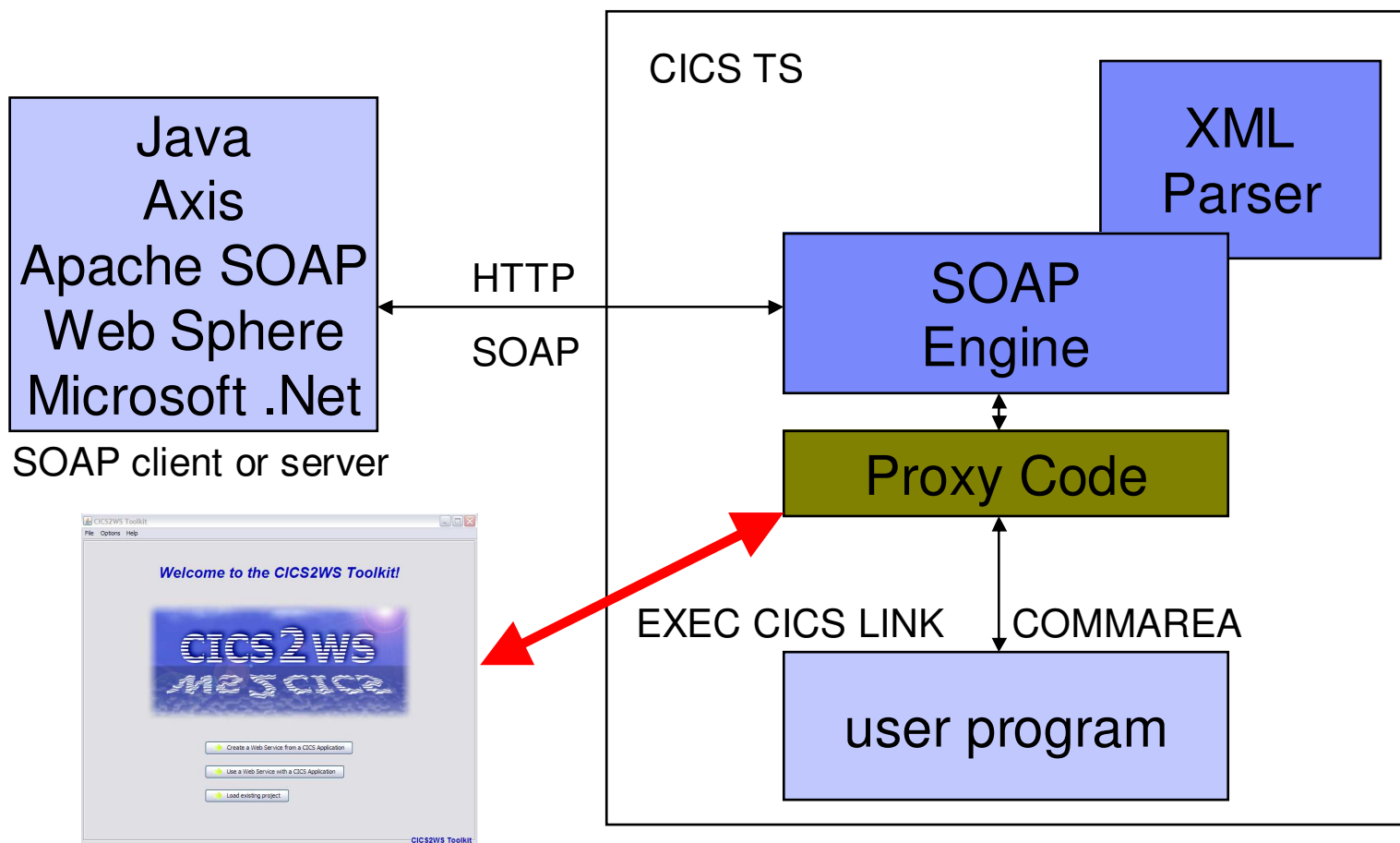


Integrated SOA Tooling Across ESB Runtimes

All 3 ESBs integrate with Eclipse, WTX, ITCAM for SOA and WSRR

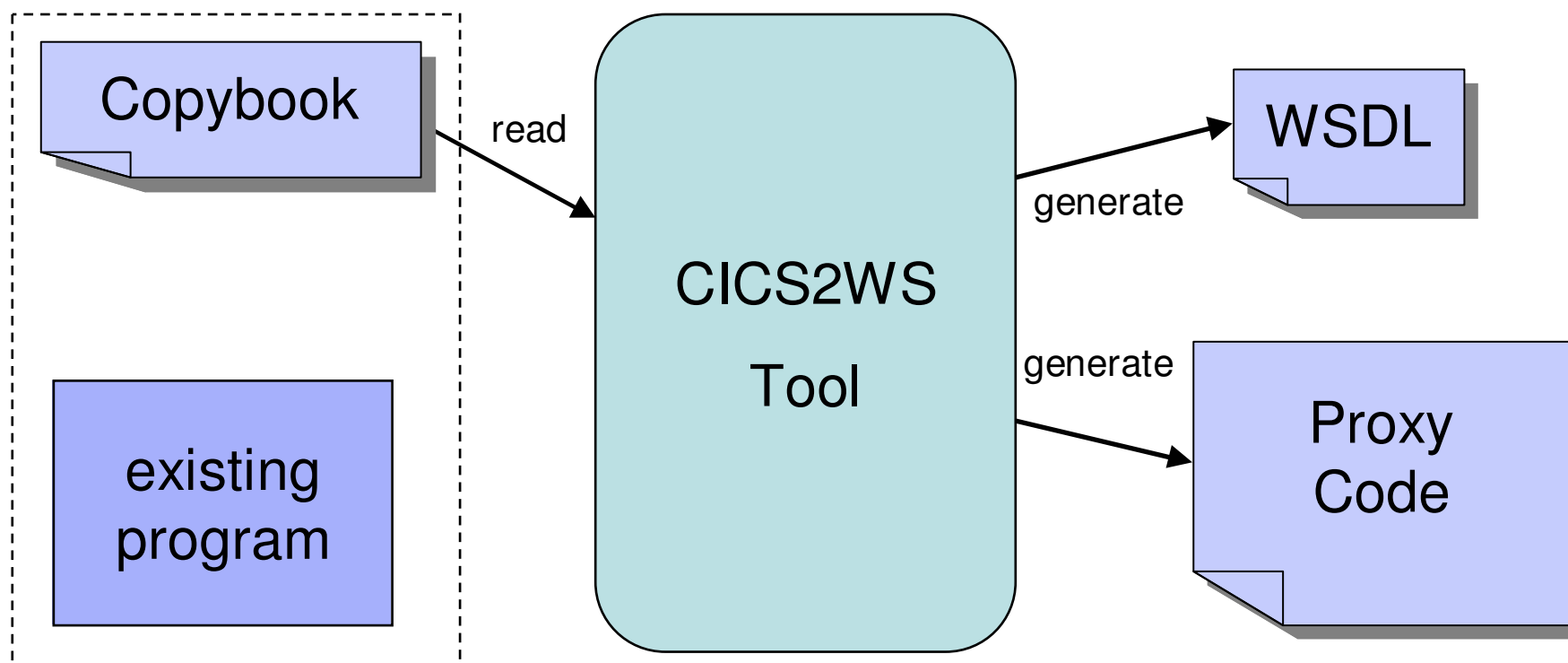


Web Services in and with VSE

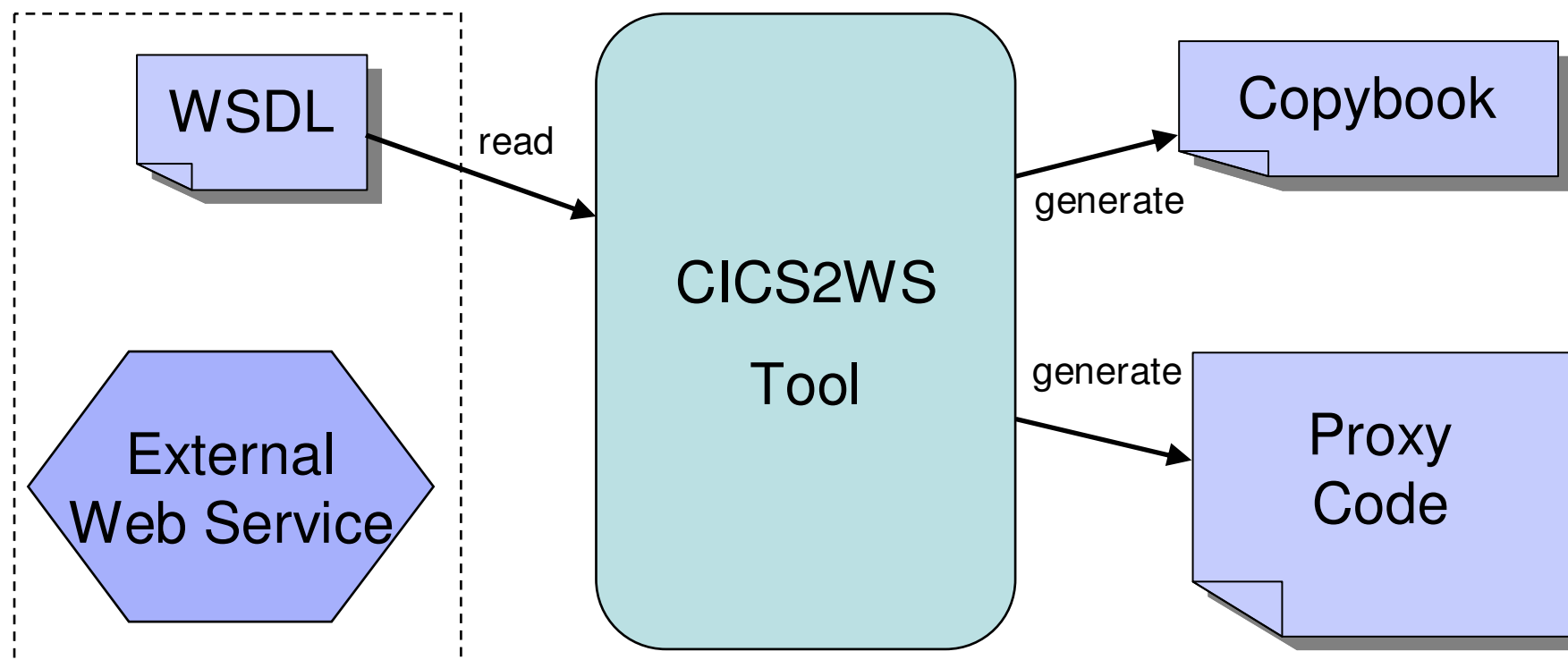


Tool to generate the Proxy code

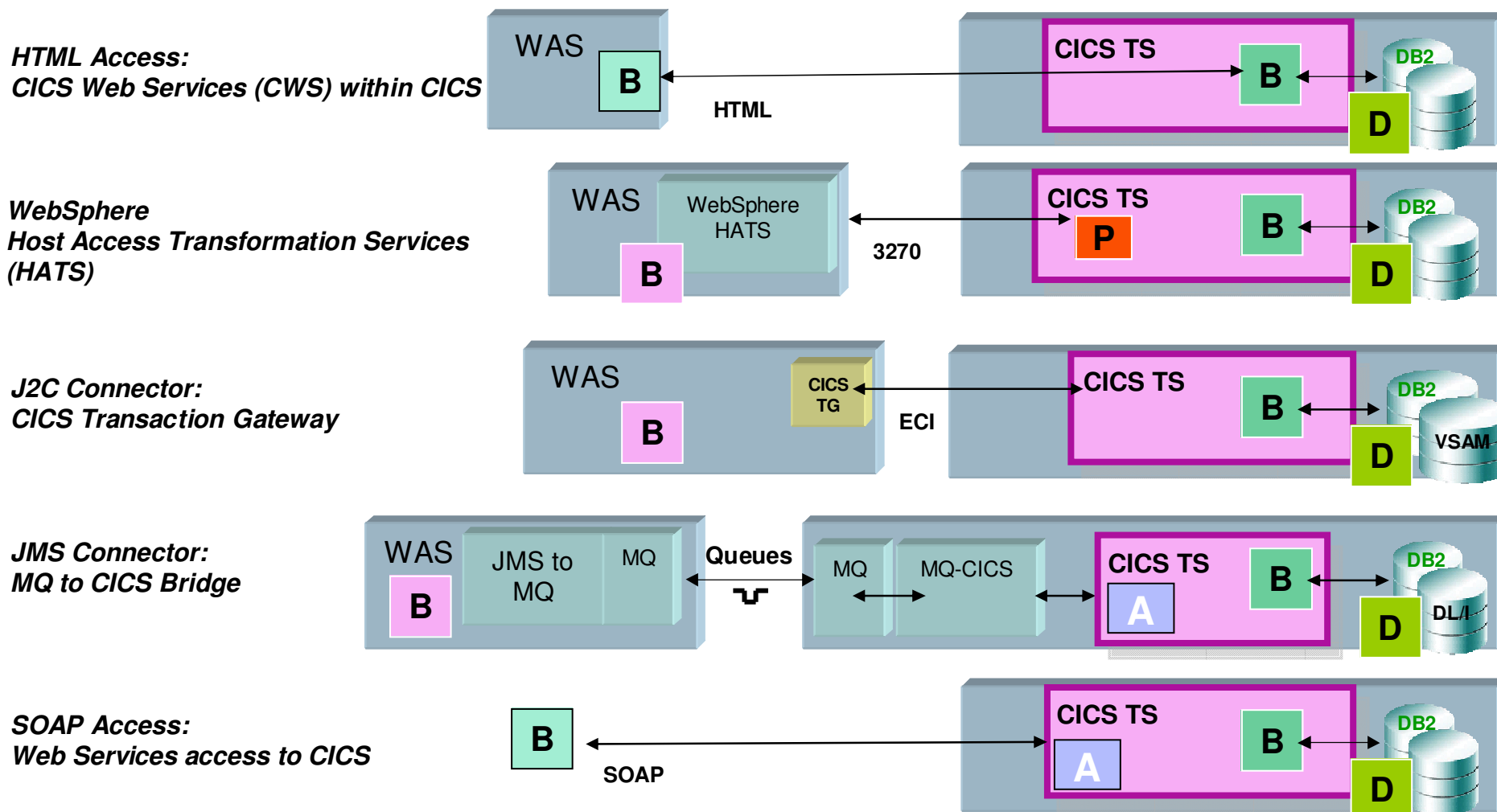
VSE as a SOAP server (service provider)



VSE as a SOAP client (service requestor)



Connectivity to CICS transactions




WAS can be on Linux on z or on another distributed platform. Qualities of Services will vary.

Transactional processing with CICS TS

Solution	Connector to use
Webify	<ul style="list-style-type: none">▪CWS – CICS Web Support▪HATS – Host Access Transformation server▪HOD – Host on Demand server
CICS application access from remote	<ul style="list-style-type: none">▪CTG – CICS Transaction Gateway▪HATS – Host Access Transformation Server▪MQ Series (Client or Server)
SOA - Flexible, platform independent, CICS application integration, the most advance Application-to-application communication Method	<ul style="list-style-type: none">▪Web Services – using XML data and SOAP protocol

Agenda

- **Integrating CICS with the Web**

-  ▪ **Options for a 24X7 online operation**

z/VSE 24 X 7

Traditional mainframe IT operation schedule

- Online Time 6:00 AM - 10:00 PM
 - **NO CICS applications after 10:00 PM**
 - Because of parallel batch
 - Because of data access
 - VSAM 'write one read multiple setting' -> SHR(2)
- Batch workload from 10:00 PM – 5:00 AM
 - **Backup from 10 PM till 11 PM**
 - **NO batch workload after 5:00 AM**
 - Because CICS workload started and files are opened for write in CICS
- Web Applications are 24 hours online and usable
 - **Data change to mainframe data has to be disabled at 10:00 PM**

z/VSE 24 X 7

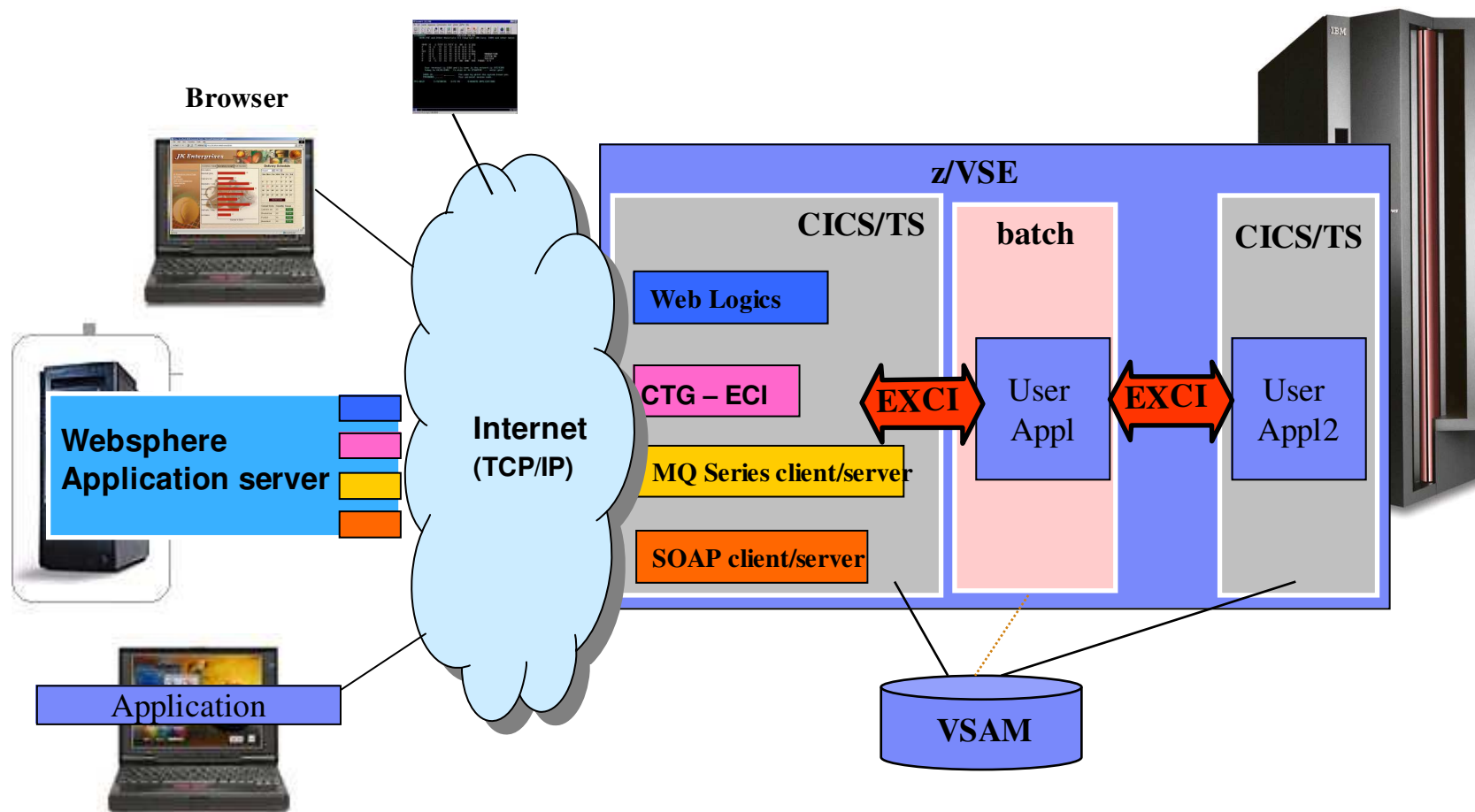
Restriction: Online Time 6:00 AM - 10:00 PM

- NO CICS applications after 10:00 PM**
 - Because of parallel batch
 - Because of VSAM 'write one read multiple setting' -> SHR(2)

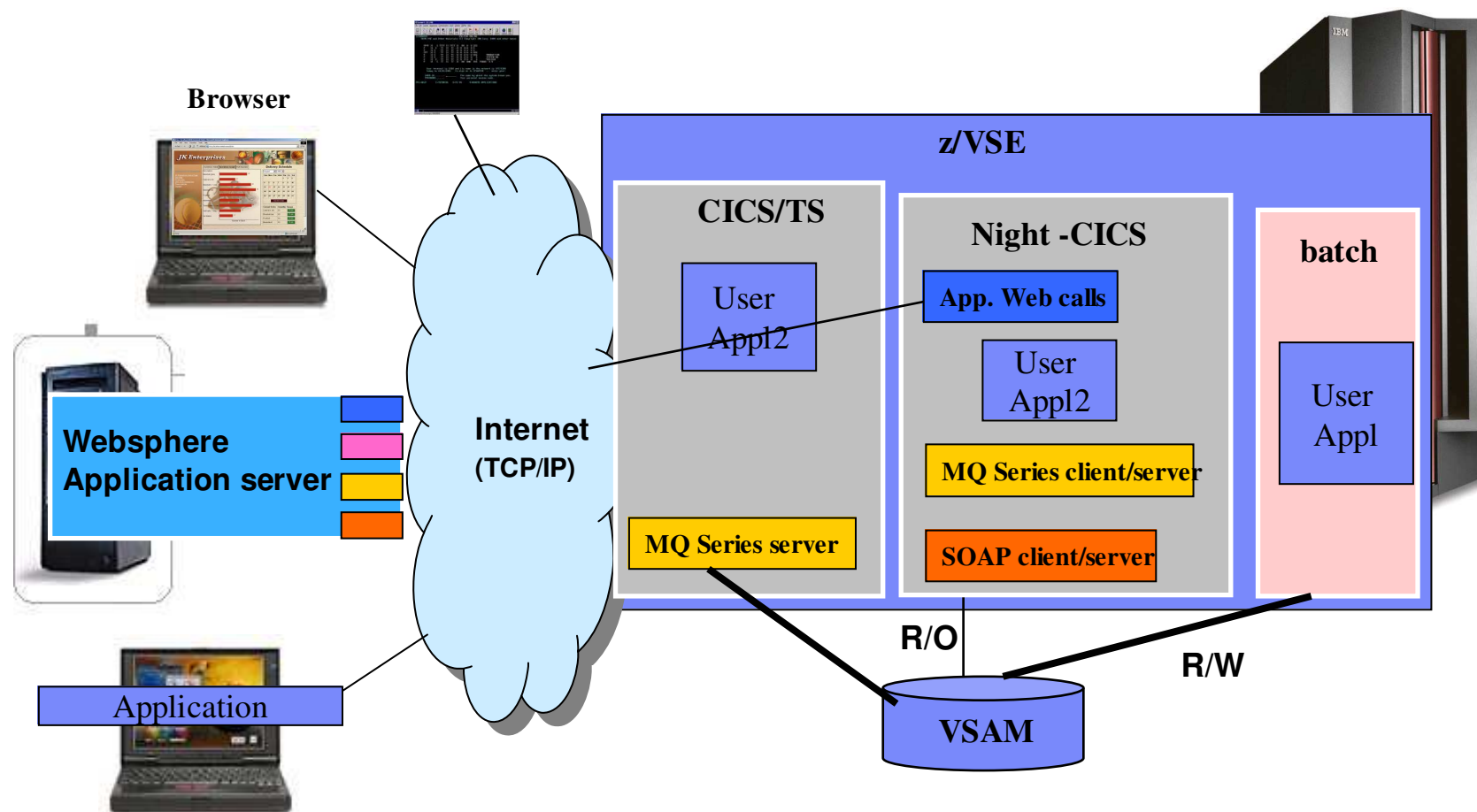
Solutions:

- 1. Increase Online time by changing VSAM files for multiple write SHR (4,4)**
- 2. Increase Online time with shadow CICS with R/O access to data**
- 3. Use separate CICS with Redirector to capture changes**
- 4. Use MQ Series to cumulate nightly changes**
- 5. For Web Applications with remote data access, enable access with connectors.**

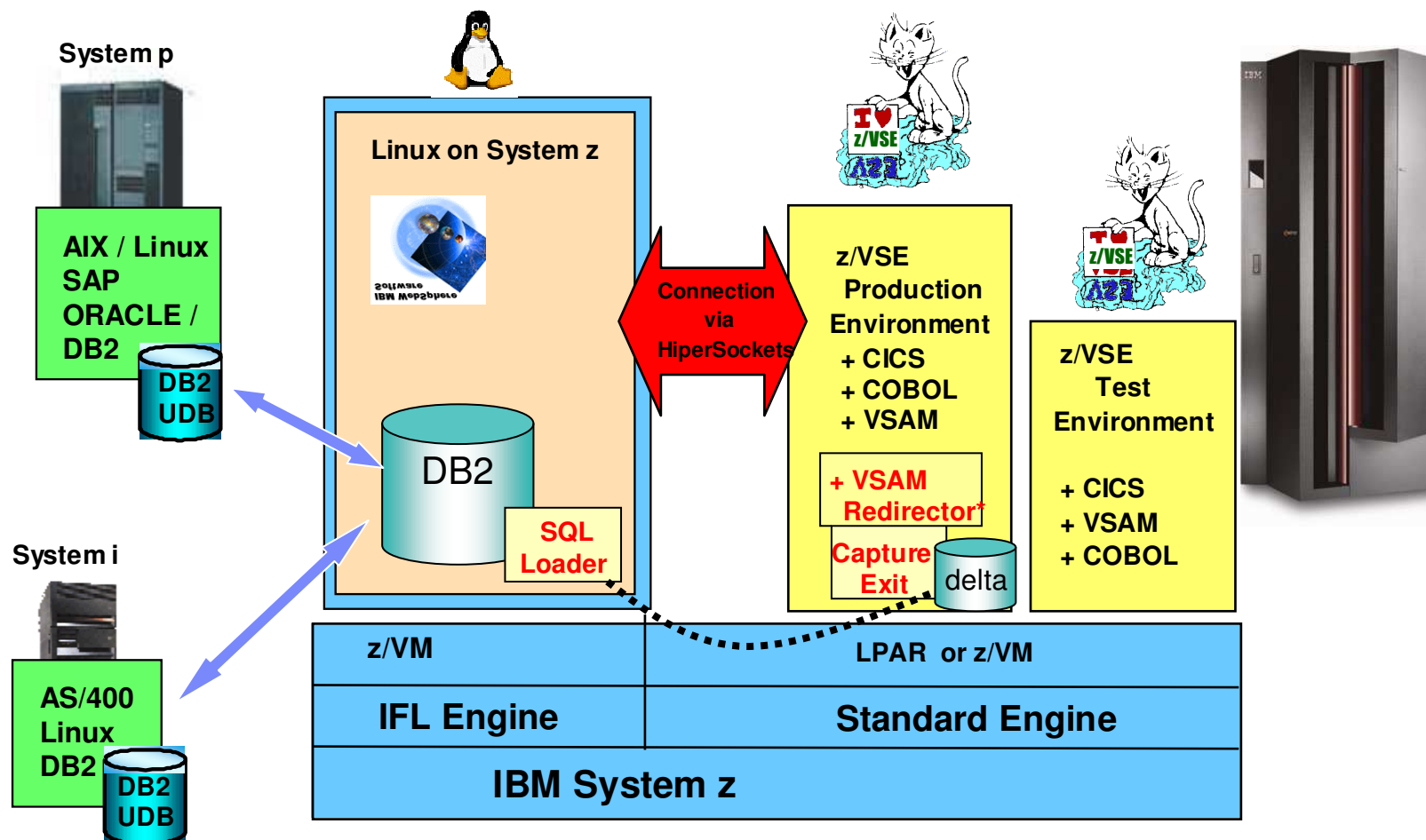
(1) Enable VSAM SHR(4,4) for parallel workload



(2) A 'night'-CICS with R/O access

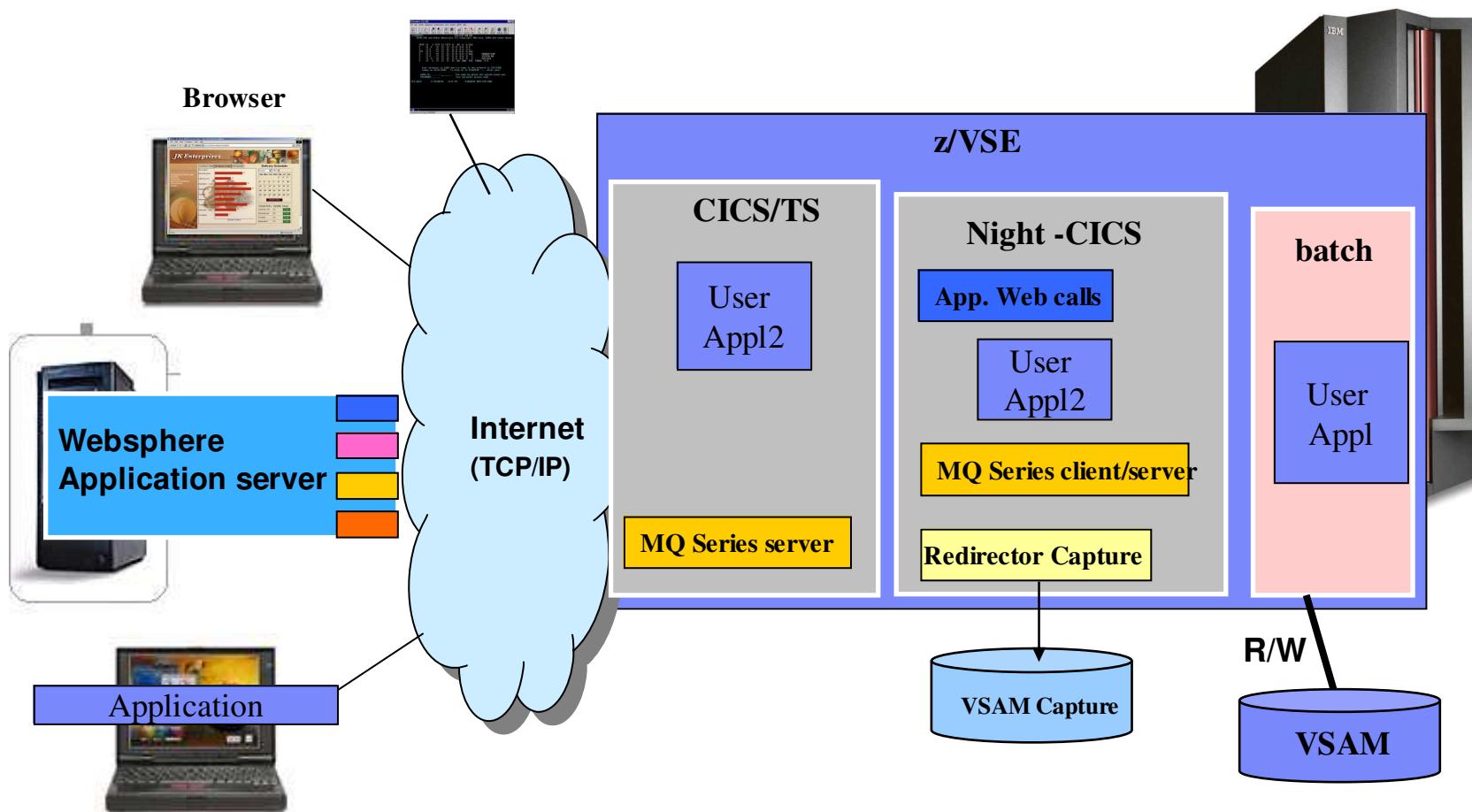


(3) VSAM changes at night are collected with VSAM Redirector Capture

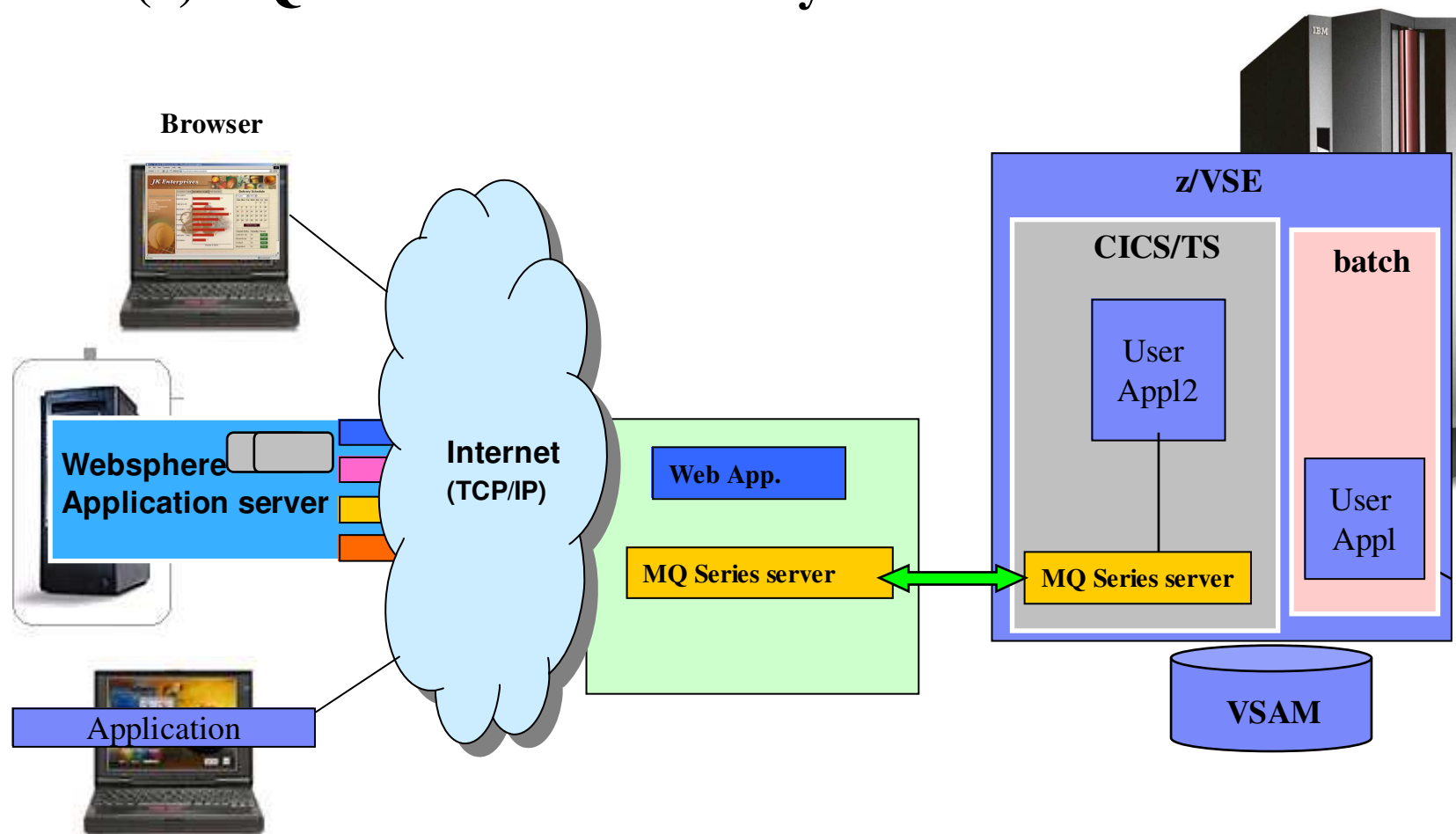


(*) VSAM Redirector – Common data store solution – with DB2 on Linux on zSeries Solutions without changes to VSAM programs

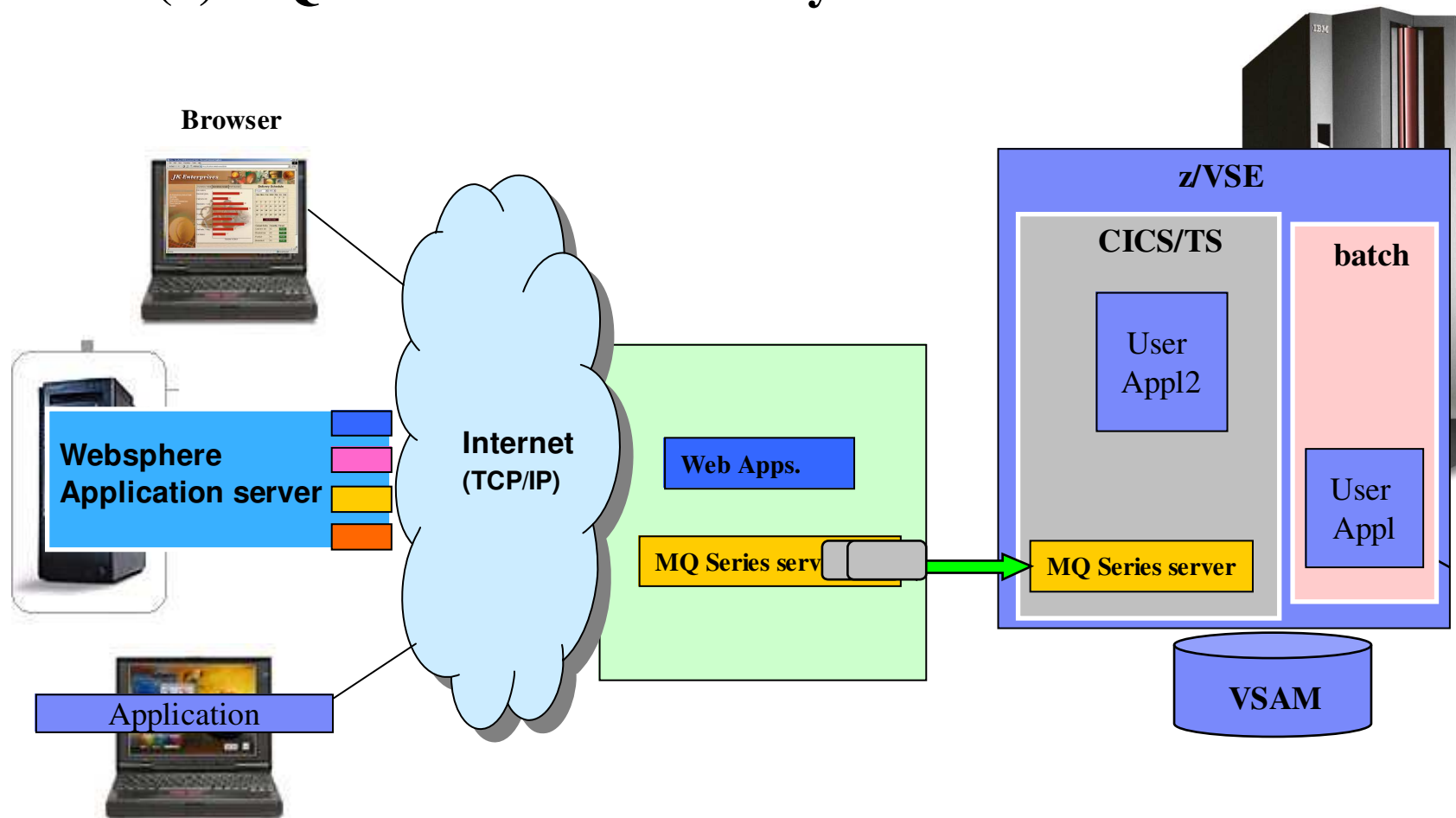
(3) VSAM changes at night are collected with VSAM Redirector Capture



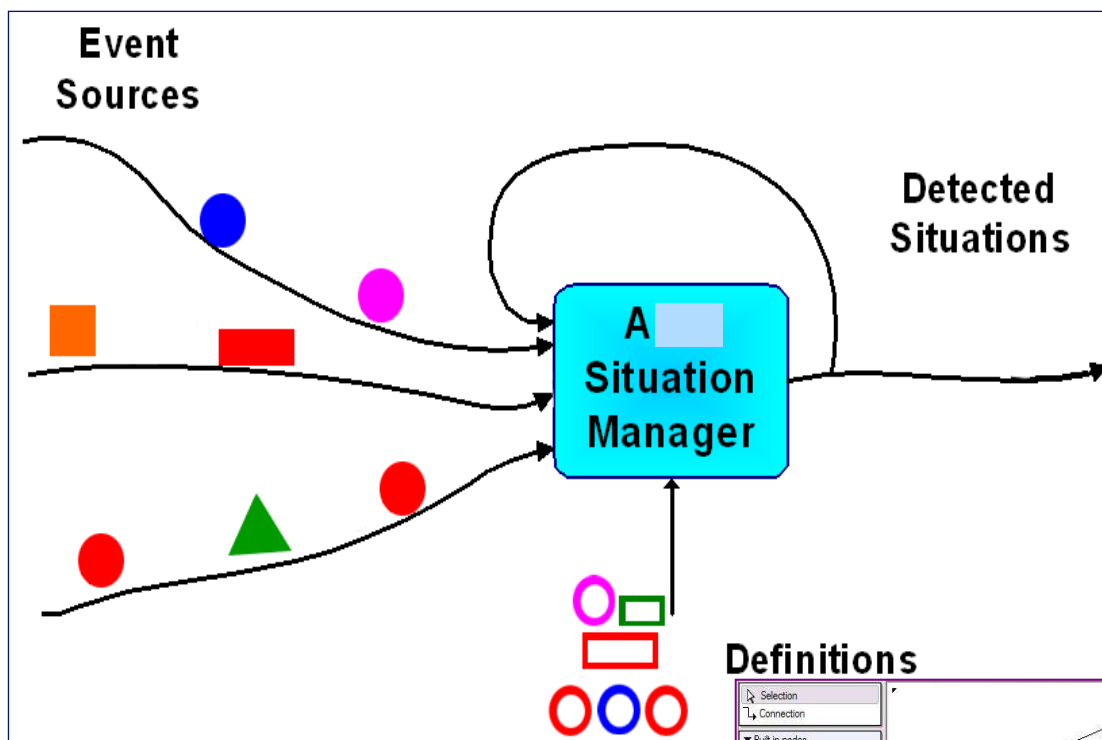
(4) MQ Environment with asynchronous work



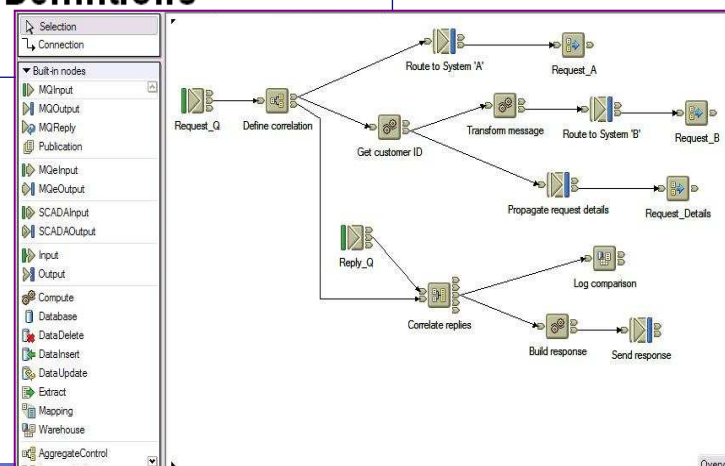
(4) MQ Environment with asynchronous work



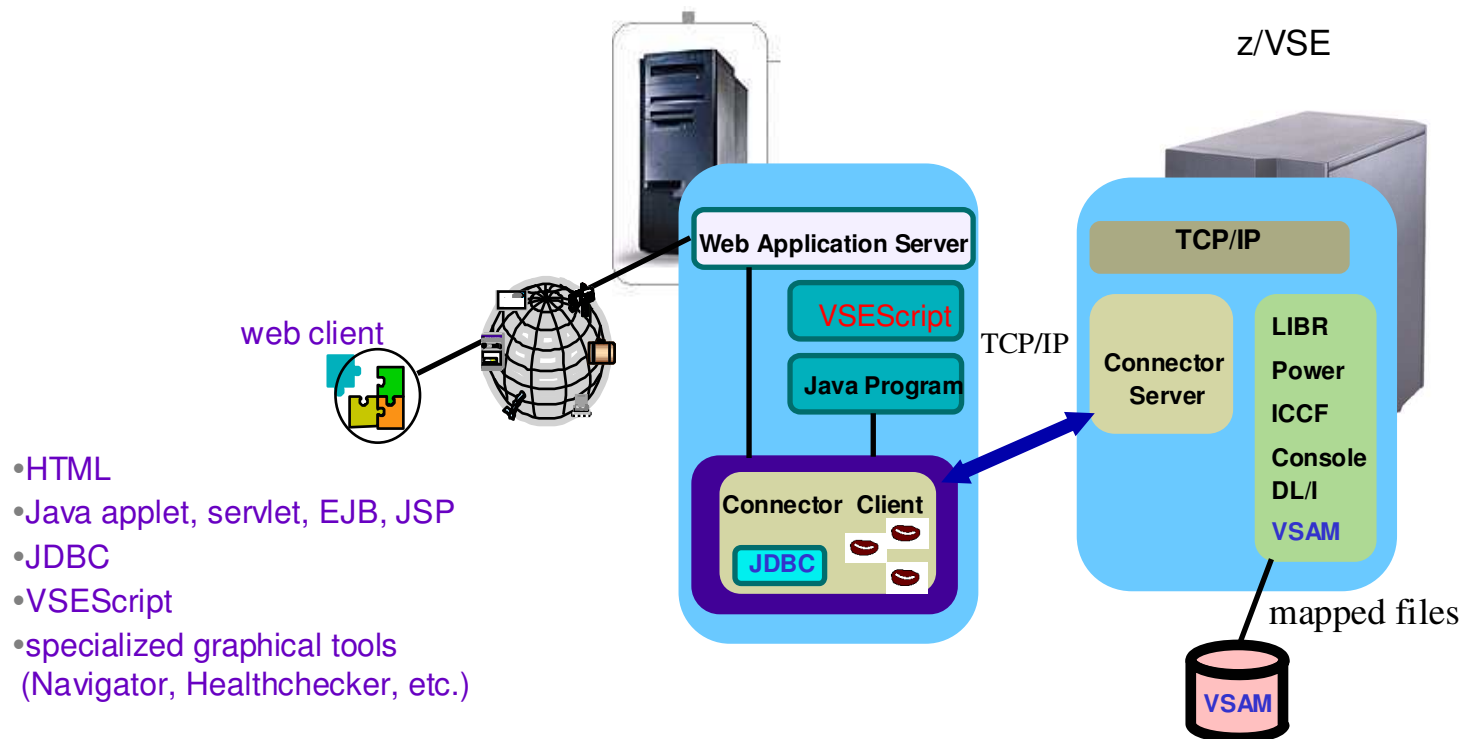
(4) Use WMQ Broker for intelligence on the net and reduce batch



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



(5) Real Time access to z/VSE resources with Java-Based Connector



- HTML
- Java applet, servlet, EJB, JSP
- JDBC
- VSEScript
- specialized graphical tools (Navigator, Healthchecker, etc.)

- Real Time access to z/VSE Resources from remote or Web applications
 - Real Time access for VSAM data, Librarian, Console, DL/I, Power
 - Monitor and analyze using the Console Java API

z/VSE 24 X 7

Restriction: Batch workload from 10:00 PM – 5:00 AM

- **Backup from 10 PM till 11 PM**
- **NO batch workload after 5:00 AM**
 - **Because CICS workload started and files are opened for write in CICS**

Solutions:

- a. Decrease Backup time with Flashcopy or VTS**
- b. Enable multiple write SHR (4,4) for VSAM for parallel CICS Workload**
- c. With VSAM SHR (4,4), Online and batch workload can run parallel during the day - > reduced or no need for nightly batch anymore**
- d. Use EXCI to write all changes through CICS**
- e. Consolidate data on a 24X7 data store in DB2 V9 on Linux**
- f. For Web Applications with remote data access, enable access with connectors.**

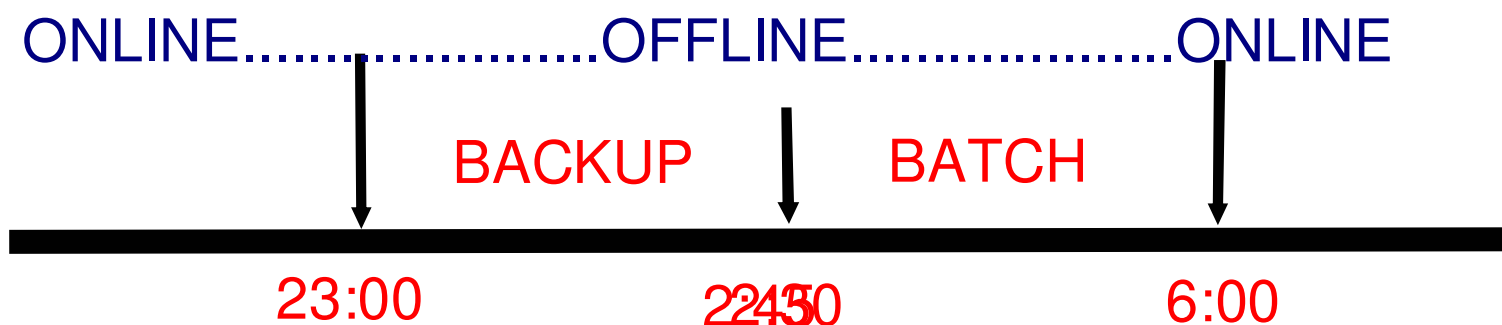
(a) Decrease backup time with Flashcopy

✘ inhibitors of **online** processing time

☞ backup-window

☞ batch-window

Typical processing time-line:



BACKUP process (after Flashcopy) running in parallel to batch from Flashcopied volumes

IDCAMS SNAP command Enhancements

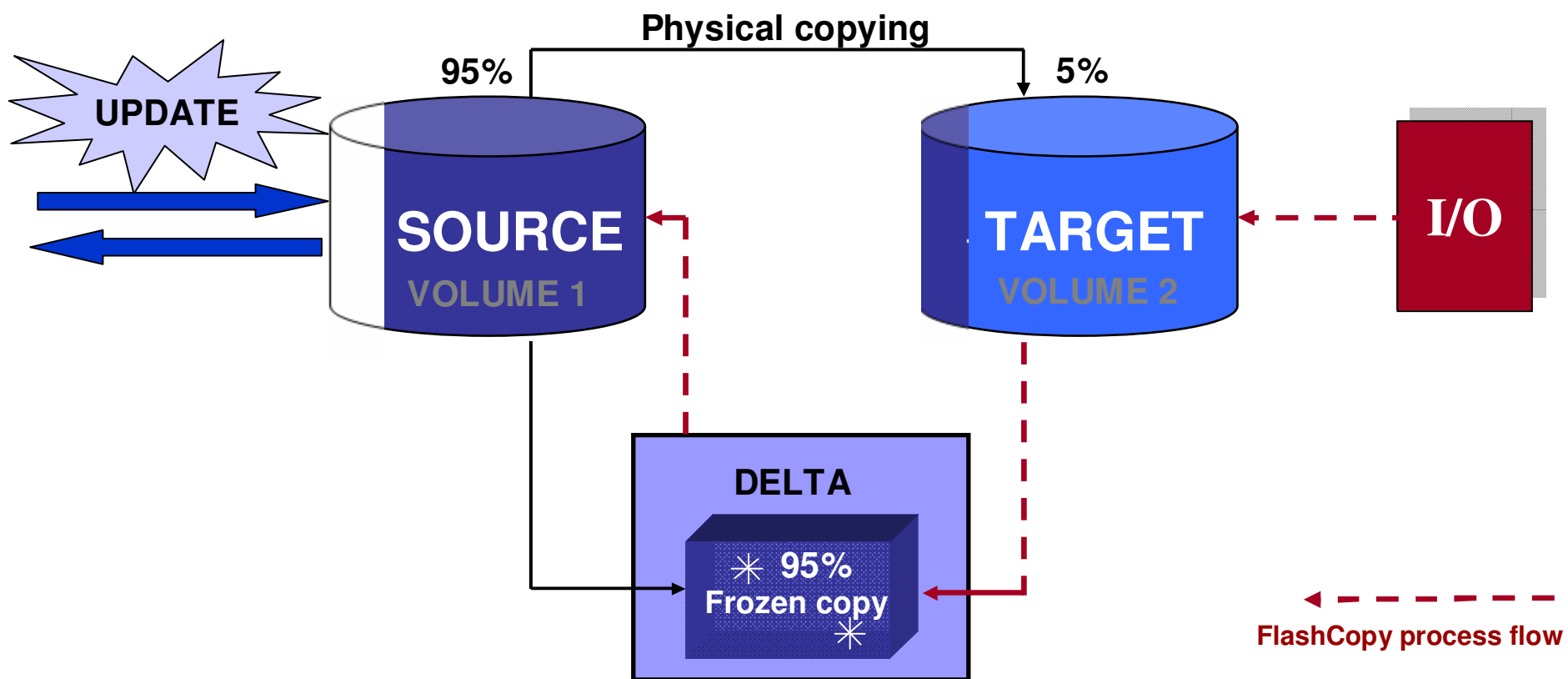
The IDCAMS SNAP command provides an interface to the FlashCopy feature.

- New **NOCOPY** parameter of the IDCAMS SNAP command creates the FlashCopy. The physical copying of data to target volumes is not performed.
- New **DDSR** parameter of the IDCAMS SNAP command terminates the FlashCopy relation between the source and target volumes and frees the used resources.
- New parameter **COPY** of the IDCAMS SNAP command is now specified explicitly.
- Provided an opportunity to administrate user access rights to the IDCAMS SNAP command using the **Basic Security Manager (BSM)**.

See New Chapter 10, “Performing an IDCAMS SNAP (FlashCopy)”
“VSE/VSAM User’s Guide and Application Programming”.

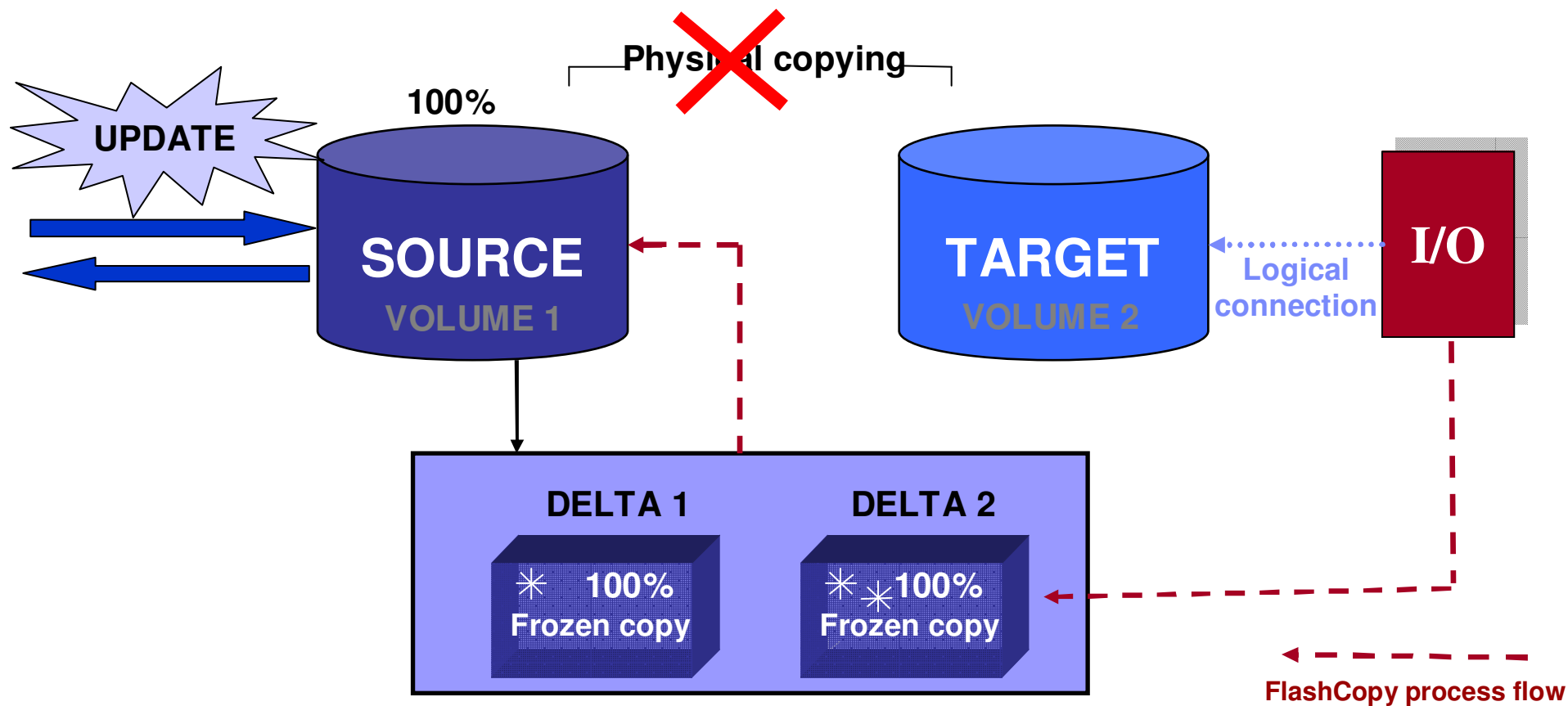
IDCAMS SNAP COPY Options

Explicit specification of the default COPY parameter of the IDCAMS SNAP command, facilitates referencing to it by other z/VSE components.



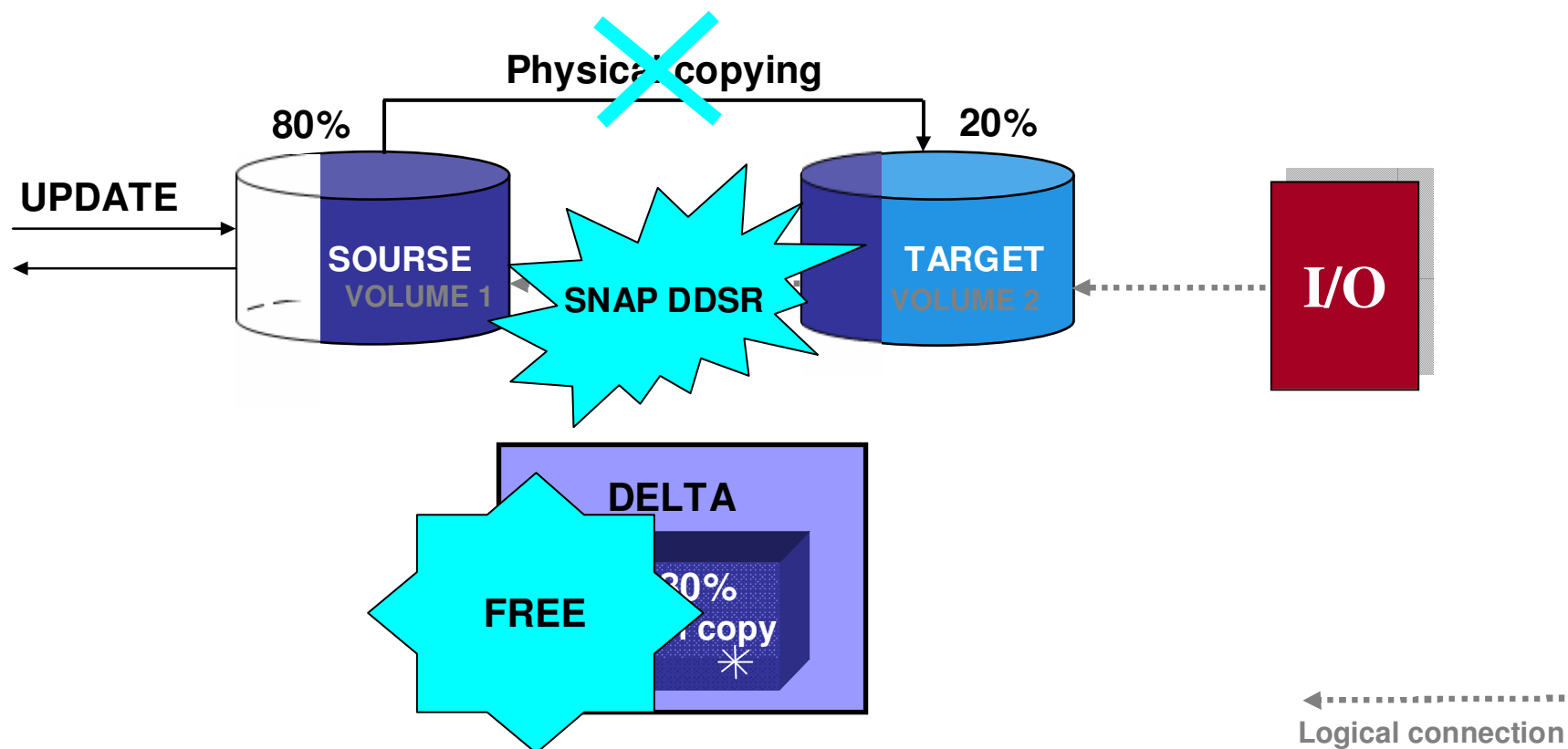
IDCAMS SNAP NOCOPY parameter

The NOCOPY parameter of the IDCAMS SNAP command allows the user to eliminate real copying of source volumes to the target volumes for temporary FlashCopy and thus eliminate the superfluous I/O activity.

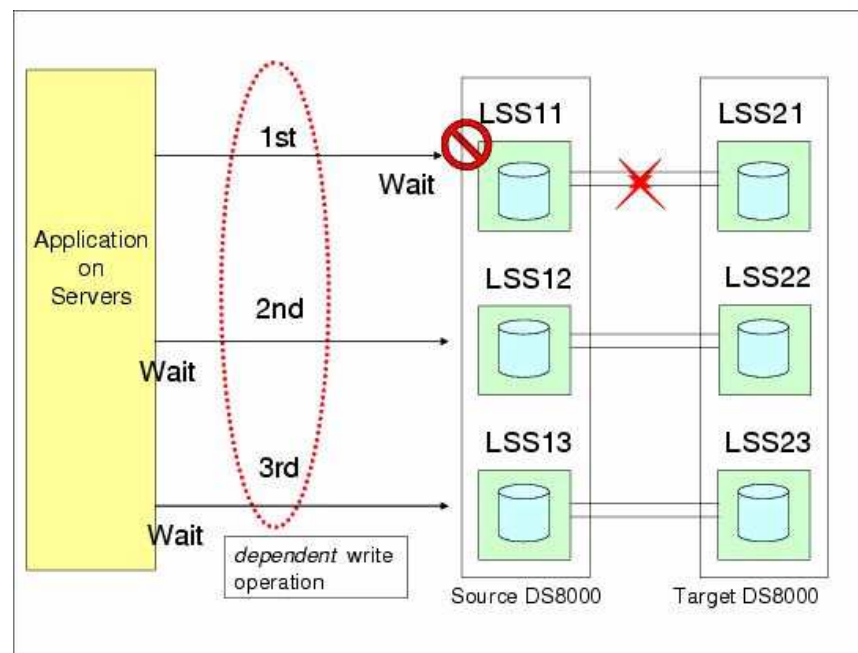


IDCAMS SNAP **DDSR** parameter

The DDSR parameter of the IDCAMS SNAP command allows the user to delete FlashCopy relations and thus to stop unnecessary managing of a Delta File and to release internal DASD resources as soon as they are no longer needed.

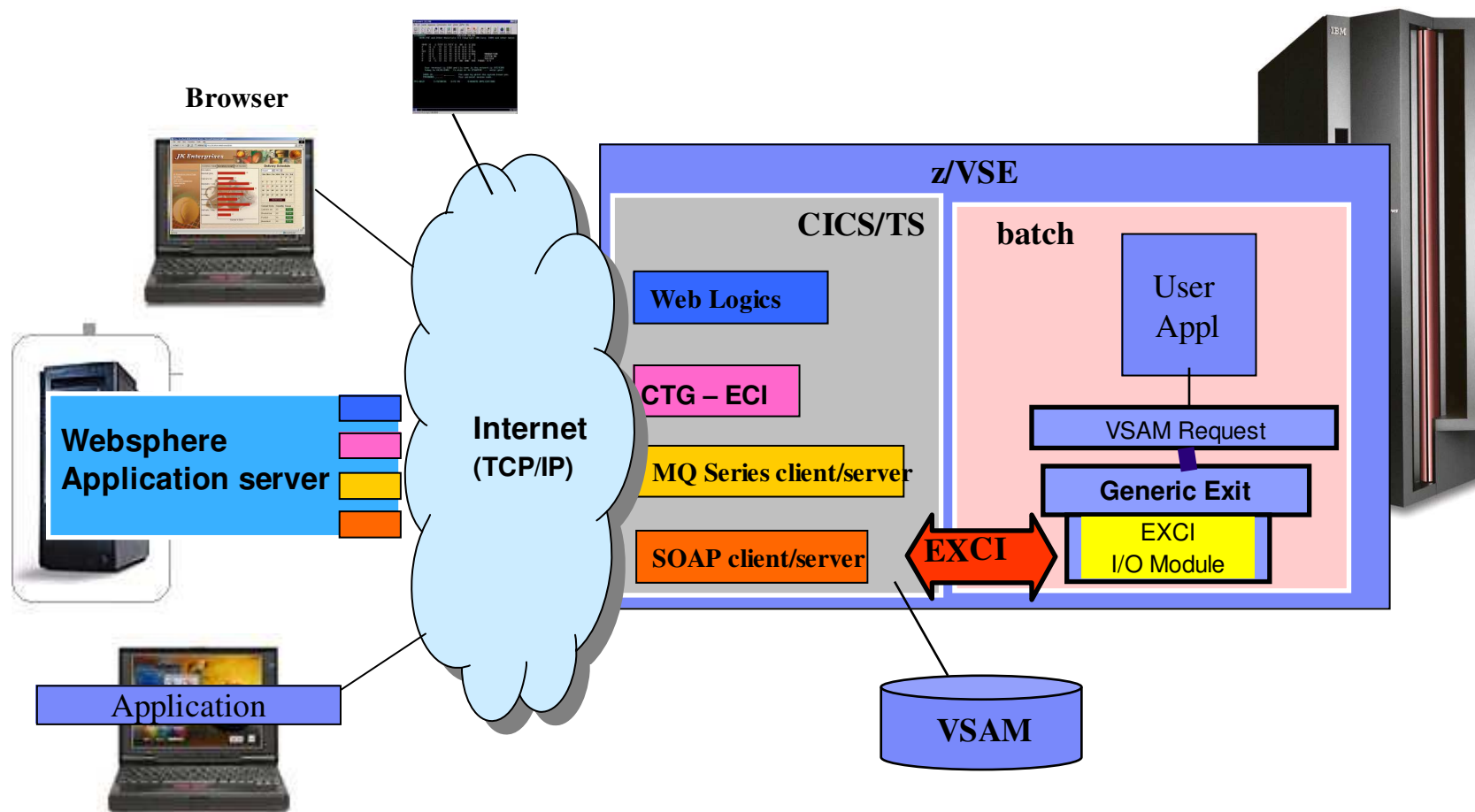


Flashcopy Consistency Group Option in z/VSE 4.3



- Flashcopy Consistency Group **is across multiple Volumes**
- Invocation
 - Establish: IXFP SNAP with keyword FREEZE
 - Release: IXFP DDSR with keyword THAW
- **FlashCopy Consistency Group provides a mechanism for achieving a consistent data copy across multiple volumes without requiring that the application I/O be quiesced. In the case of production data, application impact are minimized.**
- **Prior to ConsistencyGroup FlashCopy, you had to first quiesce the application, establish their FlashCopy relationships, and then restart the application.**

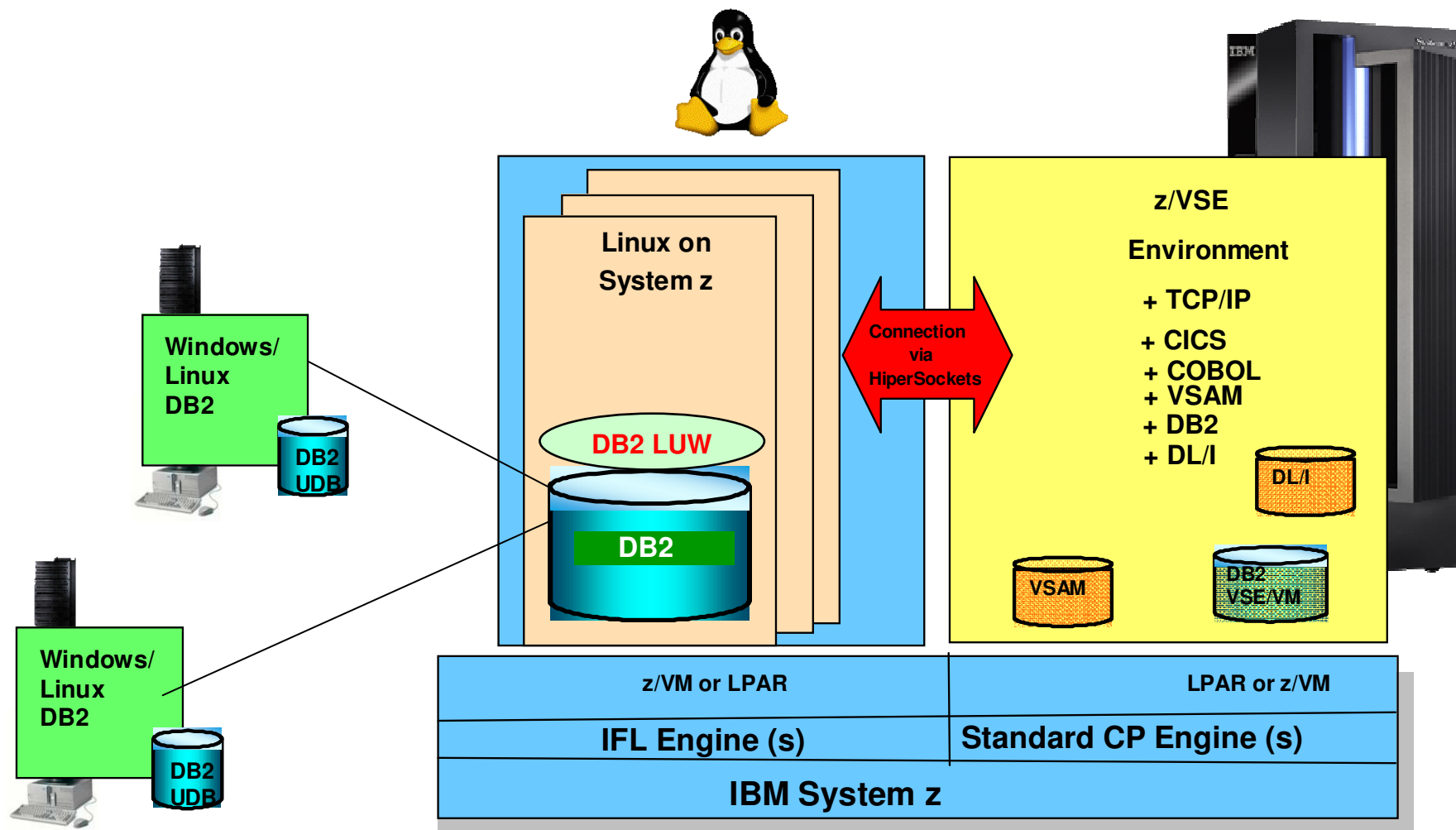
(d) Inter-Communication with z/VSE Applications



(e) Consolidate data on a 24X7 data store in DB2 on Linux

Data Integration – the Base for the future and BI

- eliminate batch workload through DB2 referential conditions



z/VSE 24 X 7

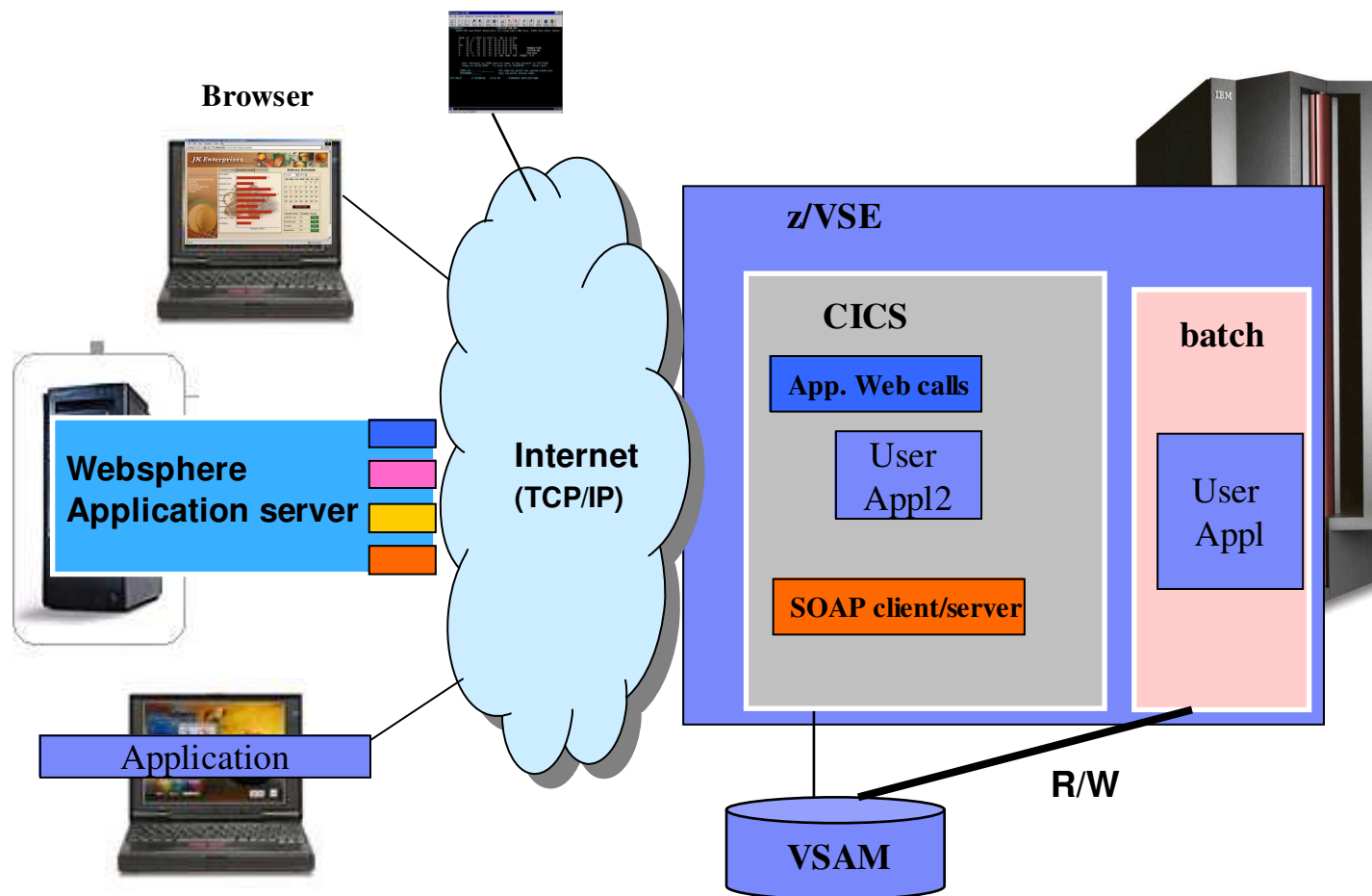
Restriction: Web Applications are 24 hours online and usable

- Data change to mainframe data has to be disabled at 10:00 PM**

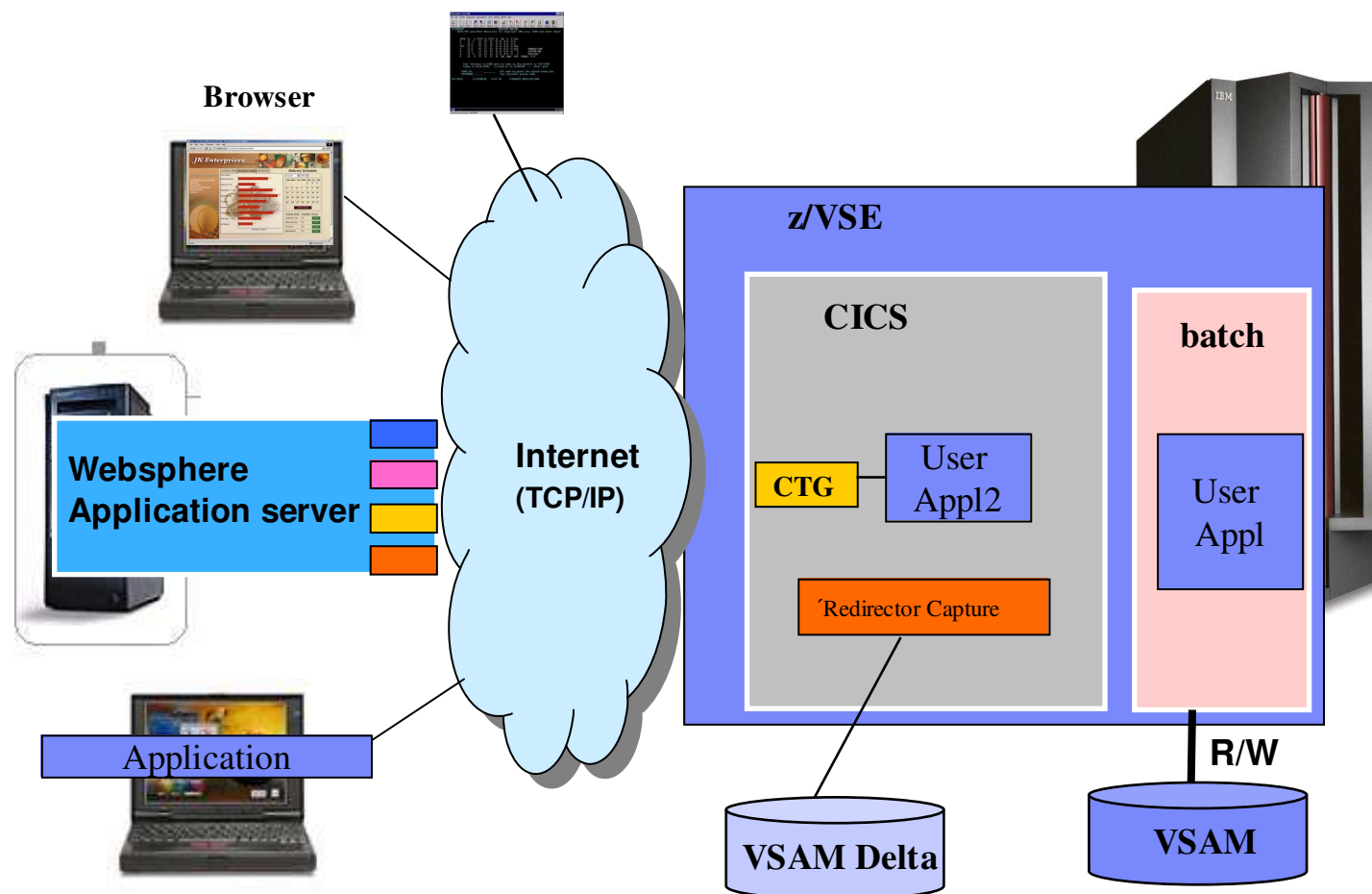
Solutions:

- 1. Increase Web application online time by using a data management system like DB2 with 24X7 availability**
- 2. Access to CICS Online applications with SOA – decoupled from batch data access**
- 3. Use CTG to access CICS and Redirector to capture changes**
- 4. Use Web applications and MQ Series to cumulate nightly changes**
- 5. For Web Applications with remote data access, enable access with connectors (JDBC/VSAM, Java access to DL/I).**
- 6. Convert nightly batch work to relational constraints or UDFs**

(2) Access applications with SOA

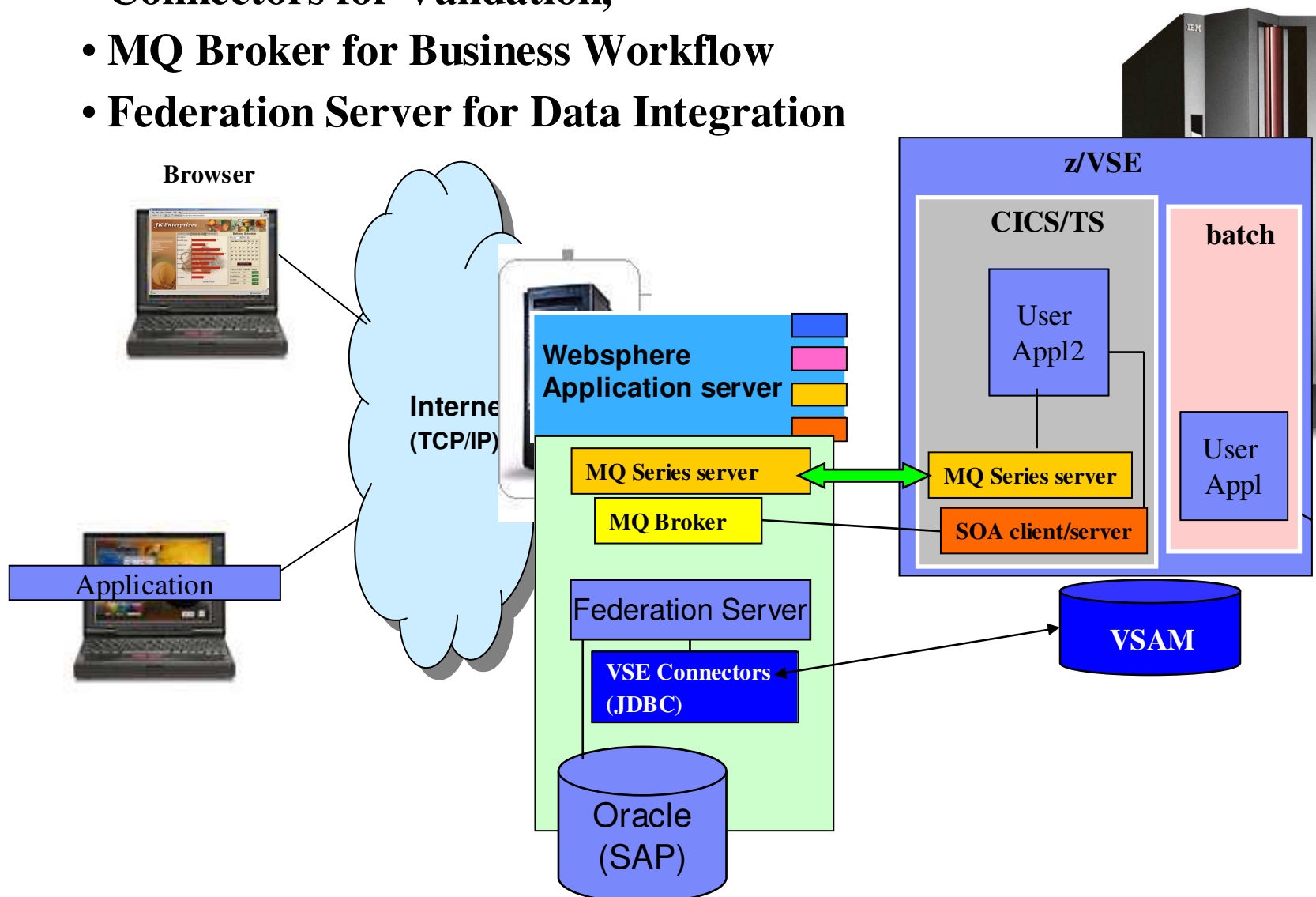


(3) Access CICS with CTG and capture night-changes



Workflow:

- Connectors for Validation,
- MQ Broker for Business Workflow
- Federation Server for Data Integration



Questions ?

