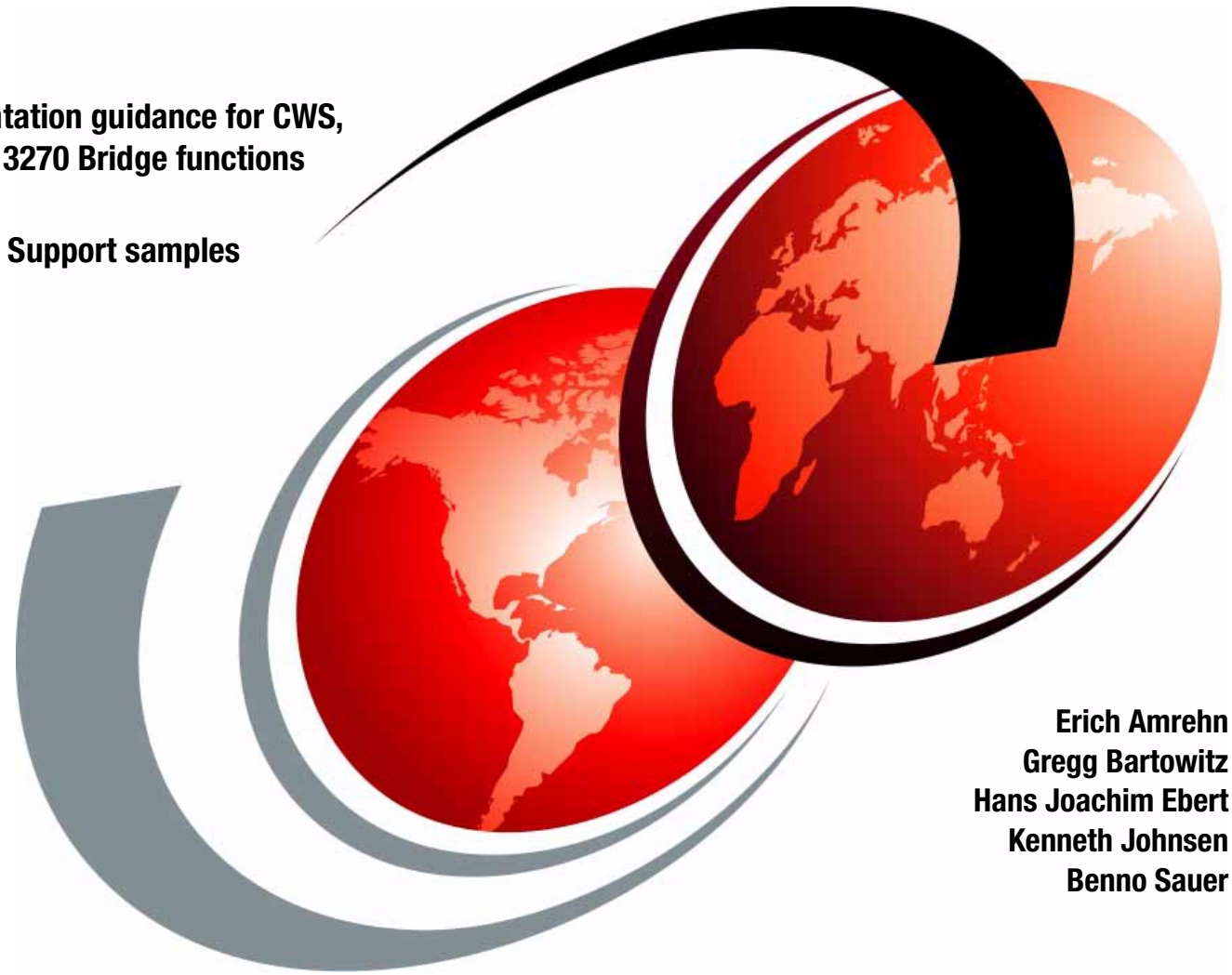
IBM

CICS Transaction Server for VSE/ESA:
CICS Web Support

- e-business connector solutions for VSE/ESA
- Implementation guidance for CWS, including 3270 Bridge functions
- CICS Web Support samples



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International Technical Support Organization

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CICS Transaction Server for VSE/ESA Web Support and 3270 Bridge

November 2000

Take Note!

Before using this information and the product it supports, be sure to read the general information in Appendix B, “Special notices” on page 109.

First Edition (November 2000)

This edition applies to CICS Transaction Server for VSE/ESA 1.1.1, Program Number 5648-054, for use with VSE/ESA 2.5

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Contents

Preface

CICS Web Support (CWS) is a new function in CICS Transaction Server for VSE/ESA 1.1.1, which has the following software prerequisites:

- VSE/ESA 2.5.0
- TCP/IP for VSE/ESA 1.4.0
- LE/VSE 1.4.1

CWS first became available in OS/390 with CICS TS 1.2, and was enhanced in release 1.3. This 1.3 functionality was ported to CICS TS for VSE/ESA 1.1.1.

CICS Web Support is an effective solution for the VSE/ESA user community. It is a powerful 2-tier Web enablement solution that is easy to plan for and simple to implement. Our goal for this IBM Redbook is to provide you with the information to use this great e-business connector. CWS unites browser technology with S/390. This provides tremendous flexibility to the end-user community, while capitalizing on S/390 performance, reliability, scalability, availability, and data integrity.

This redbook discusses and positions the new CICS TS for VSE/ESA 1.1.1 CICS Web Support (CWS) and 3270 bridge. It provides a broad understanding of the new architecture, together with examples and samples to help customers in their planning and implementation of CWS. CWS employs a unique approach for using an e-business connector in the VSE/ESA environment.

This redbook also discusses planning for CWS, installation, and customization. It provides the guidance you need to design new solutions and upgrade existing solutions.

There are three new publications available with CICS TS 1.1.1 that provide detailed information about CWS:

- *CICS Transaction Server for VSE/ESA Enhancement Guide Release 1*, SC34-5763
- *CICS Transaction Server for VSE/ESA Internet Guide Release 1,* SC34-5765
- *CICS Transaction Server for VSE/ESA CICS External Interface Guide Release 1,* SC33-1669

Appendix C, “Related publications” on page 111, contains additional information about these publications and others that may be of interest.

The team that wrote this redbook

This redbook was produced by a team of specialists from around the world working at the International Technical Support Organization Poughkeepsie Center.

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Chapter 1. Introduction to VSE/ESA connector solutions

This chapter offers an introduction to e-business connector solutions for customers using VSE/ESA, and how CICS Web Support relates to them. We also explain which connectors are used to connect browsers with VSE/ESA applications and data.

1.1 Overview of available connectors

All connectors available for VSE/ESA customers are described with their basic characteristics and grouped according to the host program product. For more information, refer to the redbooks mentioned in Appendix C, “Related publications” on page 111.

1.1.1 IBM CICS connectors

Let us begin with CICS connectors. CICS is available in nearly all VSE/ESA installations and has control over most production data. Therefore, CICS is a good base for connectors.

- **CICS Transaction Gateway (CTG)**

  The CICS Transaction Gateway provides a comprehensive set of Java-based programs for access to CICS applications from a Web browser. These include Java classes and JavaBeans for writing application-specific server programs (servlets) and browser programs (applets).

  The CICS Transaction Gateway is part of CICS Transaction Server for VSE/ESA 1.1.1.

  The CTG is a 3-tier connector model. The middle tier is usually a Netfinity or RS/6000 server with WebSphere installed to provide the Web server, Java Virtual Machine (JVM) and an application server to control the CTG program.

  There are two ways to use CTG:

  – The first way to use CTG is the COMMAREA-based method. CTG receives a request from the browser and sends a back end request including data in a COMMAREA using a CALL to the CICS Universal Client, which is also part of the CTG. The CICS Universal Client transforms this into a standardized External Call Interface (ECI) CALL and sends it with the COMMAREA down an LU 6.2 connection to CICS. This is known as a Distributed Program Link (DPL). After processing the request by CICS, the COMMAREA is sent back to CTG and, from there, data are sent to the browser.

  – The second way to use CTG for a browser is in its capability to act as a converter of HTML data stream to 3270 data stream and vice versa. This mechanism is based on the External Presentation Interface (EPI).

  For more information, visit the following Web site:

  `http://www.ibm.com/software/ts/cics/platforms/internet/tgw30/`

- **CICS Web Support (CWS)**

  CWS is a 2-tier connector solution based on HTTP/HTML. This simple but powerful solution provides:

– COMMAREA communication
– 3270 communication

CICS Web Support is covered in more detail in the remaining chapters of this redbook.

1.1.2 IBM MQSeries connector

MQSeries uses a message-based technology to transmit data between different platforms with:

- Assured, fast, and continuous delivery
- Full compatibility between platforms

Transmission is usually asynchronous and can be transmitted using TCP/IP or LU 6.2 links from the middle tier to the host.

The browser can activate a Java Servlet, which contains the MQ-API commands to communicate, by way of the middle-tier MQSeries, with the VSE/ESA MQSeries applications.

For more information, see the Web site at:

`http://www.ibm.com/software/ts/mqseries/`

1.1.3 IBM DB2 connector

If a customer has DB2 installed under VSE/ESA, VM/ESA, or both, another choice to connect a browser to host-based DB2 data is by using DB2 Connect on a middle tier.

The DB2 connector uses the Distributed Relational Database Architecture (DRDA) to access relational resources. The access from the requestor is by way of standard interfaces such as Java Database Connectivity (JDBC), Open Database Connectivity (ODBC), or Call Level Interfaces (CLIs).

For more information, see the Web site at:

`http://www.ibm.com/software/data/db2/db2connect/`

1.1.4 IBM VSE/ESA 2.5 connectors

VSE/ESA 2.5 is a “connector” release. Two new connectors are made available with this new release of VSE/ESA and are interesting possibilities to bring together Internet technology with the S/390 world. WebSphere on the middle tier is strongly recommended. For detailed information on the new VSE/ESA connectors see *e-business Connectivity for VSE/ESA*, SG24-5950.

- **DB2 infrastructure**

  This connector relies on a DB2 infrastructure and allows easy access to DB2, VSAM, and DL/I data using stored procedures. It is a TCP/IP or LU 6.2-based DRDA connection used to link from a middle tier to the host.

- **VSE/ESA native**

  The VSE/ESA native connector is TCP/IP-based and uses JavaBeans to transmit requests to a “connection server” within VSE/ESA 2.5, which itself reacts on behalf of the transmitted requests. It is a 3-tier connection.

For more information, see the following Web site at:

http://www.ibm.com/vse

1.1.5 IBM Host On-Demand

Host On-Demand (HOD) is an easy way to bring 3270-based applications to a browser. HOD itself is installed on a middle tier and is downloaded to a browser on request (on demand). It supports Secure Sockets Layer (SSL) between the middle tier and browser.

For more information, see the following Web site at:

http://www.ibm.com/software/network/hostondemand/

1.1.6 ISV solutions

There are increasing numbers of vendor solutions that either use COMMAREA techniques or convert 3270 data streams. Information about these solutions can be found at the VSE/ESA home page at:

http://www.ibm.com/vse

1.2 General selection criteria for a connector

The following criteria should be considered when selecting a connector. This is not a comprehensive list and does not cover all aspects leading to your decision. It is supplied as a guideline to assist you in making an appropriate selection.

- **2-tier or 3-tier solution**

  When we talk about 2-tier or 3-tier, we mean a *logica*l connection over 2 or 3 levels.

  Two levels implies that a browser is directly served by a server program, often called a Web server. There is no other server software between the levels, except TCP/IP.

  Three levels means that the server program previously mentioned, becomes a client itself and accesses another server for conducting application or data operations.

  The number of physical levels may differ from the logical ones. For example, in OS/390, it is common to run middle tier programs with the “UNIX System Services” on the same hardware. At the time that this redbook becomes available, middle-tier products will also be available under Linux for S/390 with VM/ESA or in an LPAR.

- **Type of access**

  The majority of available connectors are based on Java as the platform-independent language. Some connectors use HTML only.

- **DB2 or non-DB2 on host**

  If a customer has DB2 installed, it is useful to check for DB2-based connectors. DB2 Version 7 is shipped with VSE/ESA 2.5. It is now key-enabled for production use, but can be run in a test mode without a license.

- **Synchronous or asynchronous access**

  Synchronous access means that application logic and data transfer are not "buffered". Most connectors run synchronously.

  Opposite to that, a*synchronou*s means that the application logic sends data without regard to established communication links. MQSeries is a well-known example of this.

- **COMMAREA or 3270-based programs**

  The fastest way to connect a browser with VSE/ESA programs and data, is to to use existing 3270 programs and have a 3270/HTML converter between VSE/ESA and the browser. Without modifications or enhancements made to the layout of the browser panel, it stays as it was: a 3270 panel.

  COMMAREA-based programs allow a free formatting of the browser panel because these programs do not rely on any 3270 presentation logic.

- **Security aspects**

  Security requirements for browser applications vary greatly, depending on the type of data that is transmitted, on the industry, and on the type of connections being made. Most intranet applications are not critical in this sense.

  On the other hand, banking applications and online shopping applications using the Internet are much more security-sensitive.

- **TCP/IP or LU 6.2 communications protocol**

  Communication from a browser to the first server is based on TCP/IP with HyperText Transfer Protocol (HTTP) and HyperText Markup Language (HTML). This is independent of the link characteristics, whether it be LAN or WAN, Ethernet or Token Ring.

  In 3-tier environments, the connection to the third level can be TCP/IP or LU 6.2, depending on the chosen connector.

1.3 Is CICS Web Support the appropriate connector for you

As we mentioned, there are several connectors available to VSE/ESA customers. Which solution should you use to bring application and data to a browser? CICS Web Support is a very interesting connector that needs no additional license, and can be configured in less than one day.

1.3.1 Characteristics of CICS Web Support

Some characteristics of the CICS Web Support connector are:

- CWS is a 2-tier model.
- CWS uses TCP/IP.
- CWS deals with an HTTP/HTML-based data stream.
- CWS is independent of other software products on the host, except TCP/IP.
- CWS is always synchronous.
- CWS supports both a COMMAREA approach *and* a 3270 approach for applications.

1.3.2 Advantages of CICS Web Support

We came to the conclusion that CWS is an excellent connector if it meets your requirements. The areas to consider when making your decision include:

- **Operational aspects**

  The entire operation related to CWS is controlled within the VSE/ESA environment. Beyond VSE/ESA, and down to the browser, there is the network only. No other software components are between them. We called it a “centralized point of control”.

- **System programming**

  There are only a few system programmer tasks required before CWS can run. These tasks may take a couple of hours, but once completed, you should see the first CWS test panels on your browser.

- **Application programming**

  As you will see, it is easy to understand and implement applications based on HTTP/HTML, provided you have some related documentation available to use for reference in case of questions. To bring 3270-based applications to a browser with CWS is even easier--try it out!

  Note: If it is your intent to implement a Java-based solution, CWS is *not* the connector of choice.

- **Performance**

  As a 2-tier connector, the performance of CWS is likely to be better than as a 3-tier connector.

  Our tests made with COMMAREA and 3270-based applications showed subsecond response times for all tested samples. The browser and CICS were connected by way of a LAN.

- **Debugging**

  From a debugging point of view, CWS is a handy system. What we stated for operational aspects is true for debugging too: it provides a “centralized point of control”.

1.3.3 Limitations of CICS Web Support

Note that CICS Web Support (CWS) has the following limitations:

- CWS has limited security for Internet connectors because the Secure Sockets Layer (SSL) is not supported by TCP/IP for VSE/ESA 1.4 and therefore also not supported by CWS. The consequence is that if you use CWS with Internet connections, a middle tier would be needed to provide full security functions.
- Long names (more than 8 characters) used by some tools for HTTP/HTML code generation are not supported by VSE/ESA and therefore also not supported by CWS.

Keep these limitations in mind when deciding if CWS is the appropriate connector for your environment.

Chapter 2. CICS Web Support environment overview

This chapter describes the VSE/ESA environment in which CWS runs and provides an overview of the CWS solution.

2.1 CICS Web Support environment prerequisites

CWS is part of CICS/Transaction Server for VSE/ESA 1.1.1. All of the required products are installed with VSE/ESA 2.5.0. The operating environment and prerequisites for CWS are:

- VSE/ESA 2.5.0
- CICS Transaction Server 1.1.1
- TCP/IP for VSE/ESA 1.4.0.
- LE/VSE 1.4.1

2.2 CICS Web Support logic and flow

To make the right decisions about which facilities to use, and how to customize them best, you need to understand the flow of CWS. This is illustrated in Figure 1.

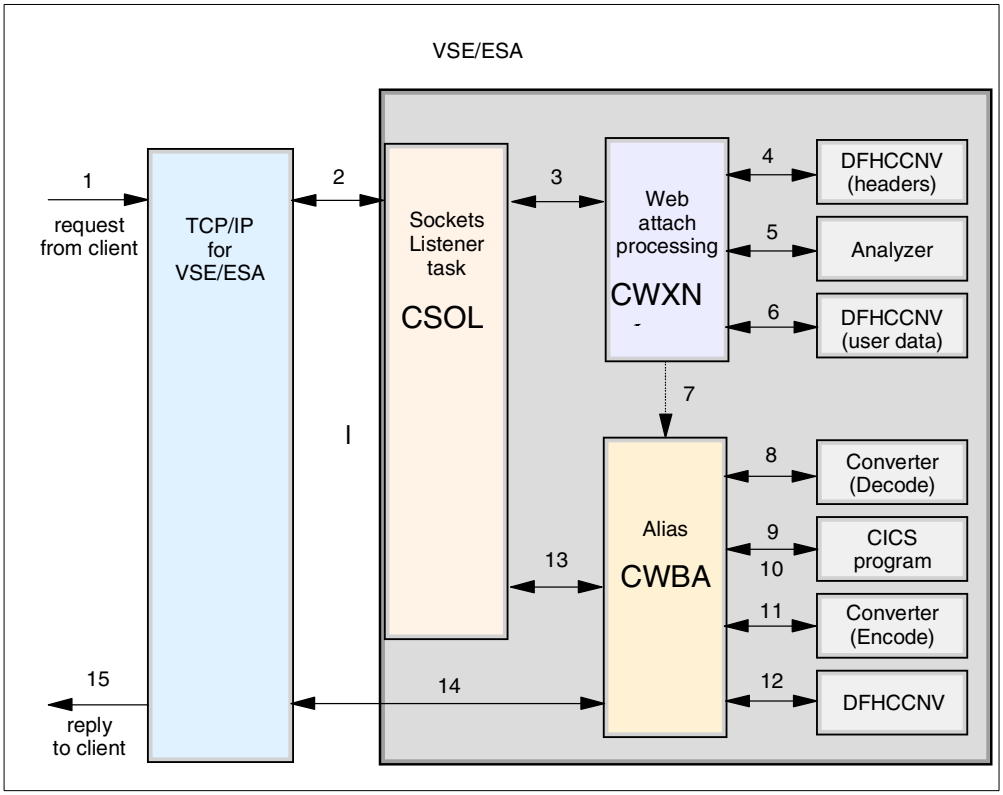

Figure 1. Calling a program with CWS: Control flow for COMMAREA solution

The flow is explained in the following list:

1. An HTTP request arrives in TCP/IP for VSE/ESA from a Web browser.
2. The sockets listener monitors the TCP/IP for VSE/ESA interface for incoming HTTP requests, based on the port number specified on the TCPIPSERVICE

resource definition. The CICS TS listener transaction is CSOL. CSOL is an internally-defined transaction. It has no RDO definition. It must be defined to BSM or ESM.

3. The sockets listener task attaches Web attach transaction CWXN. CWXN, or its alias, should be specified as the TRANSACTION on the TCPIPSERVICE definition.
4. Web attach processing receives the incoming request and calls DFHCCNV to translate HTTP request headers from ASCII to EBCDIC.
5. Web attach processing links to the user's analyzer (the analyzer URM).
6. If the analyzer requests conversion, Web attach processing calls DFHCCNV to translate the body of the HTTP request from ASCII to EBCDIC.
7. Web attach processing starts an alias transaction (CWBA or alias) to deal with all further processing of the request in CICS, and then terminates.
8. If the analyzer requests a converter, the alias calls it, requesting the *Decode function*. Decode can modify the communications area for the CICS program. The converter is a user-written CICS program.
9. The alias calls the CICS program that the analyzer or Decode specified.The communication area passed to the CICS program is the one set up by Decode. If no converter program was called, the communication area contains the entire request.
10. The CICS program processes the request and builds a response (optionally using `EXEC CICS WEB WRITE` and `EXEC CICS WEB SEND` commands) and optionally returns output in the communication area.
11. If the analyzer requested a converter, the alias calls the *Encode function* of the converter, which uses the communication area to prepare the HTTP response. If no converter program was called, the alias assumes that the CICS program has put the desired HTTP response in the communication area.
12. If the analyzer or application requested data conversion, the alias calls DFHCCNV to translate the HTTP response.
13. The alias returns the results to the sockets domain, requests that the socket be closed, and returns.
14. The sockets domain issues a call to TCP/IP for VSE/ESA to send the response.

You may access your CICS TS application from a Web browser with the following Universal Resource Locator (URL):

```
http://ip.address:port/converter/alias/program
```

In this URL, note the following explanations:

- *ip.address* is the unique Internet name or IP numerical address (dotted decimal address) of your VSE/ESA system.
- *port* is the CWS listener port defined in the RDO definition TCPIPSERVICE.
- *converter* is the name of the program used for encode and decode processing, use CICS if a converter is not required.
- *alias* is the transaction ID of the alias transaction. CWBA is the supplied alias.
- *program* is the name of the application program to be invoked.

2.3 3270 bridge solution

This feature of CWS allows access to 3270-based CICS applications without 3270 terminals!

For programs that are not BMS, HTML pages are dynamically built from the 3270 data streams. This allows dynamic, two-way translation between 3270 and HTML data. Users can access their applications from any client that supports a standard Web browser. This powerful solution requires no application changes. However, implementation of this CWS feature requires a bridge exit program. A sample bridge exit program is provided with CWS and may be sufficient in your environment.

The bridge exit program is a user-replaceable module. It is the interface between an existing 3270-based user transaction and a client application. With this support, all 3270 terminal I/O requests are intercepted and handled by a bridge exit program. It intercepts all of the 3270 input and output commands issued by the application program, and performs all necessary data transformation and routing.

For BMS programs, this solution utilizes HTML templates which can be generated from existing BMS maps. A second assembly of the BMS map is required with the parameter: TYPE=TEMPLATE added to the DFHMSD macro. The other option would be to pass: SYSPARM=TEMPLATE to the assembler. This generates the HTML code that is presented to the Web browser. The resulting HTML member may be further tailored as needed. For additional information, go to the URL at:

```
http://ip.address:port/cics/cwba/dfhwbtta/tran
```

DFHWBTTA is the program initiating the 3270 bridge operation. It is the “switch” for CWS to utilize the 3270 bridge code.

2.4 CICS Web Support transactions

With CWS, several new programs and transactions have been introduced. Some are found in RDO group DFHWEB. There are four transactions in this group of which you should be aware. They are:

- **CWBA**: CWS alias transaction
- **CWBG**: CWS garbage collection transaction
- **CWBM**: CWS controller transaction
- **CWXN**: CICS Web attach transaction

In addition, the CICS TS internal transaction CSOL (CWS sockets listener transactions) is very important for CWS.

Chapter 3. CWS planning, implementation, and customization

Because CWS requires planning, testing, and review, we recommend that you establish a separate CICS TS partition. A sample JCL is provided in ICCF library 59 for this purpose. This configuration provides the flexibility to recycle CICS TS when needed. Note that this CICS TS partition must be LE-enabled.

You may also need to consider hardware and software planning, depending on your environment; for example:

- What hardware connections will you use for connectivity to your intranet or to the Internet?
- Do you have a firewall?
- Do you need one?
- Do you already have an IP address for your VSE/ESA 2.5.0 system?
- Which TCP/IP for VSE/ESA ports, outside of the well-known ports, are you using today?
- Will you need to code your own analyzer program, converter program, or Web error program?
- What about security?
- Will you implement the sample security programs, DFH$WBSA, DFH$WBSC, and DFH$WBSN, which are provided with CWS?

Your planning will take more time than the CICS TS and TCP/IP for VSE/ESA “system” changes for the basic implementation of CWS in VSE/ESA.

Our environment consisted of VSE/ESA 2.5.0 running under VM. We used virtual channel-to-channel (VCTCA) connections to VM and TCP/IP. TCP/IP for VSE/ESA 1.4.0 ran in partition F4. Our CICS TS for testing CWS ran in partition F8. The partition size for this CICS TS was 50 MB of storage (yes, this was larger than we needed). From our location, we tested CWS on a system in Poughkeepsie, NY (local LAN, as well as dial-in), and in Munich, Germany. We used multiple browsers at different release levels and noticed subtle differences.

3.1 Implementing CICS Web Support

This section discusses the steps needed to implement CWS. It is easy to implement CWS, with some considerations. It requires two CICS TS modifications, some TCP/IP for VSE/ESA changes, and an understanding of the ramifications of those changes.

3.1.1 VSE/ESA Library for CICS Web Support templates

If the DOCTEMPLATE does not specify a library name, CICS searches the LIBDEF search chain for the member (with the suffix HTML) and in the order specified in the LIBDEF chain.

If the DOCTEMPLATE does specify a library name, CICS searches the sublibrary called DFHDOC in the specified library only (CICS does not search the LIBDEF string) for the member (still with the suffix HTML).

We found that generating a library of five 3390 cylinders provided enough space to handle approximately 1000 HTML templates. In our testing, a simple template was less than 4 KB of storage. Be sure to add `library.sublibrary` to your CICS TS LIBDEF string. The member names in the VSE library have the extension HTML. For example, one of our test members was EXTRCTF1.HTML.

To enhance performance, consider storing the templates within a VSE/ESA sublibrary on virtual disk.

3.1.2 CICS Transaction Server

Let us discuss the CICS Transaction Server (TS) implementation. For this discussion, we assume that this CICS TS is generated from the “C2” JCL sample found in ICCF library 59. We also assume that the “C2” tables (DFHSITC2 and others) are used.

DFHSIT parameters

One parameter change is required: TCPIP=NO is the default and must be changed to TCPIP=YES.

WEBDELAY=xx defines after what time, in minutes, the 3270 bridge tasks are purged if they are in a terminal wait state. This will result in a ABRQ transaction abend code.

DOCCODEPAGE=37 code page specifies the default host code page used by the Document Domain. If nothing is specified, the default of 37 will be used.

In addition, there are other parameters that you should consider. For example, another default is GRPLIST=VSELST2. Because up to four CSD lists may be concatenated, we chose to use GRPLIST=(VSELST2,MYLST2). MYLST2 contains our customizations and is processed after VSELST2.

RDO definitions

For RDO definitions, there is only one modification to do. The entry is in group DFH$SOT. The type is TCPIPSERVICE. The name is HTTPNSSL. TCPIPSERVICE is the resource definition used to define which TCP/IP services are to use CICS TS internal sockets support. The internal CICS TS service is CWS. By default, the TCPIP listener port number used by HTTPNSSL is 00080.

We recommend that the port number be outside the range of well-known ports, so you should select a port number that is greater than 1024. This will be the port address used for communications between CICS TS and TCP/IP.

The RDO group DFH$SOT is *not* in the default CSD lists. You must copy HTTPNSSL from DFH$SOT, modify it as needed, and reference it in your startup list. When you connect to CICS TS without the TCPIPSERVICE definitions, the following messages will be sent to the VSE console:

```
IPN598W Socket request rejected due to improper foundation
IPN373W Stalled TCP connection has been Flushed, IP:x.xxx.xxx.xxx
```

These messages are generated by TCP/IP (x in the above message means a valid IP adr).

Other CSD groups to be aware of are DFHWEB, TCPIP, and DFHDOC. These groups are supplied in the default lists VSELIST and VSELST2. These groups are

required for CWS support. All entries needed for CWS support are supplied in the default lists except the TCPIPSERVICE entry, HTTPNSSL. As a result, our second CSD list, MYLST2, contains only the HTTPNSSL entry and our testing entries.

DOCTEMPLATES

Use the doctemplates resource definition to define document templates to CICS TS. Document templates are the HTML representations of self-coded information and your BMS maps which are presented to users that access your CICS TS with a browser.

Doctemplates are CICS TS resources and are made available to CICS TS with RDO. The template has to be cataloged into a library according to what we specified in 3.1.1, “VSE/ESA Library for CICS Web Support templates” on page 11. The members in the library.sublibrary have the extension HTML.

DFHCNV table

DFHCNV is a user-written conversion table that is called by program DFHCCNV. It is not difficult to code this table. It is used by CWS to convert incoming requests to EBCDIC and outgoing responses back to ASCII for COMMAREA style and 3270-based programs.

The DFHWBHH template is used to translate the HTTP header information, and DFHWBUD is used by the default analyzer for user data conversion. The source code for our DFHCNV table can be found in Appendix A, “Listings” on page 69.

If DFHCNV is not available or contains incorrect definitions of code pages, you will receive ERROR 400 messages at the browser. A missing or incorrect DFHCNV can also produce an ACN1 abend in CWBA, probably followed by other transaction abends.

Defining all TRANSIDs to BSM or ESM

For this definition, use II (Interactive Interface) dialog 2.8 and remember to give a CEMT PERF SEC in the CWS partition after you submit job CATSEC. Be sure that transid CSOL is included.

Virtual storage

As a guide, CWS requires 500 KB of DSA (24-bit) storage, and 2 MB of EDSA (31-bit) storage. In addition, you need to plan for 1 MB EDSA (31-bit) storage per *concurrent* user.

Another consideration is temporary storage in CICS TS. Temporary storage queues are heavily used by CWS internally. This will have an impact on the size of your temporary storage dataset, the size of your CICS TS partition, or both.

These two storage considerations affect the size of your CICS TS partition, so plan accordingly.

CICS TS startup and LIBDEFs

If you choose to hold the templates in a separate and newly created library, this library must be added to the LIBDEF search chain of your CICS TS startup.

3.1.3 TCP/IP

This section describes the changes you must make to IPINITxx of TCP/IP for VSE/ESA as part of configuring CWS.

Reserving ports for CWS
Consistent with your overall TCP/IP strategy, reserve as many ports as you need for CWS support and ensure that CWS has exclusive use of those ports. For VSE/ESA, be careful when choosing port numbers less than 1024, the "well-known" ports (defined in RDO definition TCPIPSERVICE).

Identify the TCP/IP server
You must identify the TCP/IP for VSE/ESA server by specifying a name for its IP address:

```
DEFINE NAME,NAME=VSEESA.250.IBM.COM,IPADDR=n.n.n.n
```

Here, NAME is a meaningful host name, and IPADDR specifies the dotted decimal address of your VSE/ESA system. If you do not identify the server, CWS will not initialize successfully and the following error message appears during the CICS TS startup:

```
DFHSO0117 applid Unable to determine the TCP/IP host name. Language environment
return code X'00000458', reason code X'00000000'.TCP/IP services are
unavailable.
```

Specifying a name server
If you want full CICS TS function (that is, use of DFH$WBSN and DFHWBENV), CWS needs to access a name server during its operation:

```
SET DNS1=n.n.n.n
```

Here, n.n.n.n is the dotted decimal address of the name server.

If the name server lookup fails when CICS TS runs, then:

- The security sample program DFH$WBSN does not execute correctly.
- The environment variables program, DFH$WBENV, does not return a connection name in SERVER_NAME. However, it will return the dotted decimal address of the connection and a null string for the value REMOTE_HOST.

Specifying a HTTPD daemon
To specify a HTTPD daemon, as shown in Figure 36 on page 74, use the following definitions:

```
DEFINE HTTPD,ID=HTTP1,ROOT='DFHHTML.DFHDOC',SECURE=NO,CONFINE=NO
```

LIBDEF change for TCP/IP
We added DFHHTML.DFHDOC to the LIBDEF chain of our TCP/IP partition.

3.1.4 Installation verification

At this point, we need to verify the system changes made for the COMMAREA and 3270 bridge feature of CWS. We assume that TCP/IP for VSE/ESA has been recycled, if needed. We also assume that your second CICS TS subsystem is up and running with the appropriate LIBDEFS.

Note: TCP/IP must be active before CICS TS with CWS is started.

DFH$WB1A for COMMAREA

A sample application program, DFH$WB1A, is provided to help you test the operation of CWS. From a suitable Web browser, enter the URL that connects to the CICS TS with CWS using an absolute path /CICS/CWBA/DFH$WB1A. The response displays the following message:

```
DFH$WB1A on system xxxxxxxx successfully invoked through the CICS Web support.
```

Here, *xxxxxxxx* is the application ID of the system in which CWS is running.

CEMT+INQ+TASK for 3270 bridge

To test the 3270 bridge facility, we used the CEMT transaction. From a suitable Web browser, enter the URL that connects to the CICS TS with CWS as follows:

```
http://n.n.n.n/cics/cwba/dfhwbtta/CEMT+I+TAS
```

Note that *n.n.n.n* is replaced by your valid IP address. Also, to send data on the initial request, use plus signs (+) rather than blanks. CWS interprets a plus (+) sign as a blank. The first “real” blank space in a URL indicates end of data.

Possible problems during CICS TS startup

The following CICS TS startup message will be displayed if TCP/IP for VSE is not started or if it is started with neither DNS1 nor DEFINE NAME correctly specified.

```
DFHSO0117 IYB7ZA02
Unable to determine the TCP/IP host name. Language Environment return
code X'00000458', reason code X'00000000'. TCP/IP services are unavailable.
```

3.2 Customizing CICS Web Support

CICS TS provides facilities by which you can tailor CWS. You can use the IBM-supplied code for the analyzer, converter, and Web error programs. Why would you want to customize CWS?

Let us suppose that, in your environment, you want to impose rules about which clients can use which services. To deny access, you will need to tailor your own analyzer program.

If you have a need to reformat the inbound or outbound COMMAREA, you will need to tailor your own converter program.

If you want to tailor the default HTTP error response returned by CICS TS so that the response is more meaningful to your users, you will need to tailor your own Web error program.

In the sections that follow, we briefly discuss the analyzer program, the converter program, and the Web error program. Additional information can be found in:

- *CICS Transaction Server for VSE/ESA Internet Guide Release 1,* SC34-5765
- *CICS Transaction Server for OS/390 Version 1 Release 3: Web Support and 3270 Bridge,* SG24-5480

3.2.1 Analyzer program

The analyzer program is a user-replaceable program for CWS. Its purpose is to interpret the incoming requests and specify the CICS TS resources that are needed to provide the requested service.

DFHWBADX is the default analyzer for CWS. The source code for the analyzer is supplied in various languages, and you can use it as the basis for your own analyzer. The source members are:

- DFHWBADX (Assembler)
- DFHWBAHX (C)
- DFHWBAOX (COBOL)
- DFHWBALX (PL/I)

If you use a different analyzer, you must specify this in the RDO TCPIPSERVICE.

The default analyzer is written for HTTP requests in which the absolute path is in one of the following four forms:

- /converter/alias/program
- /converter/alias/program?token
- /converter/alias/program/<filename>
- /converter/alias/program/<filename><?token>

The default analyzer links to the CICS TS-supplied utility DFHWBUN, to analyze the user data in the communications area passed by the analyzer.

The default analyzer checks the eye-catcher, and then interprets the contents of the absolute path as follows:

- *converter* must be between one and eight characters long. It is converted to uppercase and interpreted as the name of the converter to be called by the alias, unless it has the value CICS, in which case the converter name is set to nulls to show that no converter is to be used.
- *alias* must be between one and eight characters long. It is converted to uppercase and interpreted as the transaction ID of the alias transaction to be used to service the request.
- *program* is the name of your application program and must be between one and eight characters long. It is converted to uppercase and interpreted as the name of the CICS TS program that is to be used to service the request.
- *filename* is an optional parameter when PROGNAME is regarded as a directory. It can be any length, but it must not begin with a slash (/) or contain a question mark(?). It must be made up of the characters allowed in URLs. It is ignored by the analyzer, but is available to the converter or the CICS TS program.
- *token* is an optional 8-character field to be passed in the USER_TOKEN field to the decode function of the converter program.
- If *program* is DFHWBTTA, the filename is treated as the ID of the transaction to be run using the 3270 bridge facility.

Note that CICS TS supports only the HTTP 1.0 Keep-Alive implementation of the persistent connections, not the HTTP 1.1 implementation.

3.2.2 Converter program

You can have many converter programs in a CICS TS system to support the operation of CWS. Each converter must provide two functions and the converter program must supply two sections:

- **Decode** is used *before* the CICS TS program is called. It can:

  - Use the data from the Web browser to build the communication area in the format expected by the CICS TS program.
  - Supply the lengths of the input and output data in the CICS TS program communication area.
  - Perform administrative tasks related to the response.
- **Encode** is used *after* the CICS TS program has been called. It can:
  - Use the data from the CICS TS program to build the HTTP response and HTTP response headers.
  - Perform administrative tasks related to the response.

You might not need to write any converters. If the analyzer or the caller of the CICS TS business logic interface indicates that a converter is not required, the first 32 KB of storage of the request is passed to the CICS TS program in its communication area.

The names of parameters and constants in the communication area are passed to the converter, translated into appropriate forms for the different programming languages supported, and defined in copybooks supplied as part of CWS. The copybook names are listed in Table 1.

Table 1. Copybook parameters and constants

Language	Parameters copybook	Constants copybook
Assembler	DFHWBCDD	DFHWBUCD
C	DFHWBCDH	DFHWBUCH
COBOL	DFHWBCDO	DFHWBUCO
PL/I	DFHWBCDL	DFHWBUCL

These copybooks give language-specific information about the data types of the fields in the communication area. If you use these, you must specify XOPTS(NOLINKAGE) on the translator step; failure to do this causes the compile to fail. If `CICS` is entered as the converter name, no encode or decode occurs.

3.2.3 Web error program: DFHWBEP

The Web error program, DFHWBEP, is a user-replaceable module driven by CWS when there is a failure in the processing of a Web request. DFHWBEP allows you to modify the HTTP response issued by CICS TS, or to put out an alternative message.

The parameter list passed to the Web error program contains a pointer to a buffer containing the default HTTP response returned by CICS TS for the error detected, and the length of the response. The Web error program can:

- Leave the response unchanged
- Modify the response returned, and update the length in WBEP_RESPONSE_LEN accordingly
- Use the GETMAIN function to create a new buffer, build a new HTTP response, and pass back the address of the new buffer using the WEB_RESPONSE_PTR parameter

The EXEC CICS WEB application programming interface is not available from the Web error program. The data to be returned to the client must be in the buffer addressed by WBEP_RESPONSE_PTR.

The default HTTP response is passed to the Web error program in EBCDIC form. CICS TS assumes that the HTTP response addressed by WBEP_RESPONSE_PTR on exit from the Web error program is in EBCDIC, and performs code page conversion on the response to convert it to ASCII before returning it to the client. The key used for this conversion is that which was selected by the analyzer user-replaceable module. If none was selected, or if the analyzer was not selected before the error occurred, the response is assumed to be in the ISO-8859-1 code page (Latin -1).

On input, DFHWBEP receives:

- **WBEP_LENGTH**: The length of the DFHWBEP DSECT.
- **WBEP_EYCATCHER**: An eye catcher which is greater than “wbepca”.
- **WBEP_VERSION**: Version of DFHWBEPC DSECT being passed by CICS. Should be X'001'.
- **WBEP_ERROR_CODE**: The binary number indicating the cause of the original error. Constants which this field may contain can be found in the copybook DFHWBUCD.
- **WBEP_ABEND_CODE**: The CICS abend code associated with the error.
- **WBEP_MESSAGE_NUMBER**: The message number, a pointer to the text and the length of the CICS WB message associated with the error. The message is also written on a TD queue CWBO.
- **WBEP_MESSAGE_PTR**: See the WBEP_MESSAGE_NUMBER description.
- **WBEP_MESSAGE_LEN**: See the WBEP_MESSAGE_NUMBER description.
- **WBEP_CLIENT_ADDRESS**: The 15-byte field containing the TCP/IP address of the client and the length of the address contained in this field.
- **WBEP_CLIENT_ADDRESS_LEN**: See the WBEP_CLIENT_ADDRESS description.
- **WBEP_SERVER_ADDRESS**: The 15-byte field containing the TCP/IP address of the server and the length of the address contained in this field.
- **WBEP_SERVER_ADDRESS_LEN**: See the WBEP_SERVER_ADDRESS description.
- **WBEP_TCPIPSERVICE_NAME**: Name of the TCPIPSERVICE associated with the failing request.
- **WBEP_CONVERTER_PROGRAM**: Name of the converter program, if one is used, associated with the failing request.
- **WBEP_TARGET_PROGRAM**: Name of the target program associated with the failing request.
- **WBEP_FAILING_PROGRAM**: The program in which the error occurred.
- **WBEP_HTTP_RESPONSE_CODE**: The HTTP error response code CICS is returning for this error. This response code is also contained in the buffer containing the HTTP response that is passed to DFHWBEP, where it can be overridden by DFHWBEP.

- **WBEP_ANALYZER_RESPONSE**: Response and reason code returned by the analyzer program.
- **WBEP_ANALYZER_REASON**: See the WBEP_ANALYZER_RESPONSE description.
- **WBEP_CONVERTER_RESPONSE**: Response and reason code returned by the converter program.
- **WBEP_CONVERTER_REASON**: See the WBEP_CONVERTER_RESPONSE description.

Parameters common to input and output are:

- **WBEP_RESPONSE_PTR**: On input, a pointer to and length of the default HTTP error response to be returned to the HTTP client. The HTTP response is contained in a 32 K buffer. DFHWBEP can change or append the HTTP response message. If the buffer is too small, DFHWBEP can GETMAIN a new buffer.

  On output, a pointer to and the length of the changed HTTP error response. If no new buffer is GETMAINed, the buffer pointer can stay unchanged, and only the length field has to be updated.
- **WBEP_RESPONSE_LEN**: See the WBEP_RESPONSE_PTR description.

The DSECT or copybooks to describe the fields in the COMMAREA are provided by CICS and have the following names:

- DFHWBEPD: Assembler
- DFHWBEPH: C
- DFHWBEPO: COBOL
- DFHWBEPL: PL/I

Table 2 provides the DSECT layout of the DFHWBEP parameters.

Table 2. DFHWBEP DSECT layout

Offset	Length	Field name	Type
000000		DFHWBEPC DSECT	
000000	D204	DFHWBEPC_DUMMY	
000000	D12,X'C'	WBEP_PREFIX	
000000	2	WBEP_LENGTH	Input
000002	8	WBEP_EYECATCHER	Constant
00000A	2	WBEP_VERSION	Input
00000C	D112	WBEP_DATA	
00000C	2	WBEP_ERROR_CODE	Input
00000E	2	Not currently used	
000010	4	WBEP_ABEND_CODE	Input
000014	4	WBEP_MESSAGE_NUMBER	Input
000018	4	WPEP_MESSAGE_PTR	Input
00001C	4	WPEP_MESSAGE_LEN	Input

Offset	Length	Field name	Type
000020	4	WBEP_RESPONSE_PTR	Input/Output
000024	4	WBEP_RESPONSE_LEN	Input/Output
000028	1	WBEP_CLIENT_ADDRESS_LEN	Input
000029	D15/X'F'	WBEP_CLIENT_ADDRESS	Input
000038	1	WBEP_SERVER_ADDRESS_LEN	Input
000039	D15/X'F'	WBEP_SERVER_ADDRESS	Input
000048	8	WBEP_TCPIPSERVICE_NAME	Input
000050	8	WBEP_CONVERTER_PROGRAM	Input
000058	8	WBEP_TARGET_PROGRAM	Input
000060	8	WBEP_FAILING_PROGRAM	Input
000068	4	WBEP_HTTP_RESPONSE_CODE	Input
00006C	4	WBEP_ANALYZER_RESPONSE	Input
000070	4	WBEP_ANALYZER_REASON	Input
000074	4	WBEP_CONVERTER_RESPONSE	Input
000078	4	WBEP_CONVERTER_REASON	Input

Section A.7, "Source listing DFHWBEP sample program" on page 99, contains the source code we used. The program first checks to see if the HTML tag </body> is present within the length of the response that is given as input. If yes, it overwrites this tag with the information that will be added to the buffer, and writes a new one at the end. If the tag is not present, it starts writing immediately after the response in the buffer.

There is no checking for length of the returned error message, because 32 KB should be large enough for what we add. The program checks all DFHWBEP DSECT input fields, and if one is present, it adds the information from the DSECT to the response buffer.

Figure 2 shows the output of DFHWBEP for a Program Not Found error.

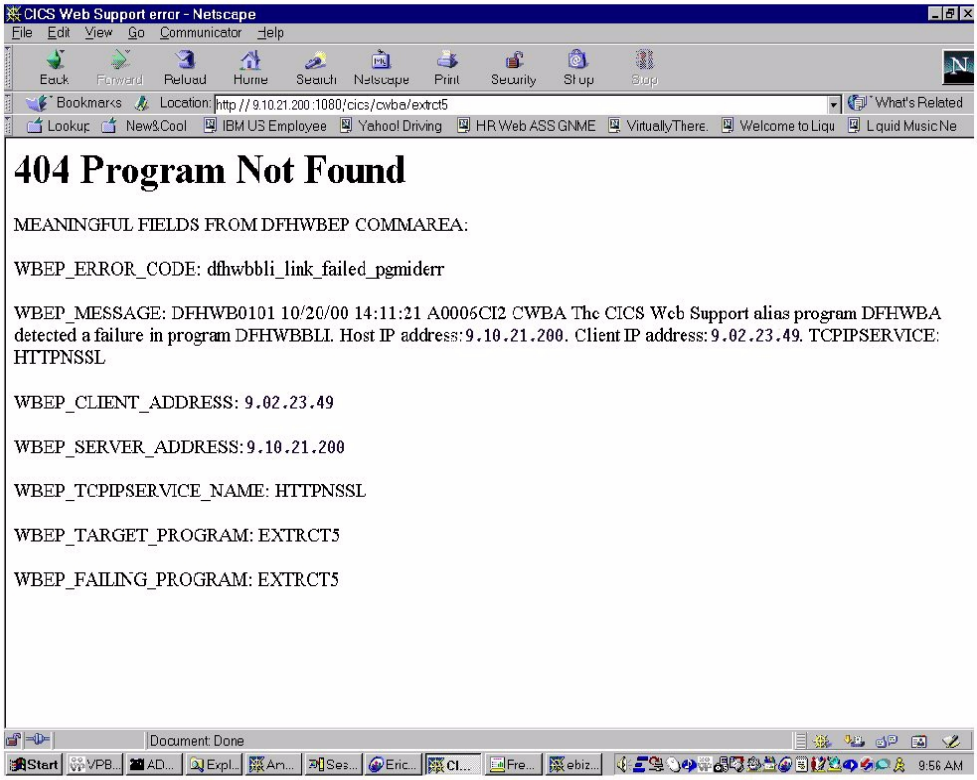

Figure 2. DFHWBEP added text to the standard error response

Chapter 4. Writing Web applications

This chapter describes the data flow of CICS Web Support programs and gives some basic information about HTTP and HTML. In addition, new and changed APIs are explained through examples using sample code and listings. Refer to Appendix A, “Listings” on page 69, for a complete collection of code and listing samples.

4.1 CICS Web Support data flow

A design principle of CICS applications should be to have the business logic separated from the presentation logic. Use the COMMAREA command, EXEC CICS LINK, to link to the business logic, as shown in Figure 3. If the business logic is separated, you can use different presentation methods like 3270 or CWS. The recommended method for CICS Web applications is to use the new Web API, which is described in 4.2, “New and changed APIs for CICS Web Support” on page 25. Examples of using the new Web API are given in 4.3, “Examples of using CWS APIs” on page 27.

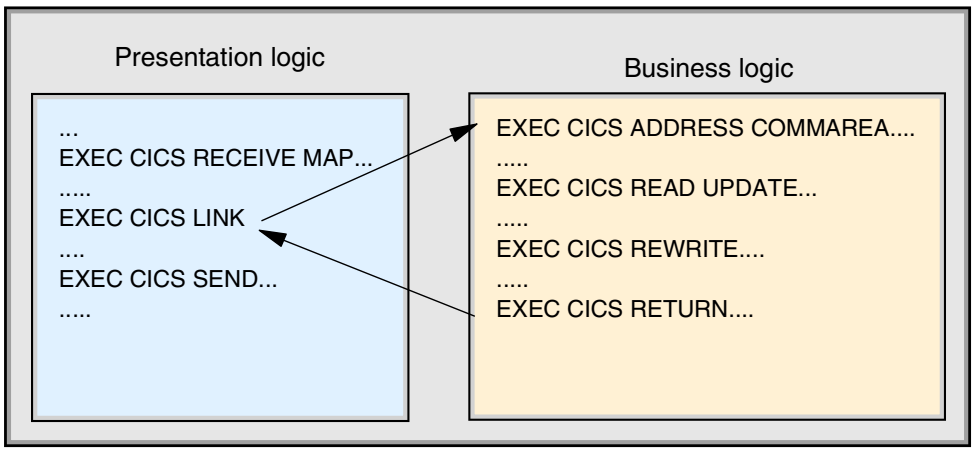

Figure 3. Separation of business and presentation logic

In order to make decisions about which facilities to use and how to customize them, you need to understand how data is passed within CICS Web Support. Figure 4 on page 24 shows the data flow from client through CICS and back, with the communications area used. Be aware that Figure 4 on page 24 is a different view than what is described in 2.2, “CICS Web Support logic and flow” on page 7. The following figure concentrates on communications area handling.

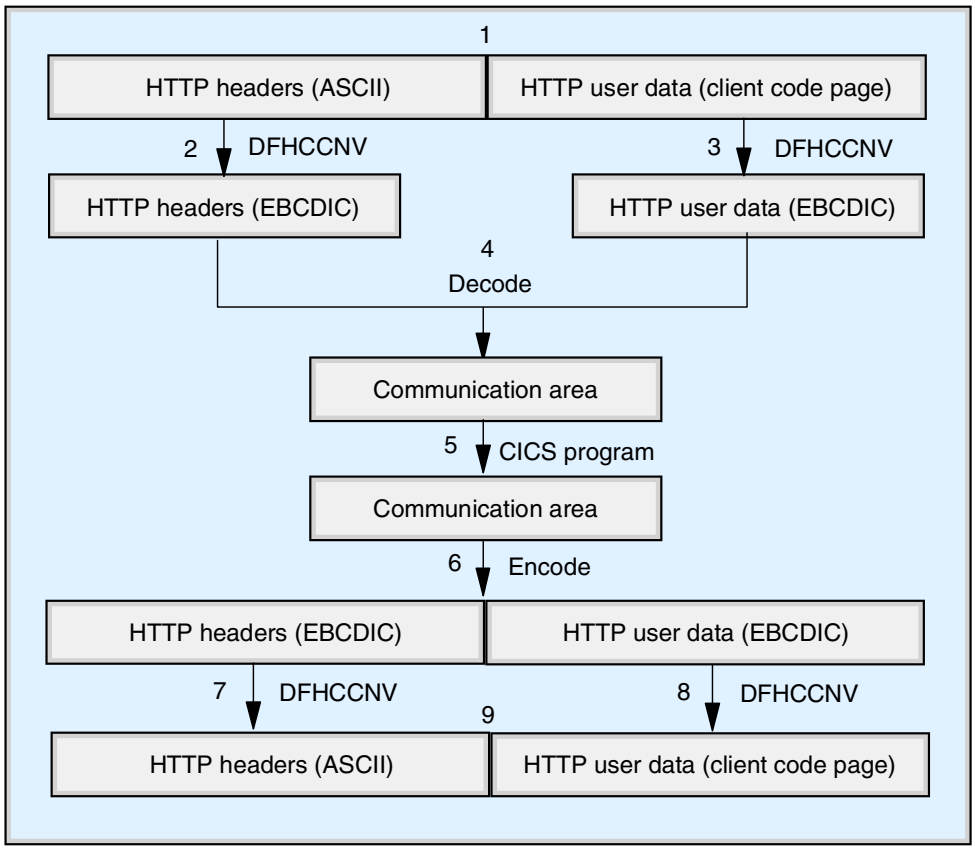

Figure 4. Calling a program using the CICS Web Support COMMAREA method-data flow

The flow shown in Figure 4 is explained here:

1. A request arrives from a client, and the CICS sockets listener transaction, CSOL, starts the Web attach transaction, CWXN, and then reads the request into CICS temporary storage.
2. The DFHCCNV program translates the HTTP headers from ASCII into EBCDIC.
3. The DFHCCNV program translates the HTTP user data from the client code page into EBCDIC.
4. The Decode function of the converter constructs the communication area for the CICS program. This communication area can be constructed in-place in the buffer provided by CICS. Decode can create a new buffer, or it can use the EXEC CICS WEB application programming interface to retrieve the parts of the incoming request.
5. The CICS program updates the communication area.
6. The Encode function of the converter constructs the HTTP response to be sent to the client. The response can be constructed in-place in the communication area.

   Encode can free the communication area and get a new buffer for the response, or it can use the new Web application programming interface to construct an HTTP response. The response consists of headers and user data. You can make your response longer than 32 K, as described in *CICS Transaction Server for VSE/ESA Internet Guide Release 1,* SC34-5765.

7. The DFHCCNV program translates the headers from EBCDIC to ASCII.
8. The DFHCCNV program translates the user data from EBCDIC to the client code page.
9. The alias sends the response to the client and frees the storage.

4.2 New and changed APIs for CICS Web Support

The following Application Programming Interface verbs have been changed or introduced with the new level of CICS Transaction Server for VSE/ESA 1.1.1. A short explanation about the following new and changed APIs is given in this chapter:

- EXEC CICS WEB
- EXEC CICS TCPIP
- EXEC CICS DOCUMENT
- EXEC CICS WRITEQ TS, READQ TS and DELETEQ TS

For a detailed description of these APIs, refer to *CICS Transaction Server for VSE/ESA Internet Guide Release 1,* SC34-5765, and *CICS Transaction Server for VSE/ESA Enhancement Guide Release 1*, SC34-5763.

It is important to note that sending data to a task, and receiving data from a task, is a totally new approach for CICS systems.

Prior to CWS, a task that was started received data in two ways:

- Using a terminal input/output area for a terminal-attached task.
- Using mechanisms like COMMAREAs, READQ TD, and RETRIEVE. This input was provided by CICS programs which run prior to the attached task.

With CWS, all tasks are non-terminal tasks, but data is exchanged with a “terminal” from a logical point of view, called a “browser”. To cover this new situation, EXEC CICS WEB was introduced with parameters such as RECEIVE and SEND, and so on. This means that certain application programming interface commands cannot be used. Those commands include:

- Terminal control commands that refer to the principal facility
- Options of EXEC CICS ASSIGN that return terminal attributes
- BMS commands
- Signon and signoff commands

Prior to CICS TS, it was not possible to debug non-terminal tasks with CEDF. To allow CWS tasks to be debugged interactively, the new CICS with CEDX transaction has been developed. More information about CEDX can be found in Chapter 7, “Problem determination and application debugging” on page 67.

4.2.1 EXEC CICS WEB API

The EXEC CICS WEB API should read and send HTTP responses, built with EXEC CICS DOCUMENT commands. The request and response APIs are:

- **WEB SEND**: Selects a document for delivery by CICS Web Support.
- **WEB RECEIVE**: Receives the body of an HTTP request from CICS Web Support into an application supplied buffer.

- **WEB WRITE**: Allows the application to add HTTP header information to the response.
- **WEB READ FORMFIELD**: Retrieves the value of a specific field from an HTML form, the name of which is given on the request of the FORMFIELD parameter. The form is part of the body of an HTTP request being processed by the current CICS task.
- **WEB READ HTTPHEADER**: Extracts the HTTP header information.
- **WEB READNEXT FORMFIELD**: Retrieves the next name-value pair in an HTML form.
- **WEB READNEXT HTTPHEADER**: Retrieves the next HTTP header in the list of headers.
- **WEB ENDBROWSE FORMFIELD**: Terminates the browse of a set of name-value pairs in an HTML form. The form is part the body of an HTTP request being processed by the current CICS task. No information is returned on the ENDBROWSE.
- **WEB ENDBROWSE HTTPHEADER**: Terminates the browse of HTTP headers. No information is returned on the ENDBROWSE.
- **WEB EXTRACT**: Allows the application to obtain additional information about an inbound request from a client.
- **WEB RETRIEVE**: Command retrieves the DOCTOKEN of the document which was sent using an earlier WEB SEND command.
- **WEB STARTBROWSE FORMFIELD**: Signals the start of a browse of a set of name-value pairs in an HTML form that is part of the body of an HTTP request being processed by the current CICS task. Pay close attention to the data conversion and code pages used.
- **WEB STARTBROWSE HTTPHEADER**: Signals the start of a browse of the HTTP header information.

4.2.2 EXEC CICS EXTRACT TCPIP API

The EXEC CICS EXTRACT TCPIP API allows Web applications to retrieve TCP/IP-related information about the client and the server. While using this API, a INVREQ condition may occur. To handle the INVREQ condition, we recommend you use EXEC CICS HANDLE CONDITION INVREQ for COMMAREA-based programs.

4.2.3 EXEC CICS DOCUMENT API

The EXEC CICS DOCUMENT API allows you to build up output data areas, which are stored in the temporary storage area, and send the data to the browser using the EXEC CICS WEB API. This API was introduced to put together static and dynamic data, including graphics, in one data stream.

- **DOCUMENT CREATE**: Signals the start of the document creation process. The document being created can be an empty document, or it can be based on an existing document, a template, or data contained in an application buffer.
- **DOCUMENT INSERT**: Allows the application to insert document objects at insertion points within the document. The insertion points (bookmarks) define relative positions within the document. Bookmarks must be defined before

being referenced. Data is always inserted after the position identified by the bookmark.

- **DOCUMENT RETRIEVE**: Allows the application to obtain a copy of the document in its own buffer, which it can then manipulate directly. The document is managed by CICS, and the application does not have direct access to the buffer containing the contents of the document.

  The document exists only for the duration of the current transaction, so the application must retrieve the document and store it if the document is to exist over transaction boundaries. The retrieved document can be used as a basis for a new document by using the FROM option of the DOCUMENT CREATE command.

- **DOCUMENT SET**: Allows the application to add symbols and their associated values to the symbol table. If the symbol being added already exists in the table, it is replaced by the new definition.

4.2.4 EXEC CICS WRITEQ/READQ/DELETQ TS

Because of the internal usage of temporary storage by CWS, the length of the TSQUEUE names has been increased to 16 characters. Therefore, a new option (QNAME) has been introduced. QNAME(name) is an alternative to QUEUE. QNAME specifies the symbolic name (1 to 16 characters) of the queue. This affects EXEC CICS READQ TS, WRITEQ TS, and DELETQ TS.

4.3 Examples of using CWS APIs

The sample program DFH$WB1A is using the COMMAREA technique for its output. The sample programs (EXTRCT1 through EXTRCT4) are using EXEC CICS WEB and EXEC CICS DOCUMENT, utilizing temporary storage instead of the communication area (COMMAREA).

This section provides two CWS COMMAREA examples and explains how they work. Table 3 describes the sample (HTML) documents and programs used throughout this chapter.

All CICS assembler sample programs and the associated HTML documents can be found in A.4, “Listing of program samples including JCL” on page 75.

Table 3. Our supplied HTML documents and CICS sample programs

Documents/Programs	Usage
INDEX.HTML	sent by TCP/IP
DEMO.HTML	sent by TCP/IP
EXTRCTH1.HTML	header for sample EXTRCT1
EXTRCTF1.HTML	footer for sample EXTRCT1
EXTRCTH2.HTML	header for sample EXTRCT2
EXTRCTF2.HTML	footer for sample EXTRCT2
EXTRCTH3.HTML	header for sample EXTRCT3
EXTRCTF3.HTML	footer for sample EXTRCT3
EXTRCTH4.HTML	header for sample EXTRCT4

Documents/Programs	Usage
EXTRCTF4.HTML	footer for sample EXTRCT4
EXTRCT1	sample program EXTRCT1
EXTRCT2	sample program EXTRCT2
EXTRCT3	sample program EXTRCT3
EXTRCT4	sample program EXTRCT4

4.3.1 Example 1: Using CWS on VSE/ESA

Before using this example, the following actions are required:

1. Compile EXTRCT1 as an online program and catalog it to the previously defined DFHHTML.DFHDOC sublibrary (use II, option 8 for job generation).
2. Catalog the header and footer documents (EXTRCTH1 and EXTRCTF1) in sublibrary DFHHTML.DFHDOC as *name*. HTML. For a sample catalog job, see Figure 58 on page 90. Change the *n.nn.nn.nn* to your defined IPADDR.
3. Define the DOCTEMPLATE (EXTRCTH1 and EXTRCTF1) with CEDA DEFINE DOCTEMPLATE (see Figure 5 for a sample of the RDO definition).
4. Install the group where the DOCTEMPLATES are in. There is no need to define the EXTRCT1 program in CICS, if AUTOINSTALLATION for programs is ON.
5. Catalog and link all COMMAREA programs with AMODE(31) and RMODE(ANY) because CWBA (transaction where user programs are running) has TASKDATLOC(ANY) defined.
6. Check EIBCALEN in your program, whether the length of the COMMAREA is as expected (not a length of zero).

Note: The screen layout presented by the browser could vary from one browser to another or even from one browser release to another.

Example 1 uses the following sample files:

- HTML header document, EXTRCTH1 (see Figure 40 on page 76)
- HTML footer document, EXTRCTF1 (see Figure 41 on page 77)
- CICS assembler source program, EXTRCT1 (see Figure 6 and Figure 7)

```
OVERTYPE TO MODIFY                                          CICS RELEASE = 0411
 CEDA  DEFine Doctemplate(EXTRCTH1)
  Doctemplate  ==> EXTRCTH1
  Group        ==> EXTRCT
  Description  ==>
 FULL TEMPLATE NAME
  TEmplatename ==> EXTRCTH1
 ASSOCIATED CICS RESOURCE
  File         ==>
  TSqueue      ==>
  TDqueue      ==>
  Program      ==>
  Exitpgm      ==>
 TEMPLATE SUBLIBRARY
  Library      ==>
  Membername   ==> EXTRCTH1
 TEMPLATE PROPERTIES
  Appendcrlf   ==> Yes              Yes | No
  TYpe         ==> Ebcdic           Binary | Ebcdic
```

Figure 5. Sample RDO definition for DOCTEMPLATE EXTRCTH1

```
DFHEISTG DSECT
DOCTOKEN DS    CL16
CLNTNAML DS    F
CLNTNAME DS    CL80
SRVRNAML DS    F
SRVRNAME DS    CL80
CLNTADRL DS    F
CLNTADDR DS    CL15
         DS    0F
SERVADRL DS    F
SERVADDR DS    CL15
         DS    0F
SSLTYPE  DS    F
TCPIPSER DS    CL8
PRTNUMB  DS    CL5
         DS    0F
EXTRCT1  CSECT
EXTRCT1  AMODE 31                                                55200000
EXTRCT1  RMODE ANY                                               56000000
         EXEC CICS HANDLE CONDITION INVREQ(DOCINSRT)
         EXEC CICS DOCUMENT CREATE DOCTOKEN(DOCTOKEN)            * 1
               TEMPLATE('EXTRCTH1')
*
         MVC   CLNTNAML,=F'80'
         MVC   SRVRNAML,=F'80'
         MVC   CLNTADRL,=F'15'
         MVC   SERVADRL,=F'15'
* Retrieve some TCPIP related information
         EXEC CICS EXTRACT TCPIP                                 * 2
               SERVERNAME(SRVRNAME) SNAMELENGTH(SRVRNAML)
         EXEC CICS EXTRACT TCPIP                                 *
               SERVERADDR(SERVADDR) SADDRLENGTH(SERVADRL)
         EXEC CICS EXTRACT TCPIP                                 *
               TCPIPSERVICE(TCPIPSER)
         EXEC CICS EXTRACT TCPIP                                 *
               PORTNUMBER(PRTNUMB)
         EXEC CICS EXTRACT TCPIP                                 *
               CLIENTADDR(CLNTADDR) CADDRLENGTH(CLNTADRL)
         EXEC CICS EXTRACT TCPIP                                 *
               CLIENTNAME(CLNTNAME) CNAMELENGTH(CLNTNAML)
* Insert client name
DOCINSRT EXEC CICS DOCUMENT INSERT DOCTOKEN(DOCTOKEN)            * 3
               TEXT(CLNTINFO) LENGTH(CLNTINFL)
         EXEC CICS DOCUMENT INSERT DOCTOKEN(DOCTOKEN)            * 4
               TEXT(CLNTNAME) LENGTH(CLNTNAML)
* Insert client address
         EXEC CICS DOCUMENT INSERT DOCTOKEN(DOCTOKEN)            *
               TEXT(ADDRINFO) LENGTH(ADDRINFL)
         EXEC CICS DOCUMENT INSERT DOCTOKEN(DOCTOKEN)            *
               TEXT(CLNTADDR) LENGTH(CLNTADRL)
* Insert server name
         EXEC CICS DOCUMENT INSERT DOCTOKEN(DOCTOKEN)            * 5
               TEXT(SRVRINFO) LENGTH(SRVRINFL)
         EXEC CICS DOCUMENT INSERT DOCTOKEN(DOCTOKEN)            * 6
               TEXT(SRVRNAME) LENGTH(SRVRNAML)
* Insert server address
         EXEC CICS DOCUMENT INSERT DOCTOKEN(DOCTOKEN)            *
               TEXT(SDDRINFO) LENGTH(SDDRINFL)
         EXEC CICS DOCUMENT INSERT DOCTOKEN(DOCTOKEN)            *
               TEXT(SERVADDR) LENGTH(SERVADRL)
```

Figure 6. CICS assembler source of EXTRCT1 (Part 1 of 2)

```
* Insert TCPIPSERVICE being used
         EXEC CICS DOCUMENT INSERT DOCTOKEN(DOCTOKEN)                  * 7
               TEXT(TCPSINFO) LENGTH(TCPSINFL)
         EXEC CICS DOCUMENT INSERT DOCTOKEN(DOCTOKEN)                  * 8
               TEXT(TCPIPSER) LENGTH(L'TCPIPSER)
* Insert Port number being used
         EXEC CICS DOCUMENT INSERT DOCTOKEN(DOCTOKEN)                  *
               TEXT(PORTINFO) LENGTH(PORTINFL)
         EXEC CICS DOCUMENT INSERT DOCTOKEN(DOCTOKEN)                  *
               TEXT(PRTNUMB) LENGTH(L'PRTNUMB)
* Insert footer for document
         EXEC CICS DOCUMENT INSERT DOCTOKEN(DOCTOKEN)                  * 9
               TEMPLATE('EXTRCTF1')
* Send complete document
         EXEC CICS WEB SEND DOCTOKEN(DOCTOKEN)                         * 10
               CLNTCODEPAGE('iso-8859-1')
         EXEC CICS RETURN
CLNTINFO DC   C'<p>Client Name : '
CLNTINFL DC   F'17'
SRVRINFO DC   C'<p>Server Name : '
SRVRINFL DC   F'17'
ADDRINFO DC   C'<p>Client Address : '
ADDRINFL DC   F'20'
SDDRINFO DC   C'<p>Server Address : '
SDDRINFL DC   F'20'
TCPSINFO DC   C'<p>TCPIPSERVICE name: '
TCPSINFL DC   F'22'
PORTINFO DC   C' - on Port Number: '
PORTINFL DC   F'19'
         END  EXTRCT1
/*
```

Figure 7. CICS assembler source of EXTRCT1 (Part 2 of 2)

The numbers appearing down the right-hand side of Figure 6 on page 30 and Figure 7 correspond to the items in the following list:

1 Creates document with the first part of the HTML template (header template ‘EXTRCTH1’).

2 Retrieves information from TCP/IP related control block.

3 Inserts the HTML tag “<p>Client Name :” into the document. This tag generates a new paragraph and inserts “Client Name :” as text.

4 Inserts the client name that we received from TCP/IP EXTRACT into the document. The client name is inserted right after the text “Client Name :”.

5 Inserts the HTML tag “<p>Server Name :” into the document. This tag generates a new paragraph and inserts “Server Name :” as text.

6 Inserts the server name that we received from TCP/IP EXTRACT into the document. The server name is inserted right after the text “Server Name :”.

7 Inserts the HTML tag “<p>TCPIPSERVICE name: ” into the document. The tag generates a new paragraph and inserts “TCPIPSERVICE name:” as text.

8 Inserts the TCP/IP service name that we received from TCP/IP EXTRACT into the document. The TCP/IP service name is inserted right after the text “TCPIPSERVICE name:”.

9 Inserts the HTML footer ‘EXTRCTF1’ to the document. This completes our document with all required tags.

10 Next, the document is sent to the browser and translated with the specified code page.

Now we are ready to use the EXTRCT1 program. To start EXTRCT1, enter a URL like the following example on your browser:

```
http://n.nn.nn.nnn:1080/cics/CWBA/EXTRCT1
```

For this URL, note the following explanations:

- *http* is the protocol you want the browser to use.
- *n.nn.nn.nnn* is the TCP/IP address for the VSE/ESA system, where CICS is running.
- *1080* is the port number you specified in the TCPIPSERVICE definition.
- *cics* means you do not want to use a converter.
- *CWBA* is the CICS Web transaction.
- *EXTRCT1* is the name of your program.

The image you should see on your browser is shown in Figure 8.

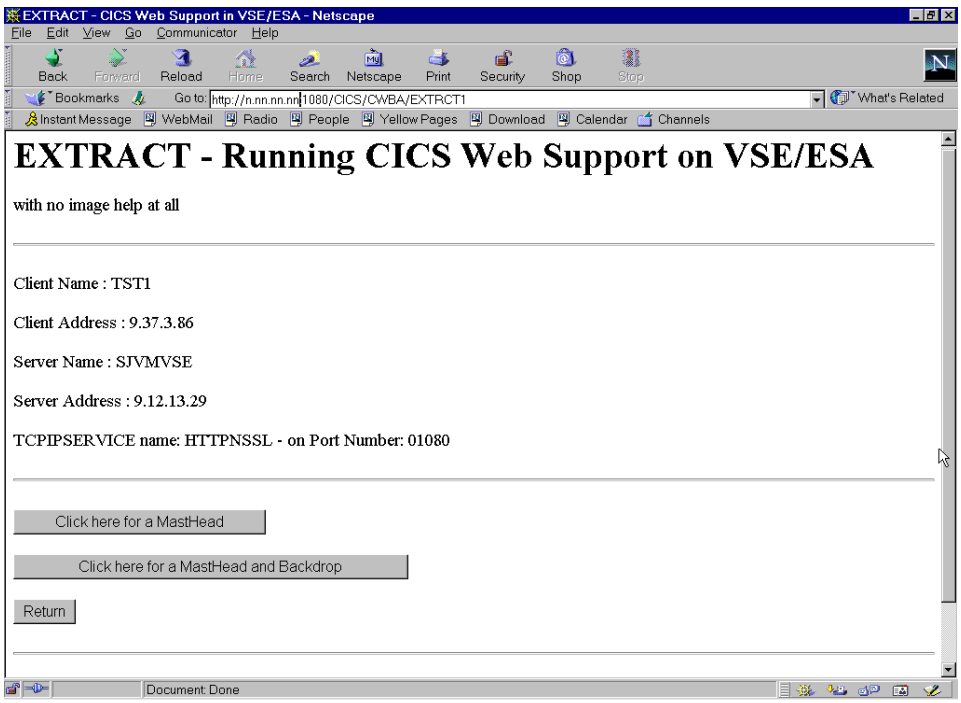

Figure 8. HTML sent by the EXTRCT1 program

4.3.2 Example 2: Starting sample programs from your browser

Example 2 shows an easier way to start our sample programs. Before using this example, you must do the following:

1. Catalog all sample HTML documents into the DFHHTML.DFHDOC sublibrary.

2. Compile, link, and catalog all CICS assembler programs into that same sublibrary.
3. Define documents EXTRCTH1, EXTRCTH2, EXTRCTH3, and EXTRCTH4 as DOCTEMPLATE in CICS TS.
4. Define documents EXTRCTF1, EXTRCTF2, EXTRCTF3, and EXTRCTF4 as DOCTEMPLATE in CICS TS.
5. Catalog DEMO.HTML and INDEX.HTML documents into the sublibrary, which is defined in the “TCP/IP HTTP daemon definition” as ROOT sublibrary. In our environment, it is also “DFHHTML.DFHDOC”. The HTTP daemon looks for the member INDEX.HTML as the default document unless the Web user enters a different file name in the URL.

As mentioned earlier, an easier way to start our sample programs is to type the URL `http://n.nn.nn.nnn` on the browser. This forces the HTTP daemon to look for the member INDEX.HTML in the ROOT sublibrary, and send it to the browser (see Figure 9).

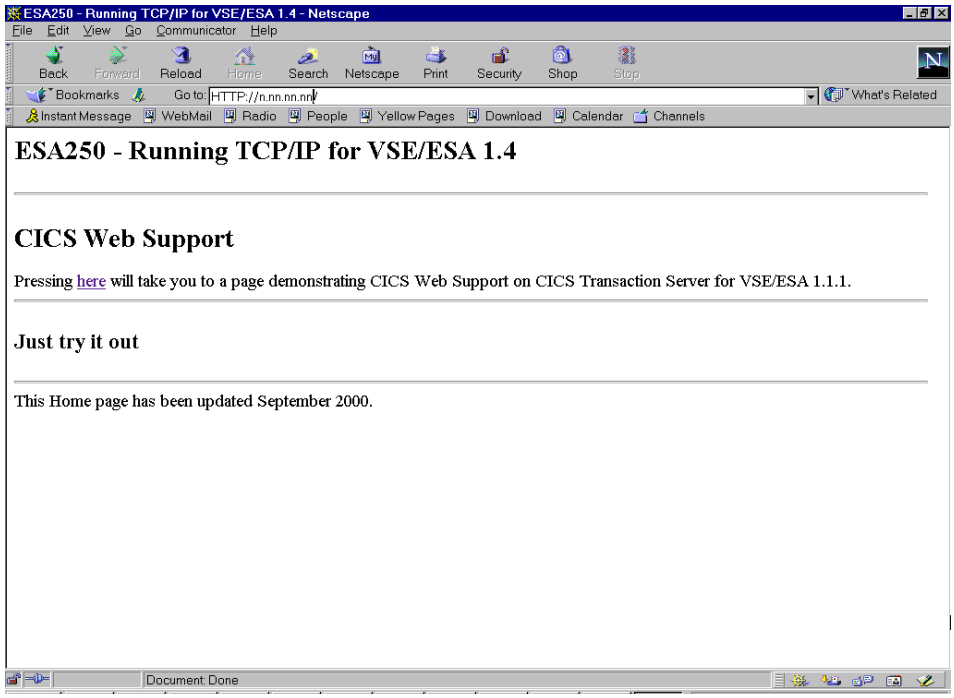

Figure 9. INDEX.HTML sent by HTTP daemon

At this INDEX page, you can click **here** to receive the DEMO.HTML page (see Figure 10 on page 34).

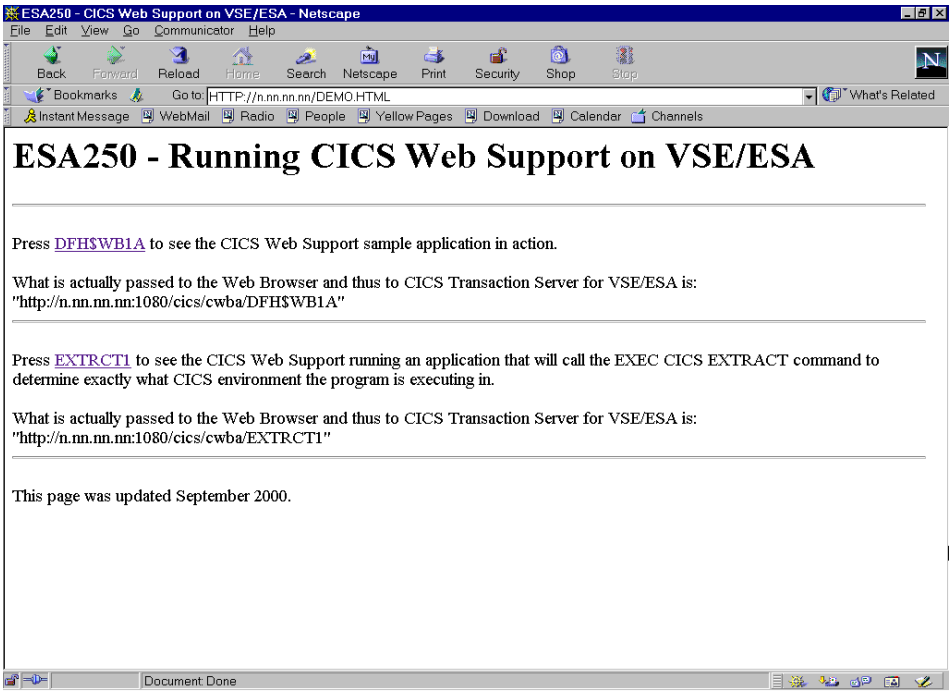

Figure 10. DEMO.HTML sent by HTTP daemon

At the DEMO page, you can choose to run the DFH$WB1A sample or the EXTRCT1 sample. If you click **EXTRCT1**, you are presented a page with two additional options as shown in Figure 11.

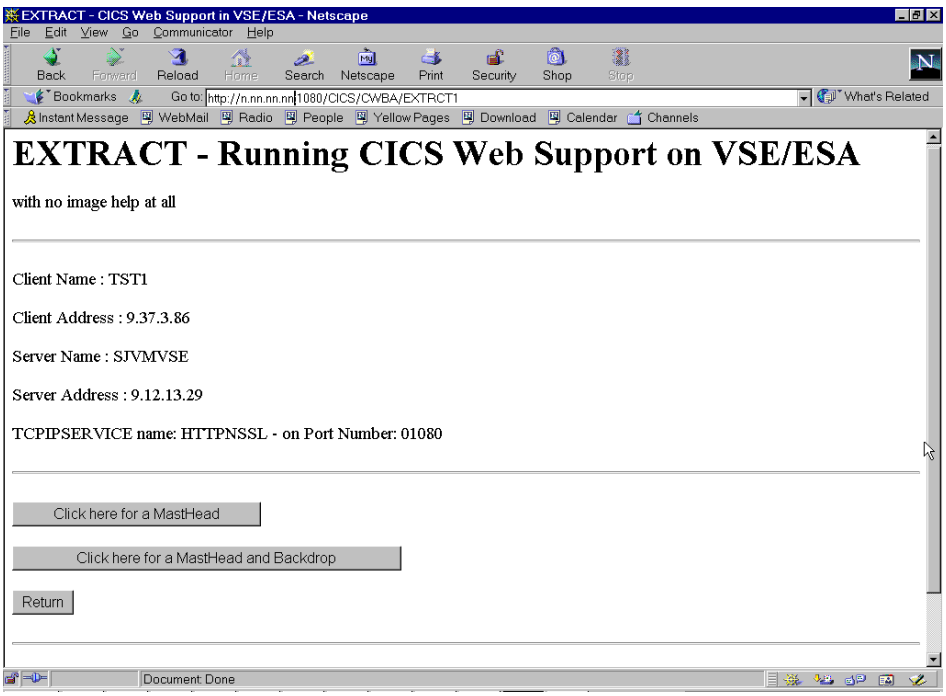

Figure 11. EXTRCT1.HTML sent by sample program EXTRCT1

The first of the additional options is *Click here for a Masthead*, which starts the EXTRCT2 program and displays the page shown in Figure 12 on page 35.

The second option, *Click here for a MastHead and Backdrop*, starts the EXTRCT3 program and display the page shown in Figure 13.

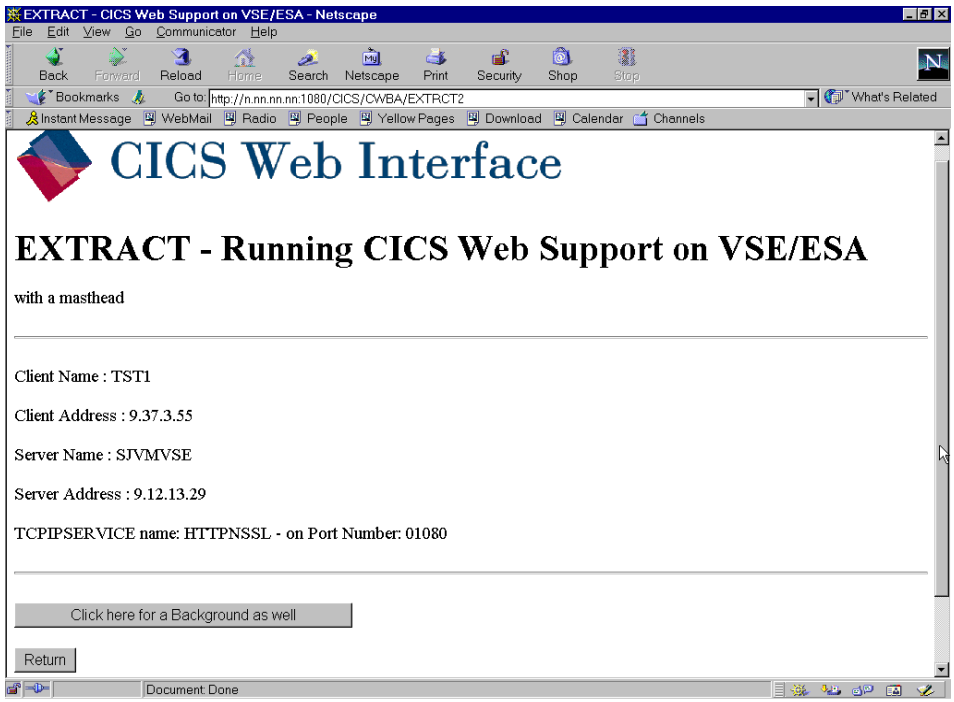

Figure 12. HTML sent by sample program EXTRCT2

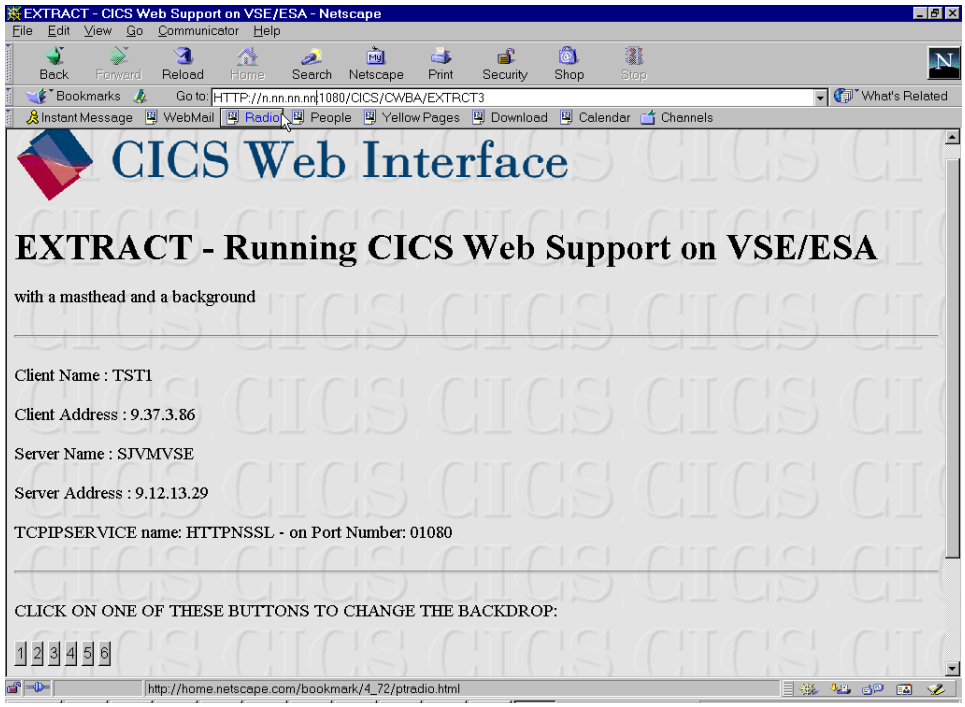

Figure 13. HTML sent by sample program EXTRCT3

The page shown in Figure 13 also allows you to select one of six backdrop boxes that will start sample program EXTRCT4.

Figure 14 shows parts of EXTRCT4.

```
.
.
EXTRCT4  CSECT
EXTRCT4  AMODE 31
EXTRCT4  RMODE ANY
         EXEC CICS HANDLE CONDITION INVREQ(DOCINSRT)
         EXEC CICS DOCUMENT CREATE DOCTOKEN(doctoken) *    1
               TEMPLATE('EXTRCTH4')
.
.
DOCINSRT EXEC CICS WEB READ FORMFIELD(TEXTURE) NAMELENGTH(L'TEXTURE)   *     2
               VALUE(TEXT) VALUELENGTH(TEXTL) NOHANDLE
         CLI   TEXT,C'1'                                          3
         BE    TEXT1
.
.
         CLI   TEXT,C'6'                                          3
         BE    TEXT6
         B     ENDBODY
TEXT1    EQU   *
         EXEC CICS DOCUMENT INSERT DOCTOKEN(doctoken) *    4
               TEXT(TEXT1NFO) LENGTH(TEXT1NFL)
         B     ENDBODY
.
.
TEXT6    EQU   *
         EXEC CICS DOCUMENT INSERT DOCTOKEN(doctoken) *    4
               TEXT(TEXT6NFO) LENGTH(TEXT6NFL)
         B     ENDBODY
* Close Body
ENDBODY  EQU   *
         EXEC CICS DOCUMENT INSERT DOCTOKEN(doctoken) *    5
               TEXT(BODYINFO) LENGTH(BODYINFL)
* Insert image name
         EXEC CICS DOCUMENT INSERT DOCTOKEN(doctoken) *    6
               FROM(IMAGINFO) LENGTH(IMAGINFL)
* Insert header
         EXEC CICS DOCUMENT INSERT DOCTOKEN(doctoken) *    7
               FROM(HEADER)   LENGTH(HEADERL)
* Insert client name                                         8
.
.
* Insert footer for document
         EXEC CICS DOCUMENT INSERT DOCTOKEN(doctoken) *    9
               TEMPLATE('EXTRCTF4')
* Send complete document
         EXEC CICS WEB SEND DOCTOKEN(doctoken) *           10
               CLNTCODEPAGE('iso-8859-1')
         EXEC CICS RETURN
.
.
IMAGINFO DC   C'<img alt="" src="/DFHWBIMG/masthead.gif">'
IMAGINFL DC   F'41'
HEADER      DC    C'<h1>EXTRACT - Running CICS Web Support on VSE/ESA</h1>'
         DC   C'<p>with a masthead and a background'
         DC   C'<p><hr>'
HEADERL  DC   A(*-HEADER)
TEXT1NFO DC   C' background="/DFHWBIMG/texture1.jpeg"'
TEXT1NFL DC   A(*-TEXT1NFO)
.
.
TEXT6NFO DC   C' background="/DFHWBIMG/texture6.jpeg"'
TEXT6NFL DC   A(*-TEXT6NFO)
BODYINFO DC   C'>'
BODYINFL DC   F'1'
TEXTURE  DC   C'TEXTURE'
         END  EXTRCT4
```

Figure 14. Parts of sample EXTRCT4 program

If you click one of the boxes in Figure 13 on page 35 to change the backdrop, program EXTRCT4 follows this process:

1 Creates a document with the first part of the HTML template (header template EXTRCTH4).

2 Reads in the FORMFIELD(TEXTURE) and VALUE(TEXT) at the “CLICK”.

3 Analyzes the “CLICK”.

4 Inserts the background you selected into the document.

5 Completes the body by adding the greater than (>) sign and inserts it into the document.

6 Inserts the HTML img tag into the document.

7 Inserts additional HTML tags into the document.

8 Inserts client name, and so on, into the document.

9 Completes the document by inserting the footer template (EXTRCTF4) into the document.

10 Sends the complete document to the browser with the selected backdrop and masthead image.

Figure 15 shows you the HTML sent by sample program EXTRCT4, when box 1 was selected as the background. See Figure 54 on page 87 to view the EXTRCT4 source code with the background choices.

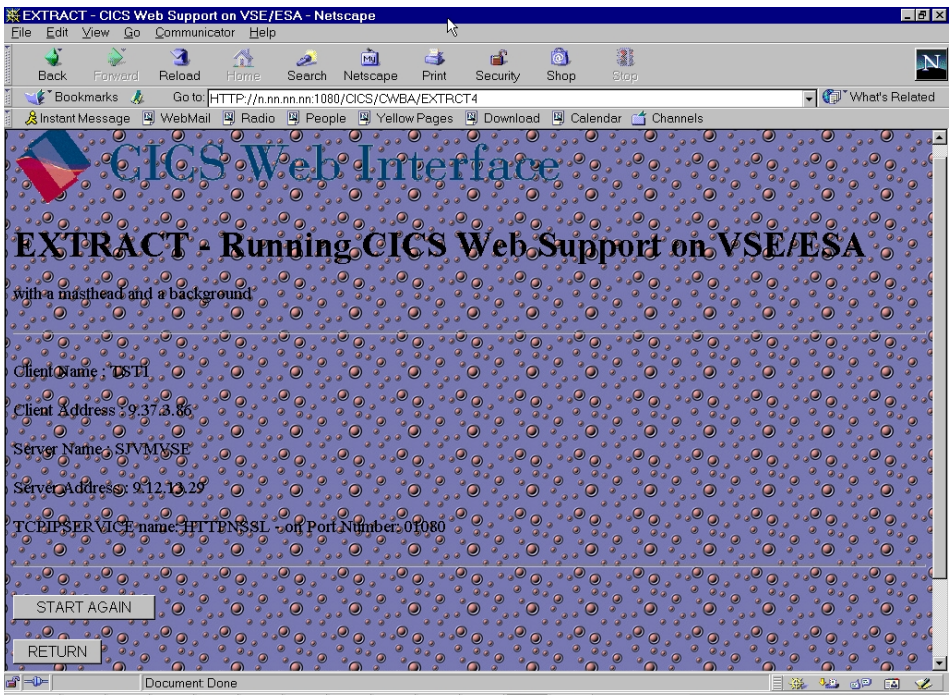

Figure 15. HTML sent by sample program EXTRCT4 (backdrop box 1 used)

Figure 16 shows the HTML sent by sample program EXTRCT4 when box 2 was selected as the background.

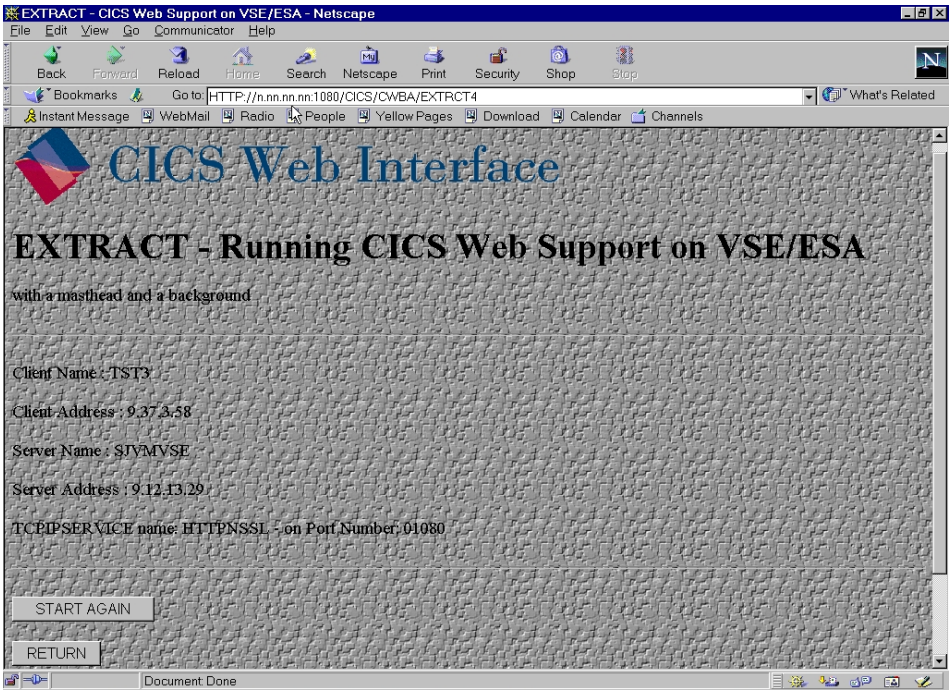

Figure 16. HTML sent by sample program EXTRC4 (backdrop box 2 used)

By the way, many browsers give you the ability to look at the source code of the displayed document. In Netscape, select **View->Page Source** to access the HTML of the page being displayed.

4.3.3 Sample Web-enabling of existing 3270 program

One of the last tasks we started during this project was the modification of the 3270 sample program VSAMTEST, described in Chapter 5, “Accessing existing 3270 transactions” on page 43, to a Web API program (VSAMHTML) with EXEC CICS WEB and EXEC CICS DOCUMENT.

This VSAMHTML program shows the operation principles of a possible conversion of a 3270 program to a Web-enabled program for browser output. We tested the following functions:

- Read (read a file)
- Browse (browse through a file)
- Long Browse (browse through a file with 10 records and display the last record)

We did not test the additional record functions Add, Update and Delete. These additional functions are disabled in the test program VSAMHTML. If you need this functionality, you must change the source code appropriately and test the results.

Figure 17 on page 39 shows a sample browser output generated by the VSAMHTML program. The difference between this VSAMHTML and the EXTRCT1 to EXTRCT4 programs is that in VSAMHTML, we insert variable data into the static templates; this is accomplished by using EXEC CICS DOCUMENT SET SYMBOL statements.

For example, in the statement EXEC CICS DOCUMENT SET SYMBOL('KEY') VALUE(MOVEKEY) in the program VSAMHTML, the SYMBOL('KEY') refers to the variable &KEY; in the template VSAMBODY, and the VALUE(MOVEKEY) is the key field within program VSAMHTML. Refer to Appendix A, "Listings" on page 69, for a complete collection of code and listing samples.

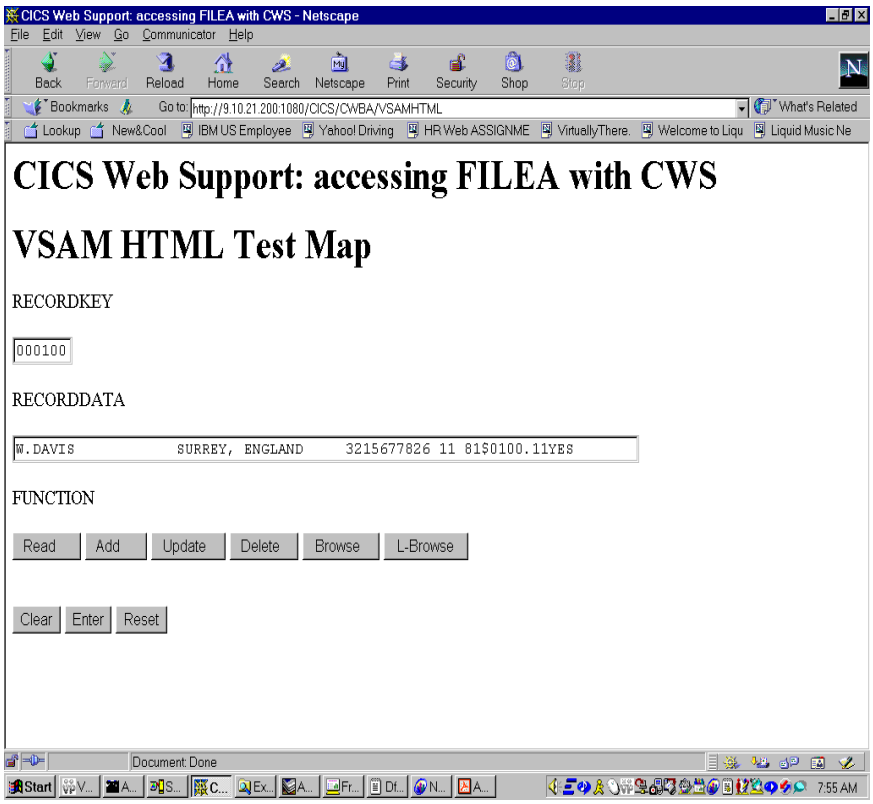

Figure 17. Sample browser output of program VSAMHTML

This sample merely gives an easily understandable example of the principles we discussed; it does not demonstrate program or Web design.

4.4 Web page design

CICS Web Support applications should take advantage of the richness of the user interface provided by Web browsers. A newly created Web page should not look like a 3270 screen. Feel free to use background colors, logos, and pictures when you design a Web page. But keep in mind that each picture or graphic that is imbedded in your Web page must be sent through the network. Extensive use of graphics and pictures may negatively impact the performance of your network, so try to find a good balance between esthetics and performance.

4.4.1 Describing and handling HTTP and HTML data

The HyperText Transfer Protocol (HTTP) defines requests and responses between a client and a server.

The HyperText Markup Language (HTML) specification defines user interface elements for text with various fonts and colors, lists, tables, images, and forms

(text fields, buttons, check boxes, radio buttons). It is similar to other markup languages like IBM BookMaster. A good introduction to HTML can be found at the Web site:

```
http://www.w3.org/MarkUp/
```

CWS supports HTTP level 1.0 and all levels of HTML.

4.4.1.1 Creating HTML output manually

HTML documents are created as standard text files with imbedded HTML tags. They must be stored in EBCDIC format in a VSE sublibrary. Tags are used to denote various elements in an HTML document. HTML tags are recognizable as text strings enclosed in less than (<) and greater than (>) symbols. Tags are usually paired: for example, <head> and </head> to start and end the tag instruction. The end tag looks like the start tag except that a slash (/) precedes the text within the brackets.

Every HTML document should contain certain standard HTML tags. Each document consists of a head and body section. The head section contains the title, and the body section contains the actual text that is made up of paragraphs, lists and other elements.

A short HTML sample is shown here:

```
<html>
  <head>
     <title>A simple HTML example</title>
  </head>
  <body>
     <h1>HTML is very easy</h>
     <p>This is the first step in HTML</p>
  </body>
</html>
```

The required elements are the <html>, <head>, <title>, and <body> tags (and their corresponding end tags). For validation of your HTML document, go to the URL:

```
http://validator.w3.org/
```

4.4.1.2 Creating HTML output using more sophisticated tools

There are several PC tools that can be used to create and validate HTML documents. These tools allow you to write text on a “what you see is what you get” basis and to generate HTML code. In some cases it might be worthwhile to check the generated code and remove lines that are not needed. Some PC tools for HTML are:

- WordPro from Lotus
- Word from Microsoft
- NetObjects Fusion
- Netscape Composer
- Microsoft FrontPage Express

4.4.2 Accessing graphics and cataloging them under VSE

Graphic and multimedia files can only be created on PCs or workstations. There are several tools available to create GIF or JPEG files, for example.

Once a LOGO or PICTURE is created on your PC, it can be downloaded to your VSE/ESA library using FTP. Graphic and multimedia files must be transferred in binary format. For performance reasons, we recommend that you either download the files to the TCP/IP ROOT directory, or store them on a separate server.

Here is a sample of how to access a GIF file from the CICS home page (Figure 18 on page 41) and transfer it to your VSE/ESA:

1. Enter `http://www-4.ibm.com/software/ts/cics/` on your browser.
2. On the CICS home page, right-click the **CICS-IMG.gif** file, and save it as CICSTST.gif on your PC.

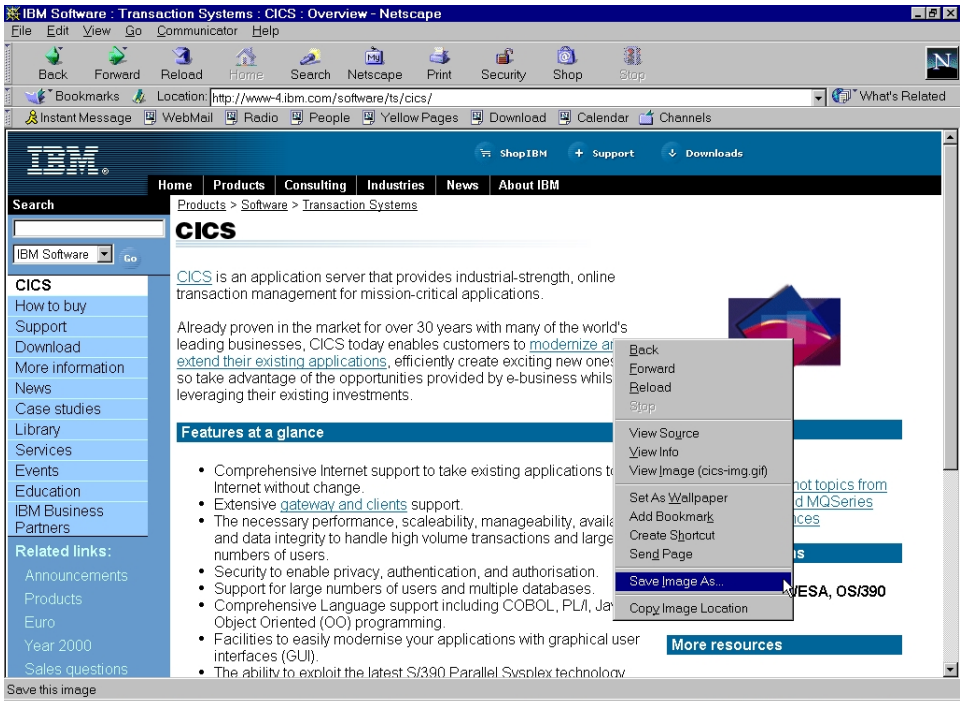

Figure 18. CICS home page

3. On your PC, open a command prompt, and use the following commands to transfer the file CICSTST.gif to your VSE/ESA to sublibrary DFHHTML.DFHDOC:

```
c:\>ftp n.nn.n.nnn
Connect to n.nn.n.nnn.
220-TCP/IP for VSE -- Version 01.03.00 -- FTP Daemon
    Copyright (c) 1995,1999 Connectivity Systems Incorporated
220 Service ready for new user.
User (n.nn.n.nnn:(none)): XXXX
331 User name okay,need password.
Password:
230 User logged in, proceed.
ftp> cd dfhhtml.dfhdoc
250 Requested file action okay, completed.
ftp> bin
200 Command okay.
ftp> put cicstst.gif
200 Command okay.
150-File: DFHHTML.DFHDOC.CICSTST.GIF
    Type: Binary Recfm: S  Lrecl:  4096
    CC:ON  UNIX=OFF RECLF=OFF TRCC=OFF CRLF=ON
150 File status okay; about to open data connection
226-Bytes sent:          5,823
```

```
    Records sent :            2
    Transfer Seconds:         1.49 (      5K/Sec)
    File I/O Seconds:          .04 (      0K/Sec)
226 Closing data connection.
5823 bytes sent in 0.01 seconds (582.30 Kbytes/sec)
ftp>
```

4. To test the GIF file you just stored, enter `http://n.nn.nn.nnn/cicstst.gif` on your browser. Figure 19 shows the result.

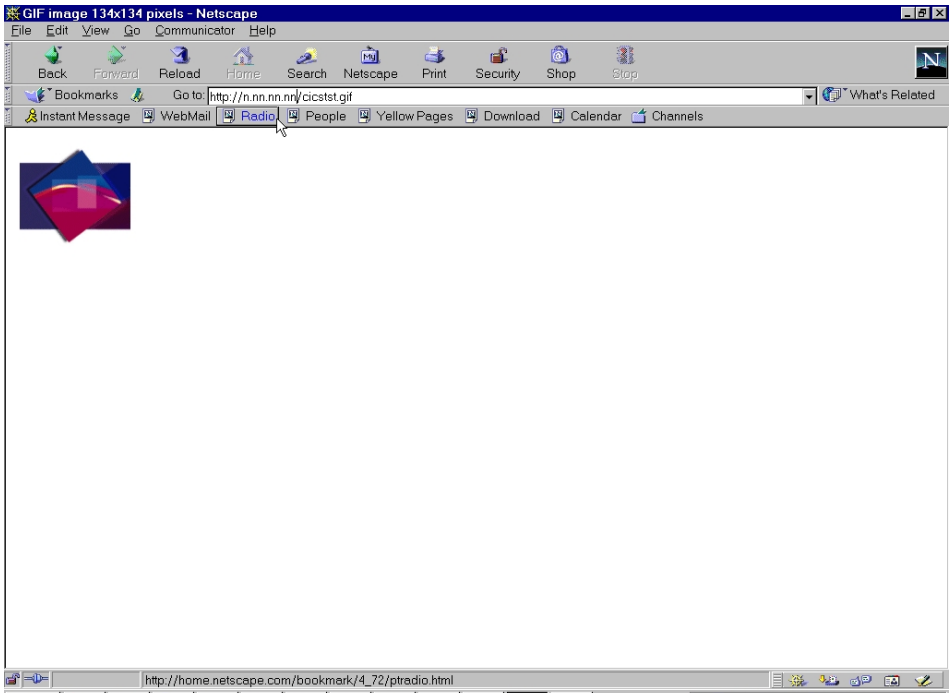

Figure 19. Display of CICSTST.GIF

To include an inline image (for example, CICSTST.gif) in your HTML document, enter the full pathname (URL) in the img statement as follows:

```
<img src=http://n.nn.nn.nnn/CICSTST.gif>
```

Each newly created Web page should be tested with different browsers and different PCs to verify that the output (Web page) meets your requirements. The Web page layout presented by the browser may vary depending on the browser.

Chapter 5. Accessing existing 3270 transactions

The 3270 bridge facility provides the ability to run existing 3270-based transactions with a browser, without the need to change the associated application.

There are two kinds of 3270-based programs:

- BMS-based programs that use the MAP parameter in a terminal command
- Non-BMS based programs that use Terminal Control 3270 data streams (that is, CEMT)

5.1 3270 bridge logic and flow

The 3270 bridge is an integral part of CICS Web Support. It follows the same control flow, up to the alias transaction, as previously described for COMMAREA-based programs as shown in Figure 1 on page 7.

The switch to the bridge facility takes place when DFHWBTTA has been detected in the incoming HTTP data stream as the program name followed by the name of the transaction to be run; see Figure 20.

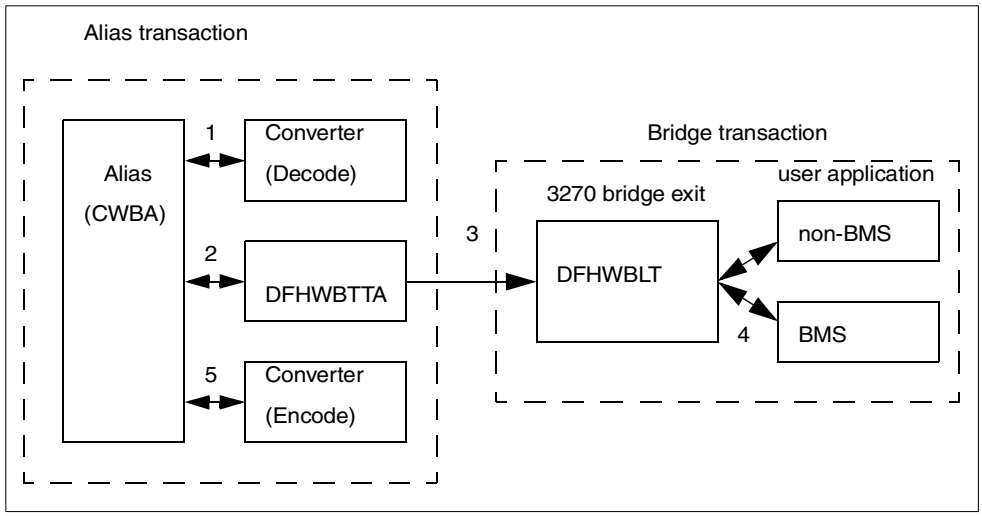

Figure 20. Running a transaction with CICS Web Support: 3270 bridge

The process shown in Figure 20 is explained here:

1. If the analyzer requests a converter, the alias links to it and requests the decode function. Decode sets up the COMMAREA for DFHWBTTA.
2. The alias links to DFHWBTTA and passes the COMMAREA setup by decode, or, if no converter program was called, the COMMAREA contains the entire request.
3. DFHWBTTA finds the transaction ID for the terminal-oriented transaction from the HTTP request. DFHWBTTA then starts the 3270 user transaction immediately and assigns the CICS Web bridge exit DFHWBLT.

4. For non-BMS programs, HTML conversion to 3270 data stream and back, is done automatically. For a BMS-based program, HTML conversion is done by using an HTML template.
5. When the application program attempts to write data, the data is intercepted by CICS and given to the 3270 bridge exit, which passes it to the alias. If the caller requested a converter, the alias calls the encode function of the converter, which uses the COMMAREA to prepare the response. If no converter program was called, the alias assumes that the communication area contains the desired response.

5.2 DFHWBTTA

DFHWBTTA, the terminal translation program, is a callable CICS-supplied program that provides an interface between Web browsers and user 3270 CICS transactions using the 3270 bridge facility. DFHWBTTA, and its associated programs, performs the translation between HTML and 3270 data streams or BMS maps. DFHWBTTA supports non-conversational, conversational, and pseudo-conversational transactions.

Note: Before you can run a BMS transaction, you must provide HTML templates that correspond to the maps you are using in the 3270 transaction. HTML templates are generated from existing BMS mapset definitions, as explained in 5.3.1, “Creating HTML templates from BMS definitions” on page 45.

5.2.1 Input to DFHWBTTA

If you want to run a 3270 transaction, you must specify DFHWBTTA as the program to be called. DFHWBTTA picks up the transaction ID (transid) of the application, and optional data, to execute under the 3270 bridge environment from the URL.

The required URL format is:

```
http://machine.name:port/converter/alias/DFHWBTTA/transid
```

If no converter is required use “CICS” in its place. The CICS-supplied alias is “CWBA”. Also note that the transid of the application to execute under the 3270 bridge facility must follow the last slash (/), for example:

```
http://..../cics/cwba/DFHWBTTA/cemt
```

To pass optional data with the request, use plus signs (+) rather than blanks. CWS interprets a (+) sign as a blank. For example, to invoke a CEMT with INQ TAS, use the following URL:

```
http://testcics/cics/cwba/dfhwbtta/cemt+inq+tas
```

The input to the user transaction ends with the first “real” blank.

Note: Keep in mind that once you have received your response, for example, to the above URL, you need to use the buttons provided in the browser output to simulate the various 3270 keys, *not* the keys on your keyboard. Also note that it is not a good practice to use the backward or forward buttons of your browser to move through your application’s output.

5.2.2 Output from DFHWBTTA

DFHWBTTA presents an HTTP response to the encode function of the converter (if any). This response is contained in a buffer that begins with a 32-bit unsigned number that specifies the length of the buffer followed by the actual HTTP response. The HTML in the response corresponds to the output BMS map or 3270 data stream from the transaction program. This output may have been customized, as described 5.3.2, “Customizing the generated HTML output” on page 57.

5.3 Programs with BMS support

In releases earlier than CICS TS 1.1.1, BMS provided three assembler macros for defining maps:

- **DFHMSD** defines a mapset
- **DFHMDI** defines a single map as a collection of fields
- **DFHMDF** defines an individual field within the map

Before you can start writing a program that uses a map, you must assemble these macros *twice*.

When you define TYPE=MAP on the DFHMSD macro, you can assemble and link edit a load module called the *physical mapset*. The physical mapset is loaded by CICS at execution time and is used to transform the application data to a 3270 data stream or vice versa.

When you specify TYPE=DSECT on the DFHMSD macro, you assemble the *symbolic mapset*. This is a series of data structures in the language specified in the LANG option. A symbolic map is copied into the program and enables you to refer to the fields in the maps by name, without having to know details about the physical position on the screen.

Various modifications to existing BMS macros and new tools enable generation of HTML templates from BMS maps and customization of the BMS maps to make the output more suitable to the Web browser environment.

5.3.1 Creating HTML templates from BMS definitions

This section describes how to create HTML templates from existing BMS mapset definitions.

For BMS programs that want to use the 3270 bridge facility, their BMS maps must be reassembled specifying TYPE=TEMPLATE on the DFHMSD macro, or by specifying SYSPARM=TEMPLATE in the parameters passed to the assembler. This, in turn, generates an HTML template to be used during the BMS mapping operation. Note that the label on the DFHMSD macro is used to name the HTML templates produced for each map in the mapset being processed.

There are no changes required to the application program, nor is there a need to generate a DOCTEMPLATE RDO definition, unless you want to specify a VSE/ESA library other than the IBM default library, DFHHTML, in which to store your templates.

Note: Installations without access to the original source code for BMS mapsets can re-create the BMS macro statements, with some limitations, using a BMS

utility called DFHBMSUP. See *CICS Transaction Server for VSE/ESA Enhancement Guide Release 1*, SC34-5763, for details.

5.3.1.1 Generating HTML templates from existing maps

Of the two methods for generating an HTML template, the easiest method is to specify SYSPARM='TEMPLATE' in the options being passed to the assembler when generating the map. The alternative method is to update the source for each mapset definition and add TYPE=TEMPLATE on the DFHMSD macro.

Unfortunately, in this release of VSE/ESA, there is no option on the Intelligent User Interface (IUI) COMPILE JOB GENERATION screen to allow you to generate a template instead of a regular map definition. Therefore, you will need to modify the generated output of the map definition and specify TYPE=TEMPLATE in the options being passed to the assembler. One way to solve this problem is:

- When compiling your mapset using the “COMPILE JOB GENERATION” IUI screen, specify that you want to catalog the mapset definition. You should also specify an output member name to save the generated job.
- Next, update the saved job. Figure 21 on page 47 takes you through this process.

```
* $$ JOB JNM=&JOBNAME,DISP=D,CLASS=A,NTFY=YES
* $$ LST DISP=D,CLASS=Q,PRI=3
// JOB &JOBNAME COMPILE PROGRAM &PROGNAME
// SETPARM CATALOG=&CATALOG
// IF CATALOG = 1 THEN
// GOTO CAT
// OPTION NODECK,ALIGN,LIST,SYSPARM='MAP'
// GOTO GENER
/. CAT
// LIBDEF PHASE,CATALOG=LIB.SUBLIB                          1
// OPTION CATAL,NODECK,ALIGN,LIST,SYSPARM='MAP'
   PHASE &PROGNAME,*
   MODE RMODE(ANY),AMODE(31)
/. GENER
// EXEC ASMA90,SIZE=(ASMA90,64K),PARM='EXIT(LIBEXIT(EDECKXIT)),SIZE(MAXC
                -200K,ABOVE)'
   PRINT NOGEN
* $$ SLI ICCF=(&PROGNAME,&PASSWORD),LIB=(&LIBNO)
/*
// IF CATALOG NE 1 OR $MRC GT 4 THEN
// GOTO ENDM
// EXEC LNKEDT,SIZE=256K
/*
* $$ PUN DISP=I,DEST=*,PRI=9,CLASS=A
// ASSGN SYSIPT,SYSRDR
// EXEC IESINSRT
$ $$ LST DISP=D,CLASS=Q,PRI=3
#/ JOB &JOBNAME CATALOG MAP &PROGNAME
// EXEC LIBR
   ACCESS SUBLIB=LIB.SUBLIB                                 1
   CATALOG &PROGNAME.A REPLACE=YES                          2
* $$ END
// ON $CANCEL OR $ABEND GOTO ENDJ2
// OPTION NOLIST,ALIGN,DECK,SYSPARM='DSECT'                 3
// EXEC ASMA90,SIZE=(ASMA90,64K),PARM='EXIT(LIBEXIT(EDECKXIT)),SIZE(MAXC
                -200K,ABOVE)'
   PRINT NOGEN
* $$ SLI ICCF=(&PROGNAME,&PASSWORD),LIB=(&LIBNO)
/*
/. ENDJ2
// EXEC IESINSRT
/*
#&
$ $$ EOJ
```

Figure 21. C$$ASMAP mapset JCL generation skeleton

The numbers in the following list correspond to the numbers printed on the right-hand side in the figure.

1 The templates must be cataloged into a library according to what we described in 3.1.1, “VSE/ESA Library for CICS Web Support templates” on page 11, which we reinforce here again. If the DOCTEMPLATE does not define a library name, CICS searches the LIBDEF search chain for the member (still with suffix HTML) and in the order specified in the LIBDEF chain.

2 Remove this catalog statement. This allows the proper catalog statement to be generated for the template name. As mentioned earlier, the HTML template names consist of the label from the DFHMSD macro, plus one character starting from A for each map in the mapset. This allows the bridge exit to match the HTML template with the BMS map when a BMS SEND or RECEIVE is issued by a program. The library member type is always HTML.

3 Change the SYSPARM='DSECT' to SYSPARM='TEMPLATE'.

Another method is to modify C$$nnMAP in ICCF library2 and make the changes directly to the skeleton.

To demonstrate the 3270 bridge facility, we used an assembler program generating BMS output to allow a user to access a VSAM data set for read, browse, delete and update functions. The program name is VSAMTEST. The mapset name is VSAMSET and the transid to invoke this program is VSAM.

The source for the BMS mapset defined for our program is shown in Figure 22 on page 49. This is followed by the normal 3270 screen output when transid VSAM is entered on the 3270 CICS screen. Note that we added additional BMS macros, DFHMSX and DFHMDX, to customize the output sent to a browser. This customization is ignored with a regular 3270 data stream generation. These macros are discussed further in 5.3.2, “Customizing the generated HTML output” on page 57.

Note: The source for our assembler program and JCL used to define and load the VSAM file is listed in Appendix A, “Listings” on page 69.

```
         MACRO
         DFHMSX
         DFHMDX MAPSET=*,MAP=*,                                        *
               BGCOLOR=YELLOW,                                         *
               TEXT=BLUE,                                              *
               RESET=NO
         MEND
 * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
 * VSAMSET -- BMS MAPSET FOR VSAMTEST TEST SUITE.            *
 * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
VSAMSET  DFHMSD MODE=INOUT,                                           *
               LANG=ASM,STORAGE=AUTO
 VSAMMAP  DFHMDI SIZE=(24,80),LINE=1,COLUMN=1
 TRAN     DFHMDF POS=(1,1),ATTRB=(UNPROT,FSET),LENGTH=4,INITIAL='VSAM'
DFHMDF POS=(1,6),ATTRB=(ASKIP),LENGTH=1
*
         DFHMDF POS=(4,30),ATTRB=(ASKIP),LENGTH=13,                   *
               INITIAL='VSAM TEST MAP'
         DFHMDF POS=(5,30),ATTRB=(ASKIP),LENGTH=13,                   *
               INITIAL='=============='
         DFHMDF POS=(7,20),ATTRB=(ASKIP),LENGTH=30,                   *
               INITIAL='R READ'
         DFHMDF POS=(8,20),ATTRB=(ASKIP),LENGTH=30,                   *
               INITIAL='U READ FOR UPDATE + REWRITE'
         DFHMDF POS=(9,20),ATTRB=(ASKIP),LENGTH=30,                   *
               INITIAL='A ADD'
         DFHMDF POS=(10,20),ATTRB=(ASKIP),LENGTH=30,                  *
               INITIAL='D READ FOR UPDATE + DELETE'
         DFHMDF POS=(11,20),ATTRB=(ASKIP),LENGTH=30,                  *
               INITIAL='B BROWSE'
         DFHMDF POS=(12,20),ATTRB=(ASKIP),LENGTH=30,                  *
               INITIAL='L LONG BROWSE'
*
         DFHMDF POS=(13,5),ATTRB=(ASKIP),LENGTH=12,INITIAL='FUNCTION'
FUNC     DFHMDF POS=(13,18),ATTRB=(UNPROT,FSET,IC),LENGTH=1
         DFHMDF POS=(13,20),ATTRB=(ASKIP),LENGTH=1
*
          DFHMDF POS=(15,5),ATTRB=(ASKIP),LENGTH=12,INITIAL='RECORDKEY'
 KEY      DFHMDF POS=(15,18),ATTRB=(UNPROT,NUM,FSET),LENGTH=6
          DFHMDF POS=(15,25),ATTRB=(ASKIP),LENGTH=1
 *
          DFHMDF POS=(17,5),ATTRB=(ASKIP),LENGTH=12,INITIAL='RECORDDATA'
 RECORD   DFHMDF POS=(17,18),ATTRB=(UNPROT,FSET),LENGTH=80
          DFHMDF POS=(20,25),ATTRB=(ASKIP),LENGTH=1
 *
 RESPONS  DFHMDF POS=(23,11),ATTRB=(ASKIP),LENGTH=20
 TIMEOUT  DFHMDF POS=(23,34),ATTRB=(ASKIP),LENGTH=12
          DFHMDF POS=(23,48),ATTRB=(ASKIP),LENGTH=20,                  *
                INITIAL='MILLISECONDS RUNTIME'
 FUNCOUT  DFHMDF POS=(23,70),ATTRB=(ASKIP),LENGTH=1
 TERMOUT  DFHMDF POS=(23,73),ATTRB=(ASKIP),LENGTH=4
          DFHMSD TYPE=FINAL
          END
 /*
```

Figure 22. Defining BMS mapset VSAMSET

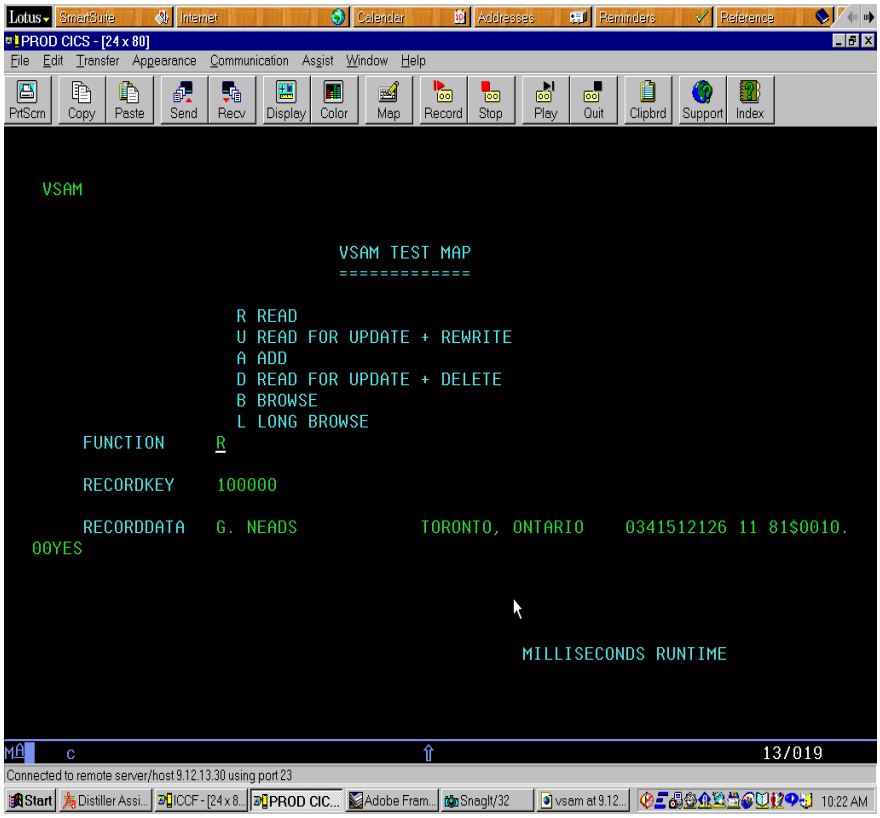

Figure 23. 3270 screen output with transid VSAM

5.3.1.2 Map output on a 3270 screen

Using the information supplied in 5.3.1, “Creating HTML templates from BMS definitions” on page 45, we generated our HTML template for which the source is listed on the following pages. Note that if you intend to modify the HTML source output, it is case sensitive. BMS generates buttons to represent 24 PF keys, three PA keys, and an Enter key as shown in Figure 24 on page 57.

When you generate HTML templates from BMS maps, templates can be larger than 32k. If this is the case, they cannot be used by the 3270 Web bridge. This problem is not apparent until a transaction using the map is run using the 3270 bridge. When this happens, message DFHWB0133 is issued and `500 Internal Server Error` is displayed on the browser.

The following example shows the generated HTML for the VSAMSET mapset:

```
<!doctype html public "-//W3C//DTD HTML 3.2//EN">
<html>
<head>
<title>CICS Web Support BMS screen emulation</title>
<meta name="generator" content="CICS Transaction Server/1.1.1">
<script language="JavaScript">
<!--
 function dfhsetcursor(n)
   {for (var i=0;i<document.VSAMMAP.elements.length;i++)
     {if (document.VSAMMAP.elements[i].name == n)
         {document.VSAMMAP.elements[i].focus();
          document.VSAMMAP.DFH_CURSOR.value=n;
          break}}}
 function dfhinqcursor(n)
   {document.VSAMMAP.DFH_CURSOR.value=n}
 // -->
</script>
```

```
</head>
<body
onLoad="dfhsetcursor('&DFH_CURSPOS;')"
bgcolor="#FFFF00" text="#0000FF"
link="#0000FF" vlink="#800080" alink="#FF0000">
<h1>CICS Web Support BMS screen emulation</h1>
<form name="VSAMMAP" method="POST" action="&DFH_ACTION_URL;">
<input type="hidden" name="DFH_STATE_TOKEN" value="&DFH_STATE_TOKEN;">
<input type="hidden" name="DFH_CURSOR" value="&DFH_CURSPOS;">
<table>
<td height=0 width=4%>
</td>
<td height=0 width=6%>
</td>
<td height=0 width=7%>
</td>
<td height=0 width=2%>
</td>
<td height=0 width=10%>
</td>
<td height=0 width=4%>
</td>
<td height=0 width=14%>
</td>
<td height=0 width=22%>
</td>
<td height=0 width=3%>
</td>
<td height=0 width=7%>
</td>
<tr>
<td colspan=10 nowrap>
<input type="text" name="TRAN" value="&TRAN;"
onFocus="dfhinqcursor('TRAN')"
size="4" maxlength="4">
</td>
</tr>
<tr>
<td colspan=6 >
</td>
<td colspan=5 nowrap>
VSAM TEST MAP
</td>
</tr>
<tr>
<td colspan=6 >
</td>
<td colspan=5 nowrap>
=============
</td>
</tr>
<tr>
<td colspan=5 >
</td>
<td colspan=6 nowrap>
R READ
</td>
</tr>
<tr>
<td colspan=5 >
</td>
<td colspan=6 nowrap>
U READ FOR UPDATE + REWRITE
</td>
</tr>
<tr>
<td colspan=5 >
</td>
<td colspan=6 nowrap>
A ADD
</td>
</tr>
<tr>
<td colspan=5 >
</td>
<td colspan=6 nowrap>
D READ FOR UPDATE + DELETE
</td>
```

```
</tr>
<tr>
<td colspan=5 >
</td>
<td colspan=6 nowrap>
B BROWSE
</td>
</tr>
<tr>
<td colspan=5 >
</td>
<td colspan=6 nowrap>
L LONG BROWSE
</td>
</tr>
<tr>
<td colspan=2 >
</td>
<td colspan=2 nowrap>
FUNCTION
</td>
<td colspan=7 nowrap>
<input type="text" name="FUNC" value="&FUNC;"
onFocus="dfhinqcursor('FUNC')"
size="1" maxlength="1">
</td>
</tr>
<tr>
<td colspan=2 >
</td>
<td colspan=2 nowrap>
RECORDKEY
</td>
<td colspan=7 nowrap>
<input type="text" name="KEY" value="&KEY;"
onFocus="dfhinqcursor('KEY')"
size="6" maxlength="6">
</td>
</tr>
<tr>
<td colspan=2 >
</td>
<td colspan=2 nowrap>
RECORDDATA
</td>
<td colspan=7 nowrap>
<input type="text" name="RECORD" value="&RECORD;"
onFocus="dfhinqcursor('RECORD')"
size="80" maxlength="80">
</td>
</tr>
<tr>
<td colspan=3 >
</td>
<td colspan=4 nowrap>
&RESPONS;
</td>
<td colspan=1 nowrap>
&TIMEOUT;
</td>
<td colspan=1 nowrap>
MILLISECONDS RUNTIME
</td>
<td colspan=1 nowrap>
&FUNCOUT;
</td>
<td colspan=1 nowrap>
&TERMOUT;
</td>
</tr>
</table>
<br>
<input type="submit" name="DFH_PF1" value="PF01">
<input type="submit" name="DFH_PF2" value="PF02">
<input type="submit" name="DFH_PF3" value="PF03">
<input type="submit" name="DFH_PF4" value="PF04">
<input type="submit" name="DFH_PF5" value="PF05">
<input type="submit" name="DFH_PF6" value="PF06">
```

```
<input type="submit" name="DFH_PF7" value="PF07">
<input type="submit" name="DFH_PF8" value="PF08">
<input type="submit" name="DFH_PF9" value="PF09">
<input type="submit" name="DFH_PF10" value="PF10">
<input type="submit" name="DFH_PF11" value="PF11">
<input type="submit" name="DFH_PF12" value="PF12">
<br>
<input type="submit" name="DFH_PF13" value="PF13">
<input type="submit" name="DFH_PF14" value="PF14">
<input type="submit" name="DFH_PF15" value="PF15">
<input type="submit" name="DFH_PF16" value="PF16">
<input type="submit" name="DFH_PF17" value="PF17">
<input type="submit" name="DFH_PF18" value="PF18">
<input type="submit" name="DFH_PF19" value="PF19">
<input type="submit" name="DFH_PF20" value="PF20">
<input type="submit" name="DFH_PF21" value="PF21">
<input type="submit" name="DFH_PF22" value="PF22">
<input type="submit" name="DFH_PF23" value="PF23">
<input type="submit" name="DFH_PF24" value="PF24">
<br>
<input type="submit" name="DFH_PA1" value="PA1">
<input type="submit" name="DFH_PA2" value="PA2">
<input type="submit" name="DFH_PA3" value="PA3">
<input type="submit" name="DFH_CLEAR" value="Clear">
<input type="submit" name="DFH_ENTER" value="Enter">
<!-- The following variables are the
names of the fields that could contain the next
CICS transaction id -->
<input type="hidden" name="DFH_NEXTTRANSID.1" value="TRAN">
<input type="hidden" name="DFH_NEXTTRANSID.2" value="FUNC">
<input type="hidden" name="DFH_NEXTTRANSID.3" value="KEY">
<input type="hidden" name="DFH_NEXTTRANSID.4" value="RECORD">
</form>
</body></html>
/+
/*

</td>
</tr>
<tr>
<td colspan=6 >
</td>
<td colspan=5 nowrap>
VSAM TEST MAP
</td>
</tr>
<tr>
<td colspan=6 >
</td>
<td colspan=5 nowrap>
==============
</td>
</tr>
<tr>
<td colspan=5 >
</td>
<td colspan=6 nowrap>
R READ
</td>
</tr>
<tr>
<td colspan=5 >
</td>
<td colspan=6 nowrap>
U READ FOR UPDATE + REWRITE
</td>
</tr>
<tr>
<td colspan=5 >
</td>
<td colspan=6 nowrap>
A ADD
</td>
</tr>
<tr>
<td colspan=5 >
</td>
<td colspan=6 nowrap>
```

```
D READ FOR UPDATE + DELETE
</td>
</tr>
<tr>
<td colspan=5 >
</td>
<td colspan=6 nowrap>
B BROWSE
</td>
</tr>
<tr>
<td colspan=5 >
</td>
<td colspan=6 nowrap>
L LONG BROWSE
</td>
</tr>
<tr>
<td colspan=2 >
</td>
<td colspan=2 nowrap>
FUNCTION
</td>
<td colspan=7 nowrap>
<input type="text" name="FUNC" value="&FUNC;"
onFocus="dfhinqcursor('FUNC')"
size="1" maxlength="1">
</td>
</tr>
<tr>
<td colspan=2 >
</td>
<td colspan=2 nowrap>
RECORDKEY
</td>
<td colspan=7 nowrap>
<input type="text" name="KEY" value="&KEY;"
onFocus="dfhinqcursor('KEY')"
size="6" maxlength="6">
</td>
</tr>
<tr>
<td colspan=2 >
</td>
<td colspan=2 nowrap>
RECORDDATA
</td>
<td colspan=7 nowrap>
<input type="text" name="RECORD" value="&RECORD;"
onFocus="dfhinqcursor('RECORD')"
size="80" maxlength="80">
</td>
</tr>
<tr>
<td colspan=3 >
</td>
<td colspan=4 nowrap>
&RESPONS;
</td>
<td colspan=1 nowrap>
&TIMEOUT;
</td>
<td colspan=1 nowrap>
MILLISECONDS RUNTIME
</td>
<td colspan=1 nowrap>
&FUNCOUT;
</td>
<td colspan=1 nowrap>
&TERMOUT;
</td>
</tr>
</table>
<br>
<input type="submit" name="DFH_PF1" value="PF01">
<input type="submit" name="DFH_PF2" value="PF02">
<input type="submit" name="DFH_PF3" value="PF03">
<input type="submit" name="DFH_PF4" value="PF04">
```

```
<input type="submit" name="DFH_PF5" value="PF05">
<input type="submit" name="DFH_PF6" value="PF06">
<input type="submit" name="DFH_PF7" value="PF07">
<input type="submit" name="DFH_PF8" value="PF08">
<input type="submit" name="DFH_PF9" value="PF09">
<input type="submit" name="DFH_PF10" value="PF10">
<input type="submit" name="DFH_PF11" value="PF11">
<input type="submit" name="DFH_PF12" value="PF12">
<br>
<input type="submit" name="DFH_PF13" value="PF13">
<input type="submit" name="DFH_PF14" value="PF14">
<input type="submit" name="DFH_PF15" value="PF15">
<input type="submit" name="DFH_PF16" value="PF16">
<input type="submit" name="DFH_PF17" value="PF17">
<input type="submit" name="DFH_PF18" value="PF18">
<input type="submit" name="DFH_PF19" value="PF19">
<input type="submit" name="DFH_PF20" value="PF20">
<input type="submit" name="DFH_PF21" value="PF21">
<input type="submit" name="DFH_PF22" value="PF22">
<input type="submit" name="DFH_PF23" value="PF23">
<input type="submit" name="DFH_PF24" value="PF24">
<br>
<input type="submit" name="DFH_PA1" value="PA1">
<input type="submit" name="DFH_PA2" value="PA2">
<input type="submit" name="DFH_PA3" value="PA3">
<input type="submit" name="DFH_CLEAR" value="Clear">
<input type="submit" name="DFH_ENTER" value="Enter">
<!-- The following variables are the
names of the fields that could contain the next
CICS transaction id -->
<input type="hidden" name="DFH_NEXTTRANSID.1" value="TRAN">
<input type="hidden" name="DFH_NEXTTRANSID.2" value="FUNC">
<input type="hidden" name="DFH_NEXTTRANSID.3" value="KEY">
<input type="hidden" name="DFH_NEXTTRANSID.4" value="RECORD">
</form>
</body></html>
/+
/*

</td>
<td colspan=6 nowrap>
L LONG BROWSE
</td>
</tr>
<tr>
<td colspan=2 >
</td>
<td colspan=2 nowrap>
FUNCTION
</td>
<td colspan=7 nowrap>
<input type="text" name="FUNC" value="&FUNC;"
onFocus="dfhinqcursor('FUNC')"
size="1" maxlength="1">
</td>
</tr>
<tr>
<td colspan=2 >
</td>
<td colspan=2 nowrap>
RECORDKEY
</td>
<td colspan=7 nowrap>
<input type="text" name="KEY" value="&KEY;"
onFocus="dfhinqcursor('KEY')"
size="6" maxlength="6">
</td>
</tr>
<tr>
<td colspan=2 >
</td>
<td colspan=2 nowrap>
RECORDDATA
</td>
<td colspan=7 nowrap>
<input type="text" name="RECORD" value="&RECORD;"
onFocus="dfhinqcursor('RECORD')"
size="80" maxlength="80">
```

```
</td>
</tr>
<tr>
<td colspan=3 >
</td>
<td colspan=4 nowrap>
&RESPONS;
</td>
<td colspan=1 nowrap>
&TIMEOUT;
</td>
<td colspan=1 nowrap>
MILLISECONDS RUNTIME
</td>
<td colspan=1 nowrap>
&FUNCOUT;
</td>
<td colspan=1 nowrap>
&TERMOUT;
</td>
</tr>
</table>
<br>
<input type="submit" name="DFH_PF1" value="PF01">
<input type="submit" name="DFH_PF2" value="PF02">
<input type="submit" name="DFH_PF3" value="PF03">
<input type="submit" name="DFH_PF4" value="PF04">
<input type="submit" name="DFH_PF5" value="PF05">
<input type="submit" name="DFH_PF6" value="PF06">
<input type="submit" name="DFH_PF7" value="PF07">
<input type="submit" name="DFH_PF8" value="PF08">
<input type="submit" name="DFH_PF9" value="PF09">
<input type="submit" name="DFH_PF10" value="PF10">
<input type="submit" name="DFH_PF11" value="PF11">
<input type="submit" name="DFH_PF12" value="PF12">
<br>
<input type="submit" name="DFH_PF13" value="PF13">
<input type="submit" name="DFH_PF14" value="PF14">
<input type="submit" name="DFH_PF15" value="PF15">
<input type="submit" name="DFH_PF16" value="PF16">
<input type="submit" name="DFH_PF17" value="PF17">
<input type="submit" name="DFH_PF18" value="PF18">
<input type="submit" name="DFH_PF19" value="PF19">
<input type="submit" name="DFH_PF20" value="PF20">
<input type="submit" name="DFH_PF21" value="PF21">
<input type="submit" name="DFH_PF22" value="PF22">
<input type="submit" name="DFH_PF23" value="PF23">
<input type="submit" name="DFH_PF24" value="PF24">
<br>
<input type="submit" name="DFH_PA1" value="PA1">
<input type="submit" name="DFH_PA2" value="PA2">
<input type="submit" name="DFH_PA3" value="PA3">
<input type="submit" name="DFH_CLEAR" value="Clear">
<input type="submit" name="DFH_ENTER" value="Enter">
<!-- The following variables are the
names of the fields that could contain the next
CICS transaction id -->
<input type="hidden" name="DFH_NEXTTRANSID.1" value="TRAN">
<input type="hidden" name="DFH_NEXTTRANSID.2" value="FUNC">
<input type="hidden" name="DFH_NEXTTRANSID.3" value="KEY">
<input type="hidden" name="DFH_NEXTTRANSID.4" value="RECORD">
</form>
</body></html>
/+
/*

<td colspan=1 nowrap>
&FUNCOUT;
</td>
<td colspan=1 nowrap>
&TERMOUT;
</td>
</tr>
</table>
<br>
<input type="submit" name="DFH_PF1" value="PF01">
<input type="submit" name="DFH_PF2" value="PF02">
<input type="submit" name="DFH_PF3" value="PF03">
```

```
<input type="submit" name="DFH_PF4" value="PF04">
<input type="submit" name="DFH_PF5" value="PF05">
<input type="submit" name="DFH_PF6" value="PF06">
<input type="submit" name="DFH_PF7" value="PF07">
<input type="submit" name="DFH_PF8" value="PF08">
<input type="submit" name="DFH_PF9" value="PF09">
<input type="submit" name="DFH_PF10" value="PF10">
<input type="submit" name="DFH_PF11" value="PF11">
<input type="submit" name="DFH_PF12" value="PF12">
<br>
<input type="submit" name="DFH_PF13" value="PF13">
<input type="submit" name="DFH_PF14" value="PF14">
<input type="submit" name="DFH_PF15" value="PF15">
<input type="submit" name="DFH_PF16" value="PF16">
<input type="submit" name="DFH_PF17" value="PF17">
<input type="submit" name="DFH_PF18" value="PF18">
<input type="submit" name="DFH_PF19" value="PF19">
<input type="submit" name="DFH_PF20" value="PF20">
<input type="submit" name="DFH_PF21" value="PF21">
<input type="submit" name="DFH_PF22" value="PF22">
<input type="submit" name="DFH_PF23" value="PF23">
<input type="submit" name="DFH_PF24" value="PF24">
<br>
<input type="submit" name="DFH_PA1" value="PA1">
<input type="submit" name="DFH_PA2" value="PA2">
<input type="submit" name="DFH_PA3" value="PA3">
<input type="submit" name="DFH_CLEAR" value="Clear">
<input type="submit" name="DFH_ENTER" value="Enter">
<!-- The following variables are the
names of the fields that could contain the next
CICS transaction id -->
<input type="hidden" name="DFH_NEXTTRANSID.1" value="TRAN">
<input type="hidden" name="DFH_NEXTTRANSID.2" value="FUNC">
<input type="hidden" name="DFH_NEXTTRANSID.3" value="KEY">
<input type="hidden" name="DFH_NEXTTRANSID.4" value="RECORD">
</form>
</body></html>
/+
/*
```

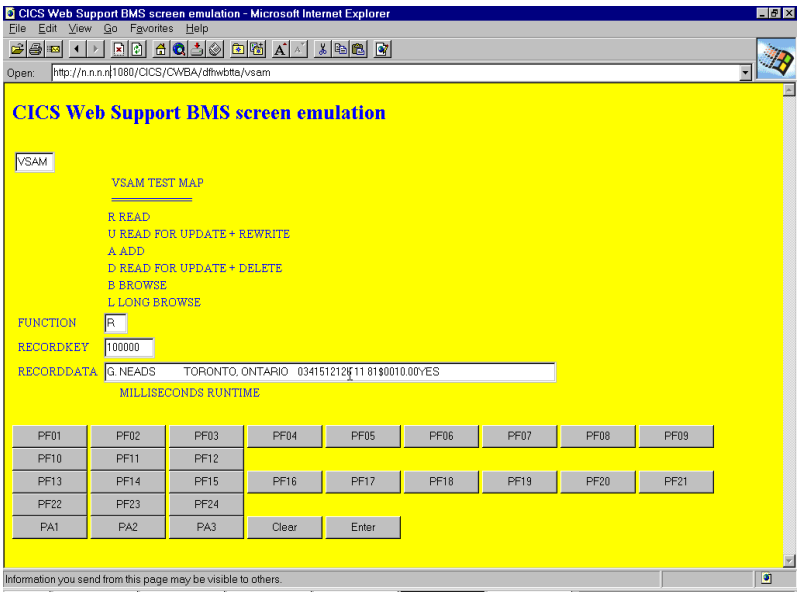

Figure 24. 3270 bridge generated HTML page displayed by a browser

5.3.2 Customizing the generated HTML output

To improve the layout of 3270-based output for a browser, modifications can be made easily using two new BMS customization macros:

- DFHMDX
- DFHWBOUT

These macros are inserted into the BMS map source, but have an effect only on the generated HTML. The definition of a customizing macro must be written according to the rules for assembler macro definitions and must also follow the rules for assembler language macro statements. A customizing macro definition contains the following elements as described in Figure 25:

- A MACRO statement to begin the definition.
- The name of the macro.
- Any number of invocations of the DFHMDX macro. DFHMDX is invoked from within macro DFHMSX.
- A MEND statement to end the definition.

For more information on these customizing macros, refer to *CICS Transaction Server for VSE/ESA Internet Guide Release 1,* SC34-5765.

```
MACRO
DFHMSX
DFHMDX MAPSET=*,MAP=*,                                          *
   BGCOLOR=YELLOW,                                              *
   TEXT=BLUE,                                                   *
   RESET=NO
MEND
```

Figure 25. Customizing a macro definition from VSAMMAP

5.3.2.1 DFHMSX and DFHMDX

You can use the DFHMSX macro to define your own customization macro that is used when the templates are being created from the BMS map definitions. With the DFHMDX macro, HTML templates can be customized to:

- Support the application's use of keys that are not in the standard output
- Suppress the HTML reset function, which does not correspond to any 3270 function
- Change the appearance of the keys, or the text associated with them
- Provide an HTML title for the HTML page
- Provide a masthead graphic for the HTML page
- Change the color of the background or specify a special background
- Modify the BMS colors
- Suppress parts of the BMS maps
- Add Web browser control functions, JavaScript functions for example, to the HTML page

When CICS creates the templates for each of your BMS map definitions, it invokes the DFHMSX customizing macro. Each DFHMDX macro is processed in sequence, and if applicable, the parameter values are stored. Where a duplicate parameter is specified for a particular map or mapset, the new value replaces the previous value for that map or mapset. The first invocation of DFHMDX sets defaults for the values to be applied to subsequent invocations of DFHMDX by specifying an asterisk (*) for the mapset name and map name.

In our example, we have set as defaults, the background color to yellow, the lettering as blue, and suppressed the HTML reset function. The definitions, which are shown in Figure 25 on page 58 and in Figure 22 on page 49, are at the top of the source code for our BMS mapset.

5.3.2.2 DFHWBOUT

The DFHWBOUT macro is used to add text to the HTML page generated from a BMS map only if PARM=TEMPLATE. You can:

- Add Web browser control functions; for example, JavaScript functions, to the HTML page
- Add text that appears only on the HTML page, but is not part of the BMS map
- Add HTML header information to the HTML page

If the macro is used before the first occurrence of DFHMDF in a macro, the text is placed in the <head> section of the HTML page. If the macro is used elsewhere in the map, the text is placed inline in the HTML page, immediately following the text generated by the preceding DFHMDF macro. Figure 26 shows how the DFHWBOUT macro is defined.

DFHWBOUT

>>-----DFHWBOUT---'---***text***---'----(, **SOSI** = no / yes)------------------><

text = The text that is to be inserted into the HTML page.

SOSI = Whether the text contains DBCS characters delimited by shift-out (X'0E') and shift-in (X'0F'). The default is SOSI = NO.

Figure 26. DFHWBOUT customization macro

For more details about the new BMS macros, see *CICS Transaction Server for VSE/ESA Internet Guide Release 1,* SC34-5765.

5.4 Customizing the 3270 to HTML conversion for non-BMS applications

When a 3270 transaction is run under a bridge transaction and the application sends 3270 data streams, the HTML conversion is done dynamically. This is a standard conversion, which can be customized in two ways.

The first way is to use a converter program where the encode function customizes the output after the 3270 conversion.

The second way is to use header and footer templates. These templates are described by an RDO DOCTEMPLATE definition and they are copied in front of, and appended after, the converted screen, as shown in Figure 27 on page 60.

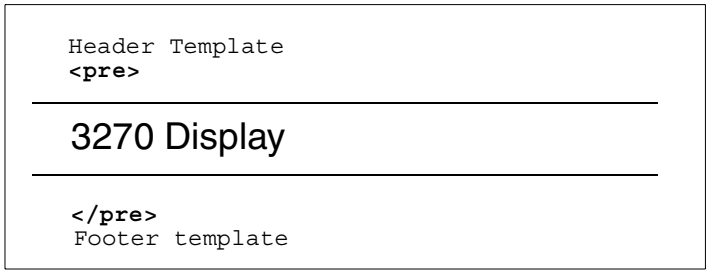

Figure 27. Customizing a non-BMS screen

Header and footer templates can be allocated as follows:

- Header and footer template per transaction
- Header and footer template per CICS region

You supply one or more of the following templates, whose names are defined in the TEMPLATENAME fields of DOCTEMPLATE definitions:

- tranHEAD is a template that is inserted at the head of the HTML page being output for transaction *tra*n*,* if it is installed.
- CICSHEAD is a template that is inserted at the head of the HTML page being output for transactions that do not have a corresponding *tran*HEAD template installed.
- tranFOOT is a template that is inserted at the foot of the HTML page being output for transaction *tran*, if it is installed.
- CICSFOOT is a template that is inserted at the foot of the HTML page being output for transactions that do not have a corresponding *tran*FOOT template installed.

Figure 28 on page 61 shows an example of a non-customized CEMT panel on a Web browser. The default header generated by CICS for a non-BMS template is as follows:

```
<!doctype html public "//W3C//DTD HTML 3.2//EN">
<html>
<head>
<title>CICS Web support screen emulation</title>
<script language="JavaScript">
</script>
<meta name="generator" content="CICS Transaction Server/1.1.1">
</head>
<body>
```

The default footer generated by CICS for a non-BMS template is as follows:

```
</pre>
<input type="submit" name="DFH_PF1" value="PF01">
<input type="submit" name="DFH_PF2" value="PF02">
<input type="submit" name="DFH_PF3" value="PF03">
<input type="submit" name="DFH_PF4" value="PF04">
<input type="submit" name="DFH_PF5" value="PF05">
<input type="submit" name="DFH_PF6" value="PF06">
<input type="submit" name="DFH_PF7" value="PF07">
<input type="submit" name="DFH_PF8" value="PF08">
<input type="submit" name="DFH_PF9" value="PF09”>
<input type=”submit" name="DFH_PF10" value="PF10">
<input type="submit" name="DFH_PF11" value="PF11">
<input type="submit" name="DFH_PF12" value="PF12">
<br>
<input type="submit" name="DFH_PF13" value="PF13">
<input type="submit" name="DFH_PF14" value="PF14">
<input type="submit" name="DFH_PF15" value="PF15">
```

```
<input type="submit" name="DFH_PF16" value="PF16">
<input type="submit" name="DFH_PF17" value="PF17">
<input type="submit" name="DFH_PF18" value="PF18">
<input type="submit" name="DFH_PF19" value="PF19">
<input type="submit" name="DFH_PF20" value="PF20">
<input type="submit" name="DFH_PF21" value="PF21">
<input type="submit" name="DFH_PF22" value="PF22">
<input type="submit" name="DFH_PF23" value="PF23">
<input type="submit" name="DFH_PF24" value="PF24">
<br>
<input type="submit" name="DFH_PA1" value="PA1">
<input type="submit" name="DFH_PA2" value="PA2">
<input type="submit" name="DFH_PA3" value="PA3">
<input type="submit" name="DFH_CLEAR" value="Clear">
<input type="submit" name="DFH_ENTER" value="Enter">
<input type="submit" name="DFH_PEN" value="Pen">
<input type="reset" value="Reset">
</f rm>
</b dy>
</html>
```

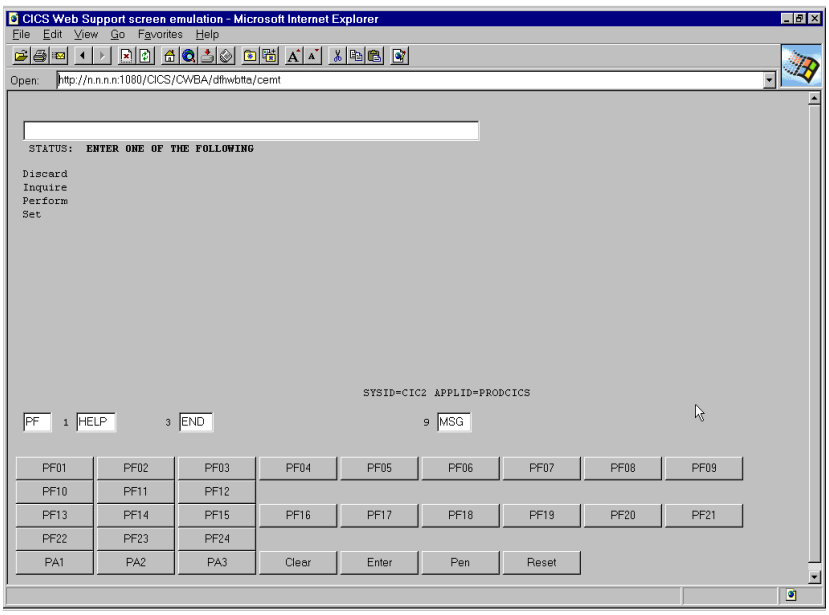

Figure 28. Non-customized CEMT panel on a Web browser

5.5 Bridge exits

An important part of the new 3270 bridge facility is the bridge exit program. The bridge exit program is a user-replacable module that essentially emulates a 3270 terminal transparently to the 3270 transaction being executed. It intercepts all the 3270 input and output data commands issued by the application program and does the necessary data transformation and routing.

Two sample 3270 bridge exit programs that use the CICS Web Support are supplied with CICS:

- DFH0CBRE is a bridge exit program supplied in COBOL source that uses CICS temporary storage (TS) or transient data (TD) queues to pass input and output from and to the user application (another CICS application). This exit can be modified. DFH0CBRE is the most general of the supplied exits. To run a transaction using this exit, you simply issue the following command:

  ```
  START TRANSID() BRDATA() BREXIT(DFH0CBRE)
  ```

The bridge environment is established when CICS receives a START BREXIT TRANSID call that applies only to non-terminal starts. The CICS translator rejects START BREXIT requests when TERMID is specified. The transaction specified by the TRANSID is associated with the bridge exit specified by BREXIT.

If BREXIT is not specified in START BREXIT, then the user transaction RDO definition's B*rexit* value is used. If no bridge exit name is specified, then the default 3270 bridge exit, DFHWBLT, is invoked.

Figure 29 shows the Brexit parameter in our RDO definition for our transaction, "VSAM". As you can see, we did not specify a parameter, which defaults to the bridge exit named DFHWBLT.

Also supplied is DFH0CBRF, which is a COBOL bridge exit formatter designed to work with DFH0CBRE.

- DFHWBLT is the default bridge exit provided by the Web 3270 support. It allows you to access a CICS transaction from the Internet through a Web browser. It is provided in object code only. This exit handles conversion of 3270 data streams to and from HTML and supports both BMS and 3270 terminal control. Support is also provided for customization of the standard HTML output produced.

```
 OBJECT CHARACTERISTICS
CEDA  View TRANSaction( VSAM )
TRANSaction    : VSAM
Group          : FILEA
DEscription    :
PROGram        : VSAMTEST
TWasize        : 00000             0-32767
PROFile        : DFHCICST
PArtitionset   :
STAtus         : Enabled           Enabled | Disabled
PRIMedsize     : 00000             0-65520
TASKDATALoc    : Below             Below | Any
TASKDATAKey    : User              User | Cics
STOrageclear   : No                No | Yes
RUnaway        : System            System | 0 |500-2700000
SHutdown       : Disabled          Disabled | Enabled
Brexit         :
REMOTE ATTRIBUTES
+  DYnamic        : No                No | Yes
```

Figure 29. The RDO DEFINE panel for TRANSACTION resource definition

If nothing is entered for BREXIT, the default bridge exit name DFHWBLT is used.

You must ensure that the LOCAL CBRF terminal is defined for default bridge facility, otherwise you will get a ABRJ abend or even a DFHTF0002 system dump error code 1715. For example:

```
DFHTF0002 DBDCCICS A severe error (code X'1715') has occurred in module DFHTFRF
This terminal is defined in RDO groups DFHTERM and VSETERM. Please do not delete.
```

Additional information on the supplied bridge exits, and how to write your own, is documented in the following publications:

- *CICS Transaction Server for VSE/ESA Internet Guide Release 1,* SC34-5765
- *CICS Transaction Server for VSE/ESA CICS External Interface Guide Release 1,* SC33-1669

Chapter 6. Security and performance

This chapter covers the topics of security and performance. Although it does not go into great detail on either topic, consider the following questions while planning your system requirements for an e-business solution:

- How much security do you need?
- Do you need a 3-tier solution?
- Do you need a firewall?
- Do you need a Proxy server?
- How much tuning is enough?

The answers to these questions depend on the type of data being accessed, and on individual company standards. We feel that in this environment, more security is better than less. With this in mind, we chose to use this section to point you in the right direction. The ultimate selections are yours. This is an overview of the non-SSL facilities available.

6.1 CICS Web Support security

CICS TS provides three sample security programs and two sample authentication programs that you may use for security and authentication. All five programs are written in assembler language.

Sample security programs are:

- DFH$WBSA: Security analyzer
- DFH$WBSC: Security converter
- DFH$WBSN: Sign-on program

To use the security analyzer program, you must specify its name as the Analyzer Program name in the CICS TS RDO definition TCPIPSERVICE. Multiple TCPIPSERVICE definitions may be used to allow access through multiple ports. Each port may have different security criteria established allowing and denying service.

In this case, DFH$WBSA is the analyzer name in the RDO definition TCPIPSERVICE. When the user enters the URL, DFH$WBSA analyzes the request. DFH$WBSA sets the converter to DFH$WBSC. This converter saves the original URL using the state management program, DFH$WBST, and sets the user program to DFH$WBSN. The sign-on program builds an HTML form to be sent to the browser requesting a user ID and password. The encode function of DFH$WBSC creates the HTTP response. The user receives the HTML form and fills it in.

The security analyzer detects the input and calls the security converter, DFH$WBSC, again. DFH$WBSC ensures that DFH$WBSN is called. DFH$WBSN extracts the user ID and password and issues a EXEC CICS VERIFY PASSWORD command to validate the user ID. The encode function of DFH$WBSC builds the HTTP response and adds a redirection to it, specifying the original URL. The browser receives the redirected URL and sends a request for the original program. Through all of this, the state management program has maintained a token which must be carried as a query string through the remainder of the conversation for it to execute under the desired user ID.

This method of prompting for user ID and password has the disadvantage that the user ID and password are transmitted in readable text over the network. This should only be used in an intranet, and only with care.

For additional information about how to manage this type of access, refer to *CICS Transaction Server for VSE/ESA Internet Guide Release 1,* SC34-5765.

Sample authentication programs are:

- DFH$WBAU: Basic authentication analyzer
- DFH$WBSB: Basic authentication converter

These sample programs show how to use the HTTP basic authentication. The first time the browser attempts to access CICS TS, it prompts for a user ID and password, which will be encoded, but not encrypted, for transmission. This user ID and password will be supplied with every request and must be validated by CICS TS for every HTTP request. The second and subsequent requests are not sent as prompts to the user at the browser.

The basic authentication analyzer, DFH$WBSB, looks for an incoming Authorization HTTP header and extracts the user ID. DFH$WBSB always schedules the basic authentication converter, DFH$WBAU.

DFH$WBAU decodes the user ID and password and issues an EXEC CICS VERIFY PASSWORD command. If the user ID/password combination is not valid, or there is no HTTP Authorization header, then an HTTP 401 response is sent back to the browser, and the result is that the user is prompted for a password. If the user ID/password combination is valid, the alias transaction that runs the application program will run under this user ID.

To use this method, DFH$WBSB must be named as the analyzer in your CICS TS TCPIPSERVICE definition.

In this case, the user ID and password are not encrypted, but are encoded using a commonly known translation algorithm. The decode algorithm can be found in the sources of both sample authentication programs.

In addition to the CWS programs, you may also employ a CICS TS security package or VSE/ESA security package to assist in securing your data.

6.1.1 VSE/ESA Web Server security

TCP/IP for VSE/ESA provides VSE/ESA the ability to participate in the Internet and intranet environments. This is the interface through which your communications and data will flow. Therefore, security is a major point to consider. A firewall can be implemented to stop unauthorized access from the Internet or from your intranet. The VSE/ESA Web server itself cannot act as a firewall. If you need the type of security that a firewall provides, it must be implemented outside of the VSE/ESA system.

TCP/IP for VSE/ESA offers a sample security exit that can be found in PRD1.BASE called SECEXIT.A. This program offers the possibility to establish your own security exit to allow or deny access to your VSE/ESA system based on the hardware or IP address. You may also modify the code to check for valid user IDs and passwords. FTP access to POWER queues can be restricted by

customizing the sample member, SECPOWER.A, which is also provided in PRD1.BASE.

TCP/IP for VSE/ESA also provides a function called basic security. This is done by specifying `SET SECURITY=ON` in the IPINITXX.L startup member and the `DEFINE USER,ID=XXXX,PASSWORD=XXXXX`. This forces the clients to log on with a valid user ID and password before they can use the TCP/IP functions. You may also want to use the SET SECURITY_ARP and SET SECURITY_IP commands to provide further security.

When using the HTTP server, the parameter SECURE=YES is available for your use. Review the TCP/IP manuals for the appropriate use of this security feature. Another parameter, CONFINE=YES, may be used to limit sublibrary access to the sublibrary specified by the ROOT parameter. In addition, the HTTP server executes in read-only mode.

TCP/IP for VSE/ESA provides a wealth of functionality. It also provides the ability to force sign-ons, limit access, limit searches, restrict FTP, and more.

6.1.2 Security summary

CICS TS and TCP/IP for VSE/ESA do provide some security. In a limited intranet, this may satisfy your company's security policy. These products, together with an external security manager for VSE/ESA and CICS TS, or perhaps a firewall or proxy server, may be needed. You must determine the levels of security required to protect your company's assets.

6.2 CICS Web Support performance

Not too long ago, performance considerations consisted of CPU processing power, central storage use, and minimizing I/O or having a robust enough I/O subsystem. These concerns still exist.

However, you now have more to consider. Discussing performance issues are not a primary goal of this redbook. It is important, however, to understand the possible performance issues related to CWS.

In general, the following performance tuning issues exist:

- Operating system tuning

  Considerations in this area include issues such as having sufficient storage, processing power, and efficient I/O subsystem. You may also consider items such as utilizing VDISK for your DFHDOC sublibrary.

- CICS TS system tuning

  CICS TS is a more robust subsystem than its predecessors. As a result, more storage is needed for these functions. For CWS, 500 KB of storage for DSA (24-bit) and 2 MB of storage for EDSA (31-bit) are required. In addition, 1 MB of storage for EDSA (31-bit) is required for each *concurrent* user.

  Keep in mind that CWS can heavily use temporary storage. Monitor this closely prior to going into production. If you can use the shared virtual area (SVA) to load CICS TS phases, do it.

- CICS TS application tuning

  Issues here would be topics such as efficient coding, correct LE parameters (confirming to site standards), proper dataset blocking and other issues that most programmers should be aware of, as documented in application programming manuals.

  The expected overhead of CWS functions in addition to resources consumed by applications is, in our opinion, small. We were not able to make any measurements, but for some cases we used the CICS TS auxiliary trace, which showed us only milliseconds of CPU consumptions as possible overhead.

  As stated previously, use care when designing Web pages. Graphics and pictures can severely impact the response time of the network and of end users.

- TCP/IP system tuning

  TCP/IP performance can be affected by partition size and partition priority within your VSE/ESA system. The TCP/IP partition should have a higher priority than CICS TS. In addition, window size, transfer buffers, and MTU/MSS used can have performance implications. More specific TCP/IP for VSE/ESA performance information and performance results are available on the CD-ROM *TCP/IP for VSE/ESA,* SK2T-1336, and at the VSE/ESA Internet home page found at:

  `http://www.s390.ibm.com/vse`

- TCP/IP application tuning

  TCP/IP application considerations should include planing the number of bytes of data being transferred in and out. Obviously, the fewer bytes of data being passed have a greater possibility of performing well.

- Network considerations

  Network considerations include items such as the type of communications adapter being used. What is the LAN/WAN available throughput? Are there bottlenecks at the routers or servers?

Summary

In summary, there is a multitude of performance issues to be concerned with. However, proper planning in advance of implementation will minimize these issues. Once you have implemented CWS, monitoring ensures that you can take appropriate steps in advance of a growing workload.

For more information about performance hints and tips, visit the VSE/ESA home page at the following address. There you can find many performance-related articles and sources of information:

`http://www.ibm.com/vse`

Chapter 7. Problem determination and application debugging

This chapter helps you debug problems in CICS Web Support. For more information, refer to:

- *CICS Transaction Server for VSE/ESA Internet Guide Release 1,* SC34-5765
- *CICS Problem Determination Guide*, GC33-1663

7.1 Documentation about the problem

To investigate a problem, you must review logs provided by VSE/ESA, TCP/IP and CICS. In addition, you should use dumps and traces when identifying the problem. More detailed “Web support information” is written to the trace table if you set the trace level for Socket (SO) and Web (WB) domain to ALL at the “CETR Component Trace Options”. With SO=ALL you can get up to 4000 bytes of data, SO=1 does not show data2.

Messages may be written to:

- Console log
- TCP/IP job log
- CICS log (use Interactive User Interface (IUI) fast path 4.2 to display the logs)
- OLPD log (use IUI fast path 4.1 to display the logs)
- Browser screen (if DFHWBEP is used, see A.7, “Source listing DFHWBEP sample program” on page 99)

Dumps and traces may be written to:

- Transaction dump data sets A or B, if defined
- CICS auxiliary trace data set, if enabled
- VSE/ESA system dump library: This also contains the CICS internal trace, if enabled

7.1.1 Using messages and codes

For messages found on any of the previously mentioned logs, use the VSE/ESA, TCP/IP, or CICS Messages and Codes manuals to find an explanation of the message. Another way to find an explanation of the message is by using the EXPLAIN MESSAGE function in VSE/ESA. On the console, type the message (for example, DFHWB1008), and press PF9 for EXPLAIN. An explanation of the message is displayed.

7.1.2 Using dumps and traces

DFHDU410 is used to print transaction dumps, and to format the trace table. Different options can be used which are described in *CICS Transaction Server for VSE/ESA Operations and Utilities Guide, Release 1,* SC33-1654.

To print the auxiliary trace data set, DFHTU410 is used. The trace can be printed in abbreviated and full format. A detailed description of the parameters can also be found in *CICS Transaction Server for VSE/ESA Operations and Utilities Guide, Release 1,* SC33-1654.

A CICS TS dump is analyzed and formatted with DFHPD410. The job with all INFOANA control statements can be generated in IUI via the dialog STORAGE DUMP MANAGEMENT (fast path 4.3). To select the level of dump formatting printed for CICS Web Support, you can change the control statement SO and WB. For a full description of the control statement, see *CICS Transaction Server for VSE/ESA Internet Guide Release 1,* SC34-5765.

7.2 Debugging with CEDX

Because CWS tasks run as nonterminal transactions within CICS TS, you should use CEDX tranid for debugging CWS tasks. The transaction CEDX is provided to assist in monitoring and debugging. CEDX is defined in the RDO group DFHEDF.

The command syntax for CEDX is as follows:

```
CEDX tranid,ON
```

or

```
CEDX tranid,OFF
```

Note: For COMMAREA programs, use CWBA for the tranid. For 3270-based programs, use *xxxx,* where *xxxx* is your tranid.

CICS TS intercepts the transaction specified on the CEDX tranid command, and displays the EDF diagnostic panels at the terminal on which the EDF command is issued.

CEDX provides the same function and diagnostic display panels as CEDF, and the basic rules for CEDF also apply to CEDX.

Appendix A. Listings

This appendix contains all the code and listing samples we used during this redbook project in Poughkeepsie.

A.1 Listing of DFHSIT for CWS

Following is a listing of DFHSIT with the CWS parameters highlighted.

```
<<..+....1....+....2....+....3....+....4....+....5....+.. MEM=DFHSITC2>>.
         TITLE 'DFHSITC2  -- SIT FOR CICS TS - APPLID PRODCICS'
         PUNCH ' CATALOG DFHSITC2.OBJ REP=YES'
         DFHSIT TYPE=CSECT,                                            *
               AIEXIT=IESZATDX,         AUTO INSTALL TERMINALS         *
               AILDELAY=200,            AUTO INSTALL DEL TERM   PQ03810*
               AIQMAX=100,              AUTO INSTALL CONC TERMINALS    *
               AIRDELAY=700,            AUTO INSTALL ELAPS TIME        *
               AKPFREQ=200,             ACTIVITY KEYPOINTING FREQUENCY *
               APPLID=PRODCICS,    <=== CICS APPLICATION NAME          *
               AUXTR=OFF,               AUXTRACE OFF                   *
               BMS=FULL,                FULL BASIC MAPPING SUPPORT     *
               CLSDSTP=NOTIFY,                                         *
               CMDPROT=YES,             VALIDATE START ADDRESSES       *
               CMDSEC=ASIS,             CMDSEC WILL BE HONORED         *
               CONFDATA=SHOW,           SHOW USER DATA IN TRACE        *
               CONFTXT=NO,              VTAM SHOW USER DATA            *
               CSDACC=READWRITE,        CSD MAY BE UPDATED             *
               CSDLSRNO=1,              CSD LOCAL SHARED RESOURCE      *
               CSDSTRNO=4,              CSD SIMULTANEOUS ACCESS        *
               DATFORM=MMDDYY,          EXTERNAL DATE DISPLAY          *
               DBP=1$,                  DYN. BACKOUT (NO LOCAL DLI I/F)*
               DBUFSZ=2000,             DYN. ADJUSTED BY CICS          *
               DCT=C2,                  FOR SECOND CICS                *
               DFLTUSER=CICSUSER,       DEFAULT USER                   *
               DISMACP=YES,             ASRD ABEND IN CASE MACROS I/F  *
               DLI=NO,                  NO DL/I SUPPORT                *
               DOCCODEPAGE=037,  <===== CODE PAGE                      *
               DSALIM=5M,               UPPER LIMIT OF STORAGE BELOW   *
               DUMP=YES,                IDUMP IN ABEND SITUATIONS      *
               DUMPDS=AUTO,             AUTO SWITCH DUMP DATA SETS     *
               DUMPSW=NEXT,             USERS MAY NOT USE DUMPSW S
               EDSALIM=25M,             DSA ABOVE THE LINE ENV. B      *
               FCT=NO,                  FOR SECOND CICS                *
               GMTEXT='VSE/ESA CICS/TS',          GMM MSG    TEXT      *
               GMTRAN=IEGM,             LOGON TRANSACTION ID           *
               GNTRAN=IEGT,             TIME OUT TRANSACTION           *
               GRPLIST=(VSELST2,MYLST2), <==AUTOINST, TERMS, &   MRO   *
               ICP=COLD,                INTERVAL CONTROL PGM           *
               ICV=1000,                INTERVAL CONTROL EXIT TIME-MS  *
               ICVR=20000,              RUNAWAY TASK TIME              *
               ICVTSD=200,              TERMINAL SCAN DELAY            *
               INTTR=ON,                INTERNAL TRACE                 *
               IRCSTRT=NO,              START IRC DURING INITIALIZATION*
               ISC=YES,                 INTERSYSTEM COMMUNICATION      *
               JCT=NO,                  NO JOURNALLING                 *
               LEVSE=YES,    <========  SUPPORT LE ON THIS CICS        *
               LGNMSG=YES,              VTAM LOGON DATA                *
               MCT=NO,                  NO MONITOR CONTROL TABLE       *
               MN=OFF,                  MONITORING OFF                 *
               MNCONV=NO,               NO MONITORING OF CONVERSATIONAL*
               MNEXC=OFF,               MONITORING EXCEPTION CLASS     *
               MNFREQ=0,                MONITORING FREQUENCY           *
               MNPER=OFF,               MONITORING PERFORMANCE CLASS   *
               MNSYNC=NO,               MONITORING SYNCPOINT           *
               MNTIME=LOCAL,            MONITORING TIME GMT            *
               MROBTCH=1,               MRO BATCHING EVENTS            *
               MROLRM=YES,              MRO LONG RUNNING MIRROR TASK   *
               MSGLVL=1,                MESSAGES ON BOTH SYSLST/SYSLOG *
               MXT=50,                  MAX NO. OF ALL CONCURRENT TASKS*
```

Figure 30. DFHSITC2 (Part 1 of 2)

```
                NATLANG=E,              (E,X) X = S,G,... NLS          *
                PGAICTLG=ALL,           UPDATE AUTOINSTALL PGM DEFINING*
                PGAIEXIT=DFHPGADX,      PGM AUTOINSTALL EXIT           *
                PGAIPGM=ACTIVE, <======= PGM AUTOINSTALL     ACTIVE    *
                PGCHAIN=X/,             BMS CHAINING COMMAND           *
                PGCOPY=COPY/,           BMS COPY COMMAND               *
                PGPURGE=T/,             BMS PURGE COMMAND              *
                PGRET=P/,               BMS RETRIEVAL COMMAND          *
                PLTPI=P2,               POST-INITIALIZATION PLT
                PLTPISEC=CMDSEC,        POST-INITIALIZATION PLT SECURE * /
                PLTPIUSR=CICSUSER,      POST-INITIALIZATION PLT USER   * *
                PLTSD=S2,               SHUTDOWN PLT                   * *
                PRGDLAY=100,            ONE HOUR PURGE DELAY           * *
                PRINT=PA1,              PRINT WITH PA1 AND TCP PRINT   * *
                PRTYAGE=5000,           PRIORITY AGING 5 SECONDS       * *
                RAMAX=256,              SIZE OF I/O AREA FOR RA        * *
                RAPOOL=10,              NUMBER OF FIXED RPLS           * *
                RUWAPOOL=YES,           RESERVE STORAGE RUN UNIT       * *
                SEC=YES,                FULL SECURITY                  * *
                SECPRFX=NO,             NO SECURITY PREFIX             * *
                SNSCOPE=NONE,           SIGNON MORE THAN ONCE          * *
                SPCTR=1,                SPECTRUM OF TRACE              * *
                SPOOL=(YES,B,A),        CICS SPOOLER ACTIVE            * *
                SRT=1$,                 DEFAULT SRT                    * *
                START=AUTO,             LET CICS DETERMINE STARTUP     * *
                STATRCD=ON,             STATISTICS RECORDING           * *
                STGPROT=YES,            STORAGE PROTECTION             * *
                STGRCVY=YES,            RECOVER FROM STORAGE VIOLATION * *
                STNTR=1,                STANDARD TRACING               * *
                SUFFIX=C2,              FOR SECOND CICS                * *
                SVA=NO,                 NO SVA LOADING FOR COEXISTENCE * *
                SYDUMAX=1,              ONLY ONE DUMP PER TABLE ENTRY  *
                SYSIDNT=CIC2,           IDENTIFIER OF THIS CICS        *
                SYSTR=ON,               ALLOW SYSTR CODING             *
                TCP=YES,                TERMINAL CONTROL PROGRAM       *
                TCSACTN=NONE,           TERMINAL CONTROL SHUTDOWN      *
                TCPIP=YES,     <======== CWS OVER TCP/IP * * * * *      *
                TCT=NO,                 FOR AUTOINSTALLED TERMINALS    *
                TCTUALOC=BELOW,         TCTUA STORAGE BELOW II         *
                TD=(3,3),               THREE BUFFERS & THREE STRINGS  *
                TRDUMAX=1,              1 XACTION DUMP PER TABLE ENTRY *
                TRTABSZ=80,             SIZE OF INTERNAL TRACE TABLE   *
                TRTRANSZ=80,            TRANSACTION DUMP TRACE SIZE    *
                TRTRANTY=TRAN,          TRANSACTION DUMP TRACE TYPE    *
                TS=(,0,0),     <======== EIGHT BUFFERS & EIGHT STRINGS  *
                TSMGSET=20,             20 MESSAGE SET ENTRIES         *
                TST=NO,                 NO TEMP STORAGE TABLE INCLUDED *
                USERTR=ON,              ALLOW USER TO SET MASTER TRACE *
                VTPREFIX=C,             COMMON CLIENT TERM NAME PREFIX *
                WEBDELAY=(5,60),  <===== CWS NETWORK DELAY             *
                WRKAREA=512,            COMMON WORK AREA OF THE CSA    *
                XCMD=NO,                COMMAND SECURITY               *
                XDCT=NO,                DCT SECURITY                   *
                XFCT=NO,                FCT SECURITY                   *
                XJCT=NO,                JCT SECURITY                   *
                XLT=SP,                 SUPPLIED WITH VSE/ESA          *
                XPCT=NO,                PCT SECURITY                   *
                XPPT=NO,                PPT SECURITY                   *
                XPSB=NO,                PSB SECURITY                   *
                XRF=NO,                 NO XRF SUPPORT INCLUDED        *
                XUSER=NO,               SURROGATE USER                 *
                XTST=NO,                TST SECURITY                   * /
                DUMMY=DUMMY             TO END MACRO                     *
        END     DFHSITBA                                                 *
/*                                                                       *
// IF $MRC GT 4 THEN                                                     *
// GOTO NOLINK                                                           *
// EXEC LNKEDT,PARM='MSHP'                                               *
/. NOLINK                                                                *
/*                                                                       *
/&                                                                       *
* $$ EOJ                                                                 *
***** END OF FILE *****                                                  *
```

Figure 31. DFHSITC2 (Part 2 of 2)

A.2 Listing of RDO definitions: CWS parameters highlighted

The following figures show RDO definitions for DOCTEMPLATEs and for TCPIPSERVICE.

A.2.1 Listing defined DOCTEMPLATEs

```
CEDA V DOCTEMPLATE(EXTRCT*) GR(*)
ENTER COMMANDS
 NAME     TYPE         GROUP                                  DATE   TIME
 EXTRCTF1 DOCTEMPLATE  EXTRCT   v                             00.248 18.12.50
 EXTRCTF2 DOCTEMPLATE  EXTRCT                                 00.248 18.13.16
 EXTRCTF3 DOCTEMPLATE  EXTRCT                                 00.248 18.13.28
 EXTRCTF4 DOCTEMPLATE  EXTRCT                                 00.248 18.13.41
 EXTRCTH1 DOCTEMPLATE  EXTRCT                                 00.248 18.13.56
 EXTRCTH2 DOCTEMPLATE  EXTRCT                                 00.248 18.14.11
 EXTRCTH3 DOCTEMPLATE  EXTRCT                                 00.248 18.14.20
 EXTRCTH4 DOCTEMPLATE  EXTRCT                                 00.248 18.14.29









                                                  SYSID=CIC1 APPLID=DBDCCICS
 RESULTS: 1 TO 8 OF 8                        TIME:  18.45.38  DATE: 00.255
```

Figure 32. CEDA V DOCTEMPLATE(EXTRCT) GROUP(*)*

```
OBJECT CHARACTERISTICS                                  CICS RELEASE = 0411
 CEDA  View Doctemplate( EXTRCTF1 )
  Doctemplate    : EXTRCTF1
  Group          : EXTRCT
  Description    :
 FULL TEMPLATE NAME
  TEmplatename   : EXTRCTF1
 ASSOCIATED CICS RESOURCE
  File           :
  TSqueue        :
  TDqueue        :
  Program        :
  Exitpgm        :
 TEMPLATE SUBLIBRARY
  Library        :
  Membername     : EXTRCTF1
 TEMPLATE PROPERTIES
  Appendcrlf     : Yes               Yes | No
  TYpe           : Ebcdic            Binary | Ebcdic

                                              SYSID=CIC1 APPLID=DBDCCICS
```

Figure 33. CEDA V definitions of DOCTEMPLATE EXTRCTF1

A.2.2 Listing of RDO TCPIPSERVICE

```
 OBJECT CHARACTERISTICS                                    CICS RELEASE = 0411
  CEDA  View TCpipservice( HTTPNSSL )
    TCpipservice   : HTTPNSSL
    Group          : F8CWS
    Description    : CICS Web TCPIPSERVICE
    Urm            : DFHWBADX
    Portnumber     : 01080             1-65535
    STatus         : Open              Open | Closed
    TRansaction    : CWXN
    Backlog        : 00005             0-32767
    TSqprefix      :
    Ipaddress      :
    SOcketclose    : No                No | 0-240000









                                                  SYSID=CIC1 APPLID=DBDCCICS

 PF 1 HELP 2 COM 3 END            6 CRSR 7 SBH 8 SFH 9 MSG 10 SB 11 SF 12 CNCL
```

Figure 34. RDO TCPIPSERVICE definition

A.3 Listing of TCP/IP IPINIT00 with CWS parameters highlighted

```
// EXEC LIBR,PARM='MSHP;A S=PRD2.CONFIG'
 CATALOG IPINIT00.L                        REPLACE=YES

 *                                          *
 *        Define the constants              *
 *                                          *
 *------------------------------------------*
 SET IPADDR   = N.NN.NN.NN                                    <---------
 SET MASK     = 255.255.255.000
 *
 SET ALL_BOUND        = 30000
 SET WINDOW           = 4096
 SET TRANSFER_BUFFERS = 20
 SET TELNETD_BUFFERS  = 20
 SET RETRANSMIT       = 100
 SET DISPATCH_TIME    = 30
 SET REDISPATCH       = 10
 *
 SET SECURITY           = ON
 SET ADDITIONAL_WINDOW  = 70000
 SET PING_MESSAGE       = ON
 SET MAX_SEGMENT        = 32684
 *
 GATEWAY ON
 *------------------------------------------*
 *                                          *
 *        Wait for VTAM Startup             *
 *                                          *
 *------------------------------------------*
 WAIT     VTAM
 *------------------------------------------*
 *                                          *
 *        Define the Communication Links    *
 *                                          *
 *------------------------------------------*
 *
   DEFINE LINK,ID=VM_TCPIP,TYPE=CTCA,DEV=C22,MTU=1500,  -     <---------
HOSTNAME=MYVMVSE,HOSTAPPL=TCPIP
 *
 *------------------------------------------*
 *                                          *
 *        Define Routine Information        *
 *                                          *
 *------------------------------------------*
   DEFINE ROUTE,ID=VMESA,LINKID=VM_TCPIP,IPADDR=0.0.0.0, -    <---------
GATEWAY=N.NN.NN.NN
 *------------------------------------------*
 *                                          *
 *        Define Names                      *
 *                                          *
 *------------------------------------------*
```

Figure 35. IPINIT00 (Part 1 of 3)

```
DEFINE NAME,NAME=MYVMVSE,IPADDR=N.NN.NN.NN                    <---------
DEFINE NAME,NAME=GREG,IPADDR=N.NN.NN.NN
DEFINE NAME,NAME=HANS,IPADDR=N.NN.NN.NN
DEFINE NAME,NAME=BENN,IPADDR=N.NN.NN.NN
DEFINE NAME,NAME=KENN,IPADDR=N.NN.NN.NN
*-----------------------------------------*
*                                         *
*        Define Name Server Support       *
*                                         *
*-----------------------------------------*
SET DNS1=N.NN.NN.NN                                           <---------
*-----------------------------------------*
*                                         *
*        Define HTTPD                     *
*                                         *
*-----------------------------------------*
DEFINE HTTPD,ID=HTTP1,ROOT='DFHHTML.DFHDOC',SECURE=NO,CONFINE=NO
*-----------------------------------------*
*                                         *
*        Define Telnet Daemons            *
*                                         *
*-----------------------------------------*
DEFINE TELNETD,ID=LU,TERMNAME=TELNLU,TARGET=DBDCCICS,PORT=23,COUNT=2
*-----------------------------------------*
*                                         *
*        Define FTP Daemons               *
*                                         *
*-----------------------------------------*
DEFINE FTPD,ID=FTP,PORT=21,COUNT=2
*-----------------------------------------*
*                                         *
*        Automated Line Printer Client    *
*                                         *
*-----------------------------------------*
DEFINE EVENT,ID=LST_LISTEN,TYPE=POWER,CLASS=X,QUEUE=LST,ACTION=LPR

*-----------------------------------------*
*                                         *
*        Setup the File System            *
*                                         *
*-----------------------------------------*
DEFINE FILESYS,LOCATION=SYSTEM,TYPE=PERM
*
DEFINE FILE,PUBLIC='IJSYSRS',DLBL=IJSYSRS,TYPE=LIBRARY
DEFINE FILE,PUBLIC='PRD1',DLBL=PRD1,TYPE=LIBRARY
DEFINE FILE,PUBLIC='PRD2',DLBL=PRD2,TYPE=LIBRARY
DEFINE FILE,PUBLIC='DFHHTML',DLBL=DFHHTML,TYPE=LIBRARY
DEFINE FILE,PUBLIC='POWER',DLBL=IJQFILE,TYPE=POWER
```

Figure 36. IPINIT00 (Part 2 of 3)

```
*
MODIFY FILE,PUBLIC='VSE.SYSRES.LIBRARY',TYPE=LIBRARY
MODIFY FILE,PUBLIC='VSE.PRD1.LIBRARY',TYPE=LIBRARY
MODIFY FILE,PUBLIC='VSE.PRD2.LIBRARY',TYPE=LIBRARY
MODIFY FILE,PUBLIC='VSE.DUMP.LIBRARY',TYPE=LIBRARY
MODIFY FILE,PUBLIC='VSE.PRIMARY.LIBRARY',TYPE=LIBRARY
*
MODIFY FILE,PUBLIC='ICCF.LIBRARY',TYPE=ICCF
MODIFY FILE,PUBLIC='VSE.POWER.QUEUE.FILE',TYPE=POWER
*-----------------------------------------*
*                                         *
*        Setup member NETWORK.L to        *
*        execute once the engine has      *
 *     been activated                       /*
*                                         *
*-----------------------------------------*
INCLUDE NETWORK,DELAY
/+
/*
/&
* $$ EOJ
```

Figure 37. IPINIT00 (Part 3 of 3)

A.4 Listing of program samples including JCL

This section contains all HTML documents and CICS assembler sample programs for the CWS COMMAREA approach. In addition, the catalog and compile jobs are listed.

A.4.1 All HTML documents

n.nn.nn.nnn in HTML documents refers to the TCP/IP address.

```
CATALOG INDEX.HTML                          REPLACE=YES
<html>
<head>
<Title>ESA250 - Running TCP/IP for VSE/ESA 1.4</TITLE>
</head>
<body>
<h2>ESA250 - Running TCP/IP for VSE/ESA 1.4</h2>
<p><hr>
<p>
<h2>CICS Web Support</h2>
<p>
Pressing <a href="DEMO.HTML">here</a>
will take you to a page demonstrating
CICS Web Support on CICS Transaction Server for VSE/ESA 1.1.1.
<hr>
<h3>Just try it out</h3>
<p>
<hr>
This Home page has been updated on 11th September 2000.
</body>
</html>
/+
```

Figure 38. INDEX.HTML document

```
CATALOG DEMO.HTML                          REPLACE=YES
<html>
<head>
<title>ESA250 - CICS Web Support on VSE/ESA</title>
</head>
<body>
<h1>ESA250 - Running CICS Web Support on VSE/ESA</h1>
<p><hr>
<p>
Press
<a href="http://n.nn.nn.nnn:1080/cics/cwba/DFH$WB1A">
DFH$WB1A</a>
to see the CICS Web Support sample application in action.
<p>
What is actually passed to the Web Browser and thus to CICS
Transaction Server for VSE/ESA is:
"http://n.nn.nn.nnn:1080/cics/cwba/DFH$WB1A"
<hr>
<p>
Press
<a href="http://n.nn.nn.nnn:1080/cics/cwba/EXTRCT1">
EXTRCT1</a>
to see the CICS Web Support running an application that will
call the EXEC CICS EXTRACT command to determine exactly what CICS
environment the program is executing in.
<p>
What is actually passed to the Web Browser and thus to CICS
Transaction Server for VSE/ESA is:
"http://n.nn.nn.nnn:1080/cics/cwba/EXTRCT1"
<hr>
<p>
This page updated 11th September 2000.
</body>
</html>
/+
```

Figure 39. DEMO.HTML document

```
CATALOG EXTRCTH1.HTML                      REPLACE=YES
<html>
<head>
<title>EXTRACT - CICS Web Support on VSE/ESA</title>
</head>
<body>
<h1>EXTRACT - Running CICS Web Support on VSE/ESA</h1>
<p>With no image help at all
<p><hr>
/+
```

Figure 40. Header document EXTRCTH1.HTML for sample EXTRCT1

```
CATALOG EXTRCTF1.HTML                    REPLACE=YES
<p><hr>
<form method=POST
ACTION="http://n.nn.nn.nnn:1080/CICS/CWBA/EXTRCT2">
<input type=submit value="Click here for a MastHead">
</form>
<form method=POST
ACTION="http://n.nn.nn.nnn:1080/CICS/CWBA/EXTRCT3">
<input type=submit value="Click here for a MastHead and Backdrop">
</form>
<form method=POST
ACTION="http://n.nn.nn.nnn/DEMO.HTML">
<input type=submit value="Return">
</form>
<p><hr>
<p>
This page is a demonstration of EXEC CICS EXTRACT commands.
This page updated 11th September 2000.
</body>
</html>
/+
```

Figure 41. Footer document EXTRCTF1.HTML for sample EXTRCT1

```
CATALOG EXTRCTH2.HTML                    REPLACE=YES
<html>
<head>
<title>EXTRACT - CICS Web Support on VSE/ESA</title>
</head>
<body>
<img alt="" src="/DFHWBIMG/masthead.gif">
<h1>EXTRACT - Running CICS Web Support on VSE/ESA</h1>
<p>with a masthead
<p><hr>
/+
```

Figure 42. Header document EXTRCTH2.HTML for sample EXTRCT2

```
CATALOG EXTRCTF2.HTML                    REPLACE=YES
<p><hr>
<form method=POST
ACTION="http://n.nn.nn.nnn:1080/CICS/CWBA/EXTRCT3">
<input type=submit value="Click here for a Background as well">
</form>
<form method=POST
ACTION="http://n.nn.nn.nnn:1080/CICS/CWBA/EXTRCT1">
<input type=submit value="Return">
</form>
<p><hr>
<p>
This page is a demonstration of EXEC CICS EXTRACT commands.
This page updated 11th September 2000.
</body>
</html>
/+
```

Figure 43. Footer document EXTRCTF2.HTML for sample EXTRCT2

```
CATALOG EXTRCTH3.HTML                    REPLACE=YES
<html>
<head>
<title>EXTRACT - CICS Web Support on VSE/ESA</title>
</head>
<body background="/DFHWBIMG/background1.gif">
<img alt="" src="/DFHWBIMG/masthead.gif">
<h1>EXTRACT - Running CICS Web Support on VSE/ESA</h1>
<p>with a masthead and a background
<p><hr>
/+
```

Figure 44. Header document EXTRCTH3.HTML for sample EXTRCT3

```
CATALOG EXTRCTF3.HTML                    REPLACE=YES
<p><hr>
<p>Click on one of these buttons to change the backdrop:
<form method=POST
ACTION="http://n.nn.nn.nnn:1080/CICS/CWBA/EXTRCT4">
<input type=submit name="texture" value="1">
<input type=submit name="texture" value="2">
<input type=submit name="texture" value="3">
<input type=submit name="texture" value="4">
<input type=submit name="texture" value="5">
<input type=submit name="texture" value="6">
</form>
<form method=POST
ACTION="http://n.nn.nn.nnn:1080/CICS/CWBA/EXTRCT2">
<input type=submit value="Return">
</form>
<p><hr>
<p>
This page is a demonstration of EXEC CICS EXTRACT commands.
This page updated 11th September 2000.
</body>
</html>
/+
```

Figure 45. Footer document EXTRCTF3.HTML for sample EXTRCT3

```
CATALOG EXTRCTH4.HTML                    REPLACE=YES
<html>
<head>
<title>EXTRACT - CICS Web Support on VSE/ESA</title>
</head>
<body
/+
```

Figure 46. Header document EXTRCTH4.HTML for sample EXTRCT4

```
CATALOG EXTRCTF4.HTML                    REPLACE=YES
<p><hr>
<form method=POST
ACTION="http://n.nn.nn.nnn/">
<input type=submit value="Start again">
</form>
<form method=POST
ACTION="http://n.nn.nn.nnn:1080/cics/cwba/EXTRCT3">
<input type=submit value="Return">
</form>
<p><hr>
<p>
This page is a demonstration of EXEC CICS EXTRACT commands.
This page updated 11th September 2000.
</body>
</html>
/+
```

Figure 47. Footer document EXTRCTF4.HTML for sample EXTRCT4

A.4.2 All HTML documents for VSAMHTML sample program

The sample code below is the VSAMHTML program.

```
* * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
* VSAMHTML -- PROGRAM FOR ACCESSING FILEA WITH CWS            *
* Please NOTE: The funtionality of this program is equivalent *
* to the VSAMTEST 3270 sample program.                        *
* It should just demonstrate how a 3270 program could be      *
* converted to a web enabled program with WEB and DOCUMENT    *
* API.                                                        *
* Due to shortage of time READ, BROWSE and L-BROWSE have been *
* tested, not ADD, DELETE and UPDATE. Therefore these three   *
* functions are disabled. A plain document is sent instead.   *
* Used DOCTEMPLATES:                                          *
* VSAMHEAD, VSAMBODY and VSAMFOOT                             *
* have to be defined via RDO.                                 *
* * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
         PRINT GEN
*********************************************************************
DFHEISTG DSECT
WORK     DS    D
VSAMAREA DS    CL80
SCRATCH  DS    CL80             SCRATCH INPUT AREA USED FOR UPDATE
DOCTOKEN DS    CL16
FUNCTION DS    CL8
FUNCTIOL DS    F
VSAMKEY  DS    CL6
VSAMKEYL DS    F
ADDREC   DS    CL80
ADDRECL  DS    F
MOVEKEY  DS    CL6
MOVEDATA DS    CL73
R8       EQU   8
*        COPY  VSAMSET
*********************************************************************
*        PROGRAM START                                              *
*********************************************************************
         PRINT NOGEN
VSAMHTML CSECT
VSAMHTML AMODE 31                                                  55200000
VSAMHTML RMODE ANY                                                 56000000
         B     MVC
         DC    CL8'VSAMHTML'
MVC      DS    0H
         MVC   FUNCTIOL,=F'8'
         MVC   VSAMKEYL,=F'6'
         MVC   ADDRECL,=F'73'
         EXEC CICS HANDLE CONDITION NOTFND(SENDHTML)
         EXEC CICS HANDLE CONDITION ENDFILE(SENDHTML)
* Address COMMAREA for viewing of input data stream
```

```
         EXEC CICS ADDRESS COMMAREA(R8)
* analyse function
         EXEC CICS WEB READ FORMFIELD(TEXTURE) NAMELENGTH(L'TEXTURE)   *
               VALUE(FUNCTION) VALUELENGTH(FUNCTIOL) NOHANDLE
* analyse key
         EXEC CICS WEB READ FORMFIELD(KEY) NAMELENGTH(L'KEY)           *
               VALUE(VSAMKEY) VALUELENGTH(VSAMKEYL) NOHANDLE
         CLI   FUNCTION,C'R'       IF FUNCTION IS READ
         BE    READ
         CLI   FUNCTION,C'U'       IF FUNCTION IS UPDATE
         BE    SENDHTML    (UPDATE DISABLED)
         CLI   FUNCTION,C'A'       IF FUNCTION IS ADD
         BE    SENDHTML    (ADD DISABLED)
         CLI   FUNCTION,C'D'       IF FUNCTION IS DELETE
         BE    SENDHTML    (DELETE DISABLED)
         CLI   FUNCTION,C'B'       IF FUNCTION IS BROWSE
         BE    BROWSE
         CLI   FUNCTION,C'L'    IF FUNCTION IS LONG BROWSE (10 RECORDS)
         BE    BROWSE10
* Create document with header template
SENDHTML EXEC CICS DOCUMENT CREATE DOCTOKEN(DOCTOKEN)                  *
               TEMPLATE('VSAMHEAD')
* Insert key
         EXEC CICS DOCUMENT SET SYMBOL('KEY') VALUE(MOVEKEY)           *
               DOCTOKEN(DOCTOKEN) LENGTH(VSAMKEYL)
* Insert data
         EXEC CICS DOCUMENT SET SYMBOL('RECORD') VALUE(MOVEDATA)       *
               DOCTOKEN(DOCTOKEN) LENGTH(ADDRECL)
* Insert body template
         EXEC CICS DOCUMENT INSERT DOCTOKEN(DOCTOKEN)                  *
               TEMPLATE('VSAMBODY')
* Insert footer template
         EXEC CICS DOCUMENT INSERT DOCTOKEN(DOCTOKEN)                  *
               TEMPLATE('VSAMFOOT')
* Send complete document
         EXEC CICS WEB SEND DOCTOKEN(DOCTOKEN)                         *
               CLNTCODEPAGE('iso-8859-1')
         B     RETURN
READ     EQU   *
         EXEC CICS READ DATASET('FILEA') RIDFLD(VSAMKEY)               *
               INTO(VSAMAREA)
         MVC   MOVEKEY(6),VSAMKEY
         MVC   MOVEDATA(73),VSAMAREA+7
         B     SENDHTML
UPDATE   DS    0H               DO READ/UPDATE OF RECORD
         EXEC CICS READ DATASET('FILEA') RIDFLD(VSAMKEY)               *
               INTO(VSAMAREA) UPDATE
         MVC   MOVEKEY(6),VSAMKEY
         MVC   MOVEDATA(73),VSAMAREA+7
         B     SENDHTML
REWRITE  DS    0H               DO ONE REWRITE OF UPDATED RECORD
         EXEC CICS REWRITE DATASET('FILEA') FROM(VSAMAREA)
         B     RETURN
ADD      DS    0H               ADD ONE RECORD TO THE FILE
         EXEC CICS WEB READ FORMFIELD(RECORD) NAMELENGTH(L'RECORD)     *
               VALUE(ADDREC) VALUELENGTH(ADDRECL) NOHANDLE
         MVC   VSAMAREA+1(6),VSAMKEY
         MVC   VSAMAREA+7(73),ADDREC
         EXEC CICS WRITE DATASET('FILEA') RIDFLD(VSAMKEY)              *
               FROM(VSAMAREA)
         B     SENDHTML
DELETE   DS    0H               DELETE ONE RECORD FROM THE FILE
         EXEC CICS READ DATASET('FILEA') RIDFLD(VSAMKEY)               X
               INTO(VSAMAREA) UPDATE
         EXEC CICS DELETE DATASET('FILEA')
         B     SENDHTML
BROWSE   DS    0H
         EXEC CICS STARTBR DATASET('FILEA') RIDFLD(VSAMKEY)
         EXEC CICS READNEXT DATASET('FILEA') INTO(VSAMAREA)            X
               RIDFLD(VSAMKEY)
         EXEC CICS ENDBR DATASET('FILEA')
         MVC   MOVEKEY(6),VSAMKEY
         MVC   MOVEDATA(73),VSAMAREA+7
         B     SENDHTML
BROWSE10 DS    0H               DO 'LIMIT / 10' CYCLES OF ...
         MVC   KEYB,VSAMKEY     ... STARTBR, 10 READNEXTS, ENDBR
         EXEC CICS STARTBR DATASET('FILEA') RIDFLD(KEYB)
         LA    8,10             LOAD LOOP COUNTER ...
```

```
BROWSE12 DS    0H               ... 10 READNEXTS PER CYCLE
         EXEC CICS READNEXT DATASET('FILEA') INTO(VSAMAREA)           X
               RIDFLD(KEYB)
         MVC   MOVEKEY(6),VSAMAREA+1
         MVC   MOVEDATA(73),VSAMAREA+7
         BCT   8,BROWSE12       COUNT, BRANCH IF NOT DONE
         EXEC CICS ENDBR DATASET('FILEA')
         B     SENDHTML
RETURN   DS    0H               DONE -- RETURN TO CICS
         EXEC CICS RETURN
*  CONSTANTS -- PROGRAM STATIC STORAGE
TEXTURE  DC    C'TEXTURE'
KEY      DC    C'KEY'
RECORD   DC    C'RECORD'
         DS    0F
AENDERN  DC    CL20'PLEASE UPDATE RECORD'
WRONG    DC    CL20'WRONG INPUT'
NOTMSG   DC    CL20'RECORD NOT FOUND'
COUNT    DS    X'00'            COUNT FOR BROWSE
ZERO     DC    PL6'0'           PACKED ZERO
ONE      DC    PL6'1'           PACKED ONE
TEN      DC    PL6'10'          PACKED TEN
KEYB     DS    CL6              FIELD FOR L10 BROWSE
         SPACE 2
         END   VSAMHTML
/*
```

The sample code below is VSAMBODY.HTML for the VSAMHTML program.

```
CATALOG VSAMBODY.HTML                    REPLACE=YES
<form method=post
ACTION="http://9.23.37.206:1080/CICS/CWBA/VSAMHTML">
<p>
RECORDKEY
<p>
<input type=text name="KEY" size=6 maxlength=6 value="&KEY;">
<p>
RECORDDATA
<p>
<input type=text name="RECORD" size=73 maxlength=73 value="&RECORD;">
<p>
FUNCTION
<p>
<input type=submit name="texture" value="Read    ">
<input type=submit name="texture" value="Add     ">
<input type=submit name="texture" value="Update  ">
<input type=submit name="texture" value="Delete  ">
<input type=submit name="texture" value="Browse  ">
<input type=submit name="texture" value="L-Browse">
</form>
/+
/*
```

The sample code below is VSAMHEAD.HTML for the VSAMHTML program.

```
CATALOG VSAMHEAD.HTML                    REPLACE=YES
<html>
<head>
<title>CICS Web Support: accessing FILEA with CWS</title>
</head>
<body>
<H1>CICS Web Support: accessing FILEA with CWS</h1>
<p>
<h1>VSAM HTML Test Map</h1>
<p>
/+
/*
```

The sample code below is VSAMFOOT.HTML for the VSAMHTML program.

```
CATALOG VSAMFOOT.HTML                      REPLACE=YES
<br>
<form method=post>
<input type="submit" name="DFH_CLEAR" value="Clear">
<input type="submit" name="DFH_ENTER" value="Enter">
<input type="reset" value="Reset">
</form>
</body></html>
/+
/*
```

A.4.3 CICS assembler samples

```
DFHEISTG DSECT
DOCTOKEN DS    CL16
CLNTNAML DS    F
CLNTNAME DS    CL80
SRVRNAML DS    F
SRVRNAME DS    CL80
CLNTADRL DS    F
CLNTADDR DS    CL15
         DS    0F
SERVADRL DS    F
SERVADDR DS    CL15
         DS    0F
SSLTYPE  DS    F
TCPIPSER DS    CL8
PRTNUMB  DS    CL5
         DS    0F
EXTRCT1  CSECT
EXTRCT1  AMODE 31                                                  55200000
EXTRCT1  RMODE ANY                                                 56000000
         EXEC CICS HANDLE CONDITION INVREQ(DOCINSRT)
         EXEC CICS DOCUMENT CREATE DOCTOKEN(DOCTOKEN)              *
               TEMPLATE('EXTRCTH1')
*
         MVC   CLNTNAML,=F'80'
         MVC   SRVRNAML,=F'80'
         MVC   CLNTADRL,=F'15'
         MVC   SERVADRL,=F'15'
* Retrieve some TCPIP related information
         EXEC CICS EXTRACT TCPIP                                   *
               SERVERNAME(SRVRNAME) SNAMELENGTH(SRVRNAML)
         EXEC CICS EXTRACT TCPIP                                   *
               SERVERADDR(SERVADDR) SADDRLENGTH(SERVADRL)
         EXEC CICS EXTRACT TCPIP                                   *
               TCPIPSERVICE(TCPIPSER)
         EXEC CICS EXTRACT TCPIP                                   *
               PORTNUMBER(PRTNUMB)
         EXEC CICS EXTRACT TCPIP                                   *
               CLIENTADDR(CLNTADDR) CADDRLENGTH(CLNTADRL)
         EXEC CICS EXTRACT TCPIP                                   *
               CLIENTNAME(CLNTNAME) CNAMELENGTH(CLNTNAML)
* Insert client name
DOCINSRT EXEC CICS DOCUMENT INSERT DOCTOKEN(DOCTOKEN)              *
               TEXT(CLNTINFO) LENGTH(CLNTINFL)
         EXEC CICS DOCUMENT INSERT DOCTOKEN(DOCTOKEN)              *
               TEXT(CLNTNAME) LENGTH(CLNTNAML)
* Insert client address
         EXEC CICS DOCUMENT INSERT DOCTOKEN(DOCTOKEN)              *
               TEXT(ADDRINFO) LENGTH(ADDRINFL)
         EXEC CICS DOCUMENT INSERT DOCTOKEN(DOCTOKEN)              *
               TEXT(CLNTADDR) LENGTH(CLNTADRL)
* Insert server name
         EXEC CICS DOCUMENT INSERT DOCTOKEN(DOCTOKEN)              *
               TEXT(SRVRINFO) LENGTH(SRVRINFL)
         EXEC CICS DOCUMENT INSERT DOCTOKEN(DOCTOKEN)              *
               TEXT(SRVRNAME) LENGTH(SRVRNAML)
* Insert server address
         EXEC CICS DOCUMENT INSERT DOCTOKEN(DOCTOKEN)              *
               TEXT(SDDRINFO) LENGTH(SDDRINFL)
         EXEC CICS DOCUMENT INSERT DOCTOKEN(DOCTOKEN)              *
               TEXT(SERVADDR) LENGTH(SERVADRL)
* Insert TCPIPSERVICE being used
         EXEC CICS DOCUMENT INSERT DOCTOKEN(DOCTOKEN)              *
               TEXT(TCPSINFO) LENGTH(TCPSINFL)
         EXEC CICS DOCUMENT INSERT DOCTOKEN(DOCTOKEN)              *
               TEXT(TCPIPSER) LENGTH(L'TCPIPSER)
```

Figure 48. Source of CICS assembler program EXTRCT1 (Part 1 of 2)

```
* Insert Port number being used
         EXEC CICS DOCUMENT INSERT DOCTOKEN(DOCTOKEN)                  *
               TEXT(PORTINFO) LENGTH(PORTINFL)
         EXEC CICS DOCUMENT INSERT DOCTOKEN(DOCTOKEN)                  *
               TEXT(PRTNUMB) LENGTH(L'PRTNUMB)
* Insert footer for document
         EXEC CICS DOCUMENT INSERT DOCTOKEN(DOCTOKEN)                  *
               TEMPLATE('EXTRCTF1')
* Send complete document
         EXEC CICS WEB SEND DOCTOKEN(DOCTOKEN)                         *
               CLNTCODEPAGE('iso-8859-1')
         EXEC CICS RETURN
CLNTINFO DC   C'<p>Client Name : '
CLNTINFL DC   F'17'
SRVRINFO DC   C'<p>Server Name : '
SRVRINFL DC   F'17'
ADDRINFO DC   C'<p>Client Address : '
ADDRINFL DC   F'20'
SDDRINFO DC   C'<p>Server Address : '
SDDRINFL DC   F'20'
TCPSINFO DC   C'<p>TCPIPSERVICE name: '
TCPSINFL DC   F'22'
PORTINFO DC   C' - on Port Number: '
PORTINFL DC   F'19'
         END  EXTRCT1
/*
```

Figure 49. Source of CICS assembler program EXTRCT1 (Part 2 of 2)

```
DFHEISTG DSECT
DOCTOKEN DS    CL16
CLNTNAML DS    F
CLNTNAME DS    CL80
SRVRNAML DS    F
SRVRNAME DS    CL80
CLNTADRL DS    F
CLNTADDR DS    CL15
         DS    0F
SERVADRL DS    F
SERVADDR DS    CL15
         DS    0F
SSLTYPE  DS    F
TCPIPSER DS    CL8
PRTNUMB  DS    CL5
         DS    0F
EXTRCT2  CSECT
EXTRCT2  AMODE 31                                                 55200000
EXTRCT2  RMODE ANY                                                56000000
         EXEC CICS HANDLE CONDITION INVREQ(DOCINSRT)
         EXEC CICS DOCUMENT CREATE DOCTOKEN(DOCTOKEN)                  *
               TEMPLATE('EXTRCTH2')
*
         MVC   CLNTNAML,=F'80'
         MVC   SRVRNAML,=F'80'
         MVC   CLNTADRL,=F'15'
         MVC   SERVADRL,=F'15'
*
```

Figure 50. Source of CICS assembler program EXTRCT2 (Part 1 of 2)

```
* Retrieve some TCPIP related information
         EXEC CICS EXTRACT TCPIP                                        *
               SERVERNAME(SRVRNAME) SNAMELENGTH(SRVRNAML)
         EXEC CICS EXTRACT TCPIP                                        *
               SERVERADDR(SERVADDR) SADDRLENGTH(SERVADRL)
         EXEC CICS EXTRACT TCPIP                                        *
               TCPIPSERVICE(TCPIPSER)
         EXEC CICS EXTRACT TCPIP                                        *
               PORTNUMBER(PRTNUMB)
         EXEC CICS EXTRACT TCPIP                                        *
               CLIENTADDR(CLNTADDR) CADDRLENGTH(CLNTADRL)
         EXEC CICS EXTRACT TCPIP                                        *
               CLIENTNAME(CLNTNAME) CNAMELENGTH(CLNTNAML)
* Insert client name
DOCINSRT EXEC CICS DOCUMENT INSERT DOCTOKEN(DOCTOKEN)                   *
               TEXT(CLNTINFO) LENGTH(CLNTINFL)
         EXEC CICS DOCUMENT INSERT DOCTOKEN(DOCTOKEN)                   *
               TEXT(CLNTNAME) LENGTH(CLNTNAML)
* Insert client address
         EXEC CICS DOCUMENT INSERT DOCTOKEN(DOCTOKEN)                   *
               TEXT(ADDRINFO) LENGTH(ADDRINFL)
         EXEC CICS DOCUMENT INSERT DOCTOKEN(DOCTOKEN)                   *
               TEXT(CLNTADDR) LENGTH(CLNTADRL)
* Insert server name
EXEC CICS DOCUMENT INSERT DOCTOKEN(DOCTOKEN)                    *
               TEXT(SRVRINFO) LENGTH(SRVRINFL)
         EXEC CICS DOCUMENT INSERT DOCTOKEN(DOCTOKEN)                   *
               TEXT(SRVRNAME) LENGTH(SRVRNAML)
* Insert server address
         EXEC CICS DOCUMENT INSERT DOCTOKEN(DOCTOKEN)                   *
               TEXT(SDDRINFO) LENGTH(SDDRINFL)
         EXEC CICS DOCUMENT INSERT DOCTOKEN(DOCTOKEN)                   *
               TEXT(SERVADDR) LENGTH(SERVADRL)
* Insert TCPIPSERVICE being used
         EXEC CICS DOCUMENT INSERT DOCTOKEN(DOCTOKEN)                   *
               TEXT(TCPSINFO) LENGTH(TCPSINFL)
         EXEC CICS DOCUMENT INSERT DOCTOKEN(DOCTOKEN)                   *
               TEXT(TCPIPSER) LENGTH(L'TCPIPSER)
* Insert POrt number being used
         EXEC CICS DOCUMENT INSERT DOCTOKEN(DOCTOKEN)                   *
               TEXT(PORTINFO) LENGTH(PORTINFL)
         EXEC CICS DOCUMENT INSERT DOCTOKEN(DOCTOKEN)                   *
               TEXT(PRTNUMB) LENGTH(L'PRTNUMB)
* Insert footer for document
         EXEC CICS DOCUMENT INSERT DOCTOKEN(DOCTOKEN)                   *
               TEMPLATE('EXTRCTF2')
* Send complete document
         EXEC CICS WEB SEND DOCTOKEN(DOCTOKEN)                          *
               CLNTCODEPAGE('iso-8859-1')
         EXEC CICS RETURN
CLNTINFO DC   C'<p>Client Name : '
CLNTINFL DC   F'17'
SRVRINFO DC   C'<p>Server Name : '
SRVRINFL DC   F'17'
ADDRINFO DC   C'<p>Client Address : '
ADDRINFL DC   F'20'
SDDRINFO DC   C'<p>Server Address : '
SDDRINFL DC   F'20'
TCPSINFO DC   C'<p>TCPIPSERVICE name: '
TCPSINFL DC   F'22'
PORTINFO DC   C' - on Port Number: '
PORTINFL DC   F'19'
         END  EXTRCT2
/*
```

Figure 51. Source of CICS assembler program EXTRCT2 (Part 2 of 2)

```
DFHEISTG DSECT
DOCTOKEN DS    CL16
CLNTNAML DS    F
CLNTNAME DS    CL80
SRVRNAML DS    F
SRVRNAME DS    CL80
CLNTADRL DS    F
CLNTADDR DS    CL15
         DS    0F
SERVADRL DS    F
SERVADDR DS    CL15
         DS    0F
SSLTYPE  DS    F
TCPIPSER DS    CL8
PRTNUMB  DS    CL5
         DS    0F
EXTRCT3  CSECT
EXTRCT3  AMODE 31                                                  55200000
EXTRCT3  RMODE ANY                                                 56000000
         EXEC CICS HANDLE CONDITION INVREQ(DOCINSRT)
         EXEC CICS DOCUMENT CREATE DOCTOKEN(DOCTOKEN)              *
               TEMPLATE('EXTRCTH3')
*
         MVC   CLNTNAML,=F'80'
         MVC   SRVRNAML,=F'80'
         MVC   CLNTADRL,=F'15'
         MVC   SERVADRL,=F'15'
* Retrieve some TCPIP related information
         EXEC CICS EXTRACT TCPIP                                   *
               SERVERNAME(SRVRNAME) SNAMELENGTH(SRVRNAML)
         EXEC CICS EXTRACT TCPIP                                   *
               SERVERADDR(SERVADDR) SADDRLENGTH(SERVADRL)
         EXEC CICS EXTRACT TCPIP                                   *
               TCPIPSERVICE(TCPIPSER)
         EXEC CICS EXTRACT TCPIP                                   *
               PORTNUMBER(PRTNUMB)
         EXEC CICS EXTRACT TCPIP                                   *
               CLIENTADDR(CLNTADDR) CADDRLENGTH(CLNTADRL)
         EXEC CICS EXTRACT TCPIP                                   *
               CLIENTNAME(CLNTNAME) CNAMELENGTH(CLNTNAML)
* Insert client name
DOCINSRT EXEC CICS DOCUMENT INSERT DOCTOKEN(DOCTOKEN)              *
               TEXT(CLNTINFO) LENGTH(CLNTINFL)
         EXEC CICS DOCUMENT INSERT DOCTOKEN(DOCTOKEN)              *
               TEXT(CLNTNAME) LENGTH(CLNTNAML)
* Insert client address
         EXEC CICS DOCUMENT INSERT DOCTOKEN(DOCTOKEN)              *
               TEXT(ADDRINFO) LENGTH(ADDRINFL)
         EXEC CICS DOCUMENT INSERT DOCTOKEN(DOCTOKEN)              *
               TEXT(CLNTADDR) LENGTH(CLNTADRL)
* Insert server name
         EXEC CICS DOCUMENT INSERT DOCTOKEN(DOCTOKEN)              *
               TEXT(SRVRINFO) LENGTH(SRVRINFL)
         EXEC CICS DOCUMENT INSERT DOCTOKEN(DOCTOKEN)              *
               TEXT(SRVRNAME) LENGTH(SRVRNAML)
* Insert server address
         EXEC CICS DOCUMENT INSERT DOCTOKEN(DOCTOKEN)              *
               TEXT(SDDRINFO) LENGTH(SDDRINFL)
         EXEC CICS DOCUMENT INSERT DOCTOKEN(DOCTOKEN)              *
               TEXT(SERVADDR) LENGTH(SERVADRL)
* Insert TCPIPSERVICE being used
         EXEC CICS DOCUMENT INSERT DOCTOKEN(DOCTOKEN)              *
               TEXT(TCPSINFO) LENGTH(TCPSINFL)
         EXEC CICS DOCUMENT INSERT DOCTOKEN(DOCTOKEN)              *
               TEXT(TCPIPSER) LENGTH(L'TCPIPSER)
```

Figure 52. Source of CICS assembler program EXTRCT3 (Part 1 of 2)

```
* Insert POrt number being used
         EXEC CICS DOCUMENT INSERT DOCTOKEN(DOCTOKEN)                  *
               TEXT(PORTINFO) LENGTH(PORTINFL)
         EXEC CICS DOCUMENT INSERT DOCTOKEN(DOCTOKEN)                  *
               TEXT(PRTNUMB) LENGTH(L'PRTNUMB)
* Insert footer for document
         EXEC CICS DOCUMENT INSERT DOCTOKEN(DOCTOKEN)                  *
               TEMPLATE('EXTRCTF3')
* Send complete document
         EXEC CICS WEB SEND DOCTOKEN(DOCTOKEN)                         *
               CLNTCODEPAGE('iso-8859-1')
         EXEC CICS RETURN
CLNTINFO DC   C'<p>Client Name : '
CLNTINFL DC   F'17'
SRVRINFO DC   C'<p>Server Name : '
SRVRINFL DC   F'17'
ADDRINFO DC   C'<p>Client Address : '
ADDRINFL DC   F'20'
SDDRINFO DC   C'<p>Server Address : '
SDDRINFL DC   F'20'
TCPSINFO DC   C'<p>TCPIPSERVICE name: '
TCPSINFL DC   F'22'
PORTINFO DC   C' - on Port Number: '
PORTINFL DC   F'19'
         END  EXTRCT3
/*
```

Figure 53. Source of CICS assembler program EXTRCT3 (Part 2 of 2)

```
DFHEISTG DSECT
DOCTOKEN DS    CL16
CLNTNAML DS    F
CLNTNAME DS    CL80
SRVRNAML DS    F
SRVRNAME DS    CL80
CLNTADRL DS    F
CLNTADDR DS    CL15
         DS    0F
SERVADRL DS    F
SERVADDR DS    CL15
         DS    0F
SSLTYPE  DS    F
TCPIPSER DS    CL8
PRTNUMB  DS    CL5
         DS    0F
TEXT     ds    CL1
TEXTL    DS    F
EXTRCT4  CSECT
EXTRCT4  AMODE 31                                              55200000
EXTRCT4  RMODE ANY                                             56000000
         EXEC CICS HANDLE CONDITION INVREQ(DOCINSRT)
         EXEC CICS DOCUMENT CREATE DOCTOKEN(DOCTOKEN)                  *
               TEMPLATE('EXTRCTH4')
*
         MVC   CLNTNAML,=F'80'
         MVC   SRVRNAML,=F'80'
         MVC   CLNTADRL,=F'15'
         MVC   SERVADRL,=F'15'
         MVC   TEXTL,=F'1'
```

Figure 54. Source of CICS assembler program EXTRCT4 (Part 1 of 3)

```
 * Retrieve some TCPIP related information
         EXEC CICS EXTRACT TCPIP                                        *
               SERVERNAME(SRVRNAME) SNAMELENGTH(SRVRNAML)
         EXEC CICS EXTRACT TCPIP                                        *
               SERVERADDR(SERVADDR) SADDRLENGTH(SERVADRL)
         EXEC CICS EXTRACT TCPIP                                        *
               TCPIPSERVICE(TCPIPSER)
         EXEC CICS EXTRACT TCPIP                                        *
               PORTNUMBER(PRTNUMB)
         EXEC CICS EXTRACT TCPIP                                        *
               CLIENTADDR(CLNTADDR) CADDRLENGTH(CLNTADRL)
         EXEC CICS EXTRACT TCPIP                                        *
               CLIENTNAME(CLNTNAME) CNAMELENGTH(CLNTNAML)
* analyse input.
DOCINSRT EXEC CICS WEB READ FORMFIELD(TEXTURE) NAMELENGTH(L'TEXTURE)    *
               VALUE(TEXT) VALUELENGTH(TEXTL) NOHANDLE
         CLI   TEXT,C'1'
         BE    TEXT1
         CLI   TEXT,C'2'
         BE    TEXT2
         CLI   TEXT,C'3'
         BE    TEXT3
         CLI   TEXT,C'4'
         BE    TEXT4
         CLI   TEXT,C'5'
         BE    TEXT5
         CLI   TEXT,C'6'
         BE    TEXT6
         B     ENDBODY
TEXT1    EQU   *
         EXEC CICS DOCUMENT INSERT DOCTOKEN(DOCTOKEN)                   *
               TEXT(TEXT1NFO) LENGTH(TEXT1NFL)
         B     ENDBODY
TEXT2    EQU   *
         EXEC CICS DOCUMENT INSERT DOCTOKEN(DOCTOKEN)                   *
               TEXT(TEXT2NFO) LENGTH(TEXT2NFL)
         B     ENDBODY
TEXT3    EQU   *
         EXEC CICS DOCUMENT INSERT DOCTOKEN(DOCTOKEN)                   *
               TEXT(TEXT3NFO) LENGTH(TEXT3NFL)
         B     ENDBODY
TEXT4    EQU   *
         EXEC CICS DOCUMENT INSERT DOCTOKEN(DOCTOKEN)                   *
               TEXT(TEXT4NFO) LENGTH(TEXT4NFL)
         B     ENDBODY
TEXT5    EQU   *
         EXEC CICS DOCUMENT INSERT DOCTOKEN(DOCTOKEN)                   *
               TEXT(TEXT5NFO) LENGTH(TEXT5NFL)
         B     ENDBODY
TEXT6    EQU   *
         EXEC CICS DOCUMENT INSERT DOCTOKEN(DOCTOKEN)                   *
               TEXT(TEXT6NFO) LENGTH(TEXT6NFL)
         B     ENDBODY
* Close Body
ENDBODY  EQU   *
         EXEC CICS DOCUMENT INSERT DOCTOKEN(DOCTOKEN)                   *
               TEXT(BODYINFO) LENGTH(BODYINFL)
* Insert image name
         EXEC CICS DOCUMENT INSERT DOCTOKEN(DOCTOKEN)                   *
               TEXT(IMAGINFO) LENGTH(IMAGINFL)
* Insert header
         EXEC CICS DOCUMENT INSERT DOCTOKEN(DOCTOKEN)                   *
               TEXT(HEADER)   LENGTH(HEADERL)
* Insert client name
         EXEC CICS DOCUMENT INSERT DOCTOKEN(DOCTOKEN)                   *
               TEXT(CLNTINFO) LENGTH(CLNTINFL)
         EXEC CICS DOCUMENT INSERT DOCTOKEN(DOCTOKEN)                   *
               TEXT(CLNTNAME) LENGTH(CLNTNAML)
```

Figure 55. Source of CICS assembler program EXTRCT4 (Part 2 of 3)

```
* Insert client address
         EXEC CICS DOCUMENT INSERT DOCTOKEN(DOCTOKEN)                  *
               TEXT(ADDRINFO) LENGTH(ADDRINFL)
         EXEC CICS DOCUMENT INSERT DOCTOKEN(DOCTOKEN)                  *
               TEXT(CLNTADDR) LENGTH(CLNTADRL)
* Insert server name
         EXEC CICS DOCUMENT INSERT DOCTOKEN(DOCTOKEN)                  *
               TEXT(SRVRINFO) LENGTH(SRVRINFL)
         EXEC CICS DOCUMENT INSERT DOCTOKEN(DOCTOKEN)                  *
               TEXT(SRVRNAME) LENGTH(SRVRNAML)
* Insert server address
         EXEC CICS DOCUMENT INSERT DOCTOKEN(DOCTOKEN)                  *
               TEXT(SDDRINFO) LENGTH(SDDRINFL)
         EXEC CICS DOCUMENT INSERT DOCTOKEN(DOCTOKEN)                  *
               TEXT(SERVADDR) LENGTH(SERVADRL)
* Insert TCPIPSERVICE being used
         EXEC CICS DOCUMENT INSERT DOCTOKEN(DOCTOKEN)                  *
               TEXT(TCPSINFO) LENGTH(TCPSINFL)
         EXEC CICS DOCUMENT INSERT DOCTOKEN(DOCTOKEN)                  *
               TEXT(TCPIPSER) LENGTH(L'TCPIPSER)
* Insert POrt number being used
         EXEC CICS DOCUMENT INSERT DOCTOKEN(DOCTOKEN)                  *
               TEXT(PORTINFO) LENGTH(PORTINFL)
         EXEC CICS DOCUMENT INSERT DOCTOKEN(DOCTOKEN)                  *
               TEXT(PRTNUMB) LENGTH(L'PRTNUMB)
* Insert footer for document
         EXEC CICS DOCUMENT INSERT DOCTOKEN(DOCTOKEN)                  *
               TEMPLATE('EXTRCTF4')
* Send complete document
         EXEC CICS WEB SEND DOCTOKEN(DOCTOKEN)                         *
               CLNTCODEPAGE('iso-8859-1')
         EXEC CICS RETURN
CLNTINFO DC   C'<p>Client Name : '
CLNTINFL DC   F'17'
SRVRINFO DC   C'<p>Server Name : '
SRVRINFL DC   F'17'
ADDRINFO DC   C'<p>Client Address : '
ADDRINFL DC   F'20'
SDDRINFO DC   C'<p>Server Address : '
SDDRINFL DC   F'20'
TCPSINFO DC   C'<p>TCPIPSERVICE name: '
TCPSINFL DC   F'22'
PORTINFO DC   C' - on Port Number: '
PORTINFL DC   F'19'
IMAGINFO DC   C'<img alt="" src="/DFHWBIMG/masthead.gif">'
IMAGINFL DC   F'41'
HEADER   DC   C'<h1>EXTRACT - Running CICS Web Support on VSE/ESA</h1>'
         DC   C'<p>with a masthead and a background'
         DC   C'<p><hr>'
HEADERL  DC   A(*-HEADER)
TEXT1NFO DC   C' background="/DFHWBIMG/texture1.jpeg"'
TEXT1NFL DC   A(*-TEXT1NFO)
TEXT2NFO DC   C' background="/DFHWBIMG/texture2.jpeg"'
TEXT2NFL DC   A(*-TEXT2NFO)
TEXT3NFO DC   C' background="/DFHWBIMG/texture3.jpeg"'
TEXT3NFL DC   A(*-TEXT3NFO)
TEXT4NFO DC   C' background="/DFHWBIMG/texture4.jpeg"'
TEXT4NFL DC   A(*-TEXT4NFO)
TEXT5NFO DC   C' background="/DFHWBIMG/texture5.jpeg"'
TEXT5NFL DC   A(*-TEXT5NFO)
TEXT6NFO DC   C' background="/DFHWBIMG/texture6.jpeg"'
TEXT6NFL DC   A(*-TEXT6NFO)
BODYINFO DC   C'>'
BODYINFL DC   F'1'
TEXTURE  DC   C'TEXTURE'
         END  EXTRCT4
/*
```

Figure 56. Source of CICS assembler program EXTRCT4 (Part 3 of 3)

A.4.4 Catalog jobs

```
* $$ JOB JNM=&JOBNAME,DISP=D,CLASS=A,NTFY=YES
* $$ LST DISP=D,CLASS=Q,PRI=3
* $$ PUN DISP=I,DEST=*,PRI=9,CLASS=A
// JOB &JOBNAME TRANSLATE PROGRAM &PROGNAME
// ASSGN SYSIPT,SYSRDR
// EXEC IESINSRT
$ $$ LST DISP=D,CLASS=Q,PRI=3
// JOB &JOBNAME COMPILE PROGRAM &PROGNAME
// SETPARM CATALOG=&CATALOG
// IF CATALOG = 1 THEN
// GOTO CAT
// OPTION ERRS,SXREF,SYM,LIST,NODECK
// GOTO ENDCAT
/. CAT
// LIBDEF PHASE,CATALOG=DFHHTML.DFHDOC
// OPTION ERRS,SXREF,SYM,CATAL,NODECK
   PHASE &PROGNAME,*
   INCLUDE DFHEAI
/. ENDCAT
// EXEC ASMA90,SIZE=(ASMA90,64K),PARM='EXIT(LIBEXIT(EDECKXIT)),SIZE(MAXC
              -200K,ABOVE)'
* $$ END
// ON $CANCEL OR $ABEND GOTO ENDJ2
// OPTION NOLIST,NODUMP,DECK
// EXEC DFHEAP1$,SIZE=512K
*ASM XOPTS(CICS)
* $$ SLI ICCF=(&PROGNAME,&PASSWORD),LIB=(&LIBNO)
/*
/. ENDJ2
// EXEC IESINSRT
/*
// IF CATALOG NE 1 OR $MRC GT 4 THEN
// GOTO NOLNK
// EXEC LNKEDT,SIZE=256K
/. NOLNK
#&
$ $$ EOJ
* $$ END
/&
* $$ EOJ
```

Figure 57. Sample job to compile, link and catalog CICS assembler programs

```
* $$ JOB JNM=CATMEMB,DISP=D,CLASS=0
// JOB CATMEMB  CATALOG MEMBER INTO AF-LIBRARY
// EXEC LIBR,PARM='MSHP'
ACCESS S=DFHHTML.DFHDOC
* $$ SLI ICCF=(xxxxx),LIB=(xx)
/*
/&
* $$ EOJ
```

Figure 58. Sample job to catalog the HTML documents into sublib DFHHTML.DFHDOC

A.5 Sample listings used with the 3270 bridge support

```
 // JOB  FILEACLU DEFINE FILE FILEA FOR TESTING 3270 BRIDGE
 // EXEC IDCAMS,SIZE=AUTO
  DELETE (CICSTS11.SAMPLE.FILEA) CL NOERASE PURGE -
         CATALOG (VSESP.USER.CATALOG   )
  DEFINE CLUSTER ( -
         NAME (CICSTS11.SAMPLE.FILEA                 ) -
         CYLINDERS(1        1          ) -
         SHAREOPTIONS (2) -
         RECORDSIZE (80     80    ) -
         VOLUMES (DOSRES ) -
         NOREUSE -
         INDEXED -
         FREESPACE (15 7) -
         KEYS (6   1     ) -
         NOCOMPRESSED -
         TO (99366)) -
         DATA (NAME (CICSTS11.SAMPLE.FILEA.@D@               ) -
         CONTROLINTERVALSIZE (4096  )) -
         INDEX (NAME (CICSTS11.SAMPLE.FILEA.@I@             )) -
         CATALOG (VSESP.USER.CATALOG                         )
   IF LASTCC NE 0 THEN CANCEL JOB
 /*
// OPTION STDLABEL=ADD
// DLBL FILEA,'CICSTS11.SAMPLE.FILEA',,VSAM,                          X
               CAT=VSESPUC
/*
// EXEC IESVCLUP,SIZE=AUTO
A CICSTS11.SAMPLE.FILEA                      FILEA   VSESPUC
/*
/&
```

Figure 59. IDCAMS definitions for user VSAM file to test 3270 bridge

```
// JOB FILEALOA LOAD FILE FILEA WITH RECORDS FOR TESTING 3270 BRIDGE
// DLBL FILEA,'CICSTS11.SAMPLE.FILEA',,VSAM,                          X
              CAT=VSESPUC
// EXEC IDCAMS,SIZE=AUTO
 REPRO  INFILE                      -
          (SYSIPT                   -
           ENVIRONMENT              -
            (BLOCKSIZE(80)          -
             RECORDFORMAT(FIXUNB)   -
             RECORDSIZE(80)))       -
        OUTFILE(FILEA)
 000100W. DAVIS             SURREY, ENGLAND     3215677826 11 81$0100.11Y
 000102F. ALDSON            WARWICK, ENGLAND    9835618326 11 81$1111.11Y
 000104S. BOWLER            LONDON,ENGLAND      1284629326 11 81$0999.99Y
 000106B. ADAMS             CROYDON, ENGLAND    1948567326 11 81$0087.71Y
 000111GENE BARLOWE         SARATOGA,CALIFORNIA 4612075301 02 74$0111.11Y
 000762GEORGE BURROW        SAN JOSE,CALIFORNIA 2231212101 06 74$0000.00Y
 000983H. L. L. CALL        WASHINGTON, DC      3451212021 04 75$9999.99Y
 001222J.R.REYNOLDS         BOBLINGEN, GERMANY  7031555110 04 73$3349.99Y
 001781HAROLD JAMES         SINDELFINGEN,GERMANY7031999021 06 77$0009.99Y
 003214HUBERT C HERBERT     SUNNYVALE, CAL.     3411212000 06 73$0009.99N
 003890PHILIPPE SMITH, JR   NICE, FRANCE        0000000028 05 74$0009.99N
 004004STAN SMITH           DUBLIN, IRELAND     7111212102 11 73$1259.99N
 004445DANIEL O'GALWAY      SOUTH BEND, S.DAK.  6121212010 10 73$0009.99N
 004878D.C. CURRENT         SUNNYVALE, CALIF.   3221212010 06 73$5399.99N
 005005J. S. LAVERENCE      SAN FRANCISCO, CA.  0000000101 08 73$0009.99N
 005444JEAN LAWRENCE        SARATOGA, CALIF.    6771212020 10 74$0809.99N
 005581JOHN ALDEN III       BOSTON, MASS.       4131212011 04 74$0259.99N
 006016DR W. T. KAR         NEW DELHI, INDIA    7033121121 05 74$0009.88Y
 006670WILLIAM KAPP         NEW YORK, N.Y.      2121212031 01 75$3509.88N
 006968D. CONRAD            WARWICK, ENGLAND    5671382126 11 81$0009.88Y
 007007BRIGITTE EICRN       STUTTGART, GERMANY  7031100010 10 75$5009.88N
 007248B. C. WILLIAMSON     REDWOOD CITY, CALF. 3331212111 10 75$0009.88N
 007779MRS. W. WELCH        SAN JOSE, CALIF.    4151212003 01 75$0009.88Y
 100000G. NEADS             TORONTO, ONTARIO    0341512126 11 81$0010.00Y
 111111C. MEARS             OTTAWA, ONTARIO     5121200326 11 81$0011.00Y
 200000A. BONFIELD          GLASGOW,  SCOTLAND  6373829026 11 81$0020.00Y
 222222J. WIEBERS           FRANKFURT, GERMANY  2003415126 11 81$0022.00Y
 300000K. TRENCHARD         NEW YORK, U.S.      6473980126 11 81$0030.00Y
 333333D. MYRING            CARDIFF, WALES      7849302026 11 81$0033.00Y
 400000W. TANNER            MILAN, ITALY        2536373826 11 81$0040.00Y
 444444A. FISHER            CALGARY, ALBERTA    7788982026 11 81$0044.00Y
 500000J. DENFORD           MADRID, SPAIN       4445464026 11 81$0000.00Y
 555555C. JARDINE           KINGSTON, N.Y.      3994442026 11 81$0005.00Y
 600000F. HUGHES            DUBLIN, IRELAND     1239878026 11 81$0010.00Y
 666666A. BROOKMAN          LA HULPE, BRUSSELS  4298384026 11 81$0016.00Y
 700000A. MACALLA           DALLAS, TEXAS       5798432026 11 81$0002.00Y
 777777D. PRYKE             WILLIAMSBURG, VIRG. 9187613126 11 81$0027.00Y
 800000H. BRISTOW           WESTEND, LONDON     2423338926 11 81$0030.00Y
 888888B. HOWARD            NORTHAMPTON, ENG.   2369163926 11 81$0038.00Y
 900000D. WOODSON           TAMPA, FLA.         3566812026 11 81$0040.00Y
 999999R. JACKSON           RALEIGH, N.Y.       8459163926 11 81$0049.00Y
/*
```

Figure 60. IDCAMS repro job to load VSAM file for testing 3270 bridge facility

Figure 61. Source listing for program VSAMTEST for testing 3270 bridge (Part 1 of 4)

```
* * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
* VSAMTEST -- PROGRAM FOR VSAMTEST TEST SUITE.              *
* * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
         PRINT GEN
*********************************************************************
DFHEISTG DSECT
         COPY  VSAMSET
STARTCLK DS    D
STOPCLK  DS    D
WORK     DS    D
VSAMDATA DS    CL80             I/O AREA FOR VSAMDATA-DATASET
SCRATCH  DS    CL80             SCRATCH INPUT AREA USED FOR UPDATE
*********************************************************************
*        PROGRAM START                                              *
*********************************************************************
         PRINT NOGEN
VSAMTEST CSECT
         B     MVC
         DC    CL8'VSAMTEST'
        MVC      DS    0H
         STCK  STARTCLK         RECORD START TIME
         EXEC CICS HANDLE CONDITION NOTFND(NOTFOUND)
         EXEC CICS HANDLE CONDITION DSIDERR(DSIDERR)
         EXEC CICS HANDLE CONDITION EOC(REWRITE)
         EXEC CICS HANDLE CONDITION ERROR(ERROR)
         EXEC CICS HANDLE CONDITION MAPFAIL(MAPFAIL)
RECEIVE  DS    0H
         EXEC CICS RECEIVE MAP('VSAMMAP') MAPSET('VSAMSET')
         MVC   RESPONSI(29),BLANK
         OI    FUNCI,C' '       OR A BLANK TO FORCE UPPERCASE
         CLI   FUNCI,C'A'       IF FUNCTION IS NOT ADD, CLEAR INPUT
         BE    NOBLANK
         MVC   RECORDI(244),BLANK
NOBLANK  DS    0H
         CLI   FUNCI,C'R'       IF FUNCTION IS READ
         BE    READ
         CLI   FUNCI,C'U'       IF FUNCTION IS UPDATE
         BE    UPDATE
         CLI   FUNCI,C'A'       IF FUNCTION IS ADD
         BE    ADD
         CLI   FUNCI,C'D'       IF FUNCTION IS DELETE
         BE    DELETE
         CLI   FUNCI,C'B'       IF FUNCTION IS BROWSE
         BE    BROWSE
         CLI   FUNCI,C'L'       IF FUNCTION IS LONG BROWSE (10 RECORDS)
         BE    BROWSE10
         CLI   FUNCI,C'E'       IF FUNCTION IS END BROWSE
         BE    ENDBR
         B     INVINPUT         OTHERWISE, SAY INVALID INPUT
MAPFAIL  DS    0H               SEND BLANK MAP ON FIRST TIME ENTRY
         EXEC CICS SEND MAP('VSAMMAP') MAPSET('VSAMSET') MAPONLY WAIT  X
               FREEKB
         B     RETURN
READ     DS    0H               DO READ OF SPECIFIED RECORD
         EXEC CICS READ DATASET('FILEA') RIDFLD(KEYI)                  X
               INTO(VSAMDATA)
         MVC   KEYI(6),VSAMDATA+1
         MVC   RECORDI(73),VSAMDATA+7
         B     SENDNORM         WHEN FINISHED, SEND NORMAL RESPONSE
UPDATE   DS    0H               DO READ/UPDATE OF RECORD
         EXEC CICS READ DATASET('FILEA') RIDFLD(KEYI)                  X
               INTO(VSAMDATA) UPDATE
         MVC   KEYI(6),VSAMDATA+1
         MVC   RECORDI(73),VSAMDATA+7
         MVC   RESPONSO,AENDERN
         EXEC CICS SEND MAP('VSAMMAP') MAPSET('VSAMSET')               X
               FREEKB
         EXEC CICS RECEIVE MAP('VSAMMAP') MAPSET('VSAMSET')
         MVC   VSAMDATA+1(6),KEYI
         MVC   VSAMDATA+7(74),RECORDI
REWRITE  DS    0H               DO ONE REWRITE OF UPDATED RECORD
         EXEC CICS REWRITE DATASET('FILEA') FROM(VSAMDATA)
         B     SENDNORM         WHEN FINISHED, SEND NORMAL RESPONSE
           SENDNORM DS    0H              SEND NORMAL RESPONSE
         MVC   RESPONSO,NORMRESP
```

```
        EXEC CICS READ DATASET('FILEA') RIDFLD(KEYI)                X
              INTO(VSAMDATA)
         MVC   KEYI(6),VSAMDATA+1
         MVC   RECORDI(73),VSAMDATA+7
         B     SENDNORM          WHEN FINISHED, SEND NORMAL RESPONSE
UPDATE   DS    0H                DO READ/UPDATE OF RECORD
         EXEC CICS READ DATASET('FILEA') RIDFLD(KEYI)                 X
              INTO(VSAMDATA) UPDATE
         MVC   KEYI(6),VSAMDATA+1
         MVC   RECORDI(73),VSAMDATA+7
         MVC   RESPONSO,AENDERN
         EXEC CICS SEND MAP('VSAMMAP') MAPSET('VSAMSET')              X
              FREEKB
         EXEC CICS RECEIVE MAP('VSAMMAP') MAPSET('VSAMSET')
         MVC   VSAMDATA+1(6),KEYI
         MVC   VSAMDATA+7(74),RECORDI
REWRITE  DS    0H                DO ONE REWRITE OF UPDATED RECORD
         EXEC CICS REWRITE DATASET('FILEA') FROM(VSAMDATA)
         B     SENDNORM          WHEN FINISHED, SEND NORMAL RESPONSE
SENDNORM DS    0H                SEND NORMAL RESPONSE
         MVC   RESPONSO,NORMRESP
SENDANY  DS    0H                SEND RESPONSE ALREADY SET IN MAP
         MVC   FUNCOUTO,FUNCI
         MVC   TERMOUTO,EIBTRMID
         STCK  STOPCLK           RECORD STOP TIME
* NOTE: THE FOLLOWING CONVERSION DEPENDS ON ELAPSED TIME FROM
* START TO STOP BEING NOT LONGER THAN 2147 SECONDS (2**31 MICROSEC.)
* THIS IS ABOUT 35 MINUTES...
         LM    0,1,STOPCLK       GET STOP TIME
         SRDL  0,12              SHIFT UNITS TO MICROSECONDS
         LM    8,9,STARTCLK      GET START TIME
         SRDL  8,12              SHIFT UNITS TO MICROSECONDS
         SR    1,9               STOP - START IN MICROSECONDS
         CVD   1,WORK            CONVERT TO DECIMAL
         MVC   TIMEOUTO,TIMEMASK
         ED    TIMEOUTO,WORK+3   EDIT TO PRETTY
         EXEC CICS SEND MAP('VSAMMAP') MAPSET('VSAMSET') DATAONLY     X
              FREEKB WAIT
RETURN   DS    0H                DONE -- RETURN TO CICS
         EXEC CICS RETURN
ADD      DS    0H                ADD ONE RECORD TO THE FILE
         MVC   VSAMDATA+1(6),KEYI
         MVC   VSAMDATA+7(74),RECORDI
         EXEC CICS WRITE DATASET('FILEA') RIDFLD(KEYI)                X
              FROM(VSAMDATA)
         B     SENDNORM          SEND NORMAL RESPONSE
DELETE   DS    0H                DELETE ONE RECORD FROM THE FILE
         EXEC CICS READ DATASET('FILEA') RIDFLD(KEYI)                 X
              INTO(VSAMDATA) UPDATE
         EXEC CICS DELETE DATASET('FILEA')
MVCBLANK DS    0H
         MVC   RECORDI(244),BLANK
         B     SENDNORM          SEND NORMAL RESPONSE
BROWSE   DS    0H
         EXEC CICS STARTBR DATASET('FILEA') RIDFLD(KEYI)
         EXEC CICS READNEXT DATASET('FILEA') INTO(VSAMDATA)           X
              RIDFLD(KEYI)
         EXEC CICS ENDBR DATASET('FILEA')
         MVC   KEYI(6),VSAMDATA+1
         MVC   RECORDI(73),VSAMDATA+7
         MVC   VSAMDATA+7(73),BLANK
         B     SENDNORM          SEND NORMAL RESPONSE
BROWSE10 DS    0H                DO 'LIMIT / 10' CYCLES OF ...
         MVC   KEYB,KEYI         ... STARTBR, 10 READNEXTS, ENDBR
BROWSE11 DS    0H
         MVC   KEYB,KEYI
         EXEC CICS STARTBR DATASET('FILEA') RIDFLD(KEYB)
         LA    8,10              LOAD LOOP COUNTER ...
BROWSE12 DS    0H                ... 10 READNEXTS PER CYCLE
         EXEC CICS READNEXT DATASET('FILEA') INTO(VSAMDATA)           X
              RIDFLD(KEYB)
*        MVC   KEYI(6),VSAMDATA+1
```

Figure 62. Source listing for program VSAMTEST for testing 3270 bridge (Part 2 of 4)

```
          MVC   VSAMDATA+7(74),RECORDI
          EXEC CICS WRITE DATASET('FILEA') RIDFLD(KEYI)                  X
               FROM(VSAMDATA)
          B     SENDNORM         SEND NORMAL RESPONSE
 DELETE   DS    0H               DELETE ONE RECORD FROM THE FILE
          EXEC CICS READ DATASET('FILEA') RIDFLD(KEYI)                   X
               INTO(VSAMDATA) UPDATE
          EXEC CICS DELETE DATASET('FILEA')
 MVCBLANK DS    0H
          MVC   RECORDI(244),BLANK
          B     SENDNORM         SEND NORMAL RESPONSE
 BROWSE   DS    0H               DO 'LIMIT' CYCLES OF ...
          AP    COUNTER,ONE      ... STARTBR, READNEXT, ENDBR
          EXEC CICS STARTBR DATASET('FILEA') RIDFLD(KEYI)
          EXEC CICS READNEXT DATASET('FILEA') INTO(VSAMDATA)             X
               RIDFLD(KEYI)
          EXEC CICS ENDBR DATASET('FILEA')
          MVC   KEYI(6),VSAMDATA+1
          MVC   RECORDI(73),VSAMDATA+7
          MVC   VSAMDATA+7(73),BLANK
          CP    COUNTER,LIMIT
          BL    BROWSE
          B     SENDNORM         SEND NORMAL RESPONSE
 BROWSE10 DS    0H               DO 'LIMIT / 10' CYCLES OF ...
          MVC   KEYB,KEYI        ... STARTBR, 10 READNEXTS, ENDBR
 BROWSE11 DS    0H
         MVC   KEYB,KEYI
         AP    COUNTER,TEN
         EXEC CICS STARTBR DATASET('FILEA') RIDFLD(KEYB)
         LA    8,10             LOAD LOOP COUNTER ...
BROWSE12 DS    0H               ... 10 READNEXTS PER CYCLE
         EXEC CICS READNEXT DATASET('FILEA') INTO(VSAMDATA)              X
               RIDFLD(KEYB)
*        MVC   KEYI(6),VSAMDATA+1
         MVC   RECORDI(73),VSAMDATA+7
         MVC   VSAMDATA+7(73),BLANK
         BCT   8,BROWSE12       COUNT, BRANCH IF NOT DONE
         EXEC CICS ENDBR DATASET('FILEA')
         CP    COUNTER,LIMIT
         BL    BROWSE11
         B     SENDNORM         SEND NORMAL RESPONSE
ENDBR    DS    0H               DO AN ENDBROWSE (VSAM ENDREQ)
         EXEC CICS ENDBR DATASET('FILEA')
         B     MVCBLANK
INVINPUT DS    0H               WRONG INPUT MESSAGE
         MVC   RESPONSO(30),WRONG
         B     ERRORSND
NOTFOUND DS    0H               RECORD NOT FOUND MESSAGE
         MVC   RESPONSO(30),NOTMSG
         B     ERRORSND
DSIDERR  DS    0H               DATASET ID ERROR
         MVC   RESPONSO(30),DSIDMSG
         B     ERRORSND
ERROR    DS    0H               MISCELLANEOUS ERROR
         MVC   RESPONSO(30),ERRMSG
ERRORSND DS    0H               SEND THE MAP WITH AN ERROR MESSAGE
         MVC   RECORDI(244),BLANK
         EXEC CICS SEND MAP('VSAMMAP') MAPSET('VSAMSET')                X
               FREEKB
         B     RETURN           GO RETURN TO CICS
*  CONSTANTS -- PROGRAM STATIC STORAGE
NORMRESP DC    CL20'NORMAL RESPONSE   '
TIMEMASK DC    XL12'402020204B2020206B202120'  EDIT MASK FOR TIME
AENDERN  DC    CL20'PLEASE UPDATE RECORD'
WRONG    DC    CL20'WRONG INPUT'
NOTMSG   DC    CL20'RECORD NOT FOUND'
DSIDMSG  DC    CL20'DATASET WRONG'
ERRMSG   DC    CL20'MISCELLANEOUS'
BLANK    DC    CL244' '
COUNT    DS    X'00'            COUNT FOR BROWSE
LIMIT    DC    PL6'000010'      LOOP LIMIT
```

Figure 63. Source listing for program VSAMTEST for testing 3270 bridge (Part 3 of 4)

```
ZERO     DC    PL6'0'           PACKED ZERO
ONE      DC    PL6'1'           PACKED ONE
TEN      DC    PL6'10'          PACKED TEN
KEYB     DS    CL6              FIELD FOR L10 BROWSE
         SPACE 2
         END   VSAMTEST
/*
```

Figure 64. Source listing for program VSAMTEST for testing 3270 bridge (Part 4 of 4)

The source for mapset *VSAMSET* is listed in Figure 22 on page 49.

We defined both the RDO definitions for file FILEA and transaction VSAM in Group FILEA.

```
DI G(FILEA)
ENTER COMMANDS
 NAME     TYPE         GROUP                                DATE   TIME
 FILEA    FILE         FILEA                                00.250 15.57.16
 VSAM     TRANSACTION  FILEA                                00.250 16.09.11
```

Figure 65. CEDA display of group FILEA

```
 OBJECT CHARACTERISTICS                                        CICS RELEA
   CEDA  View File( FILEA   )
    File           : FILEA
    Group          : FILEA
    DEScription    : FILE FOR TESTING 3270 BRIDGE
   VSAM PARAMETERS
    DSNAme         : CICSTS11.SAMPLE.FILEA
    Password       :                  PASSWORD NOT SPECIFIED
    Lsrpoolid      : 01               1-15 | None
    Catname        : VSESPUC
    DSNSharing     : Noreqs           Noreqs | Allreqs | Modifyreqs
    STRings        : 001              1-255
    Nsrgroup       :
    SHr4access     : Key              Key | Rba
   REMOTE ATTRIBUTES
    REMOTESystem   :
    REMOTEName     :
    RECORDSize     : 00080            1-32767
 +  Keylength      : 006              1-255
+ INITIAL STATUS
    STAtus         : Enabled          Enabled | Disabled | Unenabled
    Opentime       : Firstref         Firstref | Startup
   BUFFERS
    DAtabuffers    : 00002            2-32767
    Indexbuffers   : 00001            1-32767
   DATATABLE PARAMETERS
    Table          : No               No | Cics | User
    Maxnumrecs     :                  16-16777215
   DATA FORMAT
    RECORDFormat   : F                V | F
   OPERATIONS
    Add            : Yes              No | Yes
    Browse         : Yes              No | Yes
    DELete         : Yes              No | Yes
    REAd           : Yes              Yes | No
 +  Update         : Yes              No | Yes
+ AUTO JOURNALLING
    JOurnal        : No               No | 1-99
    JNLRead        : None             None | Updateonly | Readonly | All
    JNLSYNCRead    : No               No | Yes
    JNLUpdate      : No               No | Yes
    JNLAdd         : None             None | Before | AFter | ALl
    JNLSYNCWrite   : Yes              Yes | No
   RECOVERY PARAMETERS
    RECOVery       : None             None | Backoutonly | All
    Fwdrecovlog    : No               No | 1-99
```

Figure 66. RDO file definition for our test VSAM file FILEA

```
 OBJECT CHARACTERISTICS                                        CICS R
  CEDA  View TRANSaction( VSAM )
   TRANSaction    : VSAM
   Group          : FILEA
   DEscription    :
   PROGram        : VSAMTEST
   TWasize        : 00000             0-32767
   PROFile        : DFHCICST
   PArtitionset   :
   STAtus         : Enabled           Enabled | Disabled
   PRIMedsize     : 00000             0-65520
   TASKDATALoc    : Below             Below | Any
   TASKDATAKey    : User              User | Cics
   STOrageclear   : No                No | Yes
   RUnaway        : System            System | 0 | 500-2700000
   SHutdown       : Disabled          Disabled | Enabled
   Brexit         :
  REMOTE ATTRIBUTES
+  DYnamic        : No                No | Yes
CEDA  View TRANSaction( VSAM )
 +  REMOTESystem   :
    REMOTEName     :
    TRProf         :
    Localq         :                    No | Yes
   SCHEDULING
    PRIOrity       : 001                0-255
    TClass         : No                 No | 1-10
    TRANClass      : DFHTCL00
   ALIASES
    Alias          :
    TASKReq        :
    XTRanid        :
    TPName         :
                   :
    XTPname        :
                   :
 +                 :
+ RECOVERY
   DTimout        : No                No | 1-6800
   Indoubt        : Backout           Backout | Commit | Wait
   RESTart        : No                No | Yes
   SPurge         : No                No | Yes
   TPUrge         : No                No | Yes
   DUmp           : Yes               Yes | No
   TRACe          : Yes               Yes | No
   COnfdata       : No                No | Yes
  SECURITY
   RESSec         : No                No | Yes
   CMdsec         : No                No | Yes
   Extsec         : No                No | Yes
   TRANSec        : 01                1-64
   RSl            : 00                0-24 | Public
+  COnfdata       : No                No | Yes
   SECURITY
    RESSec         : No                No | Yes
    CMdsec         : No                No | Yes
    Extsec         : No                No | Yes
    TRANSec        : 01                1-64
    RSl            : 00                0-24 | Public
```

Figure 67. RDO transaction definition for our test transaction VSAM

A.6 DFHCNV source code

```
* $$ JOB JNM=DFHCNV,CLASS=0,DISP=D
 // JOB DFHCNV    CONVERSION TABLE FOR CICS CLIENT CONNECTIONS
 // LIBDEF *,CATALOG=PRD2.CONFIG
 // OPTION CATAL,NOXREF,LOG
 * THIS DFHCNV INCLUDES THE DEFINITION FOR CICS WEB SUPPORT
 * DFHWBHH IS FOR CONVERTING HPPT HEADER DATA.
 * DFHWBUD IS FOR CONVERTING HPPT USER   DATA.
 // EXEC ASSEMBLY,SIZE=2000K
          PRINT NOGEN
          DFHCNV TYPE=INITIAL
          DFHCNV TYPE=ENTRY,RTYPE=PC,RNAME=DFHWBHH,                    *
                CLINTCP=8859-1,SRVERCP=037,USREXIT=NO
          DFHCNV TYPE=SELECT,OPTION=DEFAULT
          DFHCNV TYPE=FIELD,OFFSET=0,DATATYP=CHARACTER,DATALEN=32767,  *
                LAST=YES
          DFHCNV TYPE=ENTRY,RTYPE=PC,RNAME=DFHWBUD,                    *
                CLINTCP=8859-1,SRVERCP=037,USREXIT=NO
          DFHCNV TYPE=SELECT,OPTION=DEFAULT
          DFHCNV TYPE=FIELD,OFFSET=0,DATATYP=CHARACTER,DATALEN=32767,  *
                LAST=YES
          DFHCNV TYPE=FINAL
          END
 /*
 // EXEC LNKEDT
 /*
 /&
 * $$ EOJ
 ***** END OF FILE *****
```

Figure 68. DFHCNV conversion table

A.7 Source listing DFHWBEP sample program

```
DFHEISTG DSECT
DWORD    DS    D
         COPY  DFHWBEPD
DFHWBEP  CSECT
DFHWBEP  AMODE 31
DFHWBEP  RMODE ANY
*
WBEPR    EQU   4
R5       EQU   5
R6       EQU   6
R7       EQU   7
R8       EQU   8
*
         EXEC CICS ADDRESS COMMAREA(WBEPR) , ask for COMMAREA address
         CLC   EIBRESP,DFHRESP(NORMAL)      was it good request ?
         BNE   WBEP                         problem, go to common abend
         LTR   WBEPR,WBEPR                  do minimal testing on len
         BZ    WBEP                         common abend
*
         USING DFHWBEPC,WBEPR               addressability to COMMAREA
*
* We do not test on the length of the buffer. We know we receive a
* COMMAREA of 32K and are sure that we will not use that much of it.
*
         L     R5,WBEP_RESPONSE_PTR         pointer to HTTP response
         LA    R6,0                         R6 = 0 to contain datalengt
         L     R7,WBEP_RESPONSE_LEN         R7 = length of HTTP respons
         LTR   R7,R7                        Mike Poil
         BNP   NOBODY                       Mike Poil
FINDSTRT EQU   *
         CLC   =C'</body>',0(R5)            look for the <body> tag
         BE    ADDOWN                       found, we start adding
         LA    R5,1(,R5)                    not found, add 1 to pointer
         LA    R6,1(,R6)                    and increment length with 1
         BCT   R7,FINDSTRT                  decrement resp_len with 1
NOBODY   DS    0H                           Mike Poil
```

```
         L     R5,WBEP_RESPONSE_PTR         no <body> tag found
         L     R6,WBEP_RESPONSE_LEN         add length to pointer and
         AR    R5,R6                        start adding from there
*
* We are going to scan through the COMMAREA that we received and
* append all meaningfull information that we find in there to
* HTTP response.
*
ADDOWN   EQU   *
         MVC   0(MYHEADL,R5),MYHEAD         move our header
         LA    R5,MYHEADL(,R5)              adjust pointer
         LA    R6,MYHEADL(,R6)              adjust length
         CLC   WBEP_ERROR_CODE,=H'0'        received an error code ?
         BE    ABENDCOD                     no, go check abend code
*
* For the moment there are 43 wbep error codes provided in DFHWBUCD.
* We test on the numeric value of the error code and write the
* corresponding text as given in DFHWBUCD.
*
         MVC   0(17,R5),=C'WBEP_ERROR_CODE: ' yes, write field name
         LA    R5,17(,R5)                   adjust pointer
         LA    R6,17(,R6)                   adjust length
         CLC   WBEP_ERROR_CODE,=H'1'        was it error code 1 ?
         BNE   ERRCOD2                      no, see if it is 2
         MVC   0(L'WBERR1,R5),WBERR1        yes, write text
         LA    R5,L'WBERR1(,R5)             adjust pointer
         LA    R6,L'WBERR1(,R6)             adjust length
         B     ABENDCOD                     and test for an abend code
ERRCOD2  EQU   *
         CLC   WBEP_ERROR_CODE,=H'2'        was it error code 2 ?
         BNE   ERRCOD3                      no, see if it is 3
         MVC   0(L'WBERR2,R5),WBERR2        yes, write text
         LA    R5,L'WBERR2(,R5)             adjust pointer
         LA    R6,L'WBERR2(,R6)             adjust length
         B     ABENDCOD                     and test for an abend code
ERRCOD3  EQU   *
         CLC   WBEP_ERROR_CODE,=H'3'        was it error code 3 ?
         BNE   ERRCOD4                      no, see if it is 4
         MVC   0(L'WBERR3,R5),WBERR3        yes, write text
         LA    R5,L'WBERR3(,R5)             adjust pointer
         LA    R6,L'WBERR3(,R6)             adjust length
         B     ABENDCOD                     and test for an abend code
ERRCOD4  EQU   *
         CLC   WBEP_ERROR_CODE,=H'4'        was it error code 4 ?
         BNE   ERRCOD5                      no, see if it is 5
         MVC   0(L'WBERR4,R5),WBERR4        yes, write text
         LA    R5,L'WBERR4(,R5)             adjust pointer
         LA    R6,L'WBERR4(,R6)             adjust length
         B     ABENDCOD                     and test for an abend code
ERRCOD5  EQU   *
         CLC   WBEP_ERROR_CODE,=H'5'        was it error code 5 ?
         BNE   ERRCOD6                      no, see if it is 6
         MVC   0(L'WBERR5,R5),WBERR5        yes, write text
         LA    R5,L'WBERR5(,R5)             adjust pointer
         LA    R6,L'WBERR5(,R6)             adjust length
         B     ABENDCOD                     and test for an abend code
ERRCOD6  EQU   *
         CLC   WBEP_ERROR_CODE,=H'6'        was it error code 6 ?
         BNE   ERRCOD7                      no, see if it is 7
         MVC   0(L'WBERR6,R5),WBERR6        yes, write text
         LA    R5,L'WBERR6(,R5)             adjust pointer
         LA    R6,L'WBERR6(,R6)             adjust length
         B     ABENDCOD                     and test for an abend code
ERRCOD7  EQU   *
         CLC   WBEP_ERROR_CODE,=H'7'        was it error code 7 ?
         BNE   ERRCOD8                      no, see if it is 8
         MVC   0(L'WBERR7,R5),WBERR7        yes, write text
         LA    R5,L'WBERR7(,R5)             adjust pointer
         LA    R6,L'WBERR7(,R6)             adjust length
         B     ABENDCOD                     and test for an abend code
ERRCOD8  EQU   *
         CLC   WBEP_ERROR_CODE,=H'8'        was it error code 8 ?
         BNE   ERRCOD9                      no, see if it is 9
         MVC   0(L'WBERR8,R5),WBERR8        yes, write text
         LA    R5,L'WBERR8(,R5)             adjust pointer
         LA    R6,L'WBERR8(,R6)             adjust length
         B     ABENDCOD                     and test for an abend code
ERRCOD9  EQU   *
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         CLC   WBEP_ERROR_CODE,=H'9'       was it error code 9 ?
         BNE   ERRCOD10                    no, see if it is 10
         MVC   0(L'WBERR9,R5),WBERR9       yes, write text
         LA    R5,L'WBERR9(,R5)            adjust pointer
         LA    R6,L'WBERR9(,R6)            adjust length
         B     ABENDCOD                    and test for an abend code
ERRCOD10 EQU   *
         CLC   WBEP_ERROR_CODE,=H'10'      was it error code 10 ?
         BNE   ERRCOD11                    no, see if it is 11
         MVC   0(L'WBERR10,R5),WBERR10     yes, write text
         LA    R5,L'WBERR10(,R5)           adjust pointer
         LA    R6,L'WBERR10(,R6)           adjust length
         B     ABENDCOD                    and test for an abend code
ERRCOD11 EQU   *
         CLC   WBEP_ERROR_CODE,=H'11'      was it error code 11 ?
         BNE   ERRCOD12                    no, see if it is 12
         MVC   0(L'WBERR11,R5),WBERR11     yes, write text
         LA    R5,L'WBERR11(,R5)           adjust pointer
         LA    R6,L'WBERR11(,R6)           adjust length
         B     ABENDCOD                    and test for an abend code
ERRCOD12 EQU   *
         CLC   WBEP_ERROR_CODE,=H'12'      was it error code 12 ?
         BNE   ERRCOD13                    no, see if it is 13
         MVC   0(L'WBERR12,R5),WBERR12     yes, write text
         LA    R5,L'WBERR12(,R5)           adjust pointer
         LA    R6,L'WBERR12(,R6)           adjust length
         B     ABENDCOD                    and test for an abend code
ERRCOD13 EQU   *
         CLC   WBEP_ERROR_CODE,=H'13'      was it error code 13 ?
         BNE   ERRCOD14                    no, see if it is 14
         MVC   0(L'WBERR13,R5),WBERR13     yes, write text
         LA    R5,L'WBERR13(,R5)           adjust pointer
         LA    R6,L'WBERR13(,R6)           adjust length
         B     ABENDCOD                    and test for an abend code
ERRCOD14 EQU   *
         CLC   WBEP_ERROR_CODE,=H'14'      was it error code 14 ?
         BNE   ERRCOD15                    no, see if it is 15
         MVC   0(L'WBERR14,R5),WBERR14     yes, write text
         LA    R5,L'WBERR14(,R5)           adjust pointer
         LA    R6,L'WBERR14(,R6)           adjust length
         B     ABENDCOD                    and test for an abend code
ERRCOD15 EQU   *
         CLC   WBEP_ERROR_CODE,=H'15'      was it error code 15 ?
         BNE   ERRCOD16                    no, see if it is 16
         MVC   0(L'WBERR15,R5),WBERR15     yes, write text
         LA    R5,L'WBERR15(,R5)           adjust pointer
         LA    R6,L'WBERR15(,R6)           adjust length
         B     ABENDCOD                    and test for an abend code
ERRCOD16 EQU   *
         CLC   WBEP_ERROR_CODE,=H'16'      was it error code 16 ?
         BNE   ERRCOD17                    no, see if it is 17
         MVC   0(L'WBERR16,R5),WBERR16     yes, write text
         LA    R5,L'WBERR16(,R5)           adjust pointer
         LA    R6,L'WBERR16(,R6)           adjust length
         B     ABENDCOD                    and test for an abend code
ERRCOD17 EQU   *
         CLC   WBEP_ERROR_CODE,=H'17'      was it error code 17 ?
         BNE   ERRCOD18                    no, see if it is 18
         MVC   0(L'WBERR17,R5),WBERR17     yes, write text
         LA    R5,L'WBERR17(,R5)           adjust pointer
         LA    R6,L'WBERR17(,R6)           adjust length
         B     ABENDCOD                    and test for an abend code
ERRCOD18 EQU   *
         CLC   WBEP_ERROR_CODE,=H'18'      was it error code 18 ?
         BNE   ERRCOD19                    no, see if it is 19
         MVC   0(L'WBERR18,R5),WBERR18     yes, write text
         LA    R5,L'WBERR18(,R5)           adjust pointer
         LA    R6,L'WBERR18(,R6)           adjust length
         B     ABENDCOD                    and test for an abend code
ERRCOD19 EQU   *
         CLC   WBEP_ERROR_CODE,=H'19'      was it error code 19 ?
         BNE   ERRCOD20                    no, see if it is 20
         MVC   0(L'WBERR19,R5),WBERR19     yes, write text
         LA    R5,L'WBERR19(,R5)           adjust pointer
         LA    R6,L'WBERR19(,R6)           adjust length
         B     ABENDCOD                    and test for an abend code
ERRCOD20 EQU   *
         CLC   WBEP_ERROR_CODE,=H'20'      was it error code 20 ?
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         BNE   ERRCOD21                  no, see if it is 21
         MVC   0(L'WBERR20,R5),WBERR20   yes, write text
         LA    R5,L'WBERR20(,R5)         adjust pointer
         LA    R6,L'WBERR20(,R6)         adjust length
         B     ABENDCOD                  and test for an abend code
ERRCOD21 EQU   *
         CLC   WBEP_ERROR_CODE,=H'21'    was it error code 21 ?
         BNE   ERRCOD22                  no, see if it is 22
         MVC   0(L'WBERR21,R5),WBERR21   yes, write text
         LA    R5,L'WBERR21(,R5)         adjust pointer
         LA    R6,L'WBERR21(,R6)         adjust length
         B     ABENDCOD                  and test for an abend code
ERRCOD22 EQU   *
         CLC   WBEP_ERROR_CODE,=H'22'    was it error code 22 ?
         BNE   ERRCOD23                  no, see if it is 23
         MVC   0(L'WBERR22,R5),WBERR22   yes, write text
         LA    R5,L'WBERR22(,R5)         adjust pointer
         LA    R6,L'WBERR22(,R6)         adjust length
         B     ABENDCOD                  and test for an abend code
ERRCOD23 EQU   *
         CLC   WBEP_ERROR_CODE,=H'23'    was it error code 23 ?
         BNE   ERRCOD24                  no, see if it is 24
         MVC   0(L'WBERR23,R5),WBERR23   yes, write text
         LA    R5,L'WBERR23(,R5)         adjust pointer
         LA    R6,L'WBERR23(,R6)         adjust length
         B     ABENDCOD                  and test for an abend code
ERRCOD24 EQU   *
         CLC   WBEP_ERROR_CODE,=H'24'    was it error code 24 ?
         BNE   ERRCOD25                  no, see if it is 25
         MVC   0(L'WBERR24,R5),WBERR24   yes, write text
         LA    R5,L'WBERR24(,R5)         adjust pointer
         LA    R6,L'WBERR24(,R6)         adjust length
         B     ABENDCOD                  and test for an abend code
ERRCOD25 EQU   *
         CLC   WBEP_ERROR_CODE,=H'25'    was it error code 25 ?
         BNE   ERRCOD26                  no, see if it is 26
         MVC   0(L'WBERR25,R5),WBERR25   yes, write text
         LA    R5,L'WBERR25(,R5)         adjust pointer
         LA    R6,L'WBERR25(,R6)         adjust length
         B     ABENDCOD                  and test for an abend code
ERRCOD26 EQU   *
         CLC   WBEP_ERROR_CODE,=H'26'    was it error code 26 ?
         BNE   ERRCOD27                  no, see if it is 27
         MVC   0(L'WBERR26,R5),WBERR26   yes, write text
         LA    R5,L'WBERR26(,R5)         adjust pointer
         LA    R6,L'WBERR26(,R6)         adjust length
         B     ABENDCOD                  and test for an abend code
ERRCOD27 EQU   *
         CLC   WBEP_ERROR_CODE,=H'27'    was it error code 27 ?
         BNE   ERRCOD28                  no, see if it is 28
         MVC   0(L'WBERR27,R5),WBERR27   yes, write text
         LA    R5,L'WBERR27(,R5)         adjust pointer
         LA    R6,L'WBERR27(,R6)         adjust length
         B     ABENDCOD                  and test for an abend code
ERRCOD28 EQU   *
         CLC   WBEP_ERROR_CODE,=H'28'    was it error code 28 ?
         BNE   ERRCOD29                  no, see if it is 29
         MVC   0(L'WBERR28,R5),WBERR28   yes, write text
         LA    R5,L'WBERR28(,R5)         adjust pointer
         LA    R6,L'WBERR28(,R6)         adjust length
         B     ABENDCOD                  and test for an abend code
ERRCOD29 EQU   *
         CLC   WBEP_ERROR_CODE,=H'29'    was it error code 29 ?
         BNE   ERRCOD30                  no, see if it is 30
         MVC   0(L'WBERR29,R5),WBERR29   yes, write text
         LA    R5,L'WBERR29(,R5)         adjust pointer
         LA    R6,L'WBERR29(,R6)         adjust length
         B     ABENDCOD                  and test for an abend code
ERRCOD30 EQU   *
         CLC   WBEP_ERROR_CODE,=H'30'    was it error code 30 ?
         BNE   ERRCOD31                  no, see if it is 31
         MVC   0(L'WBERR30,R5),WBERR30   yes, write text
         LA    R5,L'WBERR30(,R5)         adjust pointer
         LA    R6,L'WBERR30(,R6)         adjust length
         B     ABENDCOD                  and test for an abend code
ERRCOD31 EQU   *
         CLC   WBEP_ERROR_CODE,=H'31'    was it error code 31 ?
         BNE   ERRCOD32                  no, see if it is 32
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         MVC   0(L'WBERR31,R5),WBERR31      yes, write text
         LA    R5,L'WBERR31(,R5)            adjust pointer
         LA    R6,L'WBERR31(,R6)            adjust length
         B     ABENDCOD                     and test for an abend code
ERRCOD32 EQU   *
         CLC   WBEP_ERROR_CODE,=H'32'       was it error code 32 ?
         BNE   ERRCOD33                     no, see if it is 33
         MVC   0(L'WBERR32,R5),WBERR32      yes, write text
         LA    R5,L'WBERR32(,R5)            adjust pointer
         LA    R6,L'WBERR32(,R6)            adjust length
         B     ABENDCOD                     and test for an abend code
ERRCOD33 EQU   *
         CLC   WBEP_ERROR_CODE,=H'33'       was it error code 33 ?
         BNE   ERRCOD34                     no, see if it is 34
         MVC   0(L'WBERR33,R5),WBERR33      yes, write text
         LA    R5,L'WBERR33(,R5)            adjust pointer
         LA    R6,L'WBERR33(,R6)            adjust length
         B     ABENDCOD                     and test for an abend code
ERRCOD34 EQU   *
         CLC   WBEP_ERROR_CODE,=H'34'       was it error code 34 ?
         BNE   ERRCOD35                     no, see if it is 35
         MVC   0(L'WBERR34,R5),WBERR34      yes, write text
         LA    R5,L'WBERR34(,R5)            adjust pointer
         LA    R6,L'WBERR34(,R6)            adjust length
         B     ABENDCOD                     and test for an abend code
ERRCOD35 EQU   *
         CLC   WBEP_ERROR_CODE,=H'35'       was it error code 35 ?
         BNE   ERRCOD36                     no, see if it is 36
         MVC   0(L'WBERR35,R5),WBERR35      yes, write text
         LA    R5,L'WBERR35(,R5)            adjust pointer
         LA    R6,L'WBERR35(,R6)            adjust length
         B     ABENDCOD                     and test for an abend code
ERRCOD36 EQU   *
         CLC   WBEP_ERROR_CODE,=H'36'       was it error code 36 ?
         BNE   ERRCOD37                     no, see if it is 37
         MVC   0(L'WBERR36,R5),WBERR36      yes, write text
         LA    R5,L'WBERR36(,R5)            adjust pointer
         LA    R6,L'WBERR36(,R6)            adjust length
         B     ABENDCOD                     and test for an abend code
ERRCOD37 EQU   *
         CLC   WBEP_ERROR_CODE,=H'37'       was it error code 37 ?
         BNE   ERRCOD38                     no, see if it is 38
         MVC   0(L'WBERR37,R5),WBERR37      yes, write text
         LA    R5,L'WBERR37(,R5)            adjust pointer
         LA    R6,L'WBERR37(,R6)            adjust length
         B     ABENDCOD                     and test for an abend code
ERRCOD38 EQU   *
         CLC   WBEP_ERROR_CODE,=H'38'       was it error code 38 ?
         BNE   ERRCOD39                     no, see if it is 39
         MVC   0(L'WBERR38,R5),WBERR38      yes, write text
         LA    R5,L'WBERR38(,R5)            adjust pointer
         LA    R6,L'WBERR38(,R6)            adjust length
         B     ABENDCOD                     and test for an abend code
ERRCOD39 EQU   *
         CLC   WBEP_ERROR_CODE,=H'39'       was it error code 39 ?
         BNE   ERRCOD40                     no, see if it is 40
         MVC   0(L'WBERR39,R5),WBERR39      yes, write text
         LA    R5,L'WBERR39(,R5)            adjust pointer
         LA    R6,L'WBERR39(,R6)            adjust length
         B     ABENDCOD                     and test for an abend code
ERRCOD40 EQU   *
         CLC   WBEP_ERROR_CODE,=H'40'       was it error code 40 ?
         BNE   ERRCOD41                     no, see if it is 41
         MVC   0(L'WBERR40,R5),WBERR40      yes, write text
         LA    R5,L'WBERR40(,R5)            adjust pointer
         LA    R6,L'WBERR40(,R6)            adjust length
         B     ABENDCOD                     and test for an abend code
ERRCOD41 EQU   *
         CLC   WBEP_ERROR_CODE,=H'41'       was it error code 41 ?
         BNE   ERRCOD42                     no, see if it is 42
         MVC   0(L'WBERR41,R5),WBERR41      yes, write text
         LA    R5,L'WBERR41(,R5)            adjust pointer
         LA    R6,L'WBERR41(,R6)            adjust length
         B     ABENDCOD                     and test for an abend code
ERRCOD42 EQU   *
         CLC   WBEP_ERROR_CODE,=H'42'       was it error code 42 ?
         BNE   ERRCOD43                     no, see if it is 43
         MVC   0(L'WBERR42,R5),WBERR42      yes, write text
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         LA    R5,L'WBERR42(,R5)            adjust pointer
         LA    R6,L'WBERR42(,R6)            adjust length
         B     ABENDCOD                     and test for an abend code
ERRCOD43 EQU   *
         CLC   WBEP_ERROR_CODE,=H'43'       was it error code 43 ?
         BNE   ERRERR                       no, then it is unknown
         MVC   0(L'WBERR43,R5),WBERR43      yes, write text
         LA    R5,L'WBERR43(,R5)            adjust pointer
         LA    R6,L'WBERR43(,R6)            adjust length
         B     ABENDCOD                     and test for an abend code
ERRERR   EQU   *
         MVC   0(L'WBERRERR,R5),WBERRERR    write not found in DFHWBUCD
         LA    R5,L'WBERRERR(,R5)           adjust pointer
         LA    R6,L'WBERRERR(,R6)           adjust length
         LH    R7,WBEP_ERROR_CODE           load the error code
         CVD   R7,DWORD                     convert to decimal
         OI    DWORD+7,X'0F'                make it printable
         UNPK  0(2,R5),DWORD+6(2)           unpack it to two bytes
         LA    R5,2(,R5)                    adjust pointer
         LA    R6,2(,R6)                    adjust length
ABENDCOD EQU   *
         CLC   WBEP_ABEND_CODE,=F'0'        do we have an abend code ?
         BE    MESSAGE                      no, see if there is a msg
         MVC   0(3,R5),NL                   write on a new line
         LA    R5,3(,R5)                    adjust pointer
         LA    R6,3(,R6)                      adjust length
         MVC   0(17,R5),=C'WBEP_ABEND_CODE: ' move field name
         LA    R5,17(,R5)                   adjust pointer
         LA    R6,17(,R6)                   adjust length
         MVC   0(4,R5),WBEP_ABEND_CODE      move the abend code itself
         LA    R5,4(,R5)                    adjust pointer
         LA    R6,4(,R6)                    adjust length
MESSAGE  EQU   *
         L     R7,WBEP_MESSAGE_LEN          load message length
         LTR   R7,R7                        is it zero ?
         BZ    CLADDR                       yes, then no msg; test next
         MVC   0(3,R5),NL                   write on a new line
         LA    R5,3(,R5)                    adjust pointer
         LA    R6,3(,R6)                    adjust length
         MVC   0(14,R5),=C'WBEP_MESSAGE: '  move field name
         LA    R5,14(,R5)                   adjust pointer
         LA    R6,14(,R6)                   adjust length
         L     R8,WBEP_MESSAGE_PTR          load pointer to message
         BCTR  R7,0                         suppose <256; -1 for mvc
         EX    R7,MOVEMSG                   and move the message text
         A     R5,WBEP_MESSAGE_LEN          adjust pointer
         A     R6,WBEP_MESSAGE_LEN          adjust length
         B     CLADDR                       see client address given
MOVEMSG  MVC   0(0,R5),0(R8)
CLADDR   EQU   *
         IC    R7,WBEP_CLIENT_ADDRESS_LEN   load client addr length
         LTR   R7,R7                        is it zero ?
         BZ    SADDR                        yes, look for server addr
         MVC   0(3,R5),NL                   write on a new line
         LA    R5,3(,R5)                    adjust pointer
         LA    R6,3(,R6)                    adjust length
         MVC   0(21,R5),=C'WBEP_CLIENT_ADDRESS: ' move field name
         LA    R5,21(,R5)                   adjust pointer
         LA    R6,21(,R6)                   adjust length
         LA    R8,WBEP_CLIENT_ADDRESS       load pointer to client addr
         BCTR  R7,0                         -1 for mvc
         EX    R7,MOVEMSG                   move client address
         LA    R7,1(,R7)                    +1 to have correct length
         AR    R5,R7                        adjust pointer
         AR    R6,R7                        adjust length
SADDR    EQU   *
         IC    R7,WBEP_SERVER_ADDRESS_LEN   load server addr length
         LTR   R7,R7                        is it zero ?
         BZ    TCPIPSER                     yes, look for TCPIPSERVICE
         MVC   0(3,R5),NL                   write on a new line
         LA    R5,3(,R5)                    adjust pointer
         LA    R6,3(,R6)                    adjust length
         MVC   0(21,R5),=C'WBEP_SERVER_ADDRESS: ' move field name
         LA    R5,21(,R5)                   adjust pointer
         LA    R6,21(,R6)                   adjust length
         LA    R8,WBEP_SERVER_ADDRESS       load pointer to server addr
         BCTR  R7,0                         -1 for mvc
         EX    R7,MOVEMSG                   move server address
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         LA    R7,1(,R7)                  +1 to have correct length
         AR    R5,R7                      adjust pointer
         AR    R6,R7                      adjust length
TCPIPSER EQU   *
         CLI   WBEP_TCPIPSERVICE_NAME,X'00' test if present on 1st byte
         BE    CONVERTR                   not present, test converter
         MVC   0(3,R5),NL                 write on a new line
         LA    R5,3(,R5)                  adjust pointer
         LA    R6,3(,R6)                  adjust length
         MVC   0(24,R5),=C'WBEP_TCPIPSERVICE_NAME: ' move field name
         LA    R5,24(,R5)                 adjust pointer
         LA    R6,24(,R6)                 adjust length
         MVC   0(8,R5),WBEP_TCPIPSERVICE_NAME move 8 bytes name
         LA    R5,8(,R5)                  adjust pointer
         LA    R6,8(,R6)                  adjust length
CONVERTR EQU   *
         CLI   WBEP_CONVERTER_PROGRAM,X'00' test if present on 1st byte
         BE    TARGET                     not present, test program
         MVC   0(3,R5),NL                 write on a new line
         LA    R5,3(,R5)                  adjust pointer
         LA    R6,3(,R6)                  adjust length
         MVC   0(24,R5),=C'WBEP_CONVERTER_PROGRAM: ' move field name
         LA    R5,24(,R5)                 adjust pointer
         LA    R6,24(,R6)                 adjust length
         MVC   0(8,R5),WBEP_CONVERTER_PROGRAM move 8 bytes converter
         LA    R5,8(,R5)                  adjust pointer
         LA    R6,8(,R6)                  adjust length
TARGET   EQU   *
         CLI   WBEP_TARGET_PROGRAM,X'00'    test if present on 1st byte
         BE    FAILING                    not present, test failing
         MVC   0(3,R5),NL                 write on a new line
         LA    R5,3(,R5)                  adjust pointer
         LA    R6,3(,R6)                  adjust length
         MVC   0(21,R5),=C'WBEP_TARGET_PROGRAM: ' move field name
         LA    R5,21(,R5)                 adjust pointer
         LA    R6,21(,R6)                 adjust length
         MVC   0(8,R5),WBEP_TARGET_PROGRAM  move 8 bytes program name
         LA    R5,8(,R5)                  adjust pointer
         LA    R6,8(,R6)                  adjust length
FAILING  EQU   *
         CLI   WBEP_FAILING_PROGRAM,X'00'   test if present on 1st byte
         BE    ANALRESP                   not present, test analyzer
         MVC   0(3,R5),NL                 write on a new line
         LA    R5,3(,R5)                  adjust pointer
         LA    R6,3(,R6)                  adjust length
         MVC   0(22,R5),=C'WBEP_FAILING_PROGRAM: ' move field name
         LA    R5,22(,R5)                 adjust pointer
         LA    R6,22(,R6)                 adjust length
         MVC   0(8,R5),WBEP_FAILING_PROGRAM move 8 byte program name
         LA    R5,8(,R5)                  adjust pointer
         LA    R6,8(,R6)                  adjust length
*
* We do not format WBEP_HTTP_RESPONSE_CODE as it is the same as
* the one we have in the response code text that is passed in the
* COMMAREA. This response code will be on the top of our screen.
*
ANALRESP EQU   *
         CLC   WBEP_ANALYZER_RESPONSE,=F'0' analyzer response code ?
         BE    CONVRESP                   no, test for converter code
         MVC   0(3,R5),NL                 yes, write on a new line
         LA    R5,3(,R5)                  adjust pointer
         LA    R6,3(,R6)                  adjust length
         MVC   0(24,R5),=C'WBEP_ANALYZER_RESPONSE: ' write field name
         LA    R5,24(,R5)                 adjust pointer
         LA    R6,24(,R6)                 adjust length
         CLC   WBEP_ANALYZER_RESPONSE,=F'4' is it code 4 ?
         BNE   ANALR8                     no, see if it is 8
         MVC   0(L'RESPE,R5),RESPE        yes, write EXCEPTION
         LA    R5,L'RESPE(,R5)            adjust pointer
         LA    R6,L'RESPE(,R6)            adjust length
         B     ANALREAS                   go for the reason code
ANALR8   EQU   *
         CLC   WBEP_ANALYZER_RESPONSE,=F'8' is it code 8 ?
         BNE   ANALR12                    no, see if it is 12
         MVC   0(L'RESPI,R5),RESPI        yes, write INVALID
         LA    R5,L'RESPI(,R5)            adjust pointer
         LA    R6,L'RESPI(,R6)            adjust length
         B     ANALREAS                   go for the reason code
```

```
ANALR12  EQU   *
         CLC   WBEP_ANALYZER_RESPONSE,=F'12' is it code 12 ?
         BNE   ANALUNKN                    no, write it is unknown
         MVC   0(L'RESPD,R5),RESPD         yes, write DISASTER
         LA    R5,L'RESPD(,R5)             adjust pointer
         LA    R6,L'RESPD(,R6)             adjust length
         B     ANALREAS                    go for the reason code
ANALUNKN EQU   *
         MVC   0(L'UNKNOWN,R5),UNKNOWN     write anal resp cod unknown
         LA    R5,L'UNKNOWN(,R5)           adjust pointer
         LA    R6,L'UNKNOWN(,R6)           adjust length
         L     R7,WBEP_ANALYZER_RESPONSE   load response value
         CVD   R7,DWORD                    convert to decimal
         OI    DWORD+7,X'0F'               make it printable
         UNPK  0(4,R5),DWORD+4(4)          unpack to fullword
         LA    R5,4(,R5)                   adjust pointer
         LA    R6,4(,R6)                   adjust length
ANALREAS EQU   *
         MVC   0(3,R5),NL                  write on a new line
         LA    R5,3(,R5)                   adjust pointer
         LA    R6,3(,R6)                   adjust length
         MVC   0(22,R5),=C'WBEP_ANALYZER_REASON: ' write field name
         LA    R5,22(,R5)                  adjust pointer
         LA    R6,22(,R6)                  adjust length
         L     R7,WBEP_ANALYZER_REASON     load reason value
         CVD   R7,DWORD                    convert to decimal
         OI    DWORD+7,X'0F'               make it printable
         UNPK  0(4,R5),DWORD+4(4)          unpack to fullword
         LA    R5,4(,R5)                   adjust pointer
         LA    R6,4(,R6)                   adjust length
CONVRESP EQU   *
         CLC   WBEP_CONVERTER_RESPONSE,=F'0' converter response given ?
         BE    ENDED                       no, suppose we're through
         MVC   0(3,R5),NL                  write on a new line
         LA    R5,3(,R5)                   adjust pointer
         LA    R6,3(,R6)                   adjust length
         MVC   0(25,R5),=C'WBEP_CONVERTER_RESPONSE: ' move field name
         LA    R5,25(,R5)                  adjust pointer
         LA    R6,25(,R6)                  adjust length
         CLC   WBEP_CONVERTER_RESPONSE,=F'4' test if value is 4
         BNE   CONVR8                      no, see if it is 8
         MVC   0(L'RESPE,R5),RESPE         yes, write EXCEPTION
         LA    R5,L'RESPE(,R5)             adjust pointer
         LA    R6,L'RESPE(,R6)             adjust length
         B     CONVREAS                    go for converter reason cod
CONVR8   EQU   *
         CLC   WBEP_CONVERTER_RESPONSE,=F'8' test if value is 8
         BNE   CONVR12                     no, see if it is 12
         MVC   0(L'RESPI,R5),RESPI         yes, write INVALID
         LA    R5,L'RESPI(,R5)             adjust pointer
         LA    R6,L'RESPI(,R6)             adjust length
         B     CONVREAS                    go for converter reason cod
CONVR12  EQU   *
         CLC   WBEP_CONVERTER_RESPONSE,=F'12' test if value is 12
         BNE   CONVUNKN                    no, go to write unknown
         MVC   0(L'RESPD,R5),RESPD         yes, write DISASTER
         LA    R5,L'RESPD(,R5)             adjust pointer
         LA    R6,L'RESPD(,R6)             adjust length
         B     CONVREAS                    go for converter reason cod
CONVUNKN EQU   *
         MVC   0(L'UNKNOWN,R5),UNKNOWN     write that it is unknown
         LA    R5,L'UNKNOWN(,R5)           adjust pointer
         LA    R6,L'UNKNOWN(,R6)           adjust length
         L     R7,WBEP_CONVERTER_RESPONSE  load converter response val
         CVD   R7,DWORD                    convert to decimal
         OI    DWORD+7,X'0F'               make it printable
         UNPK  0(4,R5),DWORD+4(4)          unpack to fullword
         LA    R5,4(,R5)                   adjust pointer
         LA    R6,4(,R6)                   adjust length
CONVREAS EQU   *
         MVC   0(3,R5),NL                  write on a new line
         LA    R5,3(,R5)                   adjust pointer
         LA    R6,3(,R6)                   adjust length
         MVC   0(23,R5),=C'WBEP_CONVERTER_REASON: ' move the field name
         LA    R5,23(,R5)                  adjust pointer
         LA    R6,23(,R6)                  adjust length
         L     R7,WBEP_CONVERTER_REASON    load converter reason value
         CVD   R7,DWORD                    convert to decimal
```

```
         OI    DWORD+7,X'0F'               make it printable
         UNPK  0(4,R5),DWORD+4(4)          unpack to fullword
         LA    R5,4(,R5)                   adjust pointer
         LA    R6,4(,R6)                   adjust length
ENDED    EQU   *
         MVC   0(7,R5),=C'</BODY>'         move the ending body tag
         LA    R6,7(,R6)                   adjust length
         ST    R6,WBEP_RESPONSE_LEN        and store it for CICS
*
         EXEC CICS RETURN ,                return to DFHWBBLI
*
WBEP     EQU   *
         EXEC CICS DUMP TRANSACTION DUMPCODE('WBEP') NOHANDLE
*
MYHEAD   EQU   *
NL       DC    C'<p>'
         DC    C'MEANINGFUL FIELDS FROM DFHWBEP COMMAREA:'
         DC    C'<p>'
MYHEADL  EQU   *-MYHEAD
WBERR1   DC    C'blio_greater_than_32k_response'  equ 1
WBERR2   DC    C'commarea_no_content'             equ 2
WBERR3   DC    C'dfhwbbli_document_not_found'     equ 3
WBERR4   DC    C'dfhwbbli_codepage_not_found'     equ 4
WBERR5   DC    C'dfhwbbli_api_error'              equ 5
WBERR6   DC    C'dfhwbbli_link_failed_termerr'    equ 6
WBERR7   DC    C'dfhwbbli_link_failed_invreq'     equ 7
WBERR8   DC    C'dfhwbbli_link_failed_lengerr'    equ 8
WBERR9   DC    C'dfhwbbli_link_failed_pgmiderr'   equ 9
WBERR10  DC    C'dfhwbbli_link_failed_sysiderr'   equ 10
WBERR11  DC    C'dfhwbbli_link_failed_rolledback' equ 11
WBERR12  DC    C'dfhwbbli_link_failed_notauth'    equ 12
WBERR13  DC    C'dfhwbbli_link_failed'            equ 13
WBERR14  DC    C'invalid_decode_parameter_list'   equ 14
WBERR15  DC    C'decode_error'                    equ 15
WBERR16  DC    C'invalid_encode_parameter_list'   equ 16
WBERR17  DC    C'encode_error'                    equ 17
WBERR18  DC    C'save_certificate_failed'         equ 18
WBERR19  DC    C'dfhwbbli_abend_handler_invoked'  equ 19
WBERR20  DC    C'invalid_attach'                  equ 20
WBERR21  DC    C'receive_error'                   equ 21
WBERR22  DC    C'analyzer_link_eror'              equ 22
WBERR23  DC    C'dfhwbxn_codepage_error'          equ 23
WBERR24  DC    C'no_analyzer_specified'           equ 24
WBERR25  DC    C'receive_storage_eror'            equ 25
WBERR26  DC    C'header_length_error'             equ 26
WBERR27  DC    C'dfhwbxn_logic_error'             equ 27
WBERR28  DC    C'link_dfhwbbli_failed'            equ 28
WBERR29  DC    C'analyzer_error'                  equ 29
WBERR30  DC    C'analyzer_datalength_error'       equ 30
WBERR31  DC    C'not_authorized_to_start_alias'   equ 31
WBERR32  DC    C'dfhwbbli_bad_previous_web_send'  equ 32
WBERR33  DC    C'bad_commarea_response'           equ 33
WBERR34  DC    C'alias_task_purged'               equ 34
WBERR35  DC    C'security_unknown_esm_resp'       equ 35
WBERR36  DC    C'security_esm_not_responding'     equ 36
WBERR37  DC    C'security_application_notauth'    equ 37
WBERR38  DC    C'security_userid_revoked'         equ 38
WBERR39  DC    C'seclabel_check_failed'           equ 39
WBERR40  DC    C'security_group_access_revoked'   equ 40
WBERR41  DC    C'security_invalid_userid'         equ 41
WBERR42  DC    C'attach_logic_error'              equ 42
WBERR43  DC    C'user_not_authorised'             equ 43
WBERRERR DC    C'WBED_ERROR_CODE not found in DFHWBUCD list. Value is '
*
UNKNOWN  DC    C'unknown. Value is '
RESPE    DC    C'EXCEPTION'
RESPI    DC    C'INVALID'
RESPD    DC    C'DISASTER'
*
         END
```

Appendix B. Special notices

This publication is intended to help customers who are implementing the CICS WebSupport and the 3270 brigde in an environment of CICS Transaction Server for VSE/ESA Version 1 Release 1.1. The information in this publication is not intended as the specification of any programming interfaces that are provided by CICS Transaction Server for VSE/ESA Version 1 Release 1.1. See the PUBLICATIONS section of the IBM Programming Announcement for CICS Transaction Server for VSE/ESA Version 1 Release 1.1 for more information about what publications are considered to be product documentation.

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Appendix C. Related publications

The publications listed in this section are considered particularly suitable for a more detailed discussion of the topics covered in this redbook.

C.1 IBM Redbooks

For information on ordering these publications see “How to get IBM Redbooks” on page 113.

- *VSE/ESA as a Web Server,* SG24-2040
- *CICS Transaction Server for OS/390 Version 1 Release 3: Web Support and 3270 Bridge,* SG24-5480
- *Migration to VSE/ESA 2.4 and CICS Transaction Server for VSE/ESA 1.1*, SG24-5595
- *Implementation of VSE/ESA 2.4 and CICS Transaction Server for VSE/ESA 1.1*, SG24-5624
- *e-business Solutions for VSE/ESA,* SG24-5662
- *e-business Connectivity for VSE/ESA*, SG24-5950

C.2 IBM Redbooks collections

Redbooks are also available on the following CD-ROMs. Click the CD-ROMs button at ibm.com/redbooks for information about all the CD-ROMs offered, updates and formats.

CD-ROM Title	Collection Kit Number
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IBM Application Development Redbooks Collection	SK2T-8037
IBM Enterprise Storage and Systems Management Solutions	SK3T-3694
TCP/IP for VSE/ESA	SK2T-1336

C.3 Other resources

These publications are also relevant as further information sources:

- *CICS Transaction Server for VSE/ESA Release Guide Release 1,* GC33-1645
- *CICS Transaction Server for VSE/ESA Migration Guide Release 1,* GC33-1646
- *CICS Problem Determination Guide*, GC33-1663
- *CICS Transaction Server for VSE/ESA Enhancement Guide Release 1,* GC34-5763

- *CICS Transaction Server for VSE/ESA Operations and Utilities Guide Release 1*, SC33-1654
- *CICS Transaction Server for VSE/ESA External Interface Guide Release 1,* SC33-1669
- *CICS Transaction Server for VSE/ESA Internet Guide Release 1,* SC34-5765

C.4 Referenced Web sites

These Web sites are also relevant as further information sources:

- Visit the VSE/ESA home page at: `http://www.ibm.com/vse`
- Visit the CICS home page at: `http://www.software.ibm.com/ts/cics`
- For an overivew of the CICS transaction gateway, visit the Web sit at: `http://www.ibm.com/software/ts/cics/platforms/internet/tgw30`
- For information on the MQSeries family, log on to: `http://www.ibm.com/software/ts/mqseries`
- For information on DB2 Connect, log on to: `http://www.ibm.com/software/data/db2/db2connect`
- For information on WebSphere Host On-Demand, visit the Web site at: `http://www.ibm.com/software/network/hostondemand`
- For information on CICS, log on to: `http://www-4.ibm.com/software/ts/cics`
- VSE/ESA performance information and results are available at the VSE/ESA Internet home page at: `http://www.s390.ibm.com/vse`

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Implementation guidance for CWS, including 3270 Bridge functions

CICS Web Support samples

CICS Web Support (CWS) is a new function in CICS Transaction Server for VSE/ESA 1.1.1. CWS first became available in OS/390 with CICS TS 1.2, and was enhanced in Release 1.3. This 1.3 functionality was ported to CICS TS for VSE/ESA 1.1.1.

CICS Web Support is an effective solution for the VSE/ESA user community. It is a powerful 2-tier Web enablement solution that is easy to plan for and simple to implement. Our goal for this IBM Redbook is to provide you with the information to use this great e-business connector. CWS unites browser technology with S/390. This provides tremendous flexibility to the end-user community while capitalizing on S/390 performance, reliability, scalability, availability, and data integrity.

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