With the introduction of the 3270 Bridge Exit in CICS Transaction Server 1.2, it is fairly simple to rapidly create a web-enabled version of an existing CICS application. With the phenomenal success of dot.com businesses, most companies are rushing to put applications on the web. Until the advent of CICS Transaction Server (TS) 1.2, taking an existing CICS application and moving it to the web involved either a considerable rewrite on CICS, a large and expensive conversion to another platform, or the maintenance headache of a screen scraping front end. With the introduction of the 3270 Bridge Exit in TS 1.2, and its further expansion in TS 1.3, it is fairly simple to rapidly create a web-enabled version of an existing CICS application.

This article will examine how to take an existing CICS application, in any combination of languages, and deploy it on a web browser without recompiling any of the source except for the program maps. IBM even supplies a utility to create map source in case it is unavailable. The focus of this article will be on CICS TS 1.3, but most of the information presented here is applicable to CICS TS 1.2 as well.

WEB ENABLING PREREQUISITES

Before using the 3270 Bridge, you will first need to enable CICS web support. To enable web support in a CICS region you will need the following OS/390 facilities:

- OS/390 eNetwork Communications Server Version 3.2.0 or above (formerly TCP/IP support)
- Language Environment (LE) run-time libraries
- CICS region with LE support enabled (as described in the CICS System Definition Guide)
- a TCP/IP port from the OS/390 eNetwork Communications Server

Note: It may be easier to get a range of ports that you control rather than request a port each time it is necessary to CICS enable a CICS region.
INSTALLING WEB SUPPORT

While web enablement may seem a daunting task at first, the following installation process is simple. The relevant TS 1.3 System Initialization Table (SIT) parameters include:

TCPIP={YES|NO} (WEB={YES|NO} in TS 1.2)
WEBDELAY=|time_out,60|keep_time)
ENCRYPTION={NORMAL|WEAK|STRONG} (TS 1.3 only)
KEYFILE=key-database-path-name (TS 1.3 only)

1. Override the default SIT parameters by setting TCPIP=YES (or WEB=YES in TS 1.2). The default for WEBDELAY is five minutes, which is a reasonable value, and ENCRYPTION and KEYFILE are for Secure Sockets Layer (SSL) only.
2. Include DFHWEB in the region’s group list. DFHWEB is in list DFHLIST and you may have included it by default.
3. Copy DFHSSOT into a new group.
4. Alter entry HTTPNSSL with the new port number and add the new group to the region’s group list(s). Note: You may want to add the sample security program group, DFHSWBSN, in case you need security authorization to access your transactions.
5. Add LE support if it is not enabled and restart the region. You should receive the following message: “DFHWB1007 CICSREGX Initializing CICS Web environment. DFHWB1008 CICSREGX CICS web environment initialization is complete.”

TESTING WEB SUPPORT

An alternative to the aforementioned way of testing if web support is active is to issue the “CEMT INQ TCPIPSERVICE” transaction. If the response is similar to what is shown in Figure 2, then web support is enabled. If you get a “NOT FOUND” message you may want to add the sample security program group, DFHSWBSN, in case you need security authorization to access your transactions.

After you’ve determined that web support is active, you can try to connect a browser to your region. To do this, use either the domain name of the eNetwork Communications Server or the raw TCP/IP address displayed in the CEMT INQUIRE TCPIPSERVICE response, and issue the following http address: http://your.dns.com:8002/CICS/CSMI/DFH$WB1A. If everything is set up properly you will receive the following message on your browser:

If the response is garbled but you do not receive an error message, check the DFHCNV conversion table to ensure that it contains the entry shown in Figure 1.

USING NON-BASIC MAPPING SERVICES (BMS) APPLICATIONS

After verifying that the CICS region is web enabled, you can try to use non-BMS applications on the web. The first non-BMS application is CEMT and can be accessed using the following address: http://your.dns.com:8002/CICS/CSMI/DFH$WB1A. Note: To simulate the 3270 enter key you must use the “Enter” button at the bottom of the display. Figure 2 shows the output of the CEMT command in your browser.
3270 BRIDGE RESTRICTIONS

Not all BMS applications can be automatically converted using the 3270 Bridge. Only applications that use minimal BMS are supported. This means that any application that uses ACCUM or partitions will not work through the 3270 Bridge exit.

3270 BRIDGE CONVERSION EXAMPLE

I will use the IBM supplied COBOL FILEA sample programs that can be found in SDFHSAMP to demonstrate the 3270 bridge I created. The table in Figure 3 describes the programs, maps and transactions involved.

To avoid altering any supplied code, I created copies of the source in Figure 3 from DFHSAMP as well as a new source library, and replaced the "DFH" with "DKB". All the programs and maps were then compiled. I changed the MENU command to MEMC due to a conflict with an existing application. Figure 4 shows the screen that was displayed after the MEMC command was issued from a 3270 screen. Figure 5 shows the screen that is displayed after the BRWS was issued. These displays give you an idea about the look and feel of the original 3270 application.
The following steps describe how to web enable the 3270 transaction:

1. Recompile the maps using DFHMAPT rather than DFHMAP. TS 1.2 added Application Data Structure (ADS) to the MAP SYSPARM=DSECT. ADS allows the bridge exit to parse the incoming data without the copybooks of the symbolic MAPSETS. The JCL for the procedure definition is shown in Figure 6.

2. Issue the following command:
   http://your.dns.com:8002/CICS/CWBA/DFHWBTTA/MENCY
   You will be presented with the screen shown in Figure 7. Issuing the BRWS transaction from the screen in Figure 7 results in the browser screen displayed in Figure 8, which is acceptable but looks much like a screen scraping application. If this was all that the supplied Web Bridge Exit could do, it is doubtful that anyone would use the facility. Fortunately, it is relatively easy to change this application to look more web-enabled.

3. Customize the DFHMSX macro. DFHMSX is called by the High Level Assembler during map definition. You can simply add this macro before your map source and recompile. This macro allows a great deal of customization and is documented in the CICS Internet Guide.

4. Using the JCL shown in Figure 9, recompile the maps with the version of DFHMSX shown in Figure 10. You will be presented with the screens shown in Figures 11 and 12. Note that when you make changes to a map template the resulting web page does not change and you will discover that there is no NEWCOPY function for map templates. Barring recycling the CICS region, you must use CEMT DISCARD DOC (template-name) to remove the definition. For normal templates, you would have to reinstall the template using CEDA (or CECI) and optionally skip the DISCARD. However, with the 3270 bridge, if a DOCTEMPLATE is not defined, the bridge issues an EXEC CICS CREATE DOCTEMPLATE command for you. DOCTEMPLATEs are not AUTOINSTALLED; this is a feature of the 3270 bridge. This is all done without making any changes to the MAPS.

5. Add DFHWBOUT statements to the maps. This allows you to insert raw HTML into the output. In this case, set a link to http://www-4.ibm.com/software/ts/cics/about/modern/cicsweb.html with the DFHWBOUT statements highlighted in Figure 13. The DFHMSX macro was changed to suppress lines four through eleven. The modified DFHMSX, the augmented menu (MEMC transaction with DFHSMX2 and DFHWBOUT macros), and the augmented BRWS transaction are available for download from the NaSPA web site at www.naspa.net as filename BECK0900.ZIP. To access, click on "Technical Support" and "Coding Samples from Articles."

6. By editing the HTML template dataset DFHHTML member DKB0CGA, the output can be altered to look as much like a normal web page as the programmer wishes. The modified HTML DOCTEMPLATE is also available in the aforementioned file BECK0900.ZIP. Figures 14 and 15 provide examples of the browser output. Note that the table in Figure 15 adjusts itself for the longest name entry.
CONCLUSION

This article has demonstrated how to web enable a simple application without altering any existing code. The person converting the application can have as little knowledge of HTML as possible and use the DFHMSX macro, or use a great deal of HTML knowledge and alter the HTML template to produce professional results.

REFERENCES


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