

Session E08:
CICS Web Support

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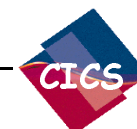




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Agenda

- Introduction
- What is CICS Web Support?
- Enabling CICS Web Support
- Writing CICS Web Applications
- Creating HTML templates from BMS definitions
- Summary

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Introduction



- Previously referred to as CICS Web Interface
- New functions to be provided to support direct connection from Web to CICS Transaction Server for VSE/ESA
 - CICS Web Support - this presentation
 - 3270 Bridge Support - see session E62 for more details
- Run existing CICS Transactions from a Web Browser, with minimal changes required to existing transactions
- Write new applications for direct access from the Web
- Easy to configure and implement
- Complements CICS Transaction Gateway - see session E09 for more details



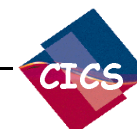


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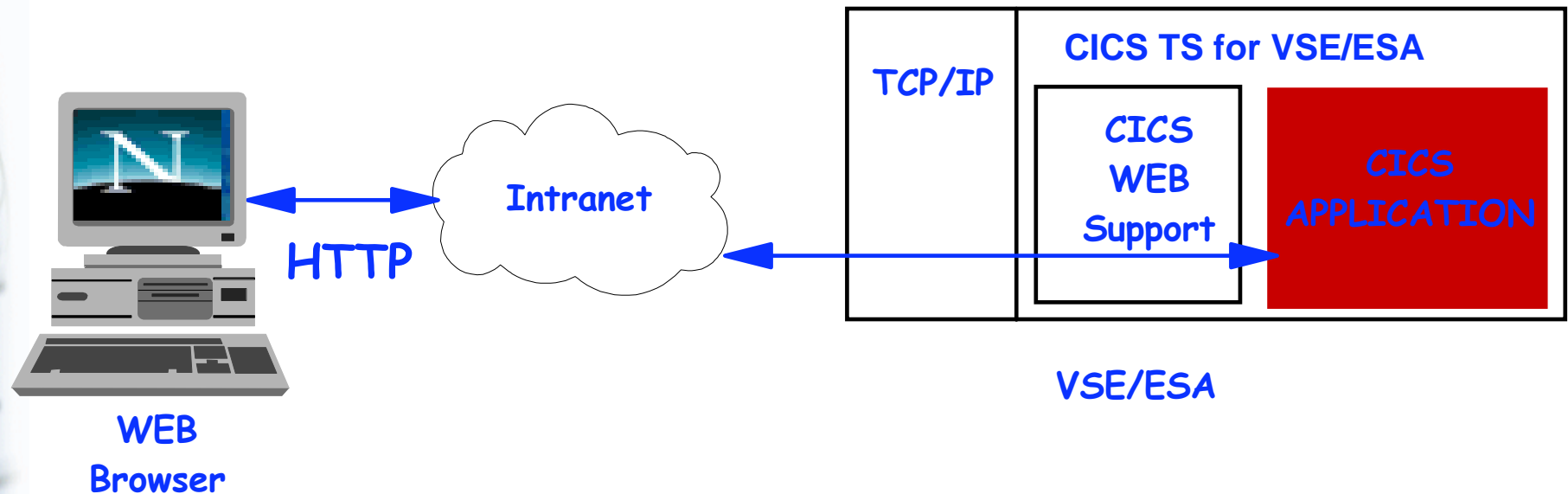
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What is CICS Web Support ?



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Allows a standard Web Browser to invoke a CICS application

The standard HTTP protocol is used

Direct connection - no intermediate gateways or Servers



Invoking a CICS application from the Web



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Via A Uniform Resource Locator (URL) of the general form :

`http://machine.name:port/converter/alias/program?optional-token`

Example: `http://cicstest.hur.ibm.com:1080/cics/cwba/webpgm1`

Where :

machine.name is the IP address or DNS name of the CICS region

port is the configured CICS Web Interface listening port number

converter is the name of the program for Decode & Encode

processing

- use 'CICS' if a converter is not required

alias is the transaction id of the alias transaction

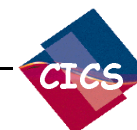
- CWBA is the supplied alias

program is the application program name

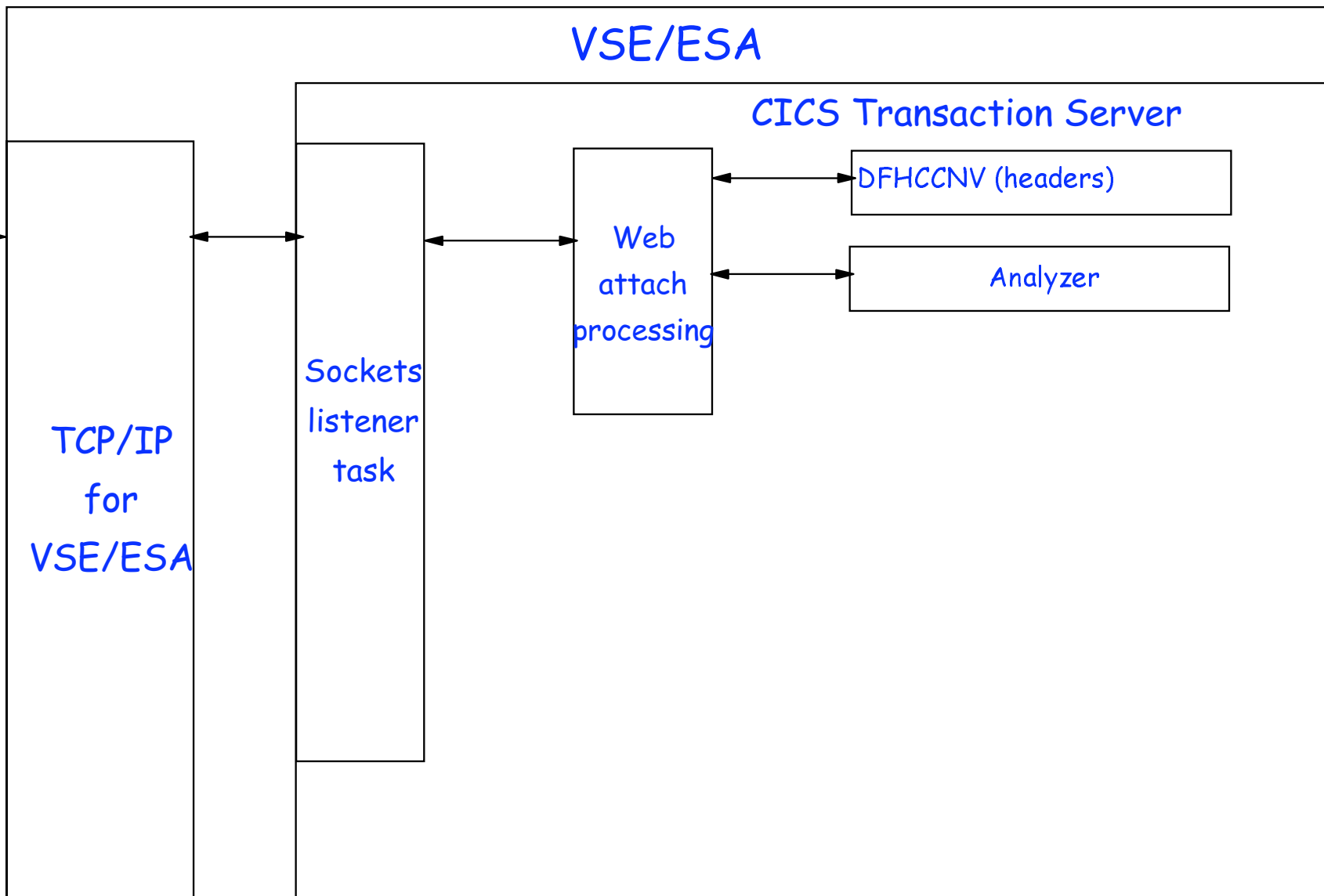
optional-token is optional data to be passed with the request

A "Web aware" application understands the HTTP protocol

Accepts HTTP requests and returns HTTP responses



The CICS Web Support Architecture



The CICS Web Support Architecture...



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- The Analyzer:
User Replaceable Module

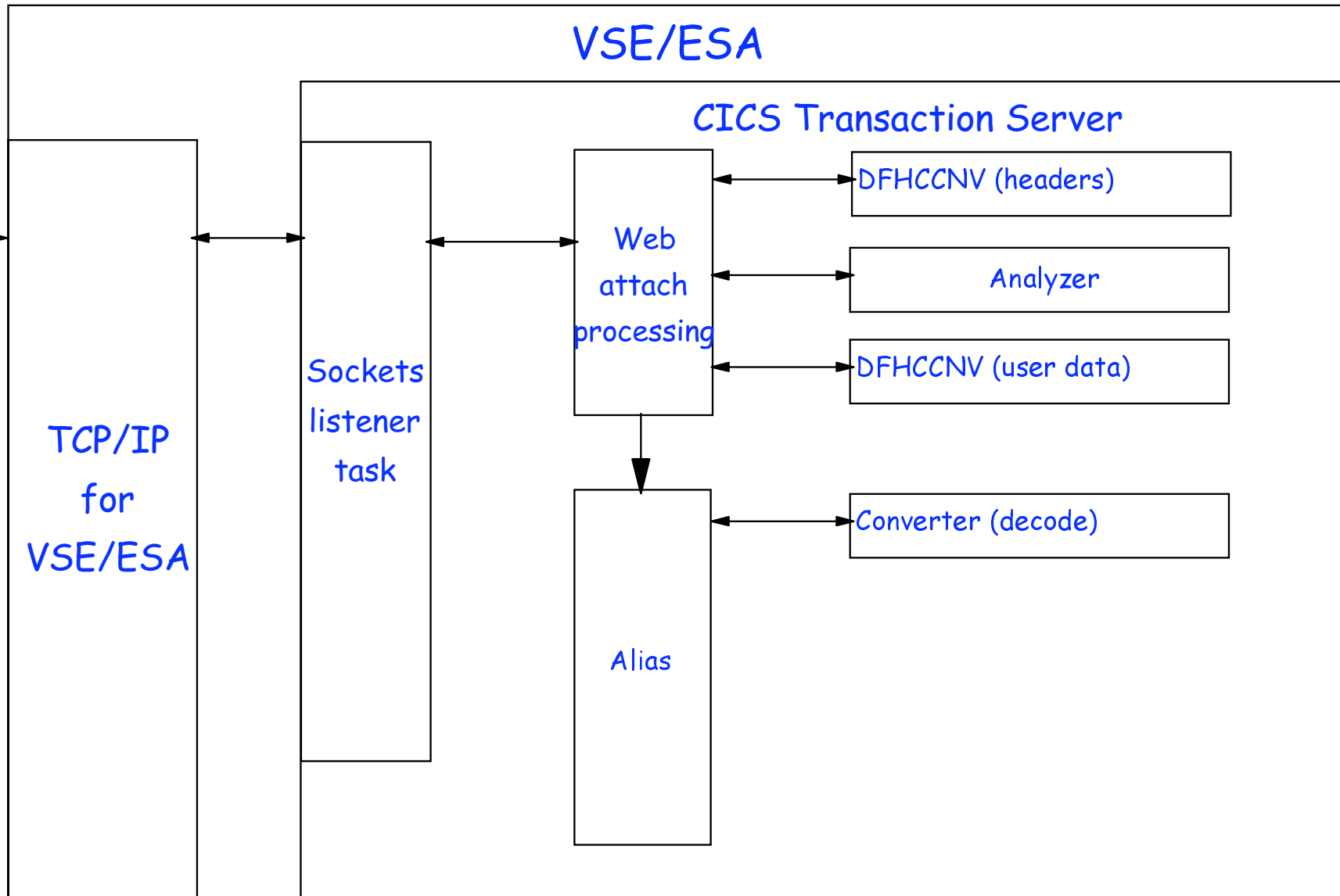
- Parses the incoming request
- Determines what to do next
- An Analyzer Exit is mandatory as it defines the codepage conversion
- The supplied default:
 - ▶ Supports the general CWI URL format
 - ▶ Optional token restricted to 8 bytes
 - ▶ Provides ISO-8859-01 codepage conversation.

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The CICS Web Support Architecture...



The CICS Web Support Architecture...

- The Converter:

Optional: provides decode and encode functions

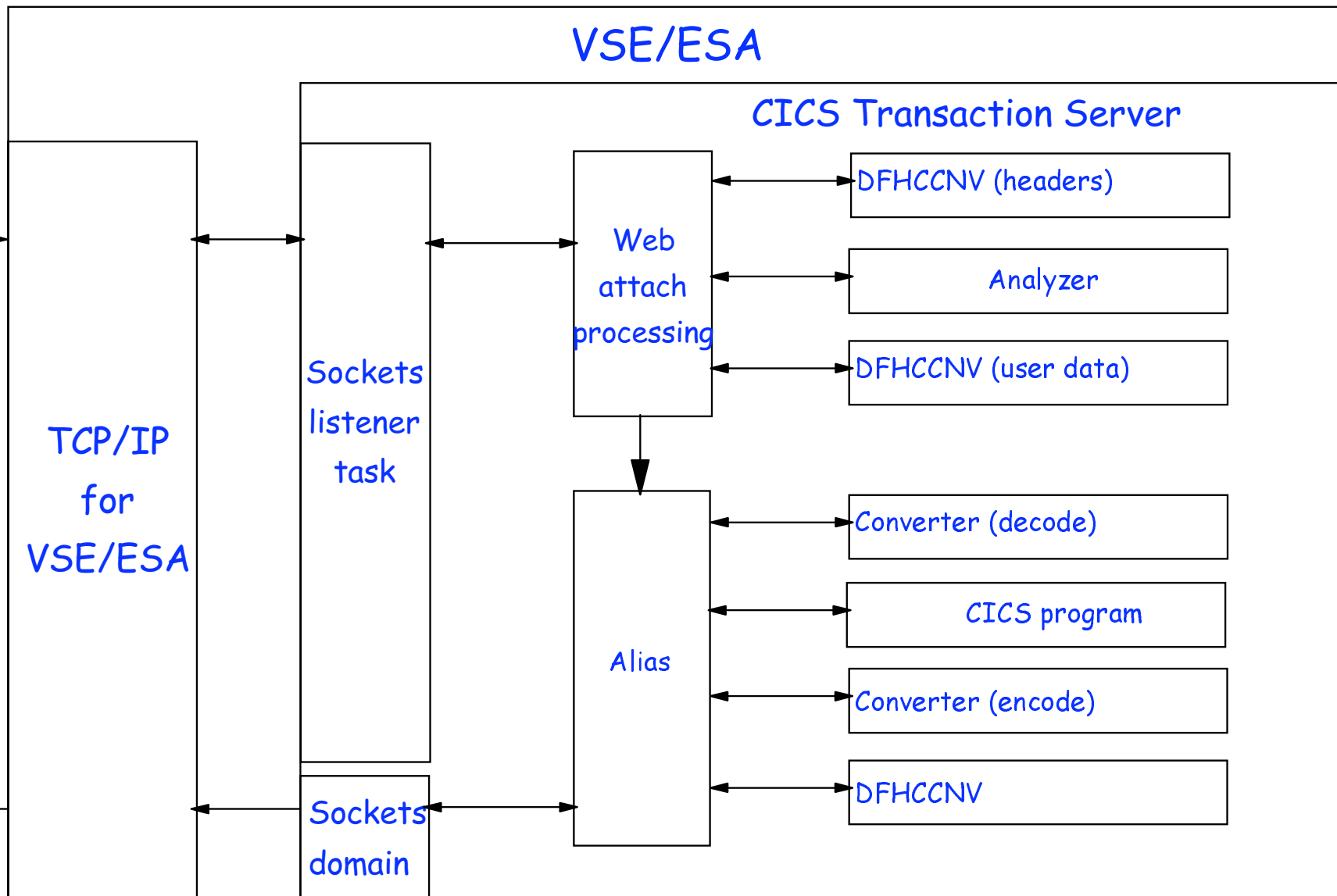
- Decode is invoked before request passed to CICS application
 - ▶ provide COMMAREA in the format expected by the application
- Encode is invoked after CICS application has processed request
 - ▶ Build HTTP response and HTTP response headers



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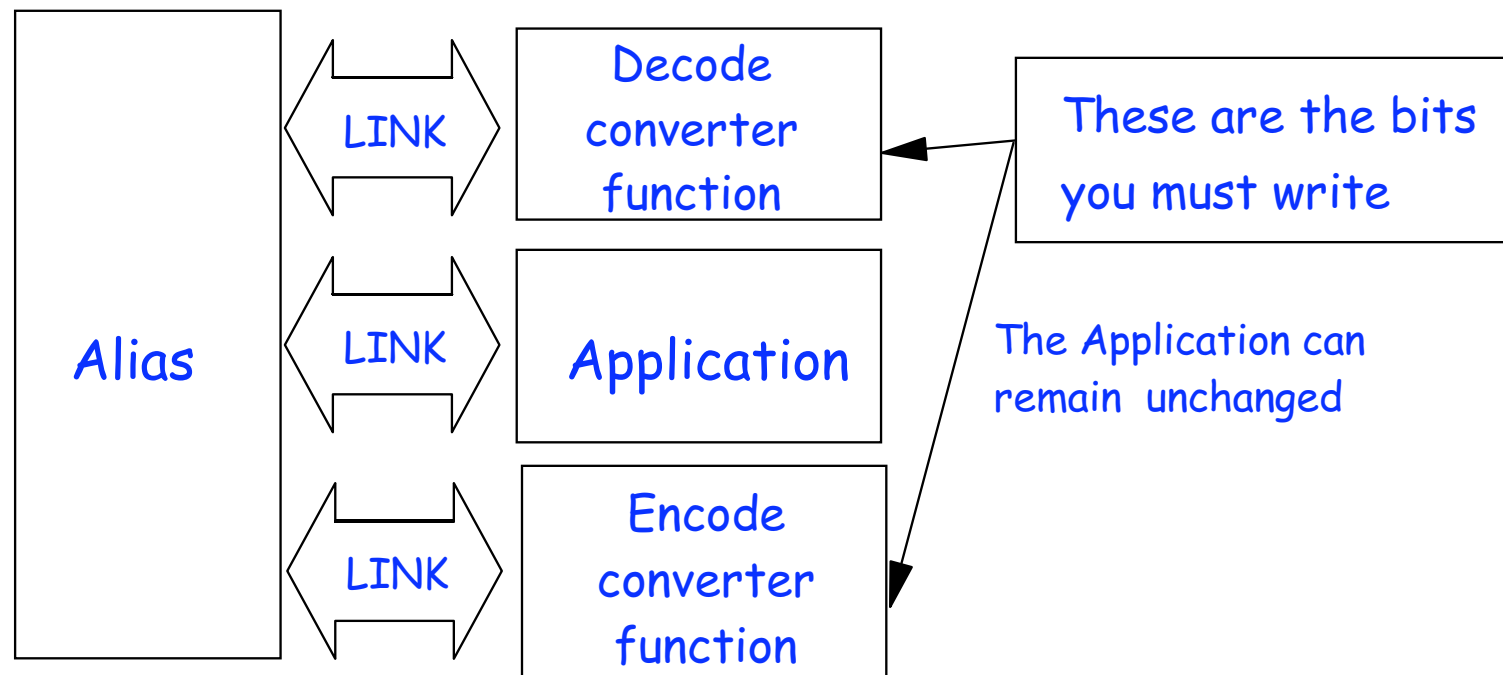


The CICS Web Support Architecture...



Accessing Existing CICS Applications

- COMMAREA applications via use of the Converter...
A Converter program can shield existing applications from HTML



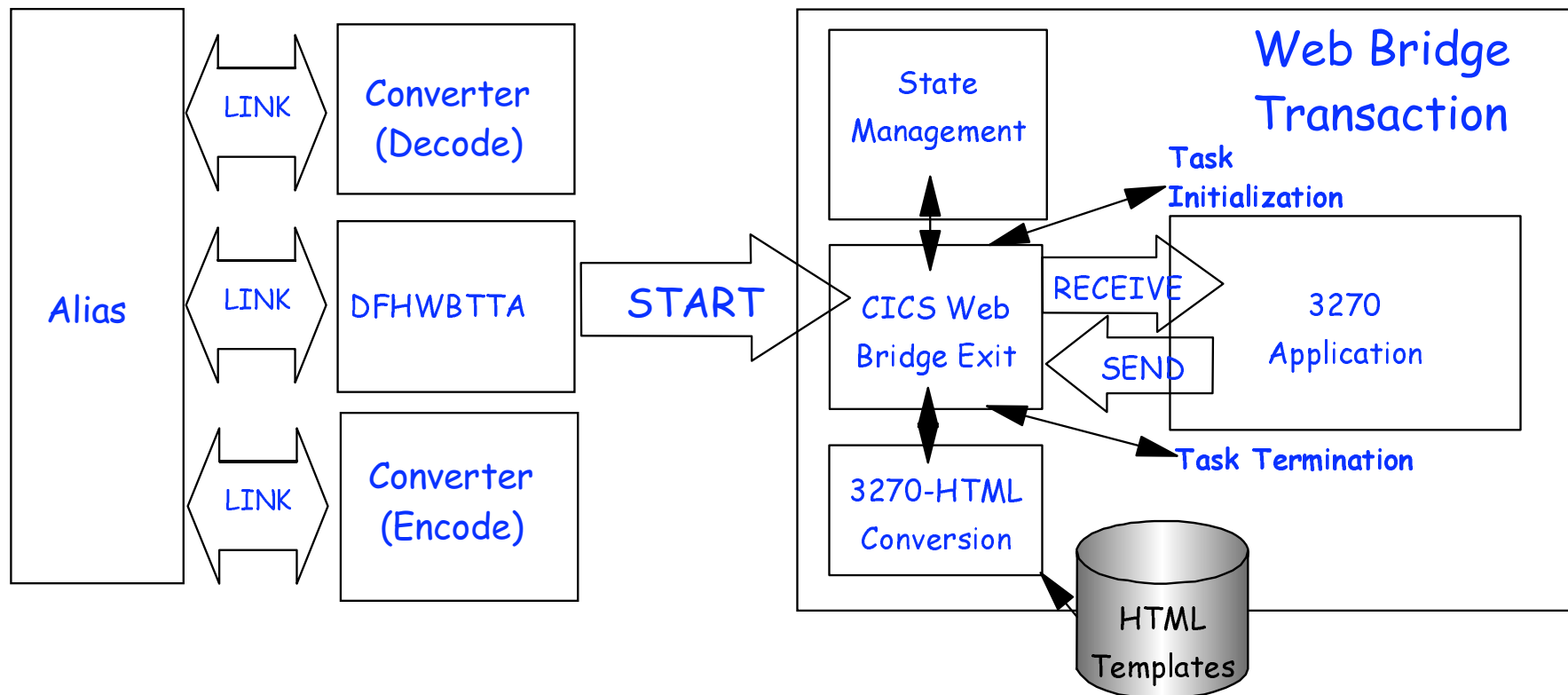
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Accessing Existing CICS Applications...



- Via the supplied CICS Web Bridge....
 - Uses 3270 Bridge support
 - ▶ Supports BMS Maps and Terminal Control 3270 datastreams
 - ▶ No changes to the existing CICS 3270 application



See session E62 for details on the 3270 Bridge

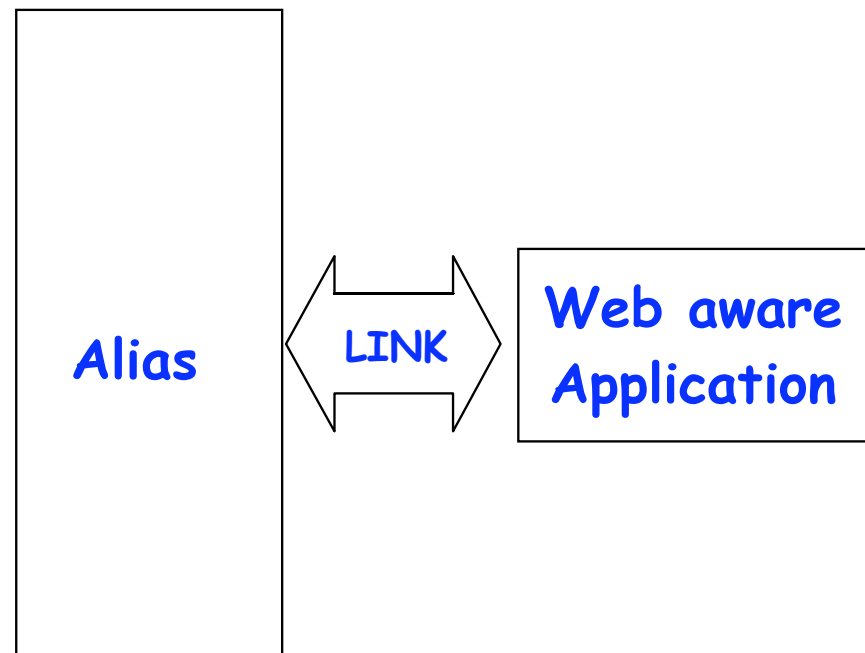




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And access to NEW applications

Using the new APIs the picture becomes much simpler

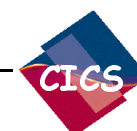




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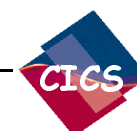
DFHSIT requirements



- Specify that TCP/IP services are required
 - TCPIP=YES

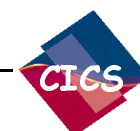
- Specify Web 3270 bridge parameters
 - WEBDELAY=(n,m)
 - ▶ *n = the time in minutes, that a transaction started by the Web 3270 Bridge is to remain in terminal wait before CICS will terminate it*
 - ▶ *m = the time in minutes during which state data is kept for a CICS Web 3270 bridge transaction*

- Increase EDSA storage by at least 2M for TCPIP services + 1M per active WEB connection



Other requirements

- Define a Conversion table using DFHCNV macros
 - This allow CICS to convert the header pages and user data from ASCII to EBCDIC and EBCDIC to ASCII correctly
- Define a TCPIP SERVICE for each type of service you want
 - Each TCPIP SERVICE defines the port number that CICS is to listen on, the name of the analyzer to be used, the transaction to be attached by CICS when new work arrives, and an IP address on which CICS is to listen for incoming requests
- Define required DOCTEMPLATES
 - A DOCTEMPLATE allows you to perform variable substitution on documents in a similar manner to that done by BMS for 3270 screens



Define a Conversion Table

- Example definition, showing simple ASCII - EBCDIC conversions:

```
DFHCNV TYPE=INITIAL
```

```
DFHCNV TYPE=ENTRY,RTYPE=PC,RNAME=DFHWPBHH,USREXIT=NO,  
          SRVERCP=037,CLINTCP=437
```

```
DFHCNV TYPE=SELECT
```

```
DFHCNV TYPE=FIELD,OFFSET=0,DATATYP=CHARACTER,DATALEN=32767,  
          LAST=YES
```

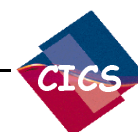
```
DFHCNV TYPE=ENTRY,RTYPE=PC,RNAME=DFHWPBUD,USREXIT=NO,  
          SRVERCP=037,CLINTCP=437
```

```
DFHCNV TYPE=SELECT
```

```
DFHCNV TYPE=FIELD,OFFSET=0,DATATYP=CHARACTER,DATALEN=32767,  
          LAST=YES
```

```
DFHCNV TYPE=FINAL
```

```
END
```



Define TCP/IP services



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The screenshot shows a terminal window titled 'WINVME' with a menu bar (File, Edit, Transfer, Appearance, Communication, Assist, Window, Help) and a toolbar. The main display area shows the following text:

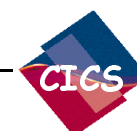
```

OBJECT CHARACTERISTICS                                CICS RELEASE = 0411
CEDA View TCpipservice( HTTPNSL )
TCpipservice   : HTTPNSL
Group          : DFHESOT
Description    : CICS Web TCPIP SERVICE
Urm           : DFHWBADX
Portnumber    : 00080                1-32767
SStatus       : Open                 Open | Closed

Transaction   : CWXN
Backlog       : 00005                0-32767
TSqprefix     :
Ippaddress    :
SOcketclose   : No                   No | 0-240000

SYSID=CICS APPLID=IYB7ZA02

PF 1 HELP 2 COM 3 END          6 CRSR 7 SBH 8 SFH 9 MSG 10 SB 11 SF 12 CNCL
MA c                                                                    01/003
Connected to remote server/host winvme using port 23
  
```



Define DOCTEMPLATES



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```

OBJECT CHARACTERISTICS                                CICS RELEASE = 0411
CEDA View Doctemplate( TEST1 )
  Doctemplate      : TEST1
  Group            : WEB
  Description      : DOCUMENT TEMPLATE
  FULL TEMPLATE NAME
  TEmplatename    : THERREALDOCTEMPLATENAME
  ASSOCIATED CICS RESOURCE
  File            :
  TSqueue         :
  TDqueue         :
  Program         :
  Exitpgm         :
  TEMPLATE SUBLIBRARY
  Library         : DFHHTML
  Membername      : TEST1
  TEMPLATE PROPERTIES
  Appendcrlf     : Yes           Yes | No
  Type           : Ebcidic      Binary | Ebcidic

                                SYSID=CICS APPLID=IYB7ZA02

PF 1 HELP 2 COM 3 END          6 CRSR 7 SBH 8 SFH 9 MSG 10 SB 11 SF 12 CNCL
MA c                                                                    01/003
Connected to remote server/host winvme using port 23

```

Not required for
transactions started
via CICS Web 3270
Bridge

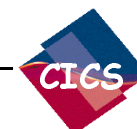




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The new Web-related API's

- For new and extended applications => Web aware
 - EXEC CICS WEB allows applications to....
 - ▶ Retrieve the various components of the inbound HTTP request
 - ▶ Construct HTTP headers to be returned in HTTP response
 - ▶ Select a document to be delivered as the body of the response
 - ▶ Symbol list can be passed for substitution



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The new Web-related API's...

- For new and extended applications => Web aware
 - EXEC CICS DOCUMENT allows creation of "Documents"....
 - ▶ Can be made up of text and binary elements
 - ▶ Can contain bookmarks and symbols
 - ▶ Bookmarks can be used to insert data at specific points
 - ▶ Documents can be imbedded
 - ▶ Codepage information is stored with the Document



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The new Web-related API's...

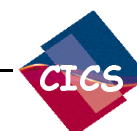
- For new and extended applications => Web aware
 - EXEC CICS EXTRACT TCPIP allows retrieval of TCP information
 - ▶ Client name and address
 - ▶ Server name and address
 - ▶ TCPIPService
 - ▶ Port number



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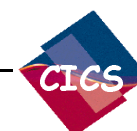
Document Templates - symbols

- Document templates are defined via RDO

- HTML example:

```
<html>
<head>
<title>Address Book</title>
</head>
<body>
<center>
<h1>&person;</h1><br>
&house_number; &street;<br>
&town;<br>
&zip;<br>
&person; can be reached on &home_number; at home
or &work_number; during office hours <br></center>
</body>
</html>
```

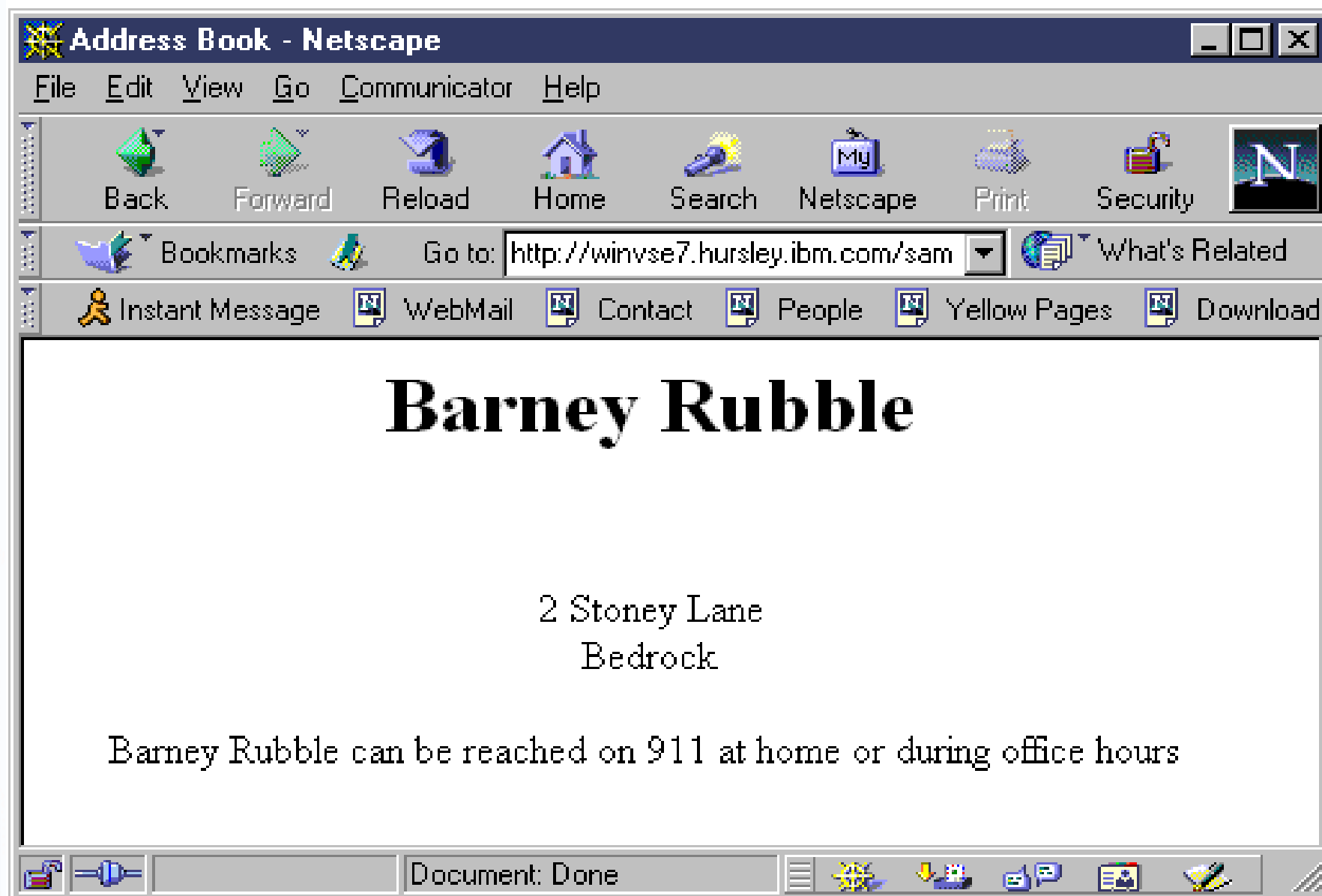
- A symbol list for the previous example would be a single string:
"person=Barney Rubble&house_number=2&street=Stoney
Lane&town=Bedrock&zip= &home_number=911&work_number="
- Any editor can be used for templates



Example screen after substitution



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HTML templates



- BMS macros have been enhanced to support creation of HTML templates that contain
 - Constants and input fields from the map
 - Buttons to represent
 - ▶ *ENTER key, PA1..PA3, PF1..PF24 HTML Reset*
 - 5 hidden fields DFH_NEXTTRANSID.1 to DFH_NEXTTRANSID.5
 - Hidden variable DFH_CURSOR
 - A JavaScript function dfhsetcursor
 - ▶ *sets the cursor position to the field named in DFH_CURSOR*
 - A JavaScript exception handler for the onLoad exception
 - ▶ *invokes dfhsetcursor*



HTML Generation



- Assemble existing BMS maps
 - Specify TYPE=TEMPLATE on the DFHMSD macro
 - Or SYSPARM=TEMPLATE in the Assembler parm statement
 - You must also re-assemble the physical map (TYPE=MAP)
- Use LIBR to store the templates in a template library
 - CICS assumes Sublibrary called DFHHTML.DFHDOC
 - ▶ *Otherwise you need to define DOCTEMPLATES for them*
- There is one template generated for each DFHMDI macro
 - The name for the template is taken from DFHMSD macro
 - ▶ *Starts by appending 'A' for first map, 'B' for second and so on*



Customizing HTML templates



- HTML templates can be customized to:
 - Support applications' keys not generated in the standard output
 - Suppress the HTML Reset Button
 - Change the appearance of the keys, or text associated with them
 - Provide an HTML title page
 - Provide a masthead graphic for the page
 - Change the color of the background or specify a special background
 - Modify the BMS colors
 - Suppress parts of the BMS map
 - And more



Customizing macros



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■ DFHMDX

- Define your own customization macro that can be used when creating the templates
- Is invoked from DFHMSX
- Add the name of your macro to the TYPE

■ DFHWBOUT

- Add invocations of DFHWBOUT to BMS source
- Inserts text only if PARM=TEMPLATE
- For example, add instructions for "web users" unfamiliar with 3270 screens, without affecting your in-house "3270 users"

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Customizing examples - DFHMDX



Set default PF keys for all maps and mapsets

MACRO

DFHMSX

```
DFHMDX MAPSET=*,MAP=*,  
        PF1='Help',PF3='Exit',PF4='Save',PF9='Messages'
```

Now change title and PF3 for all maps in mapset DFHWB0

```
DFHMDX MAPSET=DFHWB0,MAP=*,  
        TITLE='CICS Web Interface',  
        PF3='Messages'
```

Now change title and PF3 for just map DFHWB02

```
DFHMDX MAPSET=DFHWB0,MAP=DFHWB02,  
        TITLE='CICS Web Interface Enable',  
        PF3='Save'
```

MEND



Customization examples - DFHWBOUT



Add text that appears only on the HTML page

DFHWBOUT '`<p>`This text illustrates the use of the DFHWBOUT macro,'
DFHWBOUT 'which can be used to output text that should only appear'
DFHWBOUT 'in HTML templates, and will never appear in the'
DFHWBOUT 'corresponding BMS map.'

Add HTML header information to the HTML page

DFHWBOUT '`<meta name="author" content="E Phillips Oppenheim">`'
DFHWBOUT '`<meta name="owner" content="epoppenheim@xxx.com">`'
DFHWBOUT '`<meta name="review" content="20000314">`'



DFHWBOUT and DFHMDX working together

Add Web Browser control functions

Cause an action when the page is loaded

```
DFHMDX MAP=AD001,ONLOAD='jset("CWS is wonderful", "Hello there!")'
```

And add the following before any DFHMDF macros

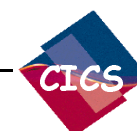
```
DFHWBOUT '<script language="JavaScript">'  
DFHWBOUT 'function jset(msg,wng)'  
DFHWBOUT '      {window.status=msg; alert(wng)}'  
DFHWBOUT '</script>'
```



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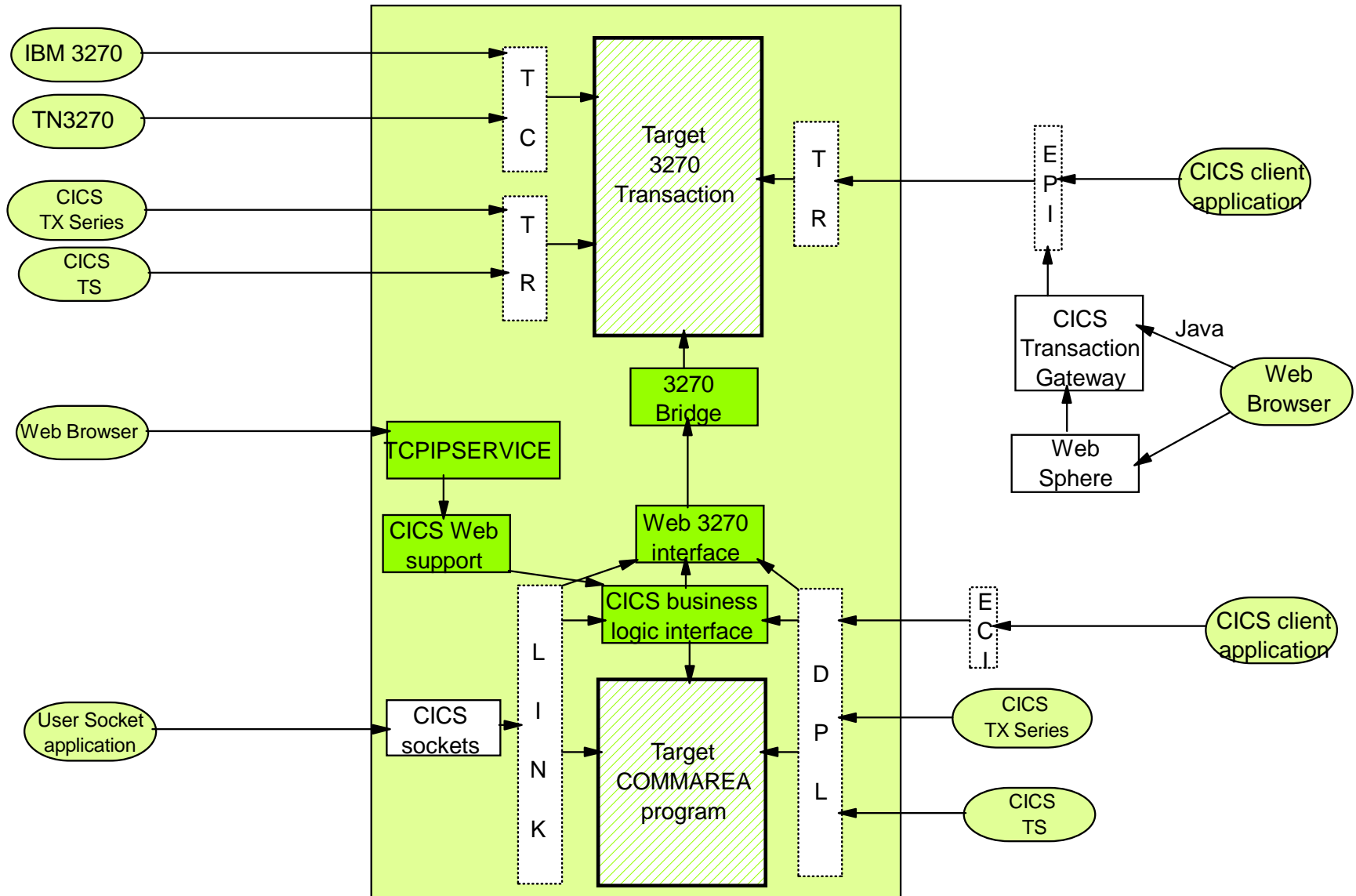
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CICS Transaction Server Environment



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CICS Transaction Server Environment



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Key to previous figure

TC	= Terminal Control
TR	= Transaction Routing
DPL	= Distributed Program Link
ECI	= External CICS Interface
EPI	= External Presentation Interface

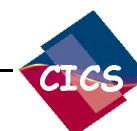
 = Sources of external requests

 = Targets of external requests

 = CICS provided interfaces

 = CICS components

 = Other product components



Summary



- CICS Web Support will allow you to open your CICS Transaction Server applications up to the World Wide Web even more
- Its easy to configure and use
- Minimal effort needed for existing applications
- New APIs to allow for creating dynamic new applications



Session E08:
CICS Web Support

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Appendix



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APPENDIX



Additional Reading



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■ CICS Publications

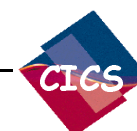
- CICS Transaction Server for OS/390: CICS External Interface Guide. SC33-1944-30
- CICS Transaction Server for OS/390: CICS Internet Guide. SC34-5445-30

■ Redbooks

- CICS Transaction Server for OS/390 Version 1 Release 3: Web Support and 3270 Bridge. SG24-5480-00
- CICS Transaction Server for OS/390: Web Interface and 3270 Bridge. SG24-5243-00

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EXEC CICS WEB



- WEB EXTRACT
- WEB RECEIVE
- WEB READ
- WEB STARTBROWSE HTTPHEADER
- WEB READNEXT
- WEB ENDBROWSE HTTPHEADER
- WEB WRITE
- WEB SEND



EXEC CICS DOCUMENT



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- DOCUMENT CREATE
- DOCUMENT INSERT
- DOCUMENT SET
- DOCUMENT RETRIEVE



Writing an Analyzer Exit



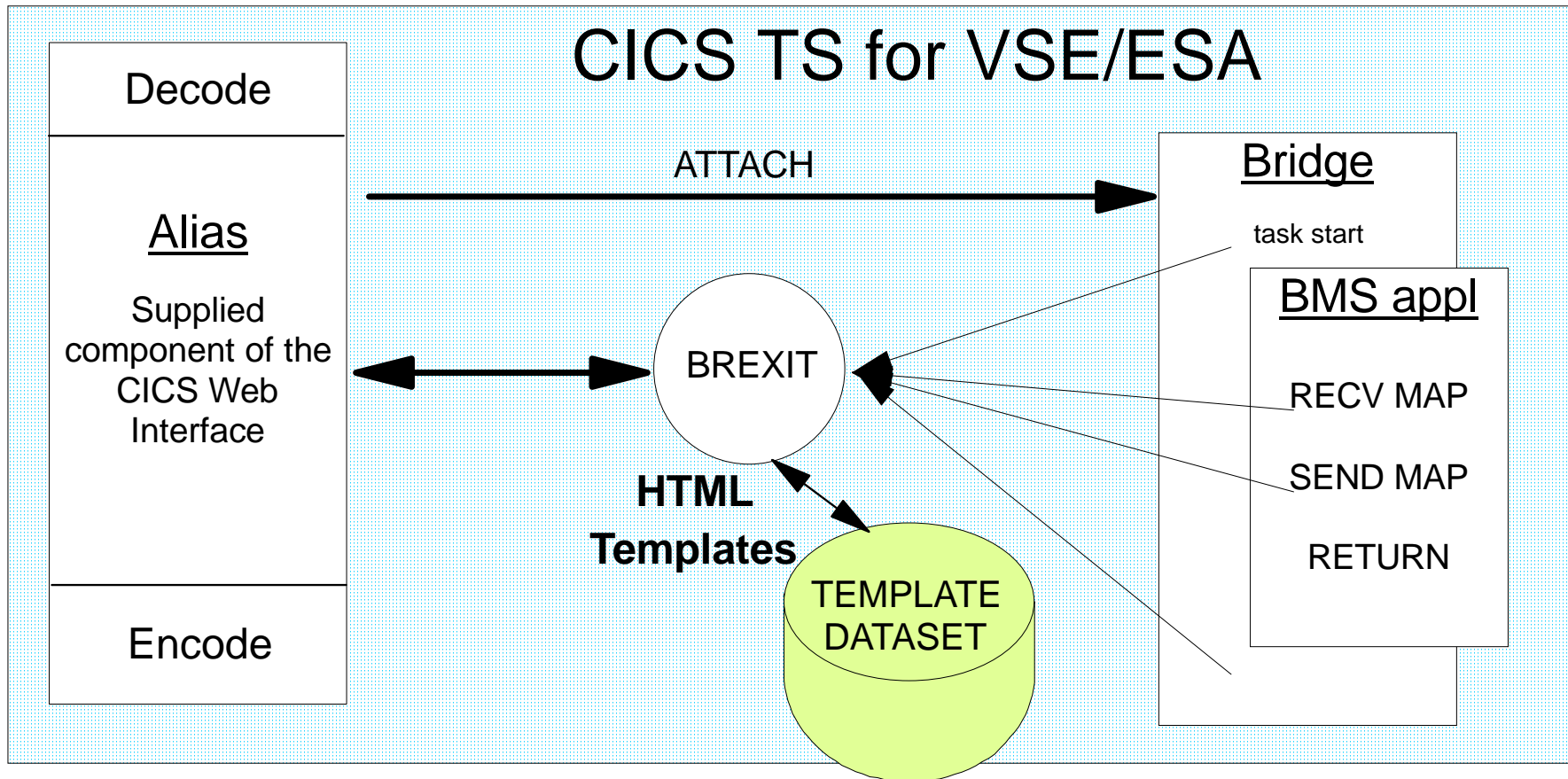
- The Analyzer is a user replaceable module
 - Allowing a different URL convention
 - Allowing support for multiple code pages
 - Allowing for auditing and logging
- Inputs
 - resource 'absolute path'
 - request method
 - request headers
- Outputs
 - Server Program Name
 - DFHCNV Key
 - converter program name
 - alias transaction id
 - alias user id
 - alias terminal id



CICS Web Interface - BMS Transactions



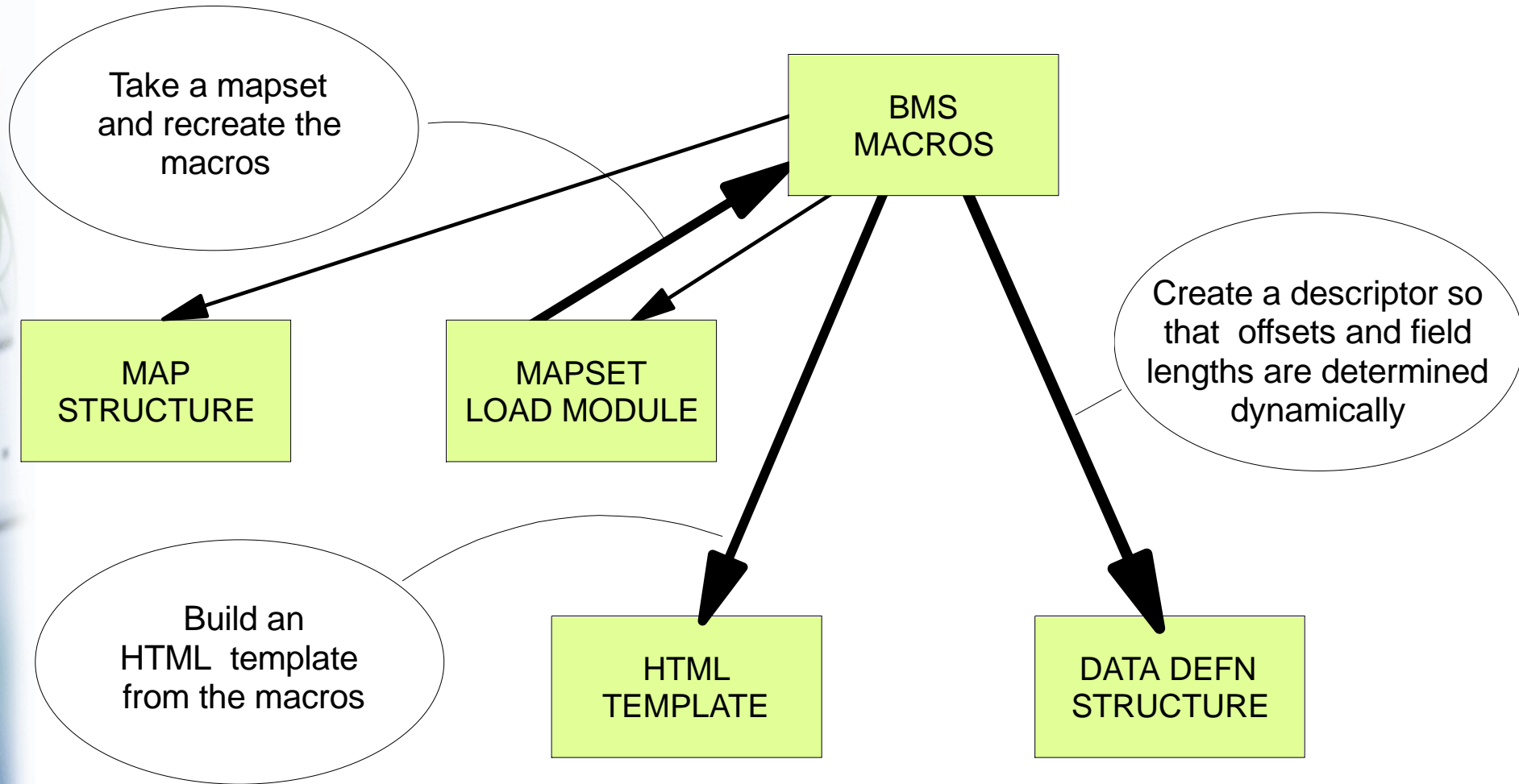
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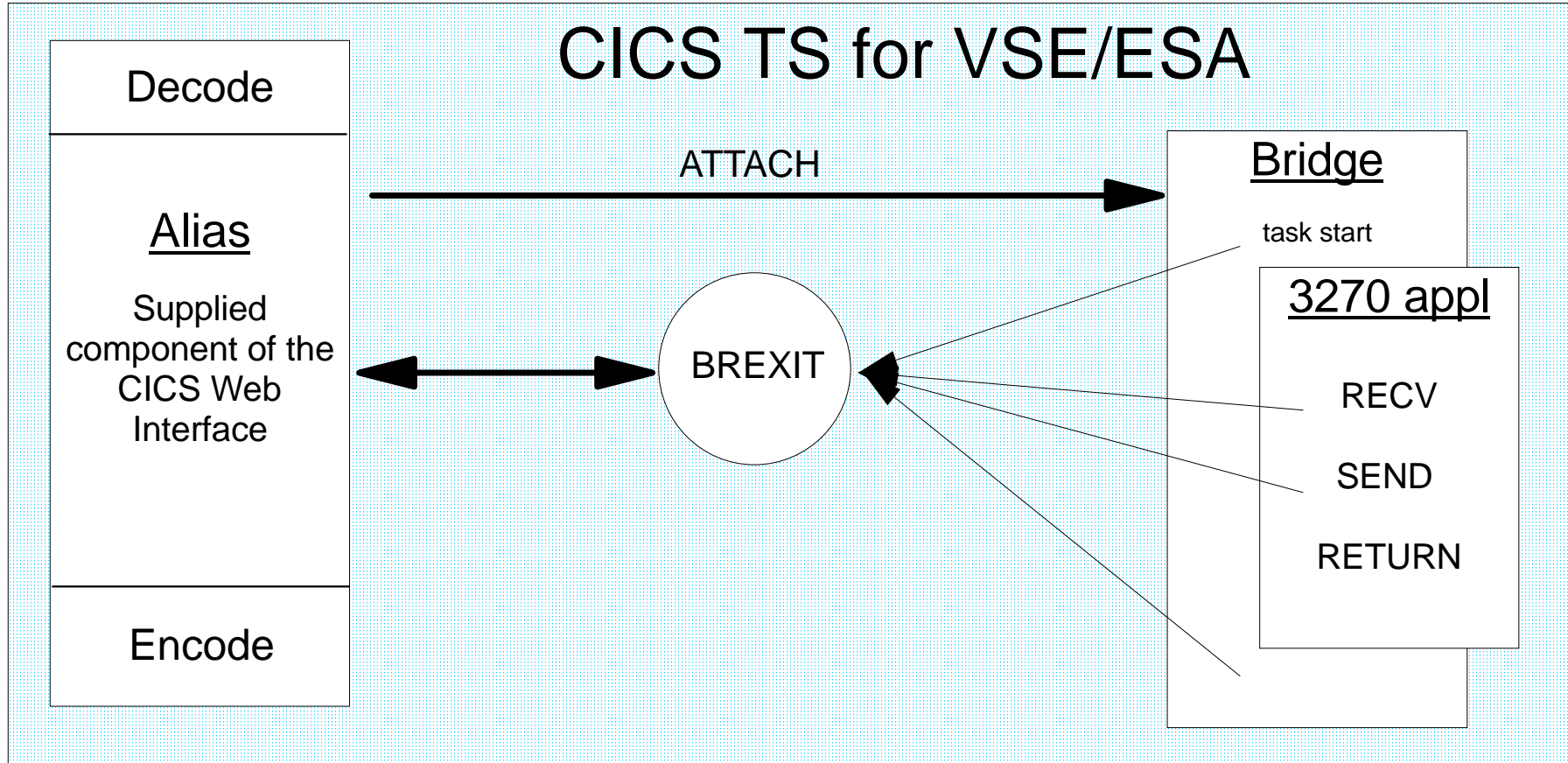
New Tools



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CICS Web Interface 3270 Transactions



HTML for Raw 3270 Applications

- Makes a reasonable effort to produce a page in fixed width font using the `<pre>` tag
- Standard header, row of PF buttons, and a footer
- Customizable by writing code in Decode / Encode routines
- E.g. To obtain consistent look with header and footer templates
- REXX available as an easier language to manipulate and parse the body

