CICS Transaction Server for VSE/ESA

CICS Web Support Technical Overview

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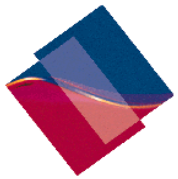

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Agenda

- What is CICS Web Support?
- CICS Web Support architecture
- Enabling CICS Web Support
- Writing CICS Web Applications
- Running 3270-based transactions with CICS Web Support
- Further Information and Summary

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- ***What is CICS Web Support?***
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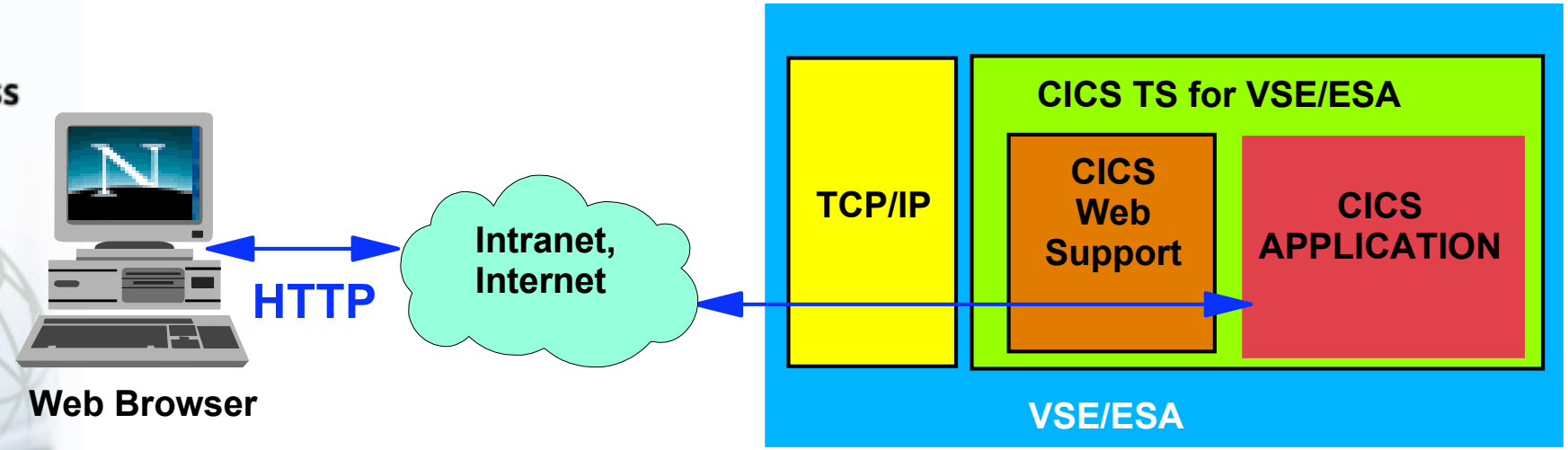
What is CICS Web Support?

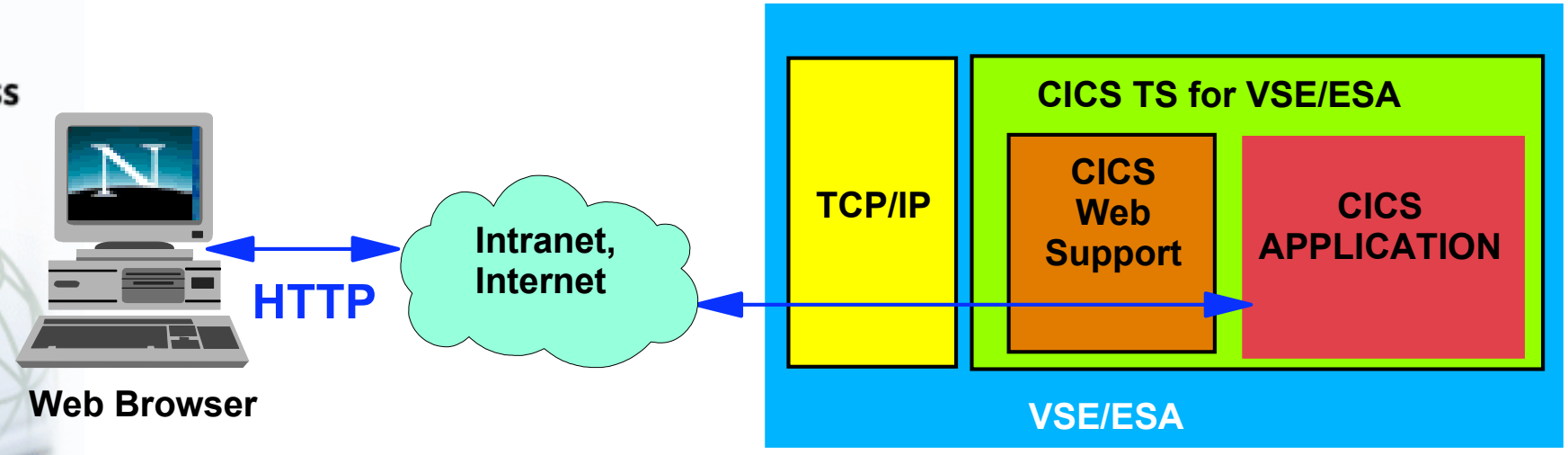
- Set of services that enables direct connection from a Web browser to CICS Transaction Server for VSE/ESA
- Formerly known as the CICS Web Interface
- Enables access to CICS Application Programs and Transactions
- New provided API's for "Web aware" applications
- Delivered in CICS Transaction Server for VSE/ESA V1.1.1

What is CICS Web Support?



- Web browser access to CICS Applications and Transactions
- Direct connection - no intermediate gateways or servers
- Standard HTTP protocol used over TCP/IP

What is CICS Web Support?



- Web browser access to CICS Applications and Transactions
- Direct connection - no intermediate gateways or servers
- Standard HTTP protocol used over TCP/IP
- Secure Sockets Layer (SSL) support coming
  - VSE/ESA V2.6

NEW!

What is CICS Web Support?

- CICS Application program to be invoked specified in URL
  - CICS supplied program for access to 3270-based transactions
- Default URL format:
  - http://hostid:port/converter/alias/program?optional-token

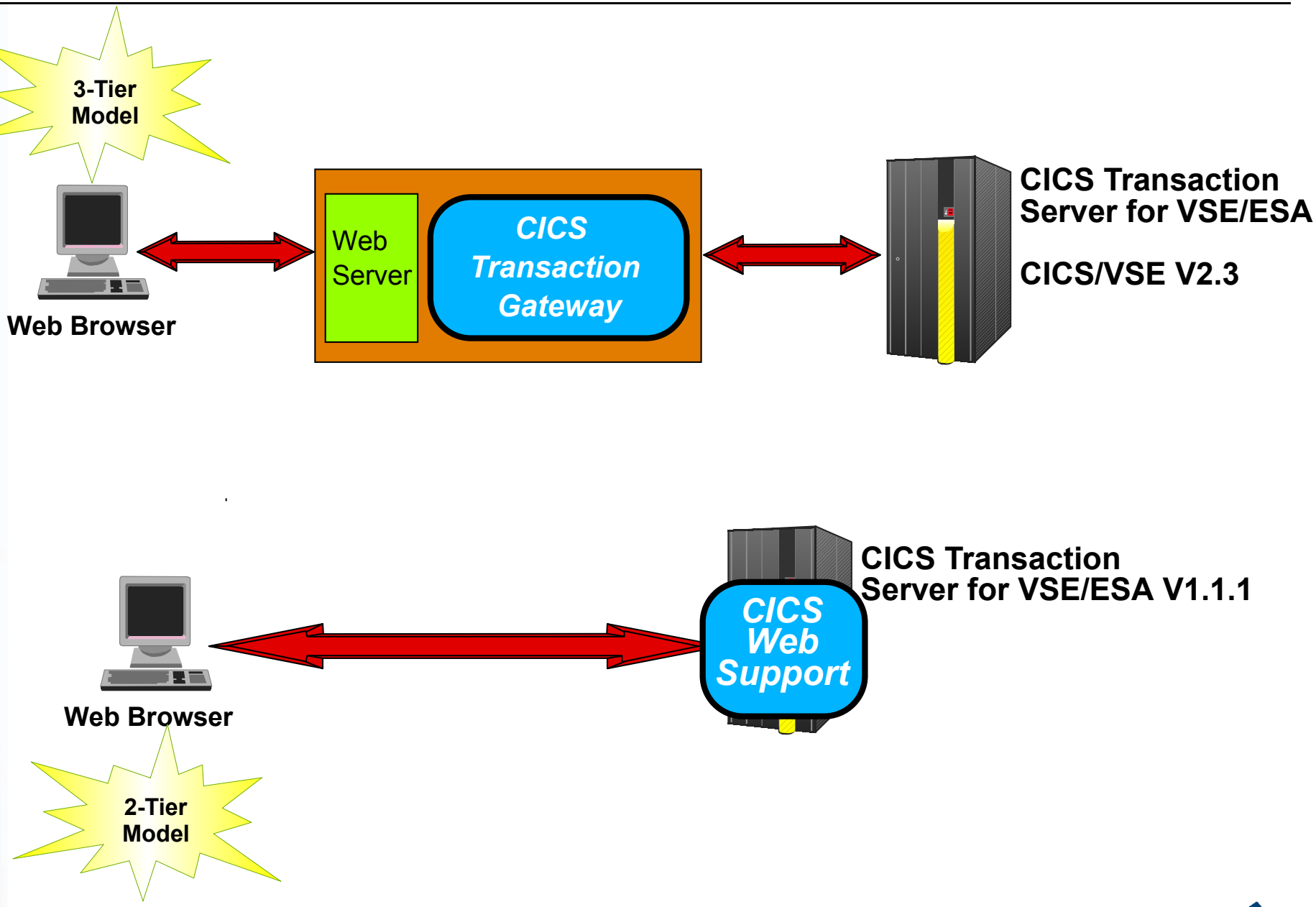
hostid is the IP address or DNS name of the CICS region
port is the configured listening port number
converter is the name of the program for Decode & Encode processing
- "CICS" if no converter

alias is the transaction id of the alias transaction
- "CWBA" is the supplied alias

program is the name of the CICS application program to be invoked
optional-token is optional data to be passed with the request

- Example URL:
  - http://cicstest.ibm.com:1080/cics/cwba/webpgm1

Relationship to the CICS Transaction Gateway



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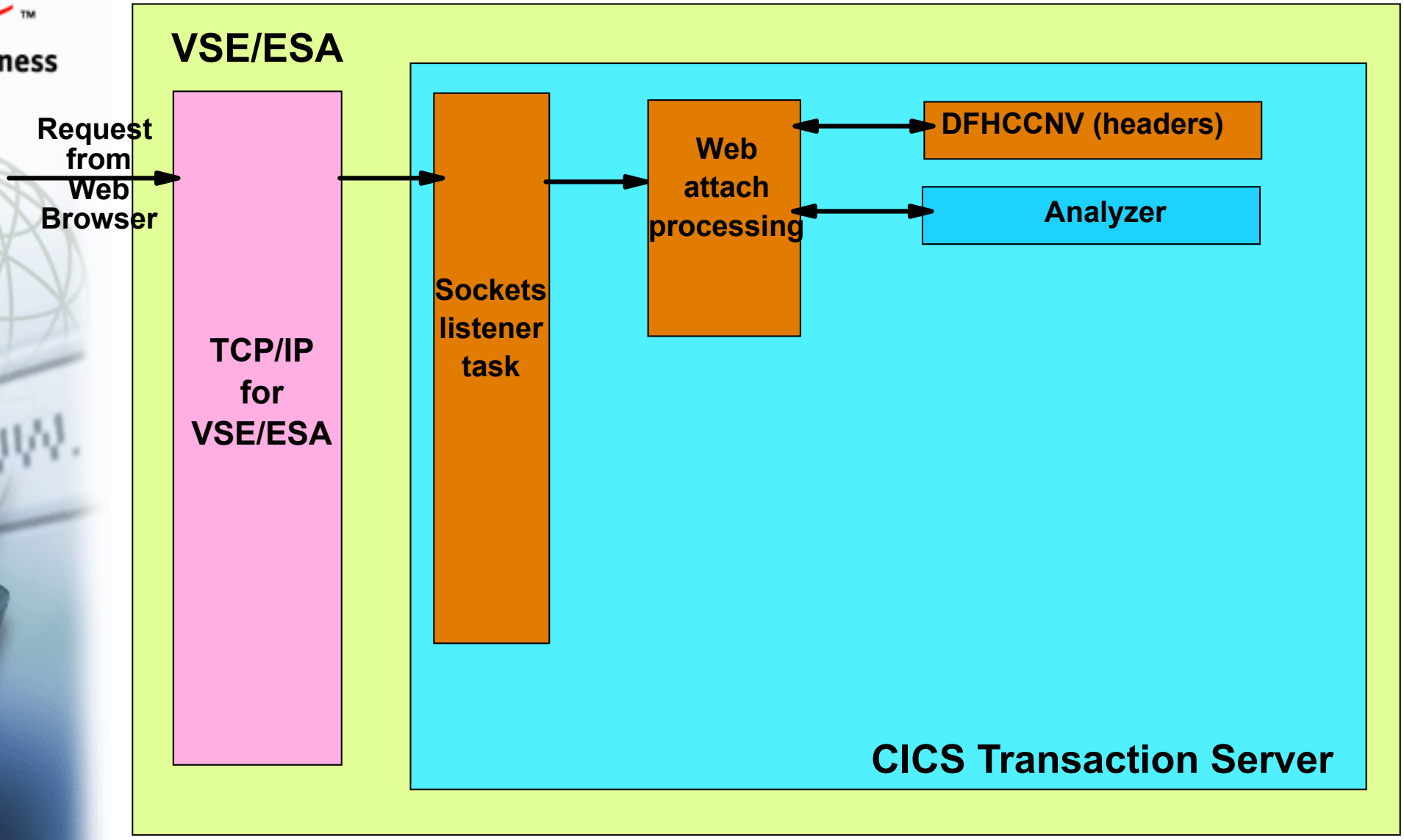
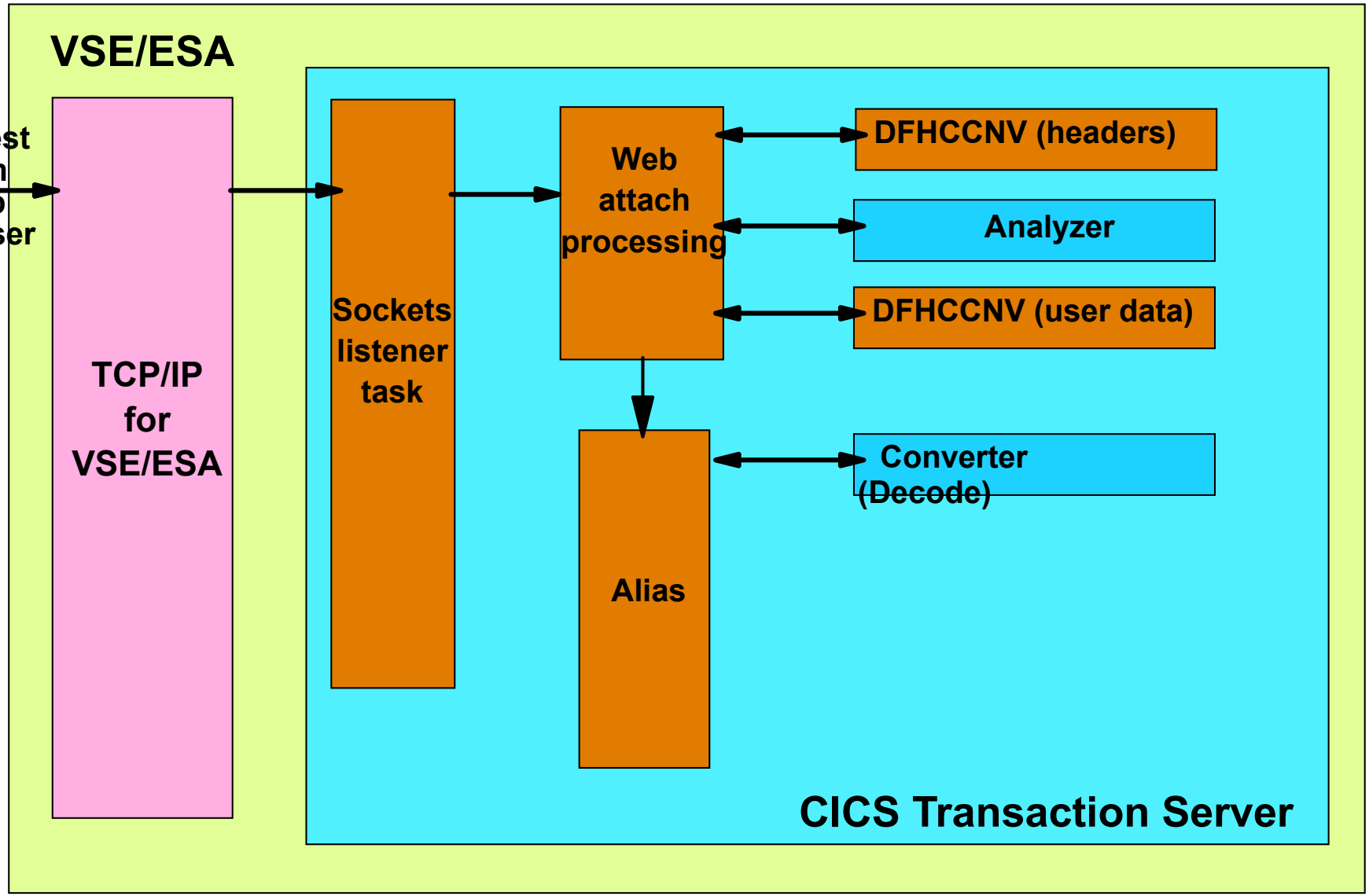
CICS Web Support Architecture...



CICS Web Support Architecture...

- The Analyzer:
  - Parses the incoming request
  - Determines resources and context for Alias transaction
  - Specifies codepage conversion for body of http request
  - User Replaceable Module
- The supplied default Analyzer:
  - Provides ISO-8859-01 codepage conversation
  - Supports the default CWS URL format
    - http://hostid:port/converter/alias/program?optional-token
- The supplied Analyzer programs:
  - DFHWBADX ----------> Assembler
  - DFHWBAHX ----------> C
  - DFHWBALX ----------> PL/I
  - DFHWBAOX ----------> COBOL

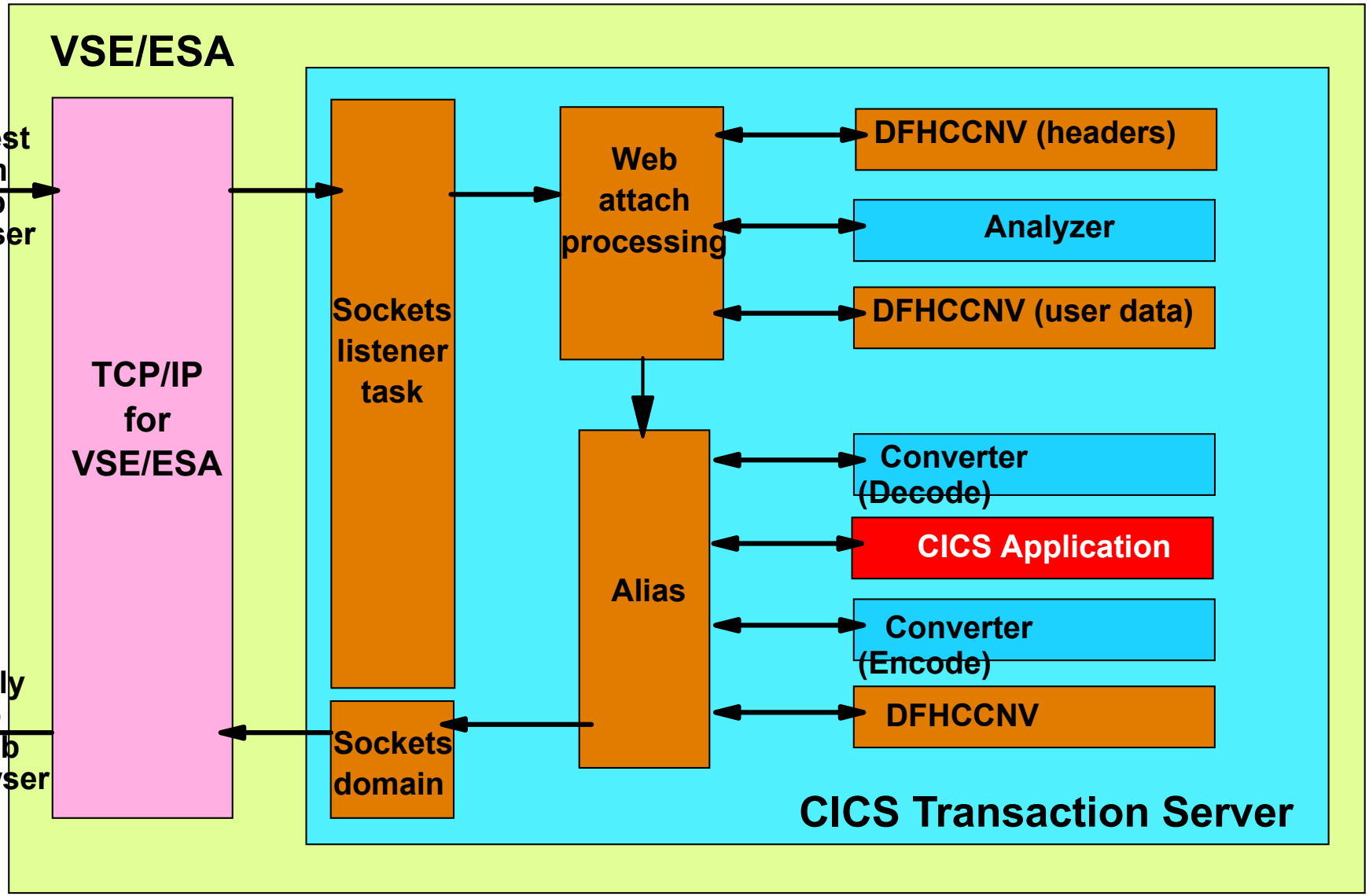
CICS Web Support Architecture...



CICS Web Support Architecture…

- The **Converter**
  - Provides **Decode** and **Encode** functions
- **Decode** invoked *before* request passed to CICS application
  - Maps inbound HTTP request to application COMMAREA
- **Encode** invoked *after* CICS application has processed request
  - Maps application COMMAREA to outbound HTTP response

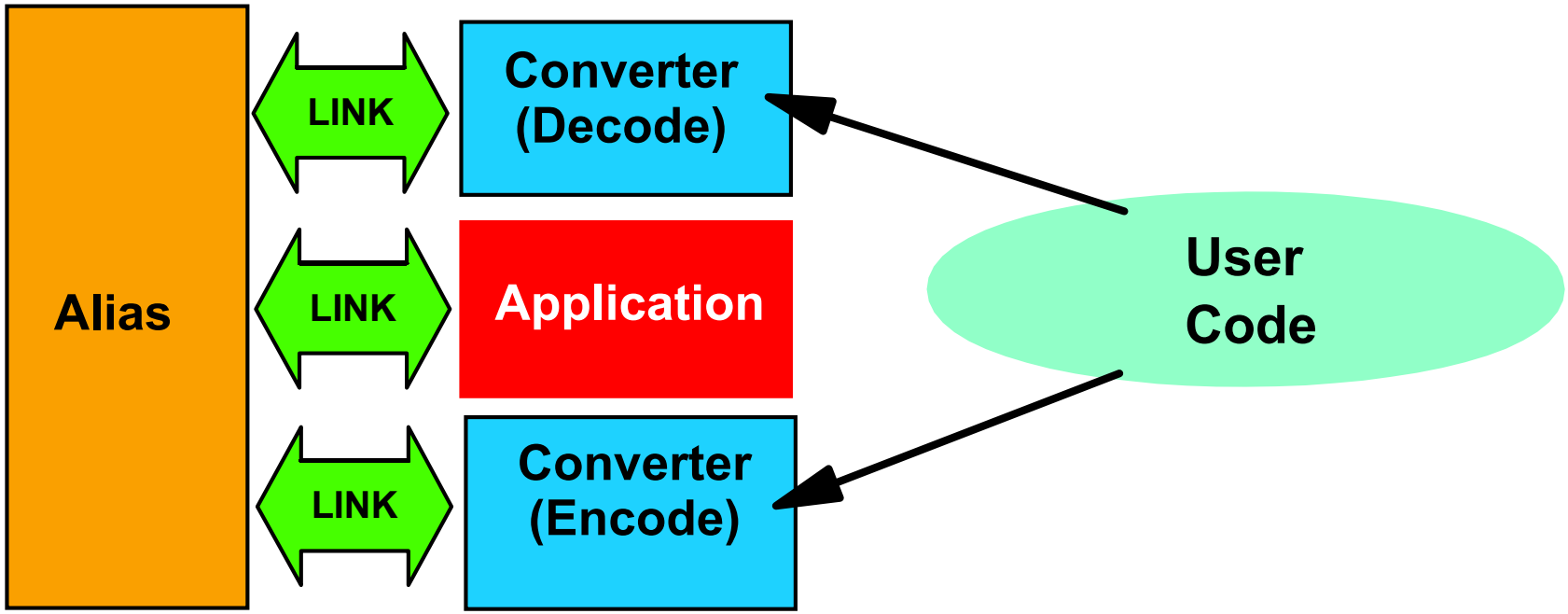
CICS Web Support Architecture...



CICS Web Support Architecture…

Accessing existing COMMAREA based applications

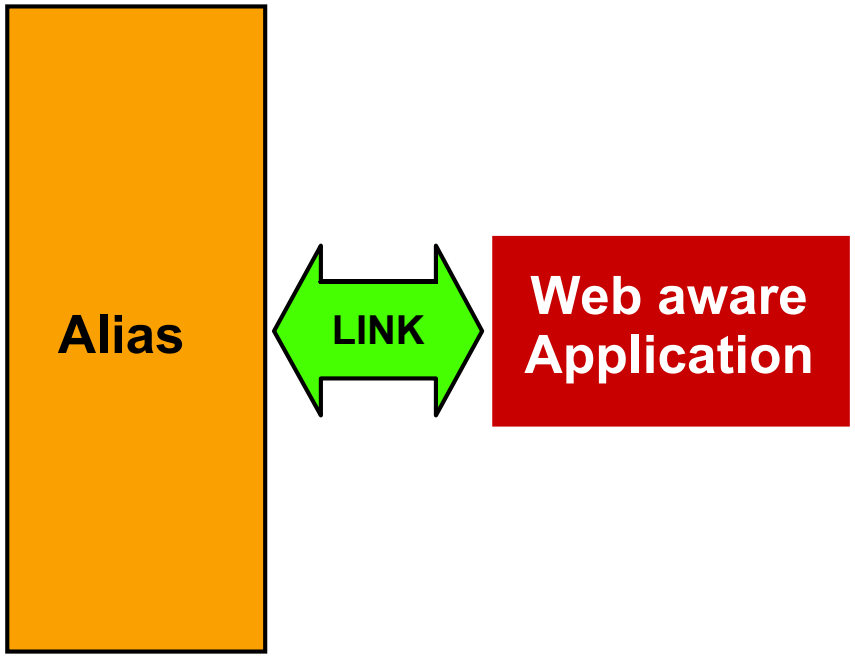
- Converter used to shield applications from HTTP and HTML



CICS Web Support Architecture...

Accessing new CICS "Web aware" Applications

- The picture becomes simpler using the new API's....

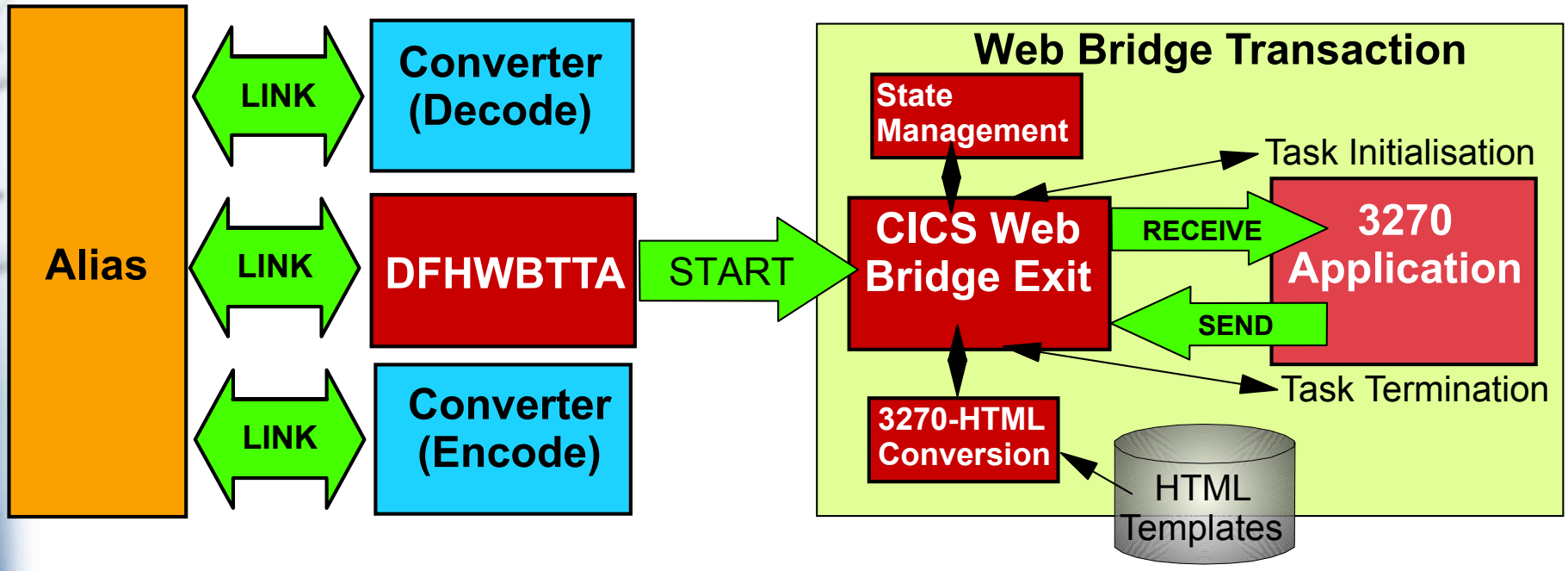


- NB: "Web aware" applications need to understand HTTP

CICS Web Support Architecture...

Accessing 3270 based transactions via the CICS Web Bridge

- Uses the 3270 Bridge support
- Some limitations - not every application may work unchanged



Example URL > **http://cics1.ibm.com:1080/cics/cwba/dfhwbtta/ceci**

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DFHSIT requirements

- Specify that TCP/IP services are required
  - TCPIP=YES
- Specify Web 3270 bridge parameters
  - WEBDELAY=(n,m)
    - *n = time a transaction is to remain in terminal wait before being terminated*
    - *m = time during which state data is kept for a transaction*
- Increase EDSA storage
  - by at least 2M for TCPIP services
  - 1M per active Web connection

Resource Definitions

- Define at least one TCPIPSERVICE
  - Specifies IP address, port number, name of the analyzer
  - Sample specified in DFH$SOT
- Install supplied RDO group DFHWEB
- Define any required DOCTEMPLATEs
  - Definition specifies location of DOCTEMPLATE
    - VSE/ESA sub-library
    - CICS File
    - CICS Temporary Storage
    - CICS Transient Data
    - CICS Load Module
    - CICS Exit Program

Other Requirements

- Define a conversion table using DFHCNV macros
  - For conversion between ASCII and EBCDIC of HTTP messages
  - Example DFHCNV table:

```
DFHCNV TYPE=INITIAL
*
DFHCNV  TYPE=ENTRY,RTYPE=PC,RNAME=DFHWBHH,USREXIT=NO,
        SRVERCP=037,CLINTCP=8859-1
DFHCNV TYPE=SELECT
DFHCNV TYPE=FIELD,OFFSET=0,DATATYP=CHARACTER,DATALEN=32767,
        LAST=YES
*
DFHCNV TYPE=ENTRY,RTYPE=PC,RNAME=DFHWBUD,USREXIT=NO,
        SRVERCP=037,CLINTCP=8859-1
DFHCNV TYPE=SELECT
DFHCNV TYPE=FIELD,OFFSET=0,DATATYP=CHARACTER,DATALEN=32767,
        LAST=YES
*
DFHCNV TYPE=FINAL
END
```

- Configure TCP/IP for VSE/ESA

Other Considerations

- Security
  - Transactions that compose CICS Web Support
  - Running Web transactions with end-user specified Userid
  - Use of Secure Sockets Layer (SSL)
  - TCP/IP VSE/ESA security facilities
- Operational Support
  - DFHWBEP - Web Error Program
  - SPI and CEMT commands

COMMAND	SPI	CEMT
CREATE DOCTEMPLATE	✓	
CREATE TCPIPSERVICE	✓	
DISCARD DOCTEMPLATE	✓	
DISCARD TCPIPSERVICE	✓	
INQUIRE DOCTEMPLATE	✓	✓
INQUIRE TCPIP	✓	✓
INQUIRE TCPIPSERVICE	✓	✓
INQUIRE WEB	✓	✓
SET TCPIP	✓	✓
SET TCPIPSERVICE	✓	✓
SET WEB	✓	✓

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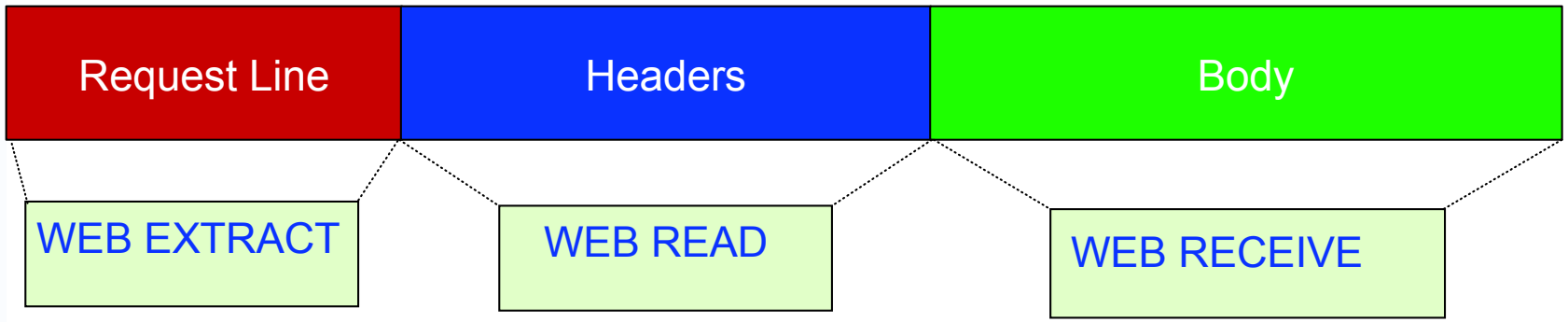
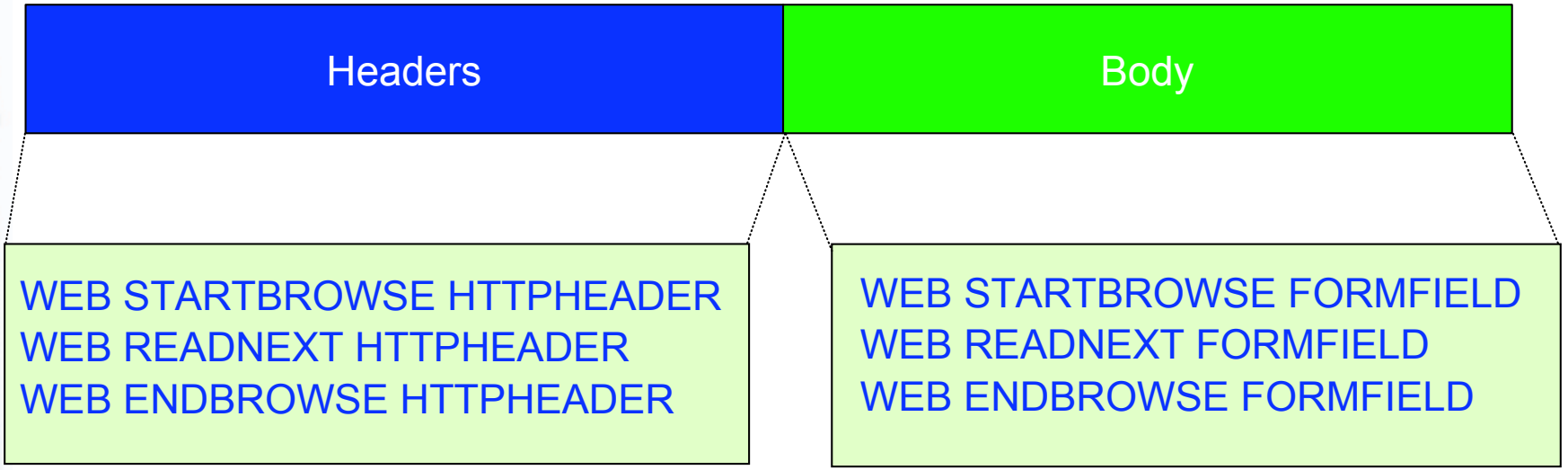
The new Web API's

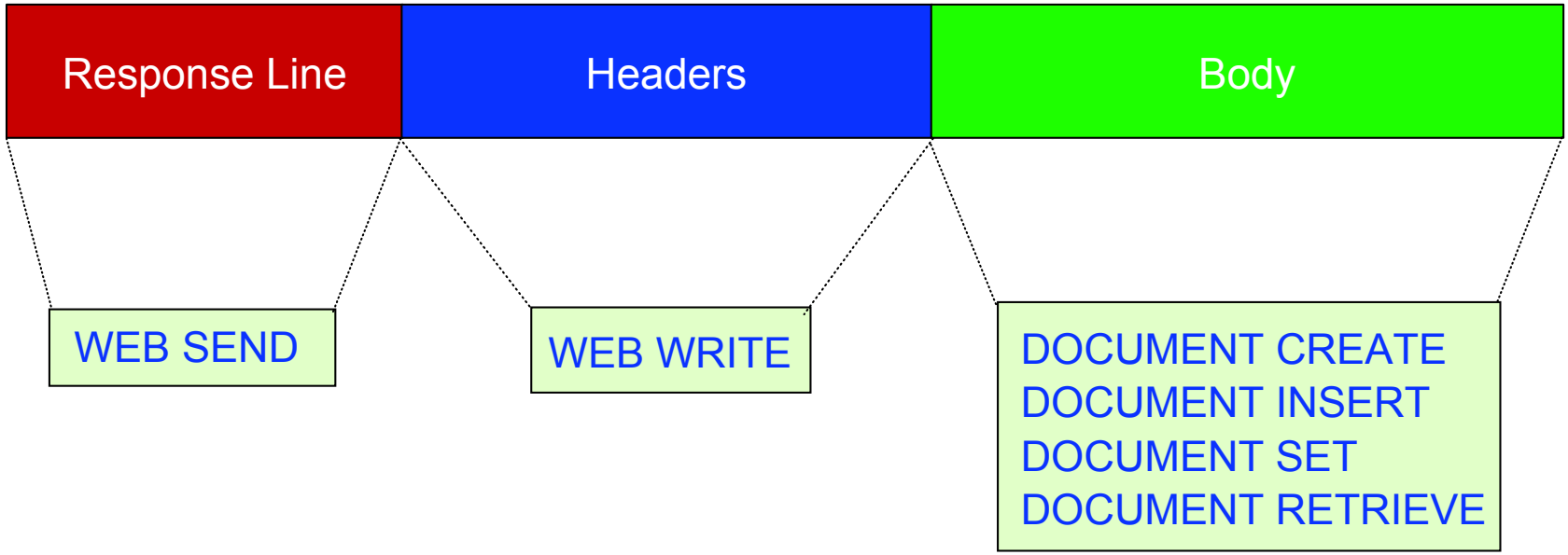
- **EXEC CICS WEB**
  - Retrieve components of the inbound HTTP request
  - Construct HTTP headers to be returned in HTTP response
  - Select a document for delivery as the body of the response
- **EXEC CICS EXTRACT**
  - Retrieve TCP information
- **EXEC CICS DOCUMENT**
  - Create and manipulate "Documents"
    - Can be made up of both text and binary elements
    - Can contain templates, symbols and bookmarks
    - Bookmarks can be used to insert data at specifics points
    - Documents can be imbedded
    - Codepage information is stored with the Document

New WEB API's....Processing HTTP Requests





New WEB API's....Processing HTTP Responses



WEB RETRIEVE
used to retrieve a copy of the document specified on the last WEB SEND

Last WEB SEND determines document to be sent

Document Templates

- Document templates are defined via RDO
- HTML example:

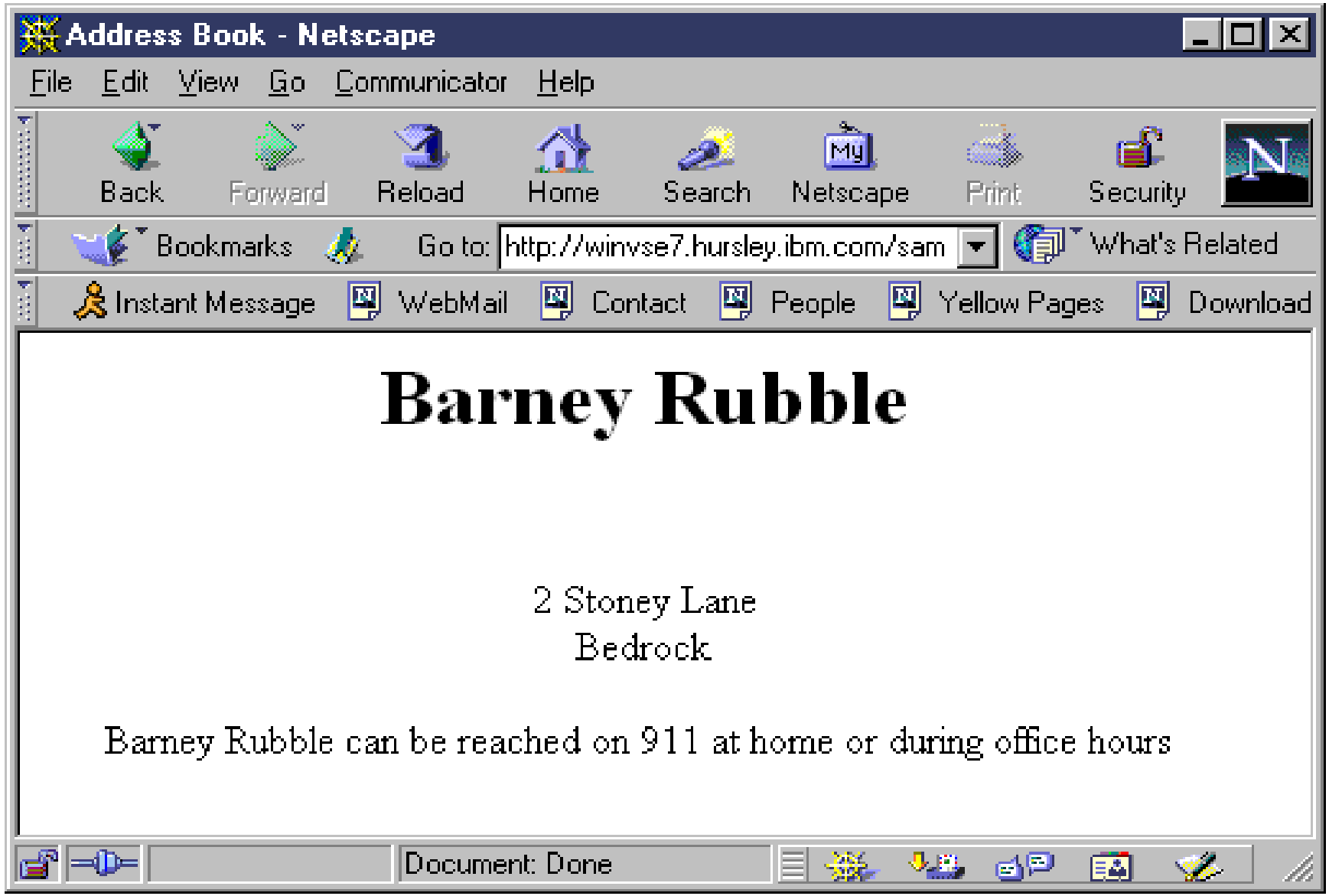
```
<html>
<head>
<title>Address Book</title>
</head>
<body>
<center>
<h1>&person;</h1><br>
&house_number; &street;<br>
&town;<br>
&zip;<br>
&person; can be reached on &home_number; at home
or &work_number; during office hours <br>
</center>
</body>
</html>
```

- Example symbol list for the above would be a single string:

  "person=Barney Rubble&house_number=2&street=Stoney Lane&town=Bedrock&zip=&home_number=911&work_number=123-456 "

- Any editor can be used for templates

Document Templates...after substitution



Web API's - Assembler code example

```
* Create document from existing HTML template
                EXEC CICS DOCUMENT CREATE DOCTOKEN(DOCTKN)
                  TEMPLATE('TEMPL1')
* Get Server TCP/IP address
                EXEC CICS EXTRACT TCPIP
                  SERVERADDR(SRVRADDR)  SADDRLENGTH(ADDRL)
* Get Client TCP/IP address
                EXEC CICS EXTRACT TCPIP
                  CLIENTADDR(CLNTADDR)  CADDRLENGTH(ADDRL)
* Insert both addresses into document
                EXEC CICS DOCUMENT INSERT DOCTOKEN(DOCTKN)
                  TEXT(DOCTXT)  LENGTH(DOCTXTL)
* Add footer to document from existing HTML template
                EXEC CICS DOCUMENT INSERT DOCTOKEN(DOCTKN)
                  TEMPLATE('TEMPL2')
* Send completed document
                EXEC CICS WEB SEND DOCTOKEN(DOCTKN)  CLNTCODEPAGE('iso-8859-1')
* Terminate program
                EXEC CICS RETURN

ADDRL          DC  F'15'
DOCTXTL        DC  F'70'
DOCTKN         DC  CL16
DOCTXT         DS  0CL
SRVRTXT        DC   C'<p> Server Address: '
SRVRADDR       DS   CL15
SRVRTXT        DC   C'<p> Client  Address: '
CLNTADDR       DS   CL15
```

Web API's - Templates for code example

First HTML Template (TEMPL1)

```
<html>
<head>
<title>Simple CWS Demo</title>
</head>
<body>
<h1>Following info produced via the EXEC CICS EXTRACT, DOCUMENT and WEB API's</h1>
```

Second HTML Template (TEMPL2)

```
<p><hr>
<p>Foot of simple CICS Web Support API demo page
</body>
</html>
```

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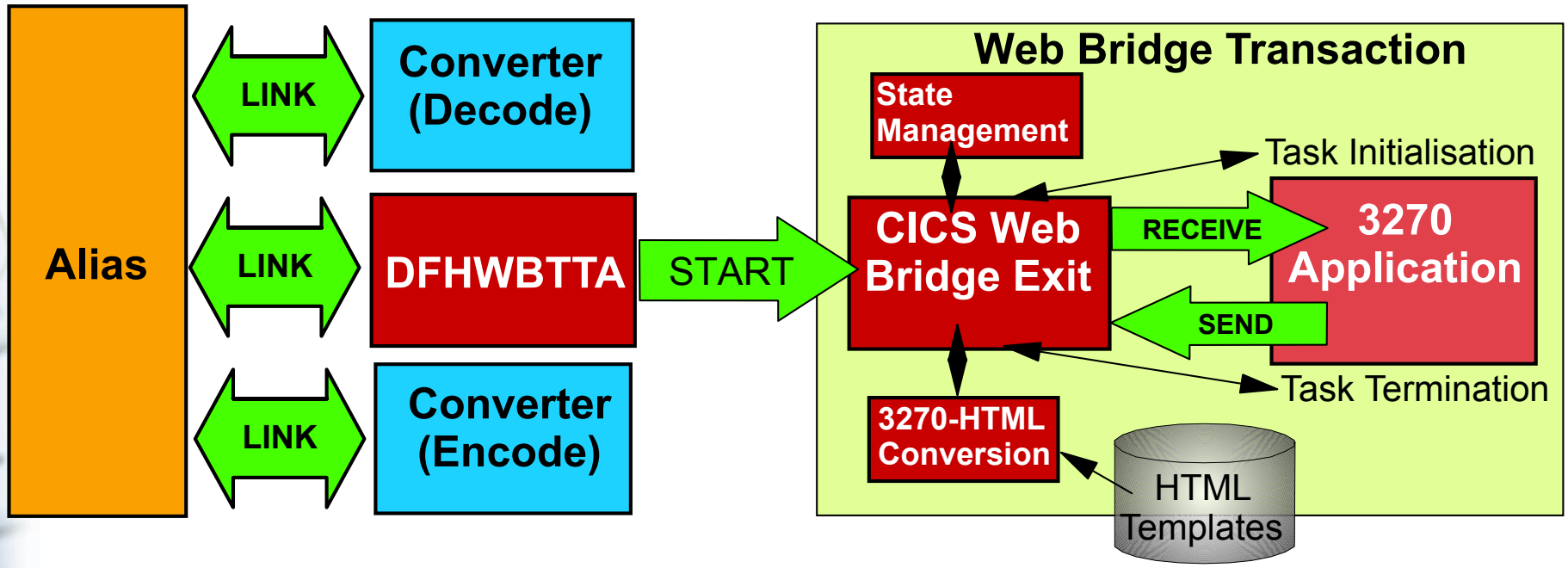
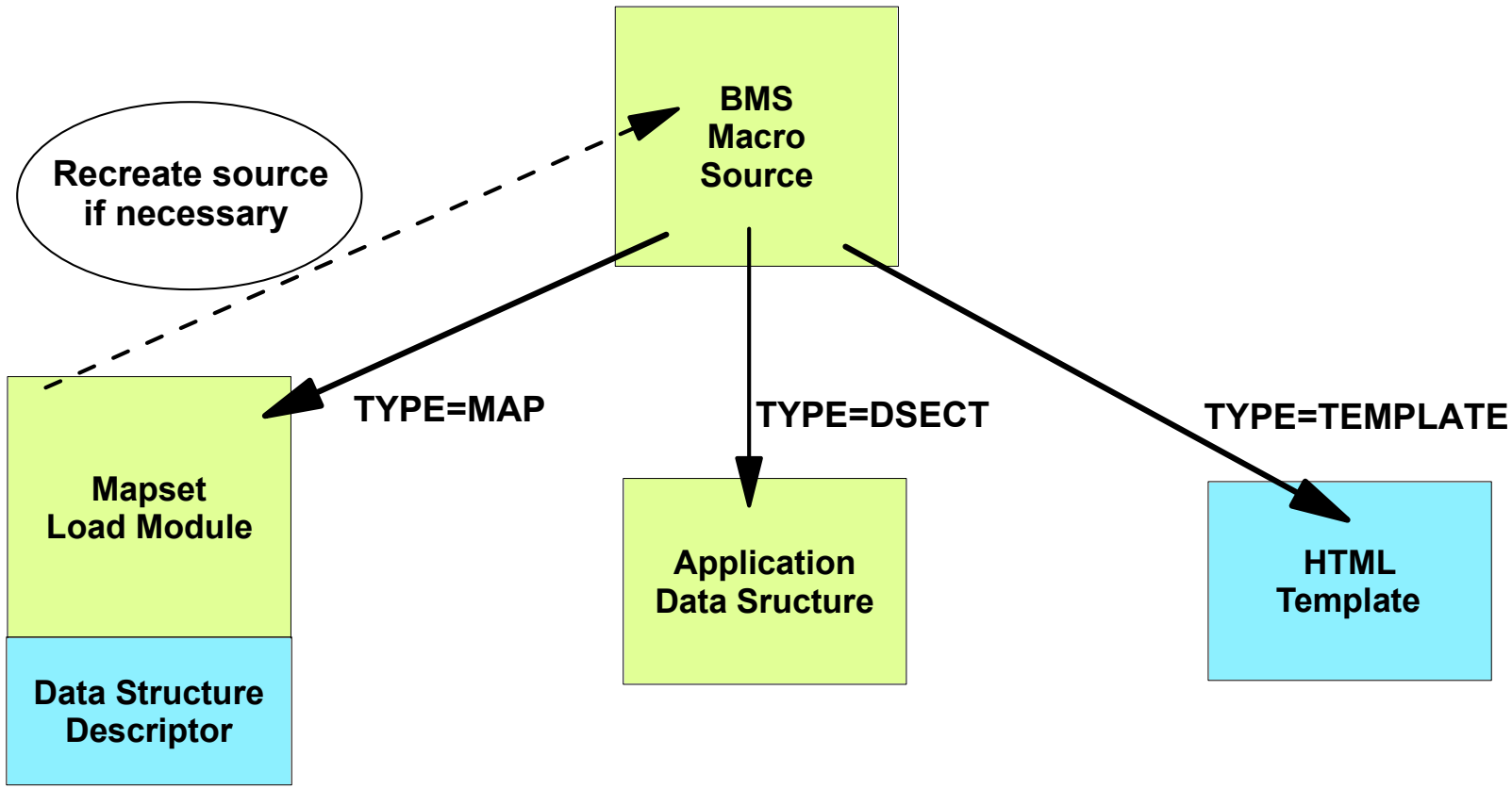
Architecture



Example URL > **http://cics1.ibm.com:1080/cics/cwba/dfhwbtta/app1**

Creating HTML for BMS applications



Creating HTML for BMS applications....

A template generated by the standard method contains...

- Constants and input fields from the map
- Buttons to represent:
  - ENTER key
  - PA1, PA2, PA3 keys
  - Program function keys PF1 to PF24
  - HTML Reset
- Hidden variables
  - For handling conversations/pseudoconversations
  - For holding name of map field where cursor is set
- JavaScript
  - Function to set the cursor position to a specific field
  - Exception handler for tracking cursor movement

Customising HTML for BMS applications

- Customise via CICS supplied macros
- Edit the generated HTML
- Run time customisation via use of Converter
  - Input (Decode)
    - e.g. change AID, change cursor position
  - Output (Encode)
    - e.g. Dynamically add or modify the HMTL

Customising HTML for BMS applications....

Customising via the DFHMDX macro.....

- Defines customization macros used for template creation
- Is invoked from DFHMSX
- Can be used to
  - Support application use of keys not in the standard output
  - Suppress HTML Reset
  - Change the appearance of the keys, or associated text
  - Provide an HTML title or masthead graphic
  - Change the background
  - Modify BMS colours
  - Suppress parts of the BMS map
  - Add Web browser control functions, e.g. JavaScript

Customising HTML for BMS applications....

Customising via the DFHWBOUT macro

- Add invocations of DFHWBOUT to BMS source
- Can be used to
  - Add HTML header information
  - Add text to HTML page that is not part of BMS map
  - Add Web browser control functions, e.g. JavaScript

HTML for non-BMS applications

Default presentation...

- Page produced in fixed width font
- Supplied Headers and Footers
  - Mandatory HTML page elements
  - Input buttons (ENTER, PF Keys, etc)

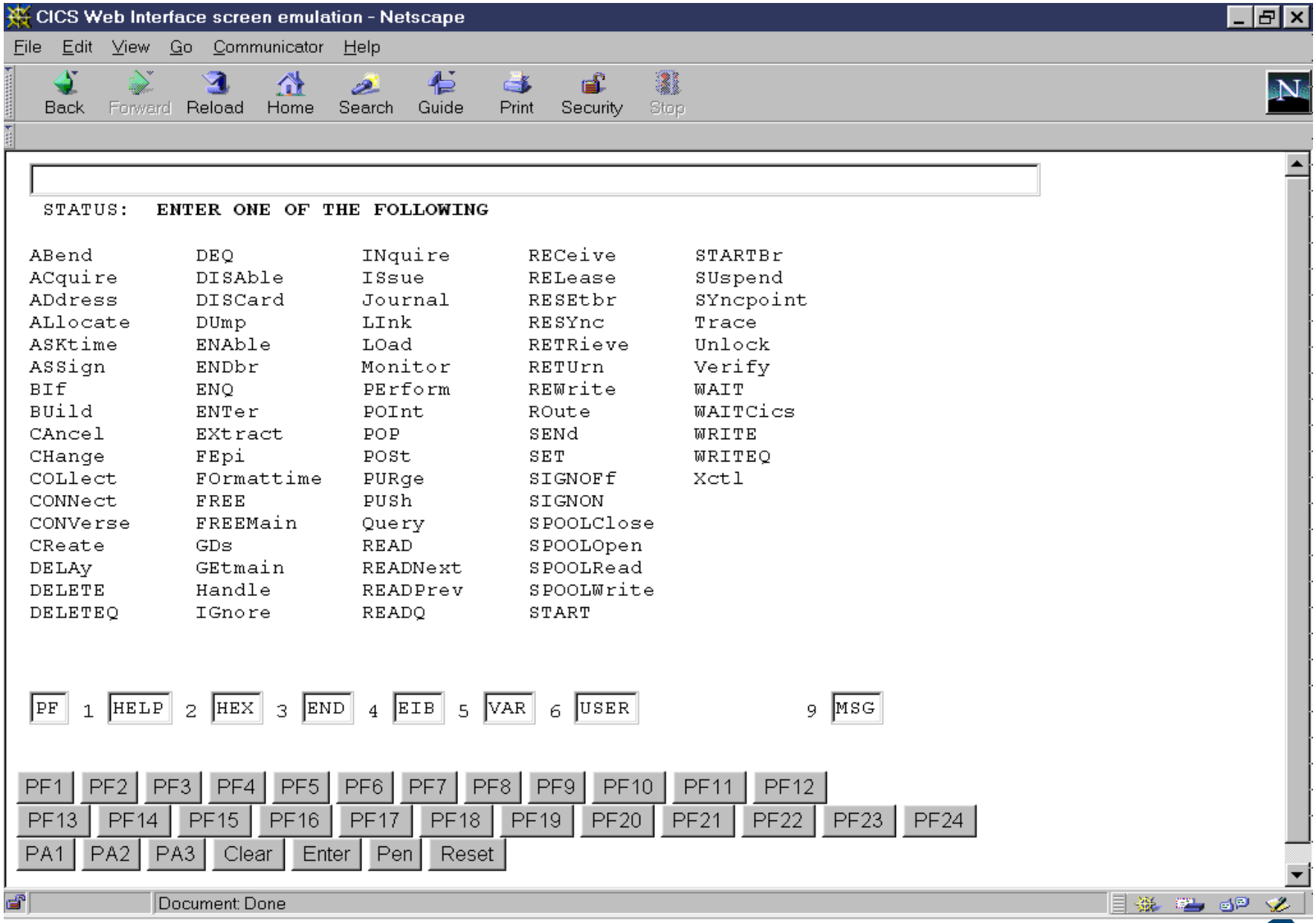
Customisation...

- Provide replacement header and footer templates
- Use a converter for customisation at run time
  - Input (Decode)
    - e.g. change AID, change cursor position
  - Output (Encode)
    - e.g. Any dynamic HTML modification needed

3270-based transactions - current restrictions

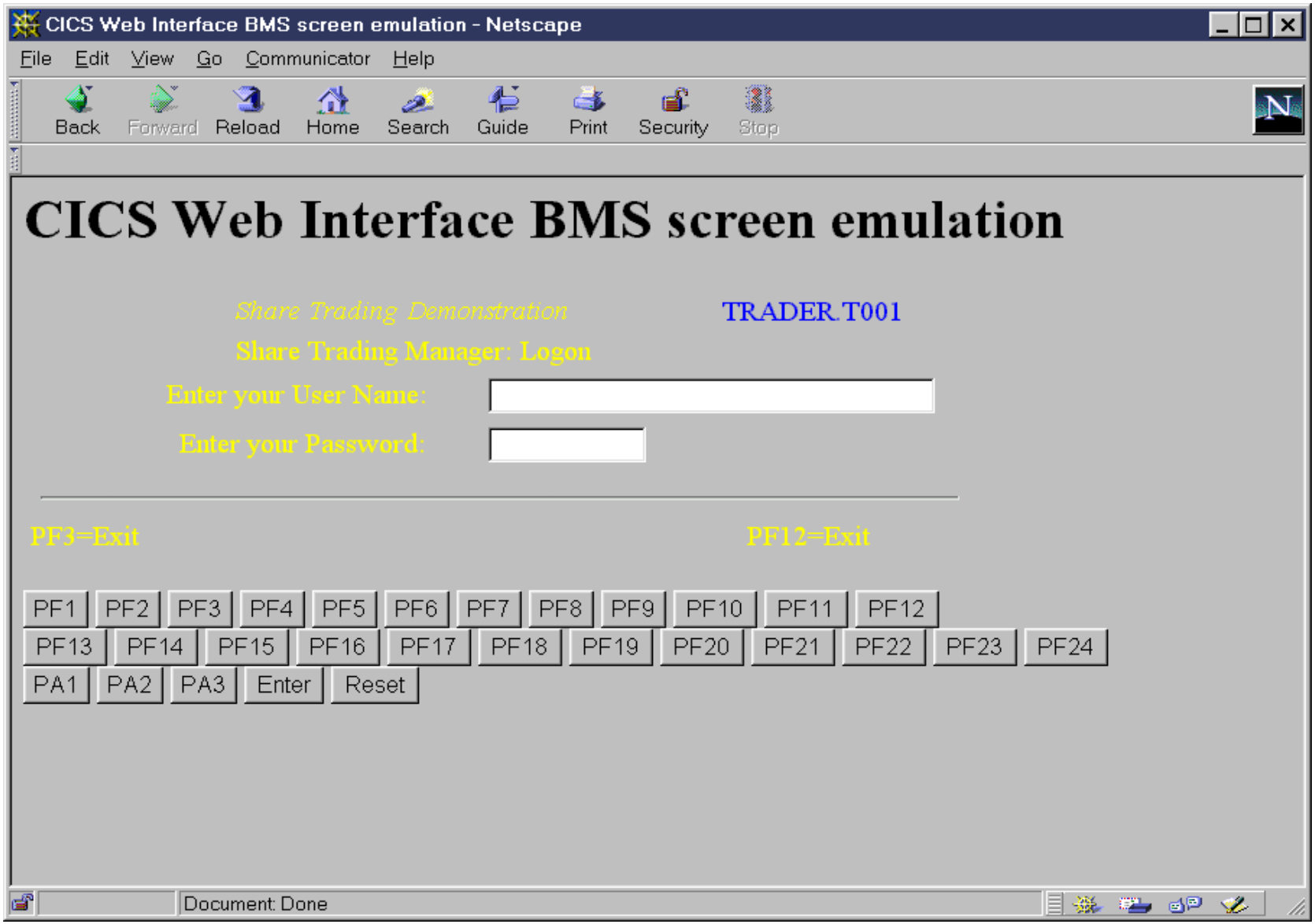
- No dynamic modification of attribute bytes by BMS
- Multiple SEND MAPs for one screen not supported
- Cannot mix BMS and non-BMS SEND commands
- Structured fields not supported
- Lightpen emulation not supported
- Must use same map on a RECEIVE following a SEND
- BMS Paging not supported

Accessing Existing CICS Transactions…non-BMS



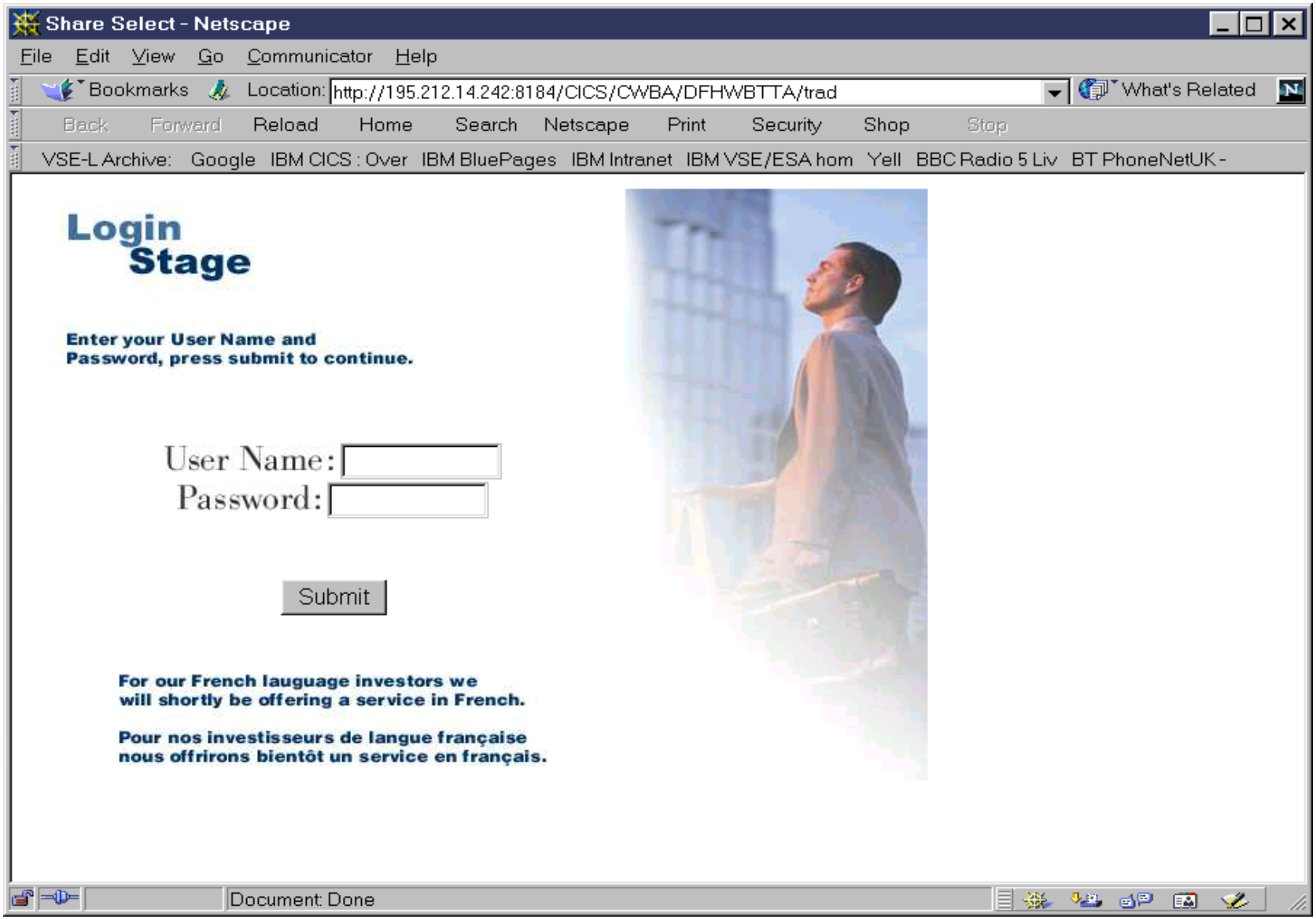
Accessing Existing CICS Applications...BMS

BMS application - default appearance.....



Accessing Existing CICS Applications...BMS

BMS application - customised.....



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Further Information

- **Web Sites**
  - CICS (main site)
    - http://www.ibm.com/software/cics
  - CICS Transaction Server for VSE/ESA
    - http://www.ibm.com/software/cics/platforms/cicsvse/vse.html
  - CICS (SupportPacs)
    - http://www.ibm.com/software/cics/txppacs/
  - VSE/ESA
    - http://www.s390.ibm.com/vse
  - Red books
    - http://www.redbooks.ibm.com
- **Announcement Letters**
  - CICS Transaction Server for VSE/ESA V1.1.1: 200-293
  - VSE/ESA V2.6 Preview: 201-097

Further Information....

Publications

Title	Number
IBM CICS Transaction Server for VSE/ESA product publications (V1.1.1)	
Internet Guide	SC34-5765
Enhancements Guide	GC34-5763
External Interfaces Guide	SC33-1669
IBM Red Books	
CICS Transaction Server for VSE/ESA: CICS Web Support	SG24-5997
Revealed! Architecting Web Access to CICS	SG24-5466
Getting Started with TCP/IP for VSE/ESA V1.4	SG24-5626
e-business Solutions for VSE/ESA	SG24-5662
VSE White Paper	
VSE Applications - How e-business fits	GF22-5137

- Accessible from the CICS and IBM Redbooks Web sites

Summary

- Access to CICS applications and transactions from Web Browsers
- Direct connection - no requirement for intermediate server
- Standard HTTP protocol used
- New APIs to enable creation of new Web aware applications
- Automatic HTML<->3270 conversion for existing applications
- Straightforward to configure and implement
- Delivered with CICS Transaction Server for VSE/ESA V1.1.1