



IBM Software Group

# CICS Web Services Structure & Debugging

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# Agenda

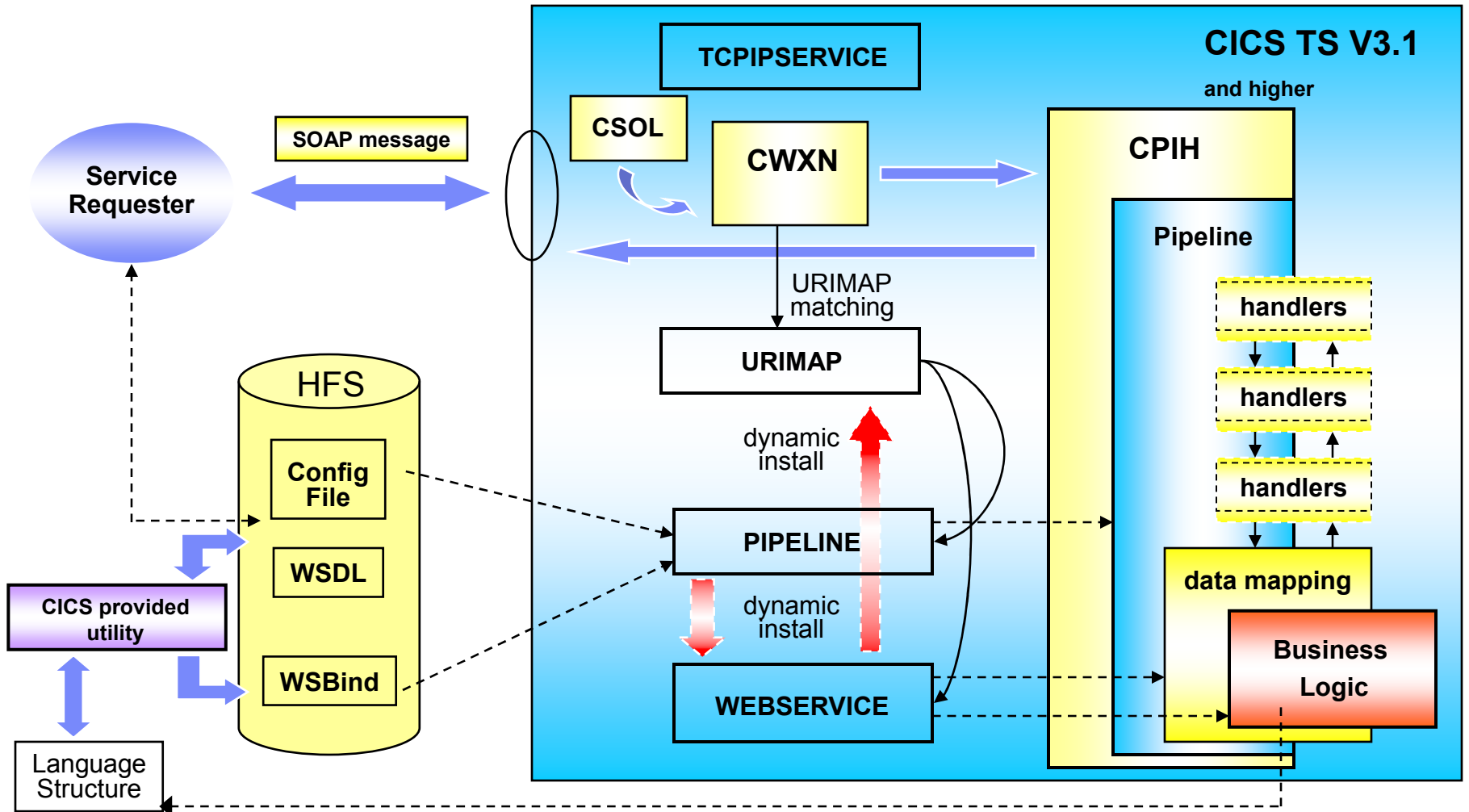
- CICS Web services Overview
  - ▶ Processing flow and requirements
  - ▶ Resource Definitions, Configuration files
- Avoiding Problems and Dodging Pitfalls
  - ▶ Testing your Web services with Eclipse
- Identifying Problems and Getting Documentation
- Diagnosis Techniques
  - ▶ Verbexit displays
  - ▶ Working with Traces
- Sample Problems

# CICS WEB SERVICES

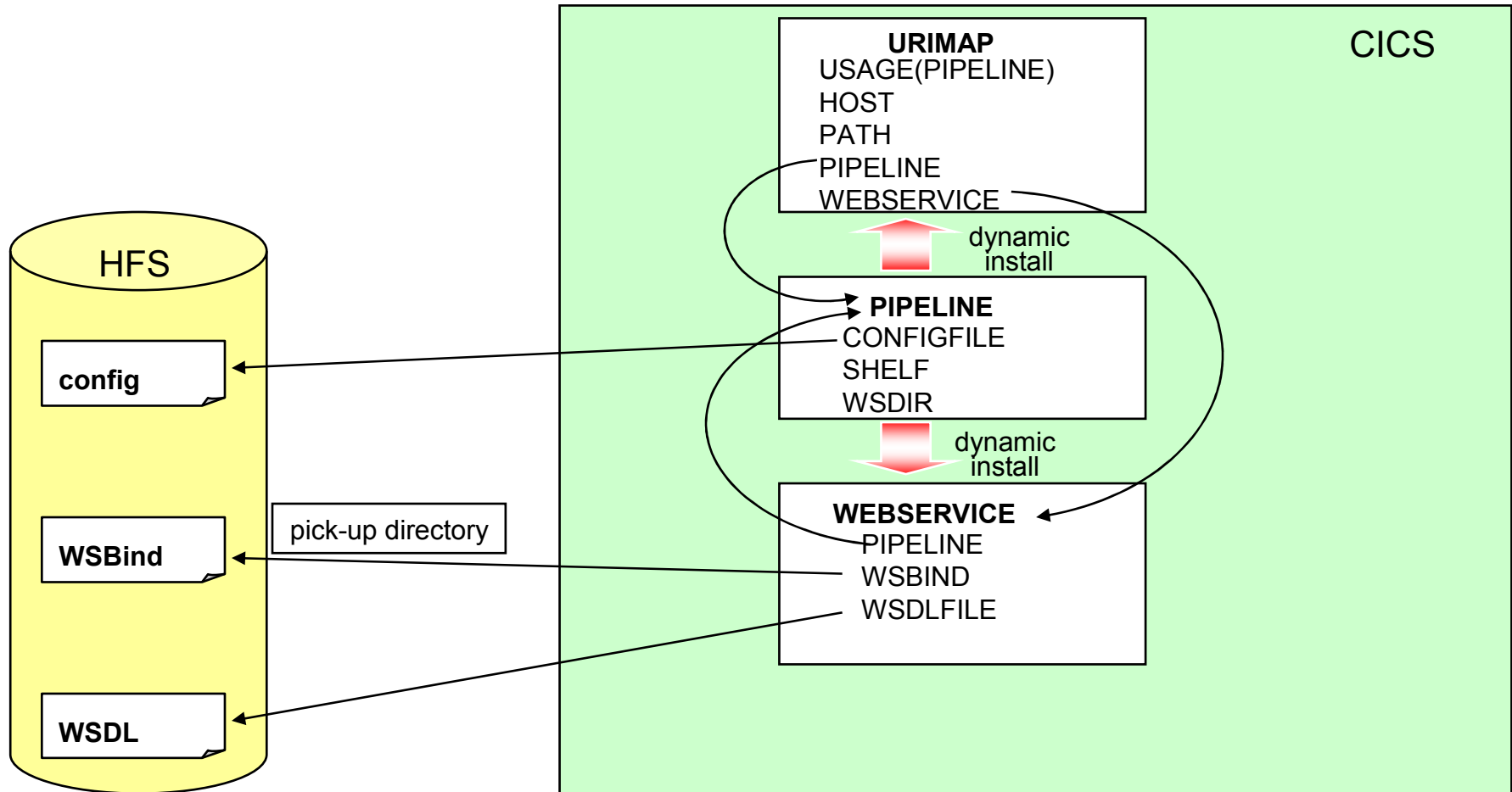
## Processing Overview



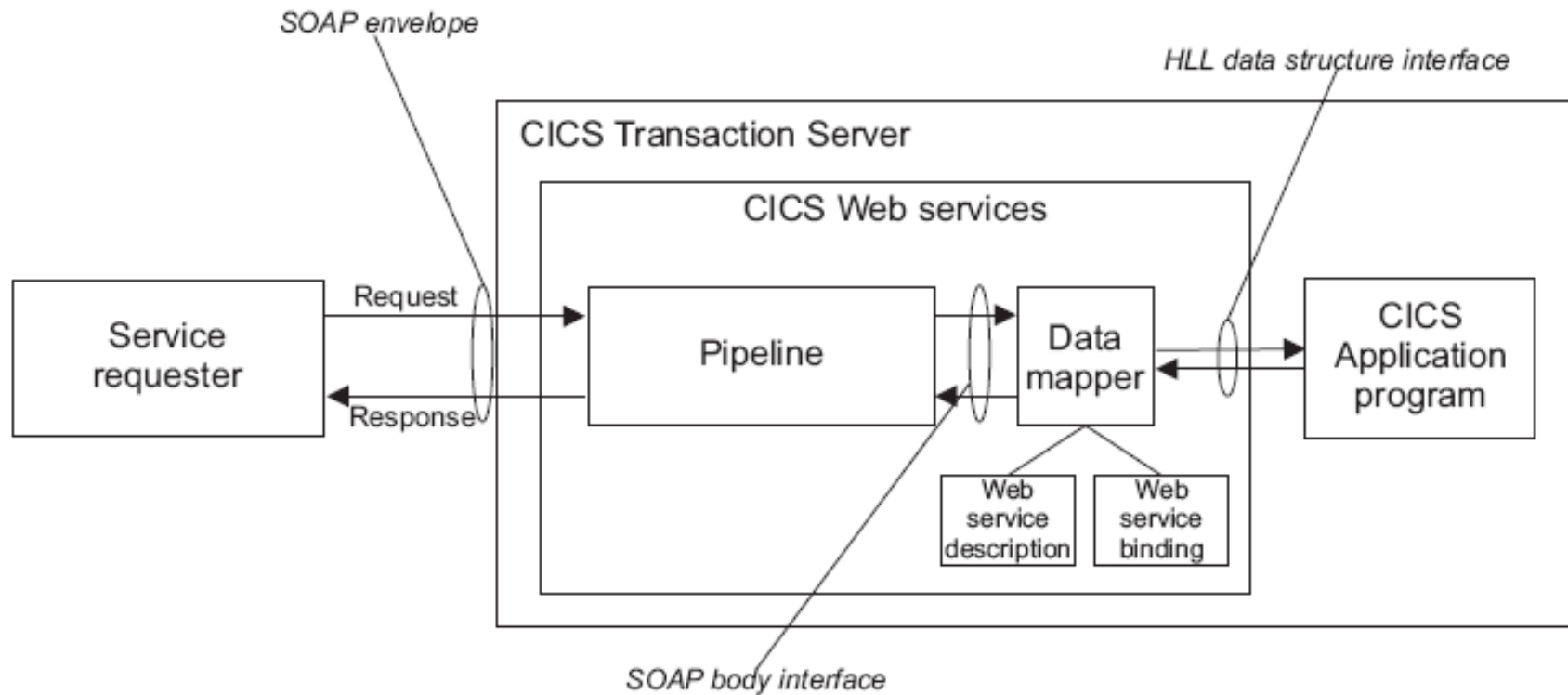
# Overview: CICS as a Service Provider



# Web service Resource Interrelationships



# Service Provider: Mapping a SOAP body to a Commarea



# CICS Web Services Overview: Structure & Flow

- Structure & Flow
  - ▶ An important technique to help in diagnosing Web services-related problems is to understand the Structure and processing Flow that CICS uses to satisfy a request
  - ▶ CICS Trace can be a very useful tool in understanding Web services processing



# CICS Web Services PROVIDER Flow Overview

- CSOL detects incoming Socket data from TCP/IP, attaches CWXN to obtain the incoming data
- CWXN receives the data, performs URI matching against the incoming data, and attaches CPIH to process Web Services request
- CPIH performs the work of Web Services processing:
  - ▶ Creates the Pipeline
  - ▶ Creates the Containers
  - ▶ Calls Handlers that have been defined to the Pipeline
  - ▶ Parses the incoming XML data, maps data into commarea or containers
  - ▶ Links to the Terminal Handler (Web Services application program)
  - ▶ Transforms commarea/container data back into XML, converts it, and sends Sockets data back to service Requester

# CICS Web Services REQUESTER Flow Overview

- Application program loads DFHWS\_DATA container, and makes Web Services request
  - ▶ EXEC CICS INVOKE WEBSERVICE
- CICS fills additional containers, configures and starts the Pipeline, and runs the pipeline
  - ▶ Link to the SOAP 1.1 Handler program, DFHPISN1, which converts data
  - ▶ Performs Socket SEND
  - ▶ Issues Socket Receive, awaiting response
  - ▶ Parse the data returned from the Web service call
  - ▶ Link to the SOAP 1.1 Handler program, DFHPISN1, which then
    - Parses the PROVIDER's reply
- Relinquish Pipeline
- Transform XML Data, writes it to DFHWS\_DATA
- Return from INVOKE WEBSERVICE

# CICS Web Services Overview

## Resource Definitions

- ▶ TCPIP SERVICE – defines a port for the CICS-provided sockets listener (CSOL) to listen for incoming requests
- ▶ HFS Artifacts:
  - Config file
  - WSBIND file
- ▶ PIPELINE – defines a Web service provider or requester, specifying the message handler programs that act on a service request and response.
  - A single PIPELINE definition can be used by many applications
  - Composed of the RDO information, combined with data from the referenced CONFIG FILE

# CICS Web Services Overview

## Resource Definitions (cont'd)

- ▶ URIMAP – defines the URIs (similar to URLs) to specify how CICS is to process incoming requests.
  - Provides 3 types of Web-related facilities: SERVER, CLIENT, and PIPELINE
  - Definition can be installed dynamically
- ▶ WEBSERVICE – defines the runtime environment for an application program deployed as a Web service.
  - VALIDATION option can provide additional checking, at the expense of overhead
  - Specifies the PIPELINE and WSBIND resources that compose that Web service.
  - Definition can be installed dynamically

# CICS WEB SERVICES

## Avoiding Problems and Pitfalls



# Avoid Common Problems

- See WSTE presentation, “Web Services Problems and Pitfalls” for further details – Technote #7012643  
<http://www.ibm.com/support/docview.wss?rs=1083&uid=swg27012643>
- Check your maintenance levels!
  - ▶ This includes both CICS modules, as well as the “mapping-level” parameter in Web Services Assistant utilities
- Ensure sufficient dataset access
  - ▶ HFS: WSBIND, Pipeline CONFIGFILE, WSDIR
- Install and test the supplied sample Web service application
- Search the CICS Support pages to see if you’ve encountered a ‘known problem’
  - ▶ <http://www.ibm.com/cics/tserver/support/>

# Recommendations: Web services Assistant (WSA)

- Use the latest MAPPING-LEVEL to ensure the most recent WSA support

<u>MAPPING-LEVEL</u>	<u>APAR</u>
1.0	CICS/TS 3.1 base
1.1	PK15904
1.2	PK23547
2.0	CICS/TS 3.2 base
2.1	PK59794
2.2	PK69738

- ▶ Unlike other CICS maintenance, WSA support enhancements are NOT automatically incorporated into WSAs
- ▶ Caution is advised, as this may result in unintended changes to the generated artifacts (WSBind, Copybook, and WSDL files)
- ▶ Refer to CICS InfoCenter, “Mapping levels for the CICS Web services assistant” for more details
- Verify you’re using the correct input parameters
  - ▶ For example, it’s invalid to specify PGMNAME for a Web service **requester**
  - ▶ Be aware of the case-sensitive parameters

# Common Problems: Deployment

- Performance problems with the CICS WSA
  - ▶ Check your LE configuration

```
//STDENV DD *  
CEE_RUNOPTS=STACK(49152,16384,ANY,KEEP,128K,128K)  
7*
```
  - ▶ Additional details available in Technote #1249544  
<http://www.ibm.com/support/docview.wss?rs=1083&uid=swg21249544>
- WSDL or WSBind errors (“deployment errors”)
  - ▶ Unusable WSDL
  - ▶ Unsupported features
  - ▶ Unable to install PIPELINE or WEBSERVICE resource
    - Just because an INSTALL completed, doesn't mean it was successful!
    - Use CEMT to inquire against the status of the appropriate resources
    - Diagnosis: Messages in Logs, and Trace of the install with PI=1-2



# Common Problems: Runtime

- Access from a Browser
  - ▶ (not appropriate for Web Services)
- Response time is longer than expected
  - ▶ Can be caused by the TCP/IP “DELAYACKS” parameter
  - ▶ Code NODELAYACKS on the TCPCONFIG statement
    - DELAYACKS can still override this setting for specific PORT, PORTRANGE, BEGINROUTES, or GATEWAY statements
  - ▶ Refer to Technote #1250026 for further details
- DFHPI0602 **The CICS SOAP handler failed to parse a message. The parse error code is *error-code*. The DFHPIEP return code is *return-code*.**
  - ▶ CICS SOAP handler program uses the PL/I XML parser to process the contents of the SOAP message; a parsing error generates this message
  - ▶ Detailed explanation and diagnosis in Technote #1264885

# Common Problems: Runtime (cont'd)

- Data Conversion errors
  - ▶ After PK23547, one of the following messages are also issued:
    - DFHPI1007, DFHPI1008, DFHPI1009, DFHPI1010
  - ▶ Possible causes:
    - invalid SOAP message
    - Out-of-range value
  - ▶ Detailed diagnosis assistance in Technote #1211424

# Common Problems: CICS and HFS

- Insufficient HFS dataset access

- ▶ Example showing an error accessing the Pickup shelf in a PIPELINE resource definition:

```
DFHPI0705 E 13/01/2006 23:10:54 DBDCCICS CICSUSER PIPELINE  
EXPIPE02 encountered an error writing the configuration to  
the derived shelf /var/cicsts/DBDCCICS/PIPELINE/EXPIPE02/.  
The response code from the HFS write was X'00000081' and the  
reason code was 'X'0594003D'.
```

- Corrupt WSBIND file

- ▶ Symptom: DFHPI0914 WEBSERVICE *webservice* is unusable because the WSBIND file is corrupt
- ▶ If you generated your WSBIND file on a distributed platform -- for example, Rational Developer for z (RD/z) -- make sure you transferred the file to z/OS in BIN (binary) mode

# CICS WEB SERVICES

## Identifying Problems and Getting Documentation



# Identifying Problems (Runtime)

- Abends
- MSGUSR log
  - ▶ CICS-supplied messages: Use these messages to learn what types of errors you're receiving, and for some degree of problem determination
  - ▶ Messages here may also give you the opportunity to capture documentation at a key point in Web Services processing
    - `CEMT SET SYD(ddnnnn) MAX(1) ADD`
- SOAPFAULT message
  - ▶ Useful for both Requesters and Providers
- Re-Create error with Auxiliary Trace active
  - ▶ Suggestions for navigating your trace slides later in this presentation

# Identifying Problems (Tooling)

- Batch Job
  - ▶ Joblog
  - ▶ SYSPRINT
  - ▶ HFS error log (specified by the LOGFILE parameter)
- Did you validate your WSDL with Eclipse?
  - ▶ If your WSDL isn't valid from ECLIPSE's viewpoint, the CICS tooling isn't going to have any better luck with it!
  - ▶ Technote #1268824 illustrates this method of testing your Web Service applications

# Getting Documentation

## ■ CICS dumps

- ▶ System dumps can be triggered by using System Dump table:

```
CEMT SET SYD(ddnnnn) MAX(1) ADD
```

(for example, use “WB0723” when message DFHWB0723 seems most closely related to the observed problem)

- ▶ As an alternative, you can set a SLIP trap to capture an SVCDUMP on a specific message
- ▶ Or manually request a dump with a console command similar to:
  - DUMP COMM=(dumpname)
  - R yy, JOBNAME=(cicsjob), CONT
  - R yy, SDATA=(RGN, CSA, SQA, LPA, LSQA, SWA, PSA, ALLNUC, TRT, GRSZ, SUM), END

## Getting Documentation cont'd

- CICS Internal or Auxiliary Trace
  - ▶ Trace should be active (“Started”), sized to at least 4000K
  - ▶ Use Standard Level=1-2 tracing for EI, PG, PI, SO, WB components
    - Use Standard Level=ALL tracing for PG at CICS TS 3.1
  - ▶ Use Standard Level=1 tracing for all other components
- MustGather publications
  - ▶ General overview CICS “MustGather” is located at <http://www.ibm.com/support/docview.wss?rs=1083&uid=swg21208053>
  - ▶ Specific MustGather technotes are linked from this document, including
    - Web Services (#1220283)
    - SOAP for CICS (#1197886)
    - Service Flow Runtime (#1239511)



# CICS WEB SERVICES

## Diagnosis Techniques



## Diagnosis Techniques: Non-standard methods

- WSDL validation tools
  - ▶ WD/z or RD/z
  - ▶ Eclipse
- WSDL Formatting
  - ▶ Web Browser (Firefox)
- CEDX (CEDF) transaction
  - ▶ HTTP transport: Tran(CPIH)
  - ▶ WMQ transport: Tran(CPIQ)

# Diagnosis Techniques

- VERBEXIT displays
  - ▶ Use DFHPDvrr to format release-specific information
    - DFHPD630            CICS TS 2.3
    - DFHPD640            CICS TS 3.1
    - DFHPD650            CICS TS 3.2
  - ▶ KE=3 for Kernel-related data
    - Display tasks present in dumped region
    - Show STACK for each task, to determine what point in processing
    - KERR display will reveal if your dump symptom cascaded from an earlier error (remember to keep focused on the ROOT CAUSE!)
  - ▶ DS=3 for Dispatch information
    - Helpful for observing and diagnosing HANG and Performance-related problems
  - ▶ WB=3 for Web Interface data
  - ▶ SO=3 for Sockets
  - ▶ PI=3 for Pipelines
  - ▶ PG=3 for Program Manager (includes Container information)

# Diagnosis: Trace techniques

- Trace listings can be formatted with various utilities, depending on where the trace data resides
  - ▶ Sample Trace request using IPCS Verbexit:

```
DFHPD650 `tr=2, trs=<typetr=(so0201-0202, xm1101, ds0002)>'
```
  - ▶ Sample Trace request using CICS Trace Utility program DFHTUnnn:

```
//DFHAXPRM DD *  
FULL  
TYPETR=(SO0201-0202)  
TYPETR=(XM1101, DS0002)  
/*
```
- Internal Trace is typically associated with a particularabend or identifying situation such as an error message that can trigger a dump
- Auxillary Trace can be used for problems that produce no (known) external symptoms
- Trace space (datasets and the internal table) fill quickly
  - ▶ Sizing considerations: Better “too big”, than “not big enough”

# Dissecting a Trace: Getting your bearings

- Specify limited trace entry types

**ABBREV or TR=1,**

**TYPETR=(XM1101,DS0002,PG0901-0902,PG1101-1102)**

to display the transactions, task numbers, and linked-to programs

```

00004 SL   XM 1101 XMAT  ENTRY ATTACH          CWXN,C,NO,YES,SOCKET,1565E000 , 00000038
00004 SL   DS 0002 DSAT  ENTRY ATTACH          14509B00,0,1,NON_SYSTEM,14509B00 , 0000428C
00428 QR   DS 0002 DSAT  ENTRY SET_PRIORITY    1
00428 QR   PG 0901 PGPG  ENTRY INITIAL_LINK    DFHWBXN
00428 QR   XM 1101 XMAT  ENTRY ATTACH          CPIH,NONE,C,YES,YES,WEB,15644030 , 00000420,UPDATE
00428 QR   DS 0002 DSAT  ENTRY ATTACH          15671100,0,1,NON_SYSTEM,15671100 , 0000429C
00428 QR   PG 0902 PGPG  EXIT  INITIAL_LINK/OK  1
00429 QR   DS 0002 DSAT  ENTRY SET_PRIORITY    DFHPIDSH
00429 QR   PG 0901 PGPG  ENTRY INITIAL_LINK    DFHPISN1,YES,DFHNODE
00429 QR   PG 1101 PGLE  ENTRY LINK_EXEC        DFHPIEP,152FAA18 , 00000010,YES
00429 L8000 PG 1101 PGLE  ENTRY LINK_EXEC        '''
00429 L8000 PG 1102 PGLE  EXIT  LINK_EXEC/OK    DFHPITP,YES,DFHAHC-V1
00429 L8000 PG 1101 PGLE  ENTRY LINK_EXEC        DFHOXCMN,15446958 , 0000009E,NO
00429 QR   PG 1101 PGLE  ENTRY LINK_EXEC        DFHOXVDS,15446958 , 000003E6,NO,NO
00429 QR   PG 1102 PGLE  EXIT  LINK_EXEC/OK    '''
00429 QR   PG 1102 PGLE  EXIT  LINK_EXEC/OK    '''
00429 L8000 PG 1102 PGLE  EXIT  LINK_EXEC/OK    '''
00429 L8000 PG 1102 PGLE  EXIT  LINK_EXEC/OK    '''
00429 QR   PG 0902 PGPG  EXIT  INITIAL_LINK/OK  '''

```

# Dissecting a Web Services Trace: Sockets Domain

- SO (Sockets Domain) entries display capture inbound and outbound datastreams. This can be useful for
  - ▶ Pinpointing the task(s) that need further investigation,
  - ▶ Identifying Performance characteristics of Web Services processing, and
  - ▶ Displaying the SOAPFAULT information associated with both Providers and Requesters
- Datastream focus: Consider requesting both SO 0201 and SO 0202 entries
  - ▶ Outgoing Socket data (SEND) is visible in SO 0201 ENTRY records
  - ▶ Incoming Socket data (RECEIVE) is visible in SO 0202 EXIT records

# SOCKET Domain Trace entries sample

## TYPETR=SO0000-FFFF

```

00428 QR    SO 0201 SOCK  ENTRY RECEIVE          16310000 , 00000000 , 00001000,DEFAULT,SYNC,0,YES          =052158=
00428 QR    SO 0D0B SOSO  ENTRY RECEIVE          =052159=
00428 SO    SO 0D23 SOSO  ENTRY TAKE_SOCKET          =052160=
00428 SO    SO 0E0A SOUS  EVENT TAKESOCKET_ENTRY      01417101          =052161=
00428 SO    SO 0E0B SOUS  EVENT TAKESOCKET_EXIT      0,0,00000000     =052162=
00428 SO    SO 0D24 SOSO  EXIT TAKE_SOCKET          =052163=
00428 SO    SO 0E00 SOUS  EVENT ASYNCIO_ENTRY      00000000         =052166=
00428 SO    SO 0E01 SOUS  EVENT ASYNCIO_EXIT      1,0,00000000     =052167=
00428 QR    SO 0D0C SOSO  EXIT RECEIVE          =052168=
00428 QR    SO 0202 SOCK  EXIT RECEIVE/OK          16310000 , 00000140 , 00001000          =052169=
00428 QR    SO 0201 SOCK  ENTRY RECEIVE          16310000 , 00000000 , 00000140,SOCKETCLOSE,SYNC,140,NO  =052170=
00428 QR    SO 0D0B SOSO  ENTRY RECEIVE          =052171=
00428 QR    SO 0D0C SOSO  EXIT RECEIVE          =052172=
00428 QR    SO 0202 SOCK  EXIT RECEIVE/OK          16310000 , 00000140 , 00000140          =052173=
00428 QR    SO 0201 SOCK  ENTRY RECEIVE          151F3500 , 00000000 , 000003D2,SOCKETCLOSE,SYNC,3D2  =052178=
00428 QR    SO 0D0B SOSO  ENTRY RECEIVE          =052179=
00428 SO    SO 0E00 SOUS  EVENT ASYNCIO_ENTRY      00000000         =052180=
00428 SO    SO 0E01 SOUS  EVENT ASYNCIO_EXIT      0,0,00000000     =052181=
00428 QR    SO 0D0C SOSO  EXIT RECEIVE          =052184=
00428 QR    SO 0202 SOCK  EXIT RECEIVE/OK          151F3500 , 000003D2 , 000003D2          =052185=
00429 L8000 SO 0201 SOCK  ENTRY SEND          152FA544 , 00000002          =053412=
00429 L8000 SO 0D09 SOSO  ENTRY SEND          =053413=
00429 SO    SO 0E00 SOUS  EVENT ASYNCIO_ENTRY      00000000         =053414=
00429 SO    SO 0E01 SOUS  EVENT ASYNCIO_EXIT      1,0,00000000     =053415=
00429 L8000 SO 0D0A SOSO  EXIT SEND          =053416=
00429 L8000 SO 0202 SOCK  EXIT SEND/OK          4FB          =053417=
00429 L8000 SO 0201 SOCK  ENTRY CLOSE          =053418=
00429 L8000 SO 0D0F SOSO  ENTRY CLOSE          =053419=
00429 SO    SO 0E04 SOUS  EVENT CLOSE_ENTRY      00000000         =053424=
00429 SO    SO 0E05 SOUS  EVENT CLOSE_EXIT      0,0,00000000     =053425=
00429 L8000 SO 0D10 SOSO  EXIT CLOSE          =053432=
00429 L8000 SO 0298 SOCK  EVENT CONNECTIONS_DECREMENTED EXMPPORT,0  =053433=
00429 L8000 SO 0202 SOCK  EXIT CLOSE/OK          =053452=

```







# Sample SO 0202 (RECEIVE) Trace entry

```

SO 0202 SOCK EXIT - FUNCTION(RECEIVE) RESPONSE(OK) RECEIVE_BUFFER(16310000 , 00000140 , 00001000)
TASK-00428 KE_NUM-0049 TCB-QR /007D5328 RET-9499F866 TIME-23:03:03.0753144592 INTERVAL-00.0003325156 =052169=
1-0000 01000000 0000019B 00000000 00000000 B3008004 04000000 03000100 00000000 *.....*
...
2-0000 504F5354 202F6578 616D706C 65417070 2F696E71 75697265 53696E67 6C652048 *POST /exampleApp/inquireSingle H*
0020 5454502F 312E310D 0A486F73 743A2039 2E32302E 3132322E 37313A33 30373031 *TTP/1.1..Host: 9.20.122.71:30701*
0040 0D0A436F 6E74656E 742D5479 70653A20 74657874 2F786D6C 3B206368 61727365 *..Content-Type: text/xml; charse*
0060 743D7574 662D380D 0A436F6E 74656E74 2D4C656E 6774683A 20393738 0D0A4163 *t=utf-8..Content-Length: 978..Ac*
0080 63657074 3A206170 706C6963 6174696F 6E2F736F 61702B78 6D6C2C20 6170706C *cept: application/soap+xml, appl*
00A0 69636174 696F6E2F 64696D65 2C206D75 6C746970 6172742F 72656C61 7465642C *ication/dime, multipart/related,*
00C0 20746578 742F2A0D 0A557365 722D4167 656E743A 2049424D 20576562 20536572 * text/*..User-Agent: IBM Web Ser*
00E0 76696365 73204578 706C6F72 65720D0A 43616368 652D436F 6E74726F 6C3A206E *vices Explorer..Cache-Control: n*
0100 6F2D6361 6368650D 0A507261 676D613A 206E6F2D 63616368 650D0A53 4F415041 *o-cache..Pragma: no-cache..SOAPA*
0120 6374696F 6E3A2022 220D0A43 6F6E6E65 6374696F 6E3A2063 6C6F7365 0D0A0D0A *ction: ""..Connection: close....*

SO 0202 SOCK EXIT - FUNCTION(RECEIVE) RESPONSE(OK) RECEIVE_BUFFER(151F3500 , 000003D2 , 000003D2)
TASK-00428 KE_NUM-0049 TCB-QR /007D5328 RET-949A1898 TIME-23:03:03.3942695976 INTERVAL-00.0000065000 =052185=
1-0000 01000000 0000019B 00000000 00000000 B3008004 00000000 03000100 00000000 *.....*
...
2-0000 3C736F61 70656E76 3A456E76 656C6F70 6520786D 6C6E733A 71303D22 68747470 *<soapenv:Envelope xmlns:q0="http*
0020 3A2F2F77 77772E44 46483058 434D4E2E 44464830 58435034 2E526571 75657374 *://www.DFH0XCMN.DFH0XCP4.Request*
0040 2E636F6D 2220786D 6C6E733A 736F6170 656E763D 22687474 703A2F2F 73636865 *.com" xmlns:soapenv="http://sche*
0060 6D61732E 786D6C73 6F61702E 6F72672F 736F6170 2F656E76 656C6F70 652F2220 *mas.xmlsoap.org/soap/envelope/" *
0080 786D6C6E 733A7873 643D2268 7474703A 2F2F7777 772E7733 2E6F7267 2F323030 *xmlns:xsd="http://www.w3.org/200*
00A0 312F584D 4C536368 656D6122 20786D6C 6E733A78 73693D22 68747470 3A2F2F77 *1/XMLSchema" xmlns:xsi="http://w*
00C0 77772E77 332E6F72 672F3230 30312F58 4D4C5363 68656D61 2D696E73 74616E63 *ww.w3.org/2001/XMLSchema-instanc*
00E0 65223E0D 0A20203C 736F6170 656E763A 426F6479 3E0D0A20 2020203C 71303A44 *e">.. <soapenv:Body>.. <q0:D*
0100 46483058 434D4E4F 70657261 74696F6E 3E0D0A20 20202020 203C7130 3A63615F *FH0XCMNOperation>.. <q0:ca_*
0120 72657175 6573745F 69643E30 31494E51 533C2F71 303A6361 5F726571 75657374 *request_id>01INQS</q0:ca_request*
0140 5F69643E 0D0A2020 20202020 3C71303A 63615F72 65747572 6E5F636F 64653E30 *_id>.. <q0:ca_return_code>0*
0160 3C2F7130 3A63615F 72657475 726E5F63 6F64653E 0D0A2020 20202020 3C71303A *</q0:ca_return_code>.. <q0:*
...

```



# Sample SO 0201 (SEND) Trace entry

```

SO 0201 SOCK ENTRY - FUNCTION(SEND) BUFFER_LIST(152FA544 , 00000002)
TASK-00429 KE_NUM-0047 TCB-L8000/007ABE88 RET-94998D2E TIME-23:03:03.4295566447 INTERVAL-00.0000038750 =001597=
 1-0000 01000000 0000019B 00000000 00000000 B0000000 00180000 01000000 00000000 *.....*
...
 2-0000 15661000 000000E1 151F38E0 0000041A *.....\....*
 3-0000 48545450 2F312E31 20323030 204F4B20 20202020 20202020 20202020 20202020 *HTTP/1.1 200 OK*
    0020 20202020 20202020 20202020 200D0A44 6174653A 20467269 2C203036 20466562 *
    0040 20323030 39203233 3A30333A 30332047 4D540D0A 53657276 65723A20 49424D5F * ..Date: Fri, 06 Feb*
    0060 43494353 5F547261 6E736163 74696F6E 5F536572 7665722F 332E322E 30287A4F * 2009 23:03:03 GMT..Server: IBM_*
    0080 53290D0A 436F6E74 656E742D 54797065 3A207465 78742F78 6D6C3B20 63686172 *CICS_Transaction_Server/3.2.0(zO*
    00A0 7365743D 5554462D 380D0A43 6F6E7465 6E742D4C 656E6774 683A2030 30303030 *S)..Content-Type: text/xml; char*
    00C0 30303030 30303130 35300D0A 436F6E6E 65637469 6F6E3A20 436C6F73 650D0A0D *set=UTF-8..Content-Length: 00000*
    00E0 0A *0000001050..Connection: Close...*
 4-0000 3C534F41 502D454E 563A456E 76656C6F 70652078 6D6C6E73 3A71303D 22687474 *
    0020 703A2F2F 7777772E 44464830 58434D4E 2E444648 30584350 342E5265 71756573 *<SOAP-ENV:Envelope xmlns:q0="htt*
    0040 742E636F 6D222078 6D6C6E73 3A736F61 70656E76 3D226874 74703A2F 2F736368 *p://www.DFH0XCMN.DFH0XCP4.Reques*
    0060 656D6173 2E786D6C 736F6170 2E6F7267 2F736F61 702F656E 76656C6F 70652F22 *t.com" xmlns:soapenv="http://sch*
    0080 20786D6C 6E733A78 73643D22 68747470 3A2F2F77 77772E77 332E6F72 672F3230 *emas.xmlsoap.org/soap/envelope/"*
    00A0 30312F58 4D4C5363 68656D61 2220786D 6C6E733A 7873693D 22687474 703A2F2F * xmlns:xsd="http://www.w3.org/20*
    00C0 7777772E 77332E6F 72672F32 3030312F 584D4C53 6368656D 612D696E 7374616E *01/XMLSchema" xmlns:xsi="http://*
    00E0 63652220 786D6C6E 733A534F 41502D45 4E563D22 68747470 3A2F2F73 6368656D *www.w3.org/2001/XMLSchema-instan*
    0100 61732E78 6D6C736F 61702E6F 72672F73 6F61702F 656E7665 6C6F7065 2F223E3C *ce" xmlns:SOAP-ENV="http://schem*
    0120 534F4150 2D454E56 3A426F64 793E3C44 46483058 434D4E4F 70657261 74696F6E *as.xmlsoap.org/soap/envelope/"><*
    0140 52657370 6F6E7365 20786D6C 6E733D22 68747470 3A2F2F77 77772E44 46483058 *SOAP-ENV:Body><DFH0XCMNOperation*
    0160 434D4E2E 44464830 58435034 2E526573 706F6E73 652E636F 6D223E3C 63615F72 *Response xmlns="http://www.DFH0X*
    0180 65717565 73745F69 643E3031 494E5153 3C2F6361 5F726571 75657374 5F69643E *CMN.DFH0XCP4.Response.com"><ca_r*
    01A0 3C63615F 72657475 726E5F63 6F64653E 303C2F63 615F7265 7475726E 5F636F64 *equest_id>01INQS</ca_request_id>*
    01C0 653E3C63 615F7265 73706F6E 73655F6D 65737361 67653E52 45545552 4E454420 *<ca_return_code>0</ca_return_cod*
    01E0 4954454D 3A205245 46203D30 30383020 20202020 20202020 20202020 20202020 *e><ca_response_message>RETURNED *
    0200 20202020 20202020 20202020 20202020 20202020 20202020 20202020 *ITEM: REF =0080*
    0220 20202020 20203C2F 63615F72 6573706F 6E73655F 6D657373 6167653E 3C63615F *
    0240 696E7175 6972655F 73696E67 6C653E3C 63615F69 74656D5F 7265665F 7265713E * </ca_response_message><ca_*
 *inquire_single><ca_item_ref_req>*

```



# Working with Trace: Revealing Container contents

## ▶ TYPETR=(WBFF60,PG1900,PG1910,PG1912)

```

WB FF60 WBQM ENTRY - FUNCTION(PUT_CONTAINER) RECORD_BUFFER(16310000 , 00000000 , 00000140) CONTAINER_POOL_TOKEN(15645030)
CONTAINER_NAME(SERVER_HDR_IN) APPEND(NO)
TASK-00428 KE_NUM-0049 TCB-QR /007D5328 RET-949A40DA TIME-23:03:03.3947961132 INTERVAL-00.0000016562 =000379=
1-0000 00700000 000001B0 00000000 00000000 B5060000 00000000 05000000 00000000 *.....*
0020 00000000 16310000 00000000 00000140 00000000 00000000 00000000 15645030 *.....*
0040 00000000 00000000 00000000 00000000 00000000 00000000 00000000 0000E2C5 *.....SE*
0060 D9E5C5D9 6DC8C4D9 6DC9D540 40400233 *RVER_HDR_IN .. *
```

```

PG 1900 PGCR ENTRY - FUNCTION(PUT_CONTAINER) POOL_TOKEN(15645030) CONTAINER_NAME(SERVER_HDR_IN) TYPE(CICS) DATATYPE(BIT) CONVERT(NO)
PUT_TYPE(REPLACE) ITEM_DATA(16310000 , 00000140)
TASK-00428 KE_NUM-0049 TCB-QR /007D5328 RET-949AB296 TIME-23:03:03.3947983320 INTERVAL-00.0000022187 =000380=
1-0000 00C00000 0000022E 00000000 00000000 B68E4000 00000000 01000000 00000000 *.{.....*
0020 15645030 E2C5D9E5 C5D96DC8 C4D96DC9 D5404040 00010000 00000000 02020100 *..&.SERVER_HDR_IN .....*
0040 00000000 16310000 00000140 00000000 00000000 00000000 00000000 00000000 *.....*
0060 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000 *.....*
0080 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000 *.....*
00A0 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000 *.....*
```

```

PG 1910 PGCR EVENT - PUT_CONTAINER_DATA
TASK-00428 KE_NUM-0049 TCB-QR /007D5328 RET-949AB296 TIME-23:03:03.3948129882 INTERVAL-00.0000005625 =000386=
1-0000 D7D6E2E3 406185A7 81949793 85C19797 61899598 A4899985 E2899587 938540C8 *POST /exampleApp/inquireSingle H*
0020 E3E3D761 F14BF10D 25C896A2 A37A40F9 4BF2F04B F1F2F24B F7F17AF3 F0F7F0F1 *TTP/1.1..Host: 9.20.122.71:30701*
0040 0D25C396 95A38595 A360E3A8 97857A40 A385A7A3 61A79493 5E408388 8199A285 *..Content-Type: text/xml; charse*
0060 A37EA4A3 8660F80D 25C39695 A38595A3 60D38595 87A3887A 40F9F7F8 0D25C183 *t=utf-8..Content-Length: 978..Ac*
0080 838597A3 7A408197 97938983 81A38996 9561A296 81974EA7 94936B40 81979793 *cept: application/soap+xml, appl*
00A0 898381A3 89969561 84899485 6B4094A4 93A38997 8199A361 99859381 A385846B *ication/dime, multipart/related,*
00C0 40A385A7 A3615C0D 25E4A285 9960C187 8595A37A 40C9C2D4 40E68582 40E28599 * text/*..User-Agent: IBM Web Ser*
00E0 A5898385 A240C5A7 97939699 85990D25 C3818388 8560C396 95A39996 937A4095 *vices Explorer..Cache-Control: n*
```



## Working with Trace: Other Important Entries

- TYPETR=(AP4800)
  - ▶ Data conversion information
- TYPETR=(PI0000-PIFFFF)
  - ▶ Pipeline details: Nodes, execution, parsing
- TYPETR=(WB0410)
  - ▶ HTTP Data

# CICS WEB SERVICES

## Sample Problems



# Sample Problems

1. Web Services failure
2. Data conversion error
3. DFHPI1008 “Incorrect Input”



# Problem 1: Web Services failure

## Background and Symptoms

- Attempting to configure and use a **new** Web Service
- Web Service isn't functional, requester receives "500 Internal Server Error"
- CICS MSGUSR log reports this message after a user tries to call the Web Service:

```
DFHWB0725 30/01/2009 16:58:08 IYNX32 CWXN CICS Web attach processing
      detected an error linking to the analyzer user replaceable module
      NONE. Host IP address: 9.20.122.71. Client IP address: 9.37.248.135.
      TCPIP SERVICE: EXMPPORT
```

- WEBSERVICE(\*) and URIMAP(\*) definitions weren't automatically generated with CEDA INSTALL PIPELINE request.

# Problem 1: Web Service failure Diagnosis

- Check CICS System Log

- ▶ No messages in Console Log, but MSGUSR contained the following information when the PIPELINE install was requested:

```
DFHPI0701 I 29/01/2009 15:36:53 IYNX32 CICSUSER PIPELINE EXPIPE01 has  
been created.
```

```
DFHRD0124 I 29/01/2009 15:36:53 IYNX32 IYCNTC57 CICSUSER CEDA INSTALL  
PIPELINE(EXPIPE01)
```

```
TC57      CEDA CICSUSER 29/01/09 15:36:53 INSTALL PIPELINE(EXPIPE01)  
GROUP(WEBSVCS)
```

```
DFHPI0705 E 29/01/2009 15:36:53 IYNX32 CICSUSER PIPELINE EXPIPE01  
encountered an error writing the configuration to the derived shelf  
/var/cicsts/IYNX32/PIPELINE/EXPIPE01/. The response code from the HFS write  
was X'0000006F' and the reason code was 'X'EF086015'.
```

```
DFHPI0709 E 29/01/2009 15:36:53 IYNX32 CICSUSER PIPELINE EXPIPE01  
resolution failed because the XML configuration file cannot be copied to the  
derived shelf.
```

- ▶ The z/OS UNIX® System Services Messages and Codes manual shows the uss-response code in message DFHPI0705:  
X'0000006F' = Permission is denied



# Problem 1: Web Service failure

## Diagnosis (cont'd)

### ▶ Digging Deeper:

CICS Trace is most helpful in this instance, for identifying the specific problem we've encountered:

```
DH 0E00 DHFS  ENTRY - FUNCTION(MAKE_HFS_DIRECTORY) PATHNAME(1454FBEO , 00000025)
TASK-00052 KE_NUM-001A TCB-L8003/007AB358 RET-9464F82E TIME-15:36:53.5902507788 INTERVAL-00.0000780781      =069504=
  2-0000  61A58199 61838983 A2A3A261 C9E8D5E7  F3F261D7 C9D7C5D3 C9D5C561 C5E7D7C9  */var/cicsts/IYNX32/PIPELINE/EXPI*
  0020  D7C5F0F1 61                                     *PE01/                                     *
```

```
DH 0E01 DHFS  EXIT - FUNCTION(MAKE_HFS_DIRECTORY) RESPONSE(EXCEPTION) REASON(NOTAUTH)
TASK-00052 KE_NUM-001A TCB-L8003/007AB358 RET-9464F82E TIME-15:36:53.5906541381 INTERVAL-00.0004033593      =069505=
```

```
DH 0E01 DHFS  EXIT - FUNCTION(WRITE_HFS_FILE) RESPONSE(EXCEPTION) REASON(NOTAUTH) USS_RESPONSE(0000006F)
  USS_REASON(EF086015) CONTENT(155FF890 , 00000116 , 00000000)
TASK-00052 KE_NUM-001A TCB-QR  /007D5328 RET-948C7A4C TIME-15:36:53.5929455881 INTERVAL-00.0022908874      =069507=
```

# Problem 1: Web Service failure Diagnosis (cont'd)

- More about Diagnosis Approach:

- The MSGUSR log entries show that the original error was recognized by CICS, when the Pipeline was initially Installed – even though the Install itself ‘worked’

```
EX G (WEBSVCS)
ENTER COMMANDS
NAME          TYPE          GROUP          DATE          TIME
EXPIPE01 PIPELINE    WEBSVCS      *n          INSTALL SUCCESSFUL
```

- As you can see from the Master Terminal (CEMT) inquiry, the Pipeline was in fact installed, but the status was set to Disabled due to the errors encountered during the Pipeline Scan:

```
I PIPE
STATUS:  RESULTS - OVERTYPE TO MODIFY
Pip(EXPIPE01) Dis Unk
          Soa (NOTSOAP )                Con (/MV23/cicsts/cics650/sampl)
```

# Problem 1: Web Service failure Resolution and Lessons Learned

- Resolving the error:
  - ▶ Address the problem identified in the error messages and trace
  - ▶ Request a new “Scan” of the Pipeline resource, either by
    - Re-installing the PIPELINE: `CEDA INSTALL GROUP (groupname)`
    - Scan the existing PIPELINE: `CEMT PERFORM PIPELINE (pipeline) SCAN`
- Lessons Learned:
  - ▶ Just because CEDA reports a Pipeline “INSTALL SUCCESSFUL”, doesn’t mean it was *complete*!
  - ▶ MSGUSR can be a valuable source of diagnostic information, but you may still need TRACE to learn important details

## Problem 2: Data Conversion Error Background and Symptoms

- CICS Message Log contains message

```
DFHPI1009 02/02/2009 20:50:48 IYNX32 00166 SOAP message processing  
failed. A conversion error (INVALID_CHARACTER) occurred when converting  
field ca_item_ref_req.
```

## Problem 2: Data Conversion Error Diagnosis

- Stack for the CPIH task attempting to provide the Web Service:

KE_NUM	@STACK	LEN	TYPE	ADDRESS	LINK	REG	OFFSET	ERR	NAME
...			Int	+0002DC	9480BB02		000192		INITIAL_LINK
0046	152EF250	0AD0	Dom	94A05700	9505BE98		000000		DFHAPLI1
			Int	+0023EE	94A061AC		000AAC		CICS_INTERFACE
0046	152EFD20	0B90	Dom	94843400	94846554		003154		DFHPIPM
0046	152F08B0	07A0	Dom	94800000	948013A0		0013A0		DFHPGLE
			Int	+0004FC	948001C0		0001C0		LINK_EXEC
0046	152F1050	0AD0	Dom	94A05700	947FFED2		000000		DFHAPLI1
			Int	+0023EE	94A061AC		000AAC		CICS_INTERFACE
0046	152F1B20	1230	Dom	9489BFE8	948A0A6E		004A86		DFHPISN
0046	152F2D50	0B90	Dom	94843400	948483FC		004FFC		DFHPIPM
0046	152F38E0	07A0	Dom	94800000	948013A0		0013A0		DFHPGLE
			Int	+0004FC	948001C0		0001C0		LINK_EXEC
0046	152F4080	0AD0	Dom	94A05700	95077350		000000		DFHAPLI1
			Int	+0023EE	94A061AC		000AAC		CICS_INTERFACE
0046	15226020	0FA0	Dom	948761F8	94877462		00126A		DFHPITL
0046	15224020	1830	Dom	94859728	9485F354		005C2C		DFHPICC
			Int	+00067E	94859A28		000300		<b>PICC_PARSE_XML</b>
			Int	+00350C	9485A3D6		000CAE		CLOSE_ELEMENT
			Int	+00238A	9485CC48		003520		HANDLE_END_ELEMENT
			Int	+005026	9485BDAE		002686		<b>CONVERT_DATA</b>
0046	15222020	0E50	Dom	9398CED0	93990B34		003C64		DFHMEME
			Int	+003222	9398D136		000266		SEND
			Int	+00146E	939901C8		0032F8		CONTINUE_SEND
			Int	+003B98	9398E448		001578		TAKE_A_DUMP_FOR_CALLER
0046	15222E70	0620	Dom	93A2EAD0	93A2F754		000C84		DFHDUDU
			Int	+000B26	93A2ECD0		000200		SYSTEM_DUMP

## Problem 2: Data Conversion Error Diagnosis (cont'd)

- SOAPFAULT container returned by CICS:

```
<SOAP-ENV:Envelope xmlns:SOAP-ENV="http://schemas.xmlsoap.org/soap/envelope/"
xmlns:q0="http://www.DFH0XCMN.DFH0XCP4.Request.com"
xmlns:soapenv="http://schemas.xmlsoap.org/soap/envelope/"
xmlns:xsd="http://www.w3.org/2001/XMLSchema"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
  <SOAP-ENV:Body>
    <SOAP-ENV:Fault xmlns="">
      <faultcode>SOAP-ENV:Server</faultcode>
      <faultstring>Conversion from SOAP failed</faultstring>
      <detail>
        <CICSFault xmlns="http://www.ibm.com/software/htp/cics/WSFault">
          DFHPI1009 30/01/2009 19:17:46 IYNX32 00059 SOAP message processing
          failed. A conversion error (INVALID_CHARACTER) occurred when
          converting field ca_item_ref_req.</CICSFault>
        </detail>
      </SOAP-ENV:Fault>
    </SOAP-ENV:Body>
  </SOAP-ENV:Envelope>
```

# Problem 2: Data Conversion Error

## Aside: IPCS EBCDIC and ASCII feature

Raw Data-----	EBCDIC format---	ASCII format----
D7D6E2E3 406185A7 81949793 85C19797	POST /exampleApp	.....@a.....
61899598 A4899985 E2899587 938540C8	/inquireSingle H	a.....@.
E3E3D761 F14BF10D 25C896A2 A37A40F9	TTP/1.1..Host: 9	...a.K...%.z@.
4BF2F04B F1F2F24B F7F17AF3 F0F7F0F1	.20.122.71:30701	K..K...K..z.....
0D25C396 95A38595 A360E3A8 97857A40	..Content-Type:	.%.....z@
A385A7A3 61A79493 5E408388 8199A285	text/xml; charse	....a....@....z.
A37EA4A3 8660F80D 25C39695 A38595A3	t=utf-8..Content	~.....%.....
60D38595 87A3887A 40F9F8F3 0D25C183	-Length: 983..Ac	.....z@....%..
838597A3 7A408197 97938983 81A38996	cept: applicatio	.....z@.....
9561A296 81974EA7 94936B40 81979793	n/soap+xml, appl	.a%.N...k@....
898381A3 89969561 84899485 6B4094A4	ication/dime, mu	.....a....k@..
93A38997 8199A361 99859381 A385846B	ltipart/related,	.....a.....k
40A385A7 A3615C0D 25E4A285 9960C187	text/*..User-Ag	@....a\%.z.....
8595A37A 40C9C2D4 40E68582 40E28599	ent: IBM Web Ser	...z@...@...@...
A5898385 A240C5A7 97939699 85990D25	vices Explorer..	.....z@.....%
C3818388 8560C396 95A39996 937A4095	Cache-Control: n	.....z@....
96608381 8388850D 25D79981 8794817A	o-cache..Pragma:	.....%.....z
40959660 83818388 850D25E2 D6C1D7C1	no-cache..SOAPA	@.....%.....
83A38996 957A407F 7F0D25C3 96959585	ction: ""..Conne	.....z@....%.....
83A38996 957A4083 9396A285 0D250D25	ction: close....	.....z@...z%.%
3C736F61 70656E76 3A456E76 656C6F70	..?/..>...>..%?.	<soapenv:Envelop
6520786D 6C6E733A 71303D22 68747470	..._%>.....	e xmlns:q0="http
3A2F2F77 77772E44 46483058 434D4E2E	..... (+.	://www.DFH0XCMN.



## Problem 2: Data Conversion Error Resolution (cont'd)

The PG domain includes information about the Channels and Containers associated with a task, as well as the program link levels.

The data within a container is located at the address specified +x'30' into the CRCB.

To display the contents of container DFHWS-BODY (length = x'2D9'), use the IPCS command  
L 15649818+30? Length(x'2d9')

```

==PG: PTA SUMMARY FOR TRAN NUM : 00166, PTA ADDRESS : 145FC510
LOG-LVL : 3 SYS-LVL : 0 TASK-LLE : 00000000 PLCB : 152F3B90
=PG: TASK PLCB SUMMARY
PROG DFHPITP LVL 3 PLCB 152F3B90 LD 15077100 ENT 95077128 LEN 000FC8 PPTE 155007C0 ENV EXEC INV DFHPISN1 EXIT
PROGRAM: DFHPITP CPE: 15501370 LIB: DFHRPL CONCAT: 00
CHANNEL DFHAHC-V1 *CURRENT* CHCB 15643030 LEN 00000802 CCSID 000025 GN 0018 CPCB 15645060
CONTAINER DFHWS-MEP TYPE USER CRCB 15649660 LEN 00000001 DTYPE (BIT) GN 0018 CSCB 1564A300
CONTAINER DFHWS-OPERATION TYPE USER CRCB 15649450 LEN 00000011 CCSID 000025 GN 0017 CSCB 1564A2D8
CONTAINER DFHWS-BODY TYPE USER CRCB 15649818 LEN 000002D9 CCSID 0004B8 GN 0014 CSCB 1564A198
CONTAINER DFHWS-XMLNS TYPE USER CRCB 15649608 LEN 000000D1 CCSID 0004B8 GN 0016 CSCB 1564A288
CONTAINER DFHWS-SOAPLEVEL TYPE R/O CRCB 15649710 LEN 00000004 DTYPE (BIT) GN 0013 CSCB 1564A260
CONTAINER DFH-HANDLERPLIST TYPE USER CRCB 156494A8 LEN 00000000 CCSID 000025 GN 000D CSCB 00000000
CONTAINER DFHRESPONSE TYPE R/O CRCB 15649558 LEN 00000000 CCSID 000025 GN 0011 CSCB 00000000
CONTAINER DFHFUNTION TYPE R/O CRCB 156493F8 LEN 00000010 CCSID 000025 GN 0015 CSCB 1564A378
CONTAINER DFHWS-SOAPACTION TYPE USER CRCB 156493A0 LEN 00000002 CCSID 000025 GN 000A CSCB 1564A350
CONTAINER DFHWS-URI TYPE USER CRCB 15649348 LEN 00000019 CCSID 000025 GN 0009 CSCB 1564A1E8
CONTAINER DFHREQUEST TYPE R/O CRCB 15649500 LEN 000003D7 CCSID 0004B8 GN 0010 CSCB 1564A210
CONTAINER DFHWS-RESPWAIT TYPE R/O CRCB 15649298 LEN 00000004 DTYPE (BIT) GN 0007 CSCB 1564A120
CONTAINER DFH-SERVICEPLIST TYPE R/O CRCB 15649240 LEN 00000000 CCSID 000025 GN 0006 CSCB 00000000
CONTAINER DFHWS-PIPELINE TYPE R/O CRCB 156491E8 LEN 00000008 CCSID 000025 GN 0005 CSCB 1564A0F8

```



# Problem 2: Data Conversion Error Resolution (cont'd)

## Displaying the DFHWS-BODY container:

```

LIST 15435A98. ASID(X'003B') LENGTH(X'03E7') AREA
ASID(X'003B') ADDRESS(15435A98.) KEY(90) ABSOLUTE(EB446A98.)
15435A98.                                4CA29681 978595A5 |                                <soapenv|
15435AA0. 7AC29684 A86E0D25 40404040 4C98F07A C4C6C8F0 E7C3D4D5 D6978599 81A38996 | :Body>..    <q0:DFH0XCMNOperatio|
15435AC0. 956E0D25 40404040 40404C98 F07A8381 6D998598 A485A2A3 6D89846E F0F1C9D5 |n>..    <q0:ca_request_id>01IN|
15435AE0. D8E24C61 98F07A83 816D9985 98A485A2 A36D8984 6E0D2540 40404040 404C98F0 |QS</q0:ca_request_id>..    <q0|
15435B00. 7A83816D 9985A3A4 99956D83 9684856E F04C6198 F07A8381 6D9985A3 A499956D | :ca_return_code>0</q0:ca_return_|
15435B20. 83968485 6E0D2540 40404040 404C98F0 7A83816D 9985A297 9695A285 6D9485A2 |code>..    <q0:ca_response_mes|
15435B40. A2818785 616E0D25 40404040 40404C98 F07A8381 6D899598 A4899985 6DA28995 |sage/>..    <q0:ca_inquire_sin|
15435B60. 8793856E 0D254040 40404040 40404C98 F07A8381 6D89A385 946D9985 866D9985 |gle>..    <q0:ca_item_ref_re|
15435B80. 986EC289 93934C61 98F07A83 816D89A3 85946D99 85866D99 85986E0D 25404040 |q>Bill</q0:ca_item_ref_req>..    |
15435BA0. 40404040 404C98F0 7A868993 938599F1 616E0D25 40404040 40404040 4C98F07A |    <q0:filler1/>..    <q0:|
15435BC0. 86899393 8599F261 6E0D2540 40404040 4040404C 98F07A83 816DA289 95879385 |filler2/>..    <q0:ca_single|
15435BE0. 6D89A385 946E0D25 40404040 40404040 40404C98 F07A8381 6DA29587 936D89A3 |_item>..    <q0:ca_sngl_it|
15435C00. 85946D99 85866EF0 F0F1F04C 6198F07A 83816DA2 9587936D 89A38594 6D998586 |em_ref>0010</q0:ca_sngl_item_ref|
15435C20. 6E0D2540 40404040 40404040 404C98F0 7A83816D A2958793 6D8485A2 83998997 |>..    <q0:ca_sngl_descrip|
15435C40. A3899695 616E0D25 40404040 40404040 40404C98 F07A8381 6DA29587 936D8485 |tion/>..    <q0:ca_sngl_de|
15435C60. 978199A3 948595A3 6EF04C61 98F07A83 816DA295 87936D84 85978199 A3948595 |partment>0</q0:ca_sngl_departmen|
15435C80. A36E0D25 40404040 40404040 40404C98 F07A8381 6DA29587 936D8396 A2A3616E |t>..    <q0:ca_sngl_cost/>|
15435CA0. 0D254040 40404040 40404040 4C98F07A 89956DA2 9587936D A2A39683 926EF04C |..    <q0:in_sngl_stock>0<|
15435CC0. 6198F07A 89956DA2 9587936D A2A39683 926E0D25 40404040 40404040 40404C98 |/q0:in_sngl_stock>..    <q|
15435CE0. F07A9695 6DA29587 936D9699 8485996E F04C6198 F07A9695 6DA29587 936D9699 |0:on_sngl_order>0</q0:on_sngl_or|
15435D00. 8485996E 0D254040 40404040 40404C61 98F07A83 816DA289 95879385 6D89A385 |der>..    </q0:ca_single_ite|

```

## Problem 2: Data Conversion Error Resolution (cont'd)

- A quick review of the WSDL that describes this element reveals the inconsistency that triggered this error:

```
<xsd:element name="ca_item_ref_req" nillable="false">
  <xsd:simpleType>
    <xsd:annotation>
      <xsd:appinfo source="http://www.ibm.com/software
        /http/cics/annotations">#Wed Sep 14 08:27:41 BST 2005
        com.ibm.cics.wsdl.properties.synchronized=false
      </xsd:appinfo>
    </xsd:annotation>
    <xsd:restriction base="xsd:unsignedShort">
      <xsd:maxInclusive value="9999"/>
      <xsd:minInclusive value="0"/>
    </xsd:restriction>
  </xsd:simpleType>
</xsd:element>
```

## Problem 3: DFHPI1008 “Incorrect Input” Background and Symptoms

- Customer attempting to upgrade CICS TS 3.1 => 3.2
- Nearly all Web Services functions migrated without error
- A single Web Service PROVIDER application encountered consistent failures, identified by message DFHPI1008:  

```
DFHPI1008 mm/dd/yyyy hh:mm:ss applid taskid SOAP message generation failed  
because of incorrect input (INPUT_STRUCTURE_TOO_SMALL ).
```
- Customer provided system dump triggered by this message, requesting assistance with problem analysis

## Problem 3: DFHPI1008 “Incorrect Input” Diagnosis

- “Getting my bearings” with Trace: Which task?

TR=2, then search for symptom code PI1008:

```
DU 0600 DUTM  ENTRY - FUNCTION(LOCATE_SYSTEM_DUMP CODE) SYSTEM_DUMP CODE (PI1008)
TASK-00350 KE_NUM-003C TCB-L8002/009ACD70 RET-9682E18C TIME-12:42:13.5301526250
```

- Now let's take a closer look at this task

```
00350 L8002 PI 0F00 PIII  ENTRY PARSE_ICM
00350 L8002 PI 0F06 PIII  DATA  OUTBOUND_COMMAREA_DATA
00350 L8002 PI 0F0B PIII  *EXC* INPUT_ERROR          INPUT_STRUCTURE_TOO_SMALL
```

- What is “INPUT\_STRUCTURE\_TOO\_SMALL”?

- ▶ The container passed to CICS does not hold sufficient data given the length of the language structure.

- What is the data being passed for Parsing?

```
PI 0F06 PIII  DATA - OUTBOUND_COMMAREA_DATA
TASK-00350 KE_NUM-003C TCB-L8002/009ACD70 RET-96EAA8F2 TIME-12:42:04.8671693437
1-0000 C1C2C3F9 F9F9F9F9 F0F5F0F0 F2F0F1F0 F0F1F0F1 *ABC99999050020100101 *
```

## Problem 3: DFHPI1008 “Incorrect Input” Diagnosis (cont’d)

- What’s the overall task flow?

```
TR=1, TRS=<TASKID=350, TYPETR=(XM1101, DS0002, PG0901-0902, PG1101-1102)>
00350 QR      PG 0901 PGP  ENTRY INITIAL_LINK          DFHPIDSH
00350 QR      PG 1101 PGL  ENTRY LINK_EXEC            DFHPISN1, YES, DFHNODE
00350 L8002 PG 1101 PGL  ENTRY LINK_EXEC            DFHPIEP, 177A3A18 , 00000010, YES
00350 L8002 PG 1102 PGL  EXIT  LINK_EXEC/OK          , , ,
00350 L8002 PG 1101 PGL  ENTRY LINK_EXEC            DFHPITP, YES, DFHAHC-V1
00350 L8002 PG 1101 PGL  ENTRY LINK_EXEC            CUSTPVDR, NO, DFHAHC-V1
00350 QR      PG 1101 PGL  ENTRY LINK_EXEC            CUSTAPPL, NO, NO, PULL-CHANNEL
00350 QR      PG 1102 PGL  EXIT  LINK_EXEC/EXCEPTION  REMOTE_PROGRAM, ZXXZ, CUSTAPPL, ABC1,
00350 QR      PG 1102 PGL  EXIT  LINK_EXEC/OK          , , ,
```

- What data was passed TO the program that had a Link failure?

```
*ABC99999050020100101          *
```

- Ah – a theory emerges:

```
PG 1102 PGL  EXIT  - FUNCTION(LINK_EXEC) RESPONSE(EXCEPTION)
REASON(REMOTE_PROGRAM) REMOTE_SYSID(ZXXZ)
REMOTE_PROGRAM_NAME(CUSTAPPL)
REMOTE_TRANID(ABC1) ABEND_CODE()
TASK-00350 KE_NUM-003C TCB-QR /009C3D98 RET-96FF3E98
TIME-12:42:04.8614592187 INTERVAL-00.0000004687          =048740=
```

## Problem 3: DFHPI1008 “Incorrect Input” Resolution and Lessons Learned

- Called customer to ask about remote program CUSTAPPL
- Explained what the dump’s internal trace showed us, our working theory, and requirements for new dump if analysis to this point didn’t identify the error
- Customer updates show a missing resource Group was discovered, which included the program in question
- Lessons Learned:
  - ▶ Worthwhile to get the lay of the land (overview-type trace listings)
  - ▶ ASK Questions!

# CICS WEB SERVICES DEBUGGING

## References



# References: CICS Support Page and Technotes

- CICS Support Web Page
  - ▶ <http://www.ibm.com/software/htp/cics/tserver/support/>
    - Helpful references and links to CICS Info Center, Technotes, Flashes, “Must Gather” documents for defect support, SupportPacs, Redbooks, and more!
- Technote Highlights <http://www.ibm.com/support/docview.wss?rs=1083&uid=swg2nnnnnnn>
  - ▶ Support for white space and variable length values (#1248612)
  - ▶ How to read WSDL – A bottom-up approach (#1199529)
  - ▶ Testing CICS Web services (#1268824)
  - ▶ Diagnosing DFHPI0602 error messages (#1264885)
  - ▶ Diagnosing data conversion errors with CICS Web Services (#1211424)
- Related Technotes
  - ▶ Answer common questions
  - ▶ Describe known problems and limitations
  - ▶ Warn of migration issues and requirements
  - ▶ Describe performance recommendations
  - ▶ Provide how-to and example implementation instructions



# References: Redbooks

- Web Services-Related Redbooks & Redpapers
  - ▶ Implementing CICS Web Services SG24-7126  
<http://www.redbooks.ibm.com/abstracts/sg247657.html>
  - ▶ Application Development for CICS Web Services SG24-7126  
<http://www.redbooks.ibm.com/abstracts/sg247126.html>
  - ▶ Securing CICS Web Services  
<http://www.redbooks.ibm.com/redpieces/abstracts/sg247658.html>
  - ▶ CICS Web Services Workload Management and Availability  
<http://www.redbooks.ibm.com/abstracts/sg247144.html>
  - ▶ SOAP Message Size Performance Considerations  
<http://www.redbooks.ibm.com/redpapers/abstracts/redp4344.html>
  - ▶ Developing Web Services Using CICS, WMQ, and WMB  
<http://www.redbooks.ibm.com/abstracts/sg247425.html>

## References: Additional Publications

- Sockets Domain – AIOCB embedded in the Sockets Listener Table Entry
  - z/OS V1R10.0 UNIX System Services Programming: Assembler Callable Services Reference (SA22-7803)
- HFS File activity – return codes
  - z/OS V1R10.0 UNIX System Services Messages and Codes (SA22-7807)

# References: Webcast Library

Numerous Technical presentations are cataloged online, and available for on-demand viewing:

<http://www.ibm.com/support/docview.wss?rs=1083&uid=swg27007244>

Presentations are categorized by Topic:

- ▶ Web Services
- ▶ CICSplex SM (CPSM)
- ▶ File Control
- ▶ Java
- ▶ Storage
- ▶ Other topics (CICS Explorer, Debugging, etc.)

## Additional Product Resources

- CICS Transaction Server Support Web page:  
<http://www.ibm.com/software/htp/cics/tserver/support/>
- IBM Education Assistant modules:  
<http://publib.boulder.ibm.com/infocenter/ieduasst/stgv1r0/index.jsp>
- Webcasts for CICS and OMEGAMON:  
<http://www.ibm.com/support/docview.wss?rs=1083&uid=swg27007244>
- CICS Featured documents:  
<http://www.ibm.com/support/docview.wss?rs=1083&uid=swg27006900>
- Sign up to receive technical support emails:  
<http://www.ibm.com/software/support/einfo.html>

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# Questions and Answers

