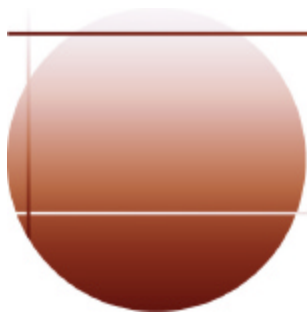


E35

IMS Connect Debugging Guide

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IMS

technical conference

Las Vegas, NV

September 15 - September 18, 2003

Agenda

- ★ IMS Connect Overview
- ★ Setup for Debugging
- ★ Documentation Collection
- ★ Diagnostic Aids
- ★ Using HWS Recorder trace
- ★ Using IPCS for IMS Connect
- ★ Relating HWS Recorder trace with HWS BPE TCPI trace
- ★ References
- ★ Questions

Agenda

- ★ **IMS Connect Overview**
- ★ Setup for Debugging
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★ What is IMS Connect ?

- 💡 TCP/IP server that enables TCP/IP clients to exchange messages with IMS OTMA (Open Transaction Manager Access)
 - ✓ *send and receive messages*
 - ✓ *supports multiple TCP/IP clients accessing one or more IMS systems*
 - ✓ *provides a mechanism to manage the TCP/IP clients or DATASTORES through the use of commands*
- 💡 Executes in a separate MVS address space than IMS
- 💡 Allows the customer access to existing and new IMS transactions and databases via intranet/internet
- 💡 Allows fast deployment of IMS transactions
 - ✓ *Without modifying the IMS transaction*
 - ✓ *Without heavy workstation development effort when used with the IMS Connector for Java*
 - ✓ *Allows the customer to write their own TCP/IP applications*
- 💡 SMP/E installable/maintainable
- 💡 User Message Exit and Init Exit provides extreme power and flexibility
- 💡 *Formerly called IMSTOC and no longer supported*

★ What is IMS Connect ?

💡 IMS Connect Client Interfaces

- TCP/IP for communications with
 - ✓ *Distributed (non zOS) IMS Connector for Java Clients*
 - ✓ *zOS IMS Connector for Java Clients*
 - ✓ *User Written Clients (RYO)*
 - ✓ *Control Center Clients*
- Local Option - Program Call (PC) interface with
 - ✓ *zOS IMS Connector for Java Clients*
- IMS Connect Datastore Interfaces
 - ✓ *XCF for communications to IMS OTMA*
 - ✓ *SCI for communications to IMS OM (Operations Manager)*

★ What is IMS Connect ?

💡 Supported Functions

- TCP/IP and SSL with IPv4 or IPv6
 - ✓ Over Transaction, Persistent and Non-persistent Sockets
- OTMA protocols
 - ▶ CM1 (send-then-commit)
 - ✓ synchlevel CONFIRM/NONE
 - ▶ CM0 (commit-then-send)
 - ✓ synchlevel CONFIRM
- IMS Transactions
 - ✓ Full Function
 - ✓ Fast Path
 - ✓ Conversational
- IMSplex
 - ✓ IMS V8.1 Control Center
 - ✓ SCI Interface with OM in an IMS Plex
- RRS Distributed 2 Phase Commit
 - ✓ used in IMS Connector for Java - synchlevel 2

★ What is IMS Connect ?

💡 Supported Functions

- Security

- ✓ *RACF User Authentication*
- ✓ *RACF Passticket*
- ✓ *Trusted User*

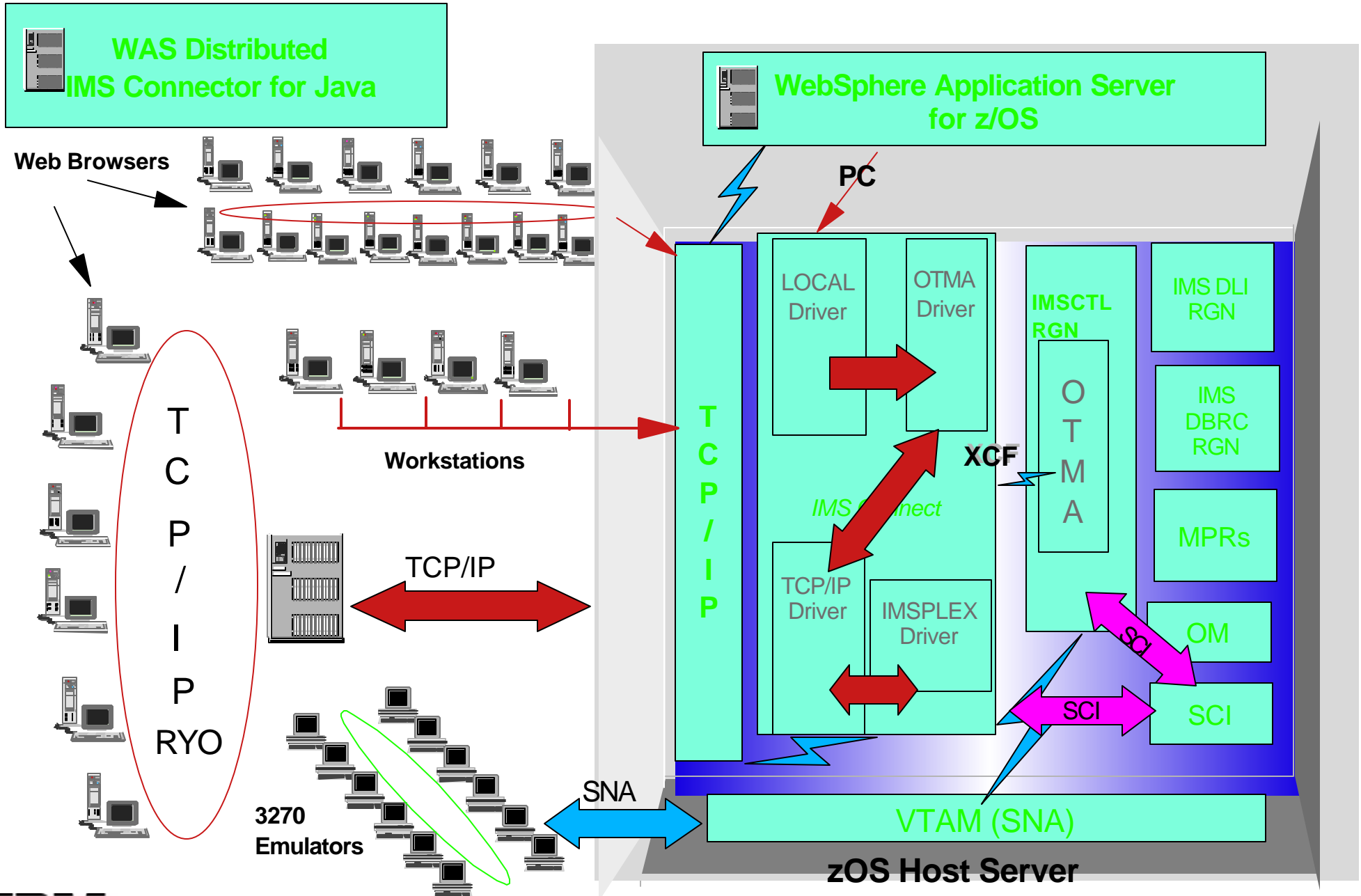
- Timers

- ✓ Disconnects client when timer expires for connection between IMS Connect and IMS

- Unicode Conversions

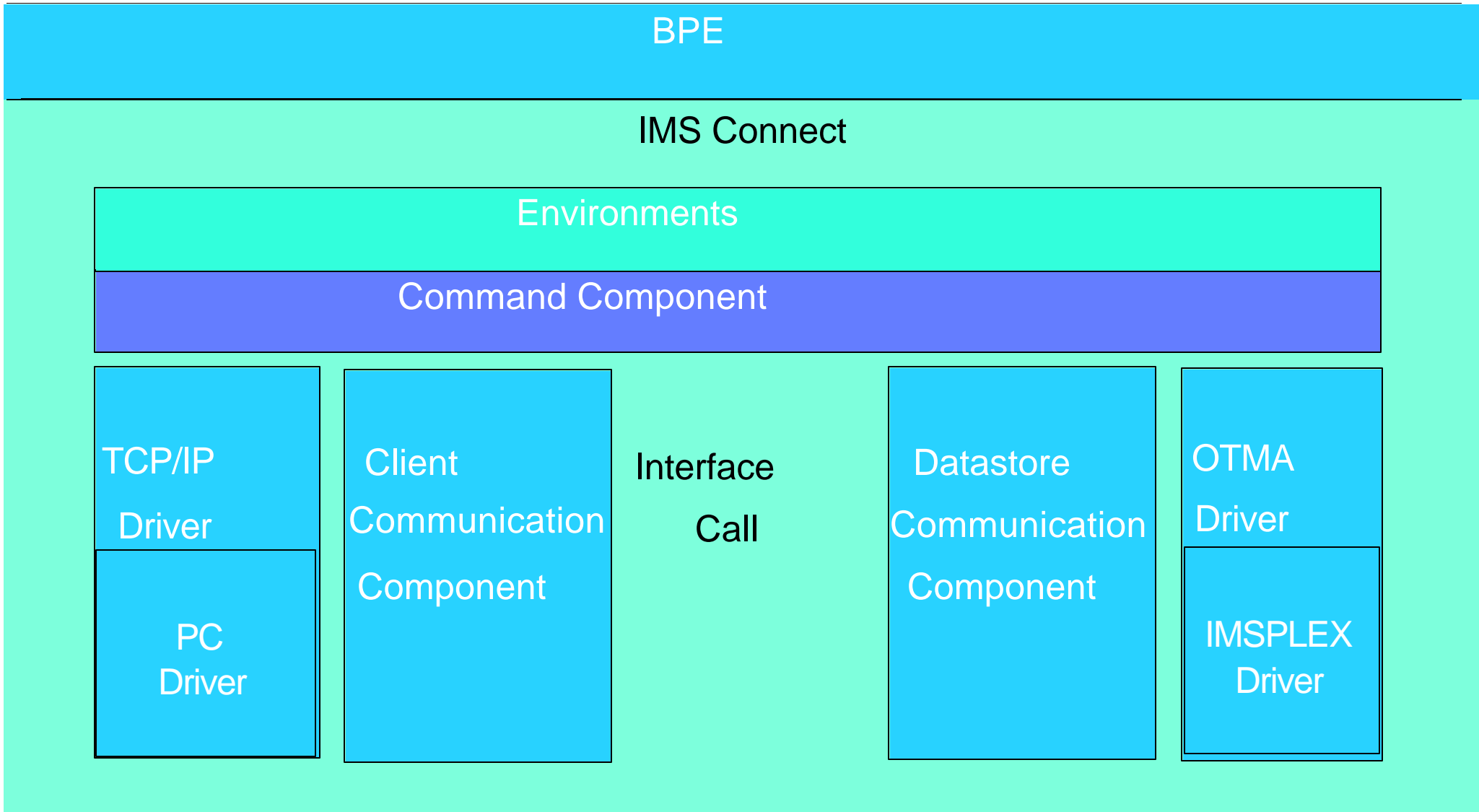
★ IMS Connect Overview

External Environment



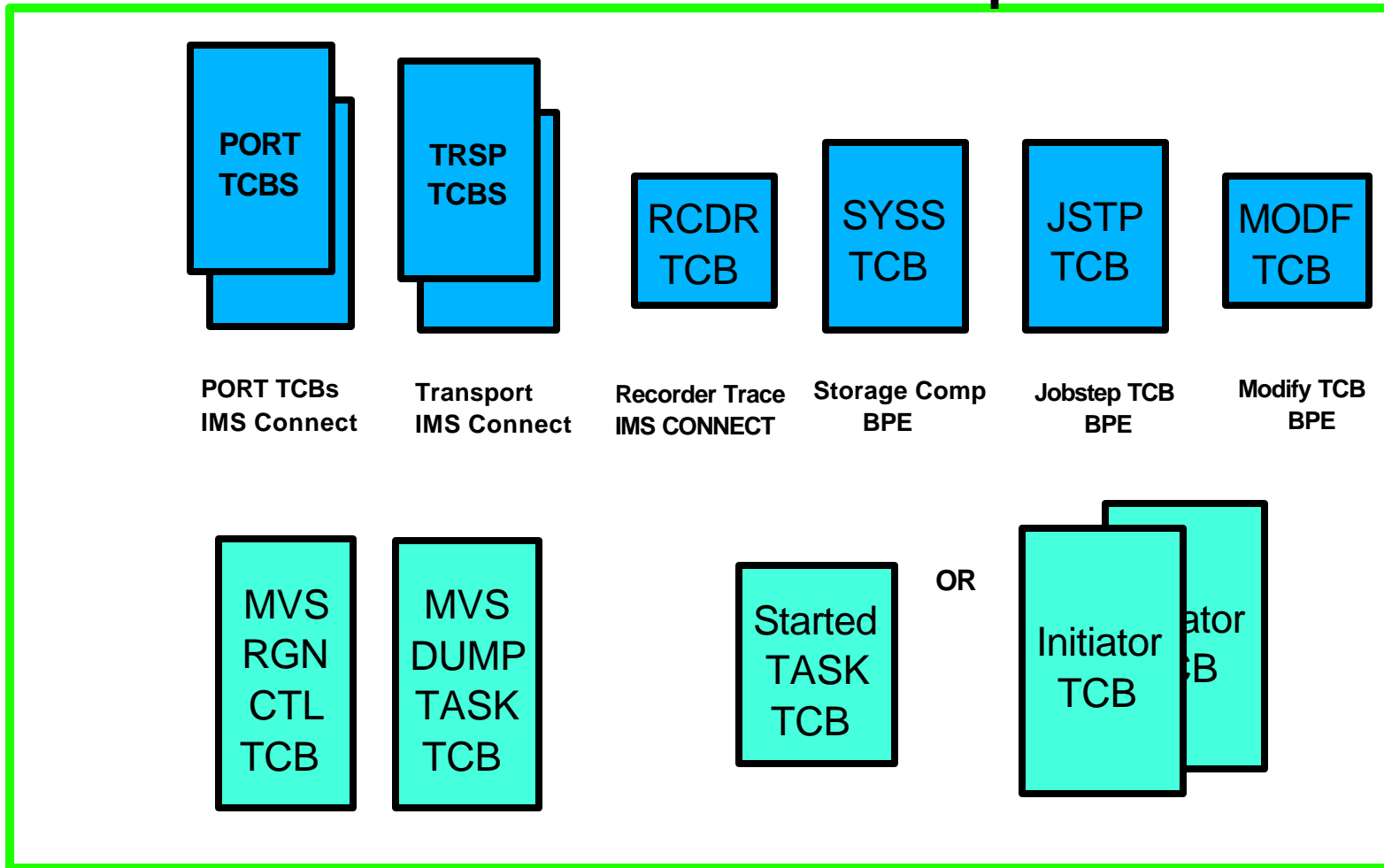
★ IMS Connect Overview

■ INTERNAL STRUCTURE



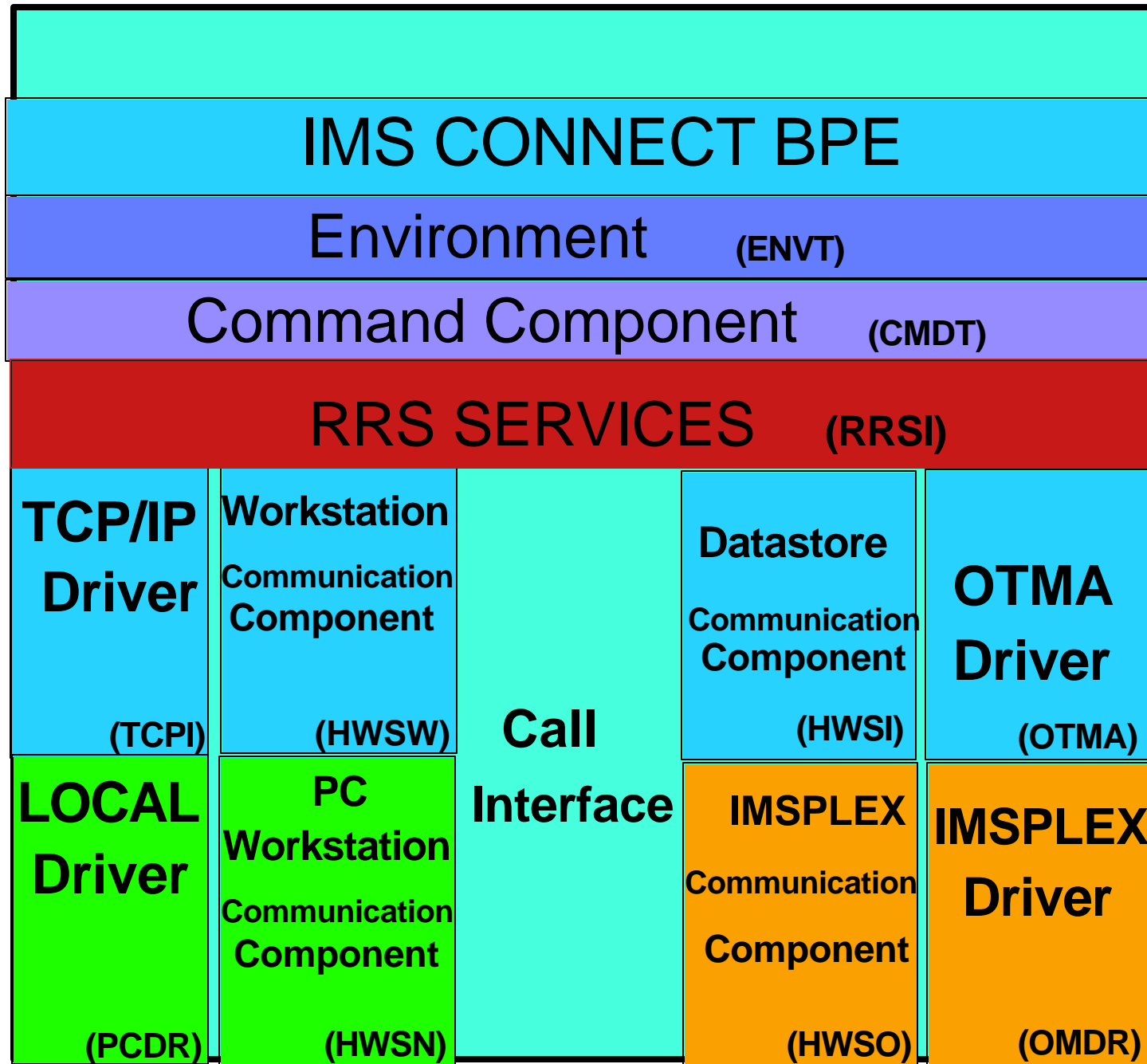
★ IMS Connect Overview

IMS Connect Address Space



BPE = Base Primitive Environment

IMS CONNECT INTERNAL STRUCTURE



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- ★ References
- ★ Questions

★ IMS Connect Setup Recommendations

REGION SIZE

- IMS Connect startup parameter **REGION=0M**
 - ✓ Allows for increased usage of private area for high peak thread usage
 - ✓ Allows for increase HWS trace table sizes
 - ▶ See MVS JCL Reference Manual for information regarding REGION= parm
 - ✓ Use IEFUSI exit to reserve storage for termination processing. This will allow MVS to pass control to IMS Connect for normal termination processing. MVS recommends that .5 M be reserve in LSQA for this process.
 - ▶ See MVS Installation Exits Manual for more information on IEFUSI exit

★ IMS Connect Setup Recommendations

SYS1.DUMP Datasets

- Abends that affect IMS Connect address space, will be recorded in the following ways
 - SDUMP macro may be used, resulting a machine readable dump sent to the SYS1.DUMP datasets
 - SYS1.LOGEC entries might be produced to describe the error
- Ensure that SYS1.DUMP datasets are available



IMS Connect Setup Recommendations

▲ SYSMDUMP DD

- Specify **SYSMDUMP DD** in JCL of IMS Connect:

```
//HWS          PROC  RGN=0M,SOUT=A,
//              BPECFG=BPECFG00,
//              HWSCFG=HWSCFG00
// *
//*****
//* BRING UP AN IMS CONNECT SYSTEM *
//*****
//STEP1       EXEC  PGM=HWSHWS00,REGION=&RGN,TIME=1440,
//              PARM=' BPECFG=&BPECFG,HWSCFG=&HWSCFG '
//STEPLIB     DD   DSN=SHWSRESL,DISP=SHR
//              DD   DSN=SDFSRESL,DISP=SHR
//PROCLIB     DD   DSN=USER.PROCLIB,DISP=SHR
//SYSPRINT    DD   SYSOUT=&SOUT
//SYSMDUMP DD   DSN=IMSCONN,UNIT=SYSDA,DISP=(,DELETE,KEEP),
//SPACE=(CYL,150,100,RLSE)
//HWSRCORD    DD   DSN=HWSRCDR,DISP=SHR
```

- The **SYSMDUMP** specification will be used by IMS Connect in the event that SDUMP processing should fail.
- The following dump options should be specified in the **SYS1.PARMLIB(IEADMR00)** member to ensure that adequate areas of MVS storage are dumped to diagnose the problem under most circumstances:
 - ▶ **SDATA=(CSA,LSQA,RGN,SQA,SUM,SWA,TRT)**

★ IMS Connect Setup Recommendations

BPE Trace Tables - BPECFG

- ▲ Use the **BPECFG=nnnnnnn** IMS Connect execution parameter to specify the Proclib member to contain the configuration for the BPE (Base Primitive Environment).

```
//HWS          PROC  RGN=0M,SOUT=A,
//              BPECFG=BPECFG00,
//              HWSCFG=HWSCFG00
//*
//*****
//* BRING UP AN IMS TCP/IP OTMA CONNECTION SYSTEM *
//*****
//STEP1        EXEC  PGM=HWSHWS00,REGION=&RGN,TIME=1440,
//              PARM=' BPECFG=&BPECFG,HWSCFG=&HWSCFG '
//STEPLIB      DD    DSN=HWS.RESLIB,DISP=SHR
//              DD    DSN=BPE.RESLIB,DISP=SHR
//PROCLIB      DD    DSN=USER.PROCLIB,DISP=SHR
//SYSPRINT     DD    SYSOUT=&SOUT
//SYSMDUMP     DD    DSN=IMSCONN,UNIT=SYSDA,DISP=(,DELETE,KEEP),
//              SPACE=(CYL,150,100,RLSE)
//HWSRCORD     DD    DSN=HWSRCDR,DISP=SHR
```


IMS Connect Setup Recommendations

BPE Trace Tables

- The **BPECFG=nnnnnnn** Proclib member should contain the following entries for BPE internal trace tables:

```
#
# DEFINITIONS FOR BPE SYSTEM TRACES
#
TRCLEV=(AWE,HIGH,BPE,PAGES=100)      /* AWE SERVER TRACE
*/
TRCLEV=(CBS,HIGH,BPE,PAGES=100)      /* CONTROL BLK SRVCS TRACE
*/
TRCLEV=(DISP,HIGH,BPE,PAGES=150)     /* DISPATCHER TRACE
*/
TRCLEV=(LATC,HIGH,BPE,PAGES=200)     /* LATCH TRACE
*/
TRCLEV=(SSRV,HIGH,BPE,PAGES=100)     /* GEN SYS SERVICES TRACE
*/
TRCLEV=(STG,HIGH,BPE,PAGES=100)      /* STORAGE TRACE
*/
TRCLEV=(ERR,BPE,PAGES=100)           /* ERROR TRACE
*/
```

- Raising the trace level and number of pages increases the chances of finding the error event in the internal traces.



IMS Connect Setup Recommendations

IMS Connect HWS Trace Tables

- The **BPECFG=nnnnnnn** Proclib member should contain the following entries for IMS Connect internal trace tables:

```
#
# DEFINITIONS FOR IMS Connect Internal Traces
#
TRCLEV=(CMDT,HIGH,HWS,PAGES=100)      /* COMMAND TRACE          */
TRCLEV=(OTMA,HIGH,HWS,PAGES=100)      /* COMM DRIVER XCF CALLS  */
TRCLEV=(TCPI,HIGH,HWS,PAGES=100)      /* COMM DRIVER TCP/IP CALLS */
TRCLEV=(ENVT,HIGH,HWS,PAGES=100)      /* EVENT STARTUP SHUTD,ETC */
TRCLEV=(HWSI,HIGH,HWS,PAGES=100)      /* COMM BETWEEN OTMA/CONNECT */
TRCLEV=(HWSW,HIGH,HWS,PAGES=100)      /* COMM BETWEEN TCPIP/CONNECT*/
```

IMS Connect Setup Recommendations

HWS RECORDER Trace

- Specify the **HWSRCORD DD** statement in the IMS Connect JCL to allow the Recorder Trace to be gathered should an error scenario develop.

```
//HWS          PROC  RGN=0M,SOUT=A,
//              BPECFG=BPECFG00,
//              HWSCFG=HWSCFG00
// *
// *****
// * BRING UP AN IMS TCP/IP OTMA CONNECTION SYSTEM *
// *****
//STEP1       EXEC  PGM=HWSHWS00,REGION=&RGN,TIME=1440,
//              PARM=' BPECFG=&BPECFG,HWSCFG=&HWSCFG '
//STEPLIB     DD   DSN=HWS.RESLIB,DISP=SHR
//           DD   DSN=BPE.RESLIB,DISP=SHR
//PROCLIB     DD   DSN=USER.PROCLIB,DISP=SHR
//SYSPRINT    DD   SYSOUT=&SOUT
//SYSMDUMP    DD   DSN=IMSCONN,UNIT=SYSDA,DISP=( ,DELETE,KEEP) ,
//              SPACE=(CYL,150,100,RLSE)
// HWSRCORD DD   DSN=HWSRCDR,DISP=SHR
```

IMS Connect Setup Recommendations

HWS RECORDER TRACE ALLOCATION

💡 Recorder trace **HWSRCORD** dataset allocation recommendation

- Organization: PS
- Record format: FB
- Record length: 1440
- Block size: 14400
- 1st extent cylinders: 200
- Second cylinders: 100

💡 Print using **IDCAMS** utility

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- ★ IMS Connect commands / IMS commands
- ★ References
- ★ Questions

★ Documentation Collection

Preserve Standard Documentation Collection

- 💡 Implement normal operating procedure to collect or preserve the following documentation near time of error:
 - ✓ MVS Syslog
 - ✓ IMS Connect / IMS control region Joblogs
 - ✓ Any dumps produced
 - ✓ IMS OLDS

★ Documentation Collection

Enabling the IMS Connect HWS Recorder Trace

- 💡 The **RECORDER** can be started by issuing : (MVS console)
 - **RECORDER OPEN**

- 💡 The **RECORDER** can be stopped by issuing : (MVS console)
 - **RECORDER CLOSE**

- 💡 The **RECORDER** Trace will stop once the **HWSRCORD** dataset is full.
 - To reset to the beginning of the dataset:
 - **RECORDER CLOSE**
 - **RECORDER OPEN**

★ Documentation Collection

IMS OTMA Traces

💡 /TRACE SET ON TABLE OTMT (OPTION LOG)

- Trace entries written on module entries/exits, XCF calls, user exits called, etc
- Cuts log records x'67FA' (with OPTION LOG)
- Format with DFSERA10, EXIT=DFSERA60
- see IMS Version 7 Diagnosis Guide and Reference for information

💡 /TRACE SET ON TMEMBER client TPIPE tpipename

- Trace entries show input and output message identified by the ID= in the trace record
 - TIB0 - input message before DFSYIOE0
 - TIB2 - input message after DFSYIOE0
 - QAB0 - CM0 output message before DFSYIOE0
 - QAB2 - CM0 output message after DFSYIOE0
 - SLM0 - CM1 output message before DFSYIOE0
 - SLM2 - CM1 output message after DFSYIOE0
- OTMA message prefix starts at offset x'50' in the MSG PREF section
- I/O BUFF section has the message text
- Cuts log records x'6701'
- Format with DFSERA10, EXIT=DFSERA30

★ Documentation Collection

IMS Transaction Trace

! /TRACE SET ON TRAN **transaction name**

- Trace entries written on PCB, I/O area, MODNAME , PST
- Cuts log records x'6701'
- trace ID LA3A (entry) or LA3b (exit)
- Format with DFSERA10, EXIT=DFSERA30
- see IMS Version 7 Diagnosis Guide and Reference for information

★ Documentation Collection

IMS Connect Commands

💡 Issue the following IMS Connect commands two or more times to check status:

- **VIEWHWS**

- Displays the current activity of the IMS Connect

- Key Fields

- Datastore name

- Status (ACTIVE, NOT ACTIVE, NOT DEFINED, or DISCONNECTED)

- Port Address

- Status (ACTIVE or INACTIVE)

- Client

- Status

- RECV - waiting for input from client (receive state)

- CONN - waiting for output from IMS

- XMIT - sending data to client

- CONV - in a conversational state

- WFCM - waiting for confirmation (ACK, NAK, or DEALLOCATE) from IMS

★ Documentation Collection

■ VIEWHWS (sample output)

```
HWS ID=HWS01          Racf=Y
  Maxsoc=150  Timeout=12000
  Datastore=IMSH      Status=ACTIVE
  Group=IMSH         Member=IMCONO01
  Target Member=MIIMSH
  Datastore=IMSK      Status=NOT ACTIVE
  Group=IMSK         Member=IMCONO01
  Target Member=MIIMSK
  Port=4522          Status=ACTIVE
  Client  Userid  Trancode Status  Second  IP-Address  ClientPort
  DELDUMMY ..... .. REC V  180029800 010.020.097.011 -31895
  DELDUMMY ..... .. REC V  180029800 010.020.097.012 -8181
  90378152 I108997  IMSH    REC V WFCM      0 010.020.097.012 -8182
  90292136 I108997  IMSH    REC V WFCM      0 010.020.097.012 -8184
  90435496 I368997  IMSH    REC V WFCM      0 010.020.097.011 -31898
  89296808 I484997  IMSK    CONN      103 010.020.097.011 -32450
  90095528 I377998  IMSK    CONN      104 010.020.097.012 -8812
  89804712 I757998  IMSK    CONN      105 010.020.097.012 -8818
  89825192 I116998  IMSK    CONN      108 010.020.097.012 -8833
  89845672 I108998  IMSH    CONN      109 010.020.097.011 -32479
  89915304 I377997  IMSK    CONN      112 010.020.097.011 -32489
  Total Clients=11  RECV=5  CONN=6  XMIT=0  OTHER=0
```



Documentation Collection

IMS Connect Commands

! VIEWHWS (sample 2)

```
HWS ID=IMSCON11      Racf=N
  Maxsoc=200  Timeout=5000
  Datastore=IV01      Status=ACTIVE
  Group=BSYS      Member=V11TOV01
  Target Member=IV01
  RACF APPL NAME=
  Datastore=IV02      Status=ACTIVE
  Group=BSYS      Member=V11TOV02
  Target Member=IV02
  RACF APPL NAME=
NO ACTIVE IMSPLEX
Port=2233      Status=ACTIVE
  No active Clients
Port=2234      Status=ACTIVE
  No active Clients
Port=2235      Status=ACTIVE
  Client  Userid  Trancode  Status  Second  ClientPort  IP-Address
  79696448      CQ60    RECV      69 4324  010.004.000.042
  79704640      CC60    RECV      91 4323  010.004.000.042
  79610432      EJ60    RECV      21 4282  010.004.000.042
  79602240      CC01    RECV      30 4280  010.004.000.042
  79581760      EJ60    RECV      43 4278  010.004.000.042
  79544896      CQ01    RECV      107 4272  010.004.000.042
  Total Clients=6  RECV=6  CONN=0  XMIT=0  OTHER=0
Port=2236      Status=ACTIVE
  No active Clients
```



Documentation Collection

IMS Connect Commands

💡 Issue the following IMS Connect commands two or more times to check status:

- **VIEWPORT** portid

- Displays the current activity of the IMS Connect

- Key Fields

- Port Address

- Status (ACTIVE or INACTIVE)

- Client

- Status

- RECV - waiting for input from client (receive state)

- CONN - waiting for output from IMS

- XMIT - sending data to client

- CONV - in a conversational state

- WFCM - waiting for confirmation (ACK,NAK,or DEALLOCATE) from IMS

Documentation Collection

IMS Connect Commands

💡 Issue the following IMS Connect commands two or more times to check status:

- **VIEWDS** `datastore_id`

- Displays the current activity a datastore

- Key Fields

- Datastore Name**

- Status

- ACTIVE

- NOT ACTIVE

- NOT DEFINED

- Group**

- XCF group name for the group to which IMS Connect and IMS OTMA belong

- Member**

- IMS Connect member name in the XCF group listed

- Target Member**

- IMS OTMA member name in the XCF group listed.

Documentation Collection

IMS Commands

💡 Issue the following IMS commands to check the status of IMS Connect

- /DISPLAY OTMA
- /DISPLAY TMEMBER IMSNAME TPIPE DSNAME

When IMS Connect is ready for use:

/DISPLAY OTMA output

GROUP/MEMBER	XCF-STATUS	USER-STATUS	SECURITY
GRPNAME			
-IMSNAME	ACTIVE	SERVER	FULL*
-ICONNAME	ACTIVE	ACCEPT TRAFFIC	

When a message is sent to the datastore, output appears:

/DISPLAY TMEMBER IMSNAME TPIPE DSNAME

MEMBER/TPIPE	ENQCT	DEQCT	QCT	STATUS
ICONNAME				
DSNAME	n	n	0	

Note: n = count

above examples has following datastore definitions:

DATASTORE=(ID=DSNAME, MEMBER=ITOCNAME, TMEMBER=IMSNAME, GROUP=GRPNAME...)



Documentation Collection

IMS Commands

! Fail to receive a response to a request message sent from a client (or to check if host datastore ready to accept traffic)

- /DISPLAY A REG
- /DISPLAY TRAN TranName

When IMS dependent is ready for use:

/DISPLAY A REG (output)

REGID	JOBNAME	TYPE	TRAN/STEP	PROGRAM	STATUS	CLASS
1	Job1	TP			WAITING	1, 2, 3, 4

When IMS transaction is started and queued for processing:

/DISPLAY TRAN TranName (output)

TRAN	CLS	ENQCT	QCT	LCT	PLCT	CP	NP	LP	SEGSZ	SEGNO	PARLM	RC
TRANNAME	2	1	1	65535	65535	8	8	8	0	0	NONE	0

QCT is the number of transactions that are currently queued.

ENQCT includes transactions that have been dequeued (processed), as well as those that are currently on the queue.



Documentation Collection

IMS Connector for Java

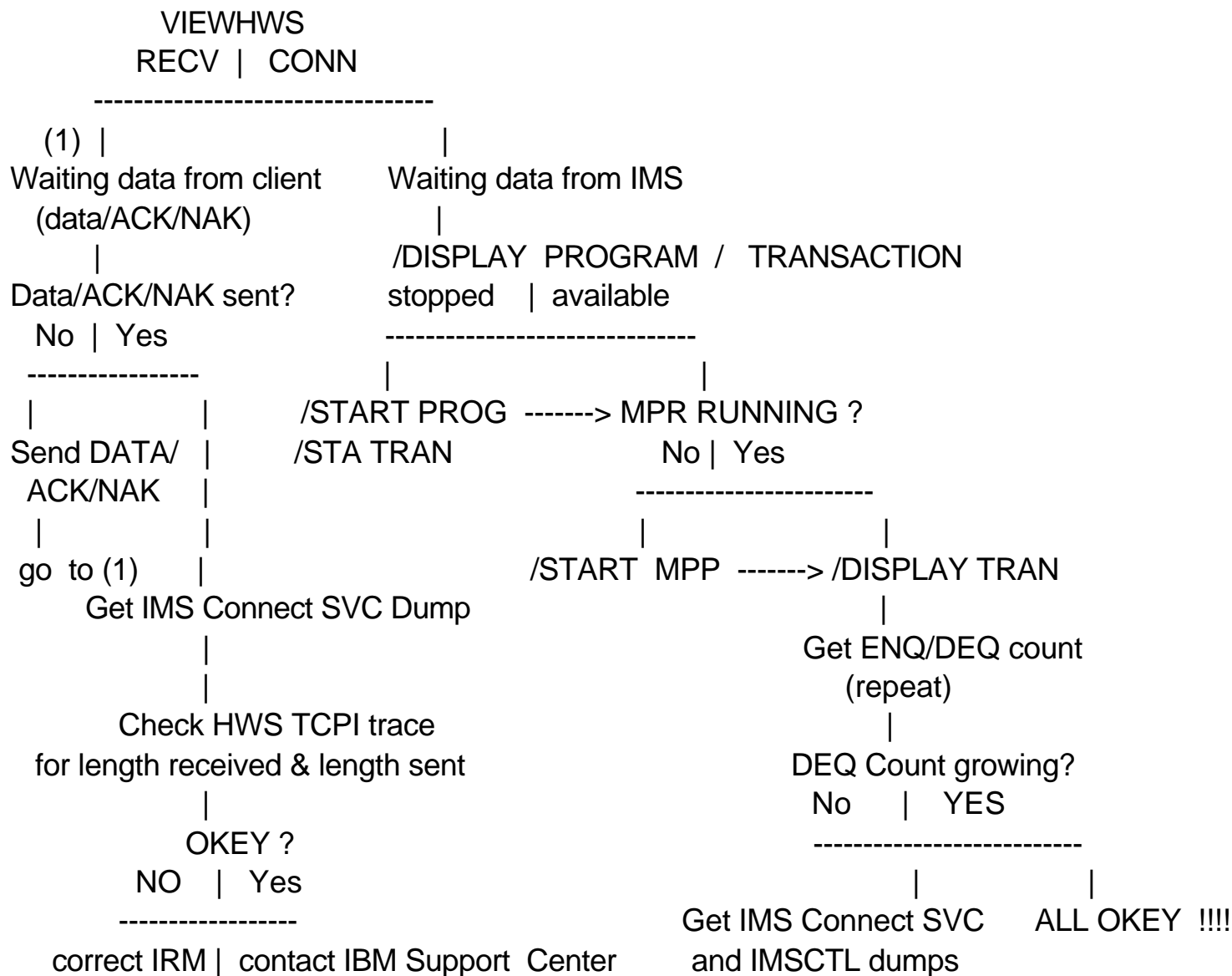
- ✓ WebSphere Studio Application Developer Integration Edition (WSADIE)
- ✓ See Doc in WSADIE
 - *Help -> WebSphere Studio -> Resource Adapters -> IMS Resource Adapter -> Tasks -> Logging and tracing with the IMS resource adapter*
- ✓ See Diagnostic Guide on IMS Connector for Java Web site when it is available
- ✓ Set TraceLevel in Resource Properties of J2C Connection Factory

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- ★ **Diagnostic Aids**
- ★ Using HWS Recorder trace
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Diagnostic Aids

CLIENT / HOST APPLICATION APPEARS HANG or WAIT ???



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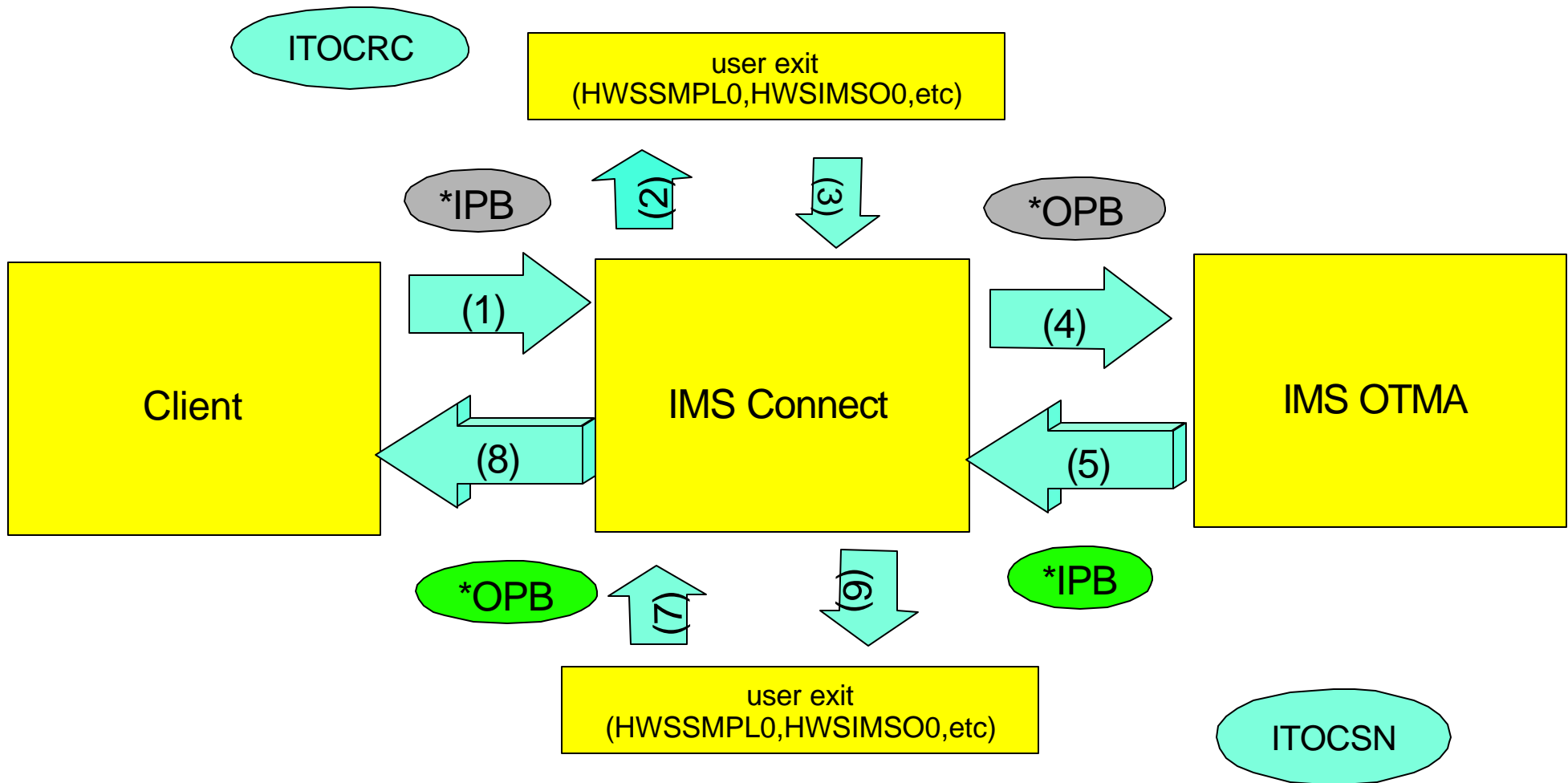
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- ★ References
- ★ Questions

★ Using the HWS RECORDER TRACE

- What is a HWS RECORDER TRACE ?
 - shows the message layout
 - ✓ *Input message received from client*
 - ✓ *Input message after user message exit processing before it is sent to IMS for processing*
 - ✓ *Output reply from IMS*
 - ✓ *Output reply after user message exit processing before it is sent to the client*

★ Using HWS RECORDER TRACE

HWS Recorder trace flow



★ Using the HWS RECORDER TRACE

■ ITOCRC

Receive from client

*IPB

- input to the user message exit
- begins at offset x'5C'
- actual input message given to the exit at x'60'

*OPB

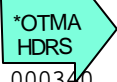
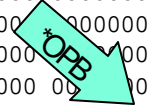
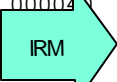
- output from user message exit
- begins at offset x'2FC'
- actual output message after processed by IMS Connect user exit at x'300'

★ Using HWS RECORDER TRACE

■ ITOCRC display output

```

LISTING OF DATA SET -MUSTANG.PM35896.D0708.RECORDER
RECORD SEQUENCE NUMBER - 1
000000 00000000 C9E3D6C3 D9C30052 00000877 10452084 0103183F 00000000 00000000
000020 C3D3C9C5 D5E3F0F1 B9A8BB1F 9265A823 B9A8BB1F 9508C003 00000000 00000000
000040 00000000 00000000 00000000 00000000 00000000 00000000 00000000 5CC9D7C2
000060 IRM 00000090 00680000 5CE2C1D4 D7D3C55C 00000000 00000000 C3D3C9C5 D5E3F0F1
000080 00000040 C6E2E3E3 D9C1D5F1 C9C9E2F1 C3D5E2F1 D3E3D3E5 D3C6F3F1 D5C2E3D6
000100 00000400 C4D4F440 40404040 40404040 D9D9C3E7 F9F0F8F0 D5C2E3D6 C4D4F440 40404040
000120 00000C00 40404040 D9D9C3E7 F7F0F2F0 00200000 C9E5E3D5 D6404040 4040C4C9 E2D7D3C1
000140 00000E00 E840D1D6 D5C5E240 40404040 00040000 00000000 00000000 00000000 00000000
000160 00000100 00000000 00000000 00000000 00000000 00000000 00000000 00000000
000180 00000200 00000000 00000000 00000000 00000000 00000000 00000000 00000000
000200 00000400 00000000 00000000 00000000 00000000 00000000 00000000 00000000
000220 00000600 00000000 00000000 00000000 00000000 00000000 00000000 00000000
000240 00000800 00000000 00000000 00000000 00000000 00000000 00000000 00000000
000260 00001000 00000000 00000000 00000000 00000000 00000000 00000000 00000000
000280 00001200 00000000 00000000 00000000 00000000 00000000 00000000 00000000
000300 00001400 00000000 00000000 00000000 00000000 00000000 00000000 00000000
000320 00001600 00000000 00000000 00000000 00000000 00000000 00000000 00000000
000340 *OTMA 01400000 00000000 00000000 0000A0F0 00000000 00000000 00000000 00010000
HDRS 00480020 00000000 00000000 00000000 00000000 00000000 00000000 00000000
000360 00000000 00000000 00000000 00000000 00000000 00000000 00000000 0000D3E3
000380 D3E5D3C6 F3F10000 006AC66A 50018055 55559555 55555555 55555555 55555555
000400 55555555 55555555 55555555 55555555 55555555 55555555 55555555
000420 55555555 55555555 55555555 8097B683 9181A115 949C81B7 15151515 00000902
000440 D5C2E3D6 C4D4F440 09034040 40404040 40400100 0000C9C9 E2F1C3D5 E2F10000
000460 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000
RECORD SEQUENCE NUMBER - 2
000000 00000000 0000D9D9 C3E7F9F0 F8F00000 00000000 00000000 00000000 00000000
000020 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000
000040 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000
    
```



★ Using the HWS RECORDER TRACE

■ ITOCSN

sent to client

*IPB

- input to the user message exit
- begins at offset x'60'
- output messages from OTMA consist of OTMA headers and the data
- OTMA Tpipe name ID can be found at offset x'66'

*OPB

- output from user message exit
- actual output message after processed by IMS Connect user exit at x'300'

★ Using HWS RECORDER TRACE

■ ITOCSN

0001A0	00000000	C9E3D6C3	E2D50052	00000877	10452086	0103183F	00000000	00000000	00000000	*....ITOCSN.....*
0001B0	00000000	C3D3C9C5	D5E3F0F1	B9A8BB1F	00000000	00000000	B9A8BB1F	00000000	00000000	*CLIENT01.....*
0001C0	00000000	00000000	00000000	00000000	00010000	00000000	00000000	00000000	5CC9D7C2	*.....*IPB*
0001D0	00000000	01800000	0000F3F4	F0F14040	00000002	00000000	00000000	00010000	00000000	*.....3401 .0.....*
0001E0	00000000	00480020	00004040	40404040	00000000	00000000	00000000	00000000	00000000	*.....*
000200	00000000	00000000	00000000	00000000	00000000	00000000	00000000	0000D3E3	00000000	*.....LT*
000260	D3E5D3C6	F3F10000	006AC66A	0902D5C2	E3D6C4D4	F4400903	40404040	40404040	40404040	*LVL31....F...NBTODM4 .. *
000280	51005001	80555555	95555555	55555555	55555555	55555555	55555555	55555555	55555555	*..&.....*
0002A0	55555555	55555555	55555555	55555555	55555555	55555555	55555555	55555555	55555555	*.....*
0002C0	55558097	B6839181	A115949C	81B71515	15150100	0000C9C9	E2F1C3D5	E2F1C3D3	00000000	*.....IIS1CNS1CL*
0002E0	C9C5D5E3	F0F1F3F4	F0F14040	4040B9A8	BB1F925D	14030000	00000000	00000000	00000000	*IENT013401)*.....*
000300	00002805	5F180000	00000000	00000000	20000000	0000C5F8	00000000	00000000	00000000	*.....E8.....*
000320	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	*.....*
000340	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	*.....*
000360	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	*.....*
000380	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	*.....*
0003A0	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	*.....*
0003C0	00000000	00000000	00000000	00000000	0000005D	0300C5D5	E3D9E840	E6C1E240	00000000	*.....)..ENTRY WAS *
0003E0	C4C9E2D7	D3C1E8C5	C4404040	40404040	40404040	40404040	40404040	40404040	4040C4C9	*DISPLAYED DI*
RECORD SEQUENCE NUMBER - 3										
000000	E2D7D3C1	E840D1D6	D5C5E240	40404040	D1C5D9D9	E8404040	4040F9F0	F2F2F2F2	00000000	*SPLAY JONES JERRY 904272*
000020	F0F2F2F2	C6D3F9F0	F2F2F2F0	F0F0F100	00000000	00000000	00000000	00000000	00000000	*0222FL902220001.....*
000040	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	*.....*
000060	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	*.....*
000080	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	5CC9D7C2	*.....*OPB*
0000A0	005D0300	C5D5E3D9	E840E6C1	E240C4C9	E2D7D3C1	E8C5C440	40404040	40404040	40404040	*.)..ENTRY WAS DISPLAYED *
0000C0	40404040	40404040	40404040	C4C9E2D7	D3C1E840	D1D6D5C5	E2404040	4040D1C5	00000000	* DISPLAY JONES JE*
0000E0	D9D9E840	40404040	F9F0F4F2	F7F2F0F2	F2F2C6D3	F9F0F2F2	F2F0F0F0	F1000C00	00000000	*RRY 9042720222FL902220001...*
000100	005CC3E2	D4D6D2E8	5C000000	00000000	00000000	00000000	00000000	00000000	00000000	*.*CSMOKY*.....*
000120	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	*.....*
000140	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	*.....*
000160	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	*.....*
000180	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	*.....*
0001A0	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	*.....*
0001C0	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	*.....*
0001E0	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	*.....*
000200	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	*.....*
000220	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	*.....*

OTMA HDRS

Output msg

*IPB

*OPB



★ Using the HWS RECORDER TRACE

■ ITOCER

Read Error

*IPB

- input to the user message exit
- begins at offset x'5C'
- actual input message given to the exit at x'60'

*OPB

- output from user message exit
- begins at offset x'2FC'
- actual output message after processed by IMS Connect user exit at x'300'

★ Using HWS RECORDER TRACE

■ ITOCER - read error

```
000000 00000000 C9E3D6C3 C5D90052 00000877 12442854 0103195F 00000000 00000000 *...ITOCER.....*
000020 C3D3C9C5 D5E3F0F1 B9B7EC21 AE7D0B84 00000000 00000000 00000000 00000000 *CLIENT01.....*
000040 00000000 00000000 B9B7EC21 B0F83D84 00000000 00000000 00000000 5CC9D7C2 *.....8.....*IPB*
000060 00000090 00680000 5CE2C1D4 D7D3C55C 00000000 00000000 C3D3C9C5 D5E3F0F1 *.....*SAMPLE*.....CLIENT01*
000080 00000040 C6E2E3E3 D9C1D5F1 C9C9E2F1 C3D5E2F1 D3E3D3E5 D3C6F3F1 D5C2E3D6 *... FSTTRAN1IIS1CNS1LTLVLF31NBTO*
0000A0 C4D4F440 40404040 40404040 D9D9C3E7 F9F0F8F0 D5C2E3D6 C4D4F440 40404040 *DM4 RRCX9080NBODM4 *
0000C0 40404040 D9D9C3E7 F7F0F2F0 00200000 C9E5E3D5 D6404040 4040C4C9 E2D7D3C1 * RRCX7020...IVTNO DISPLA*
0000E0 E840D1D6 D5C5E240 40404040 00040000 00000000 00000000 00000000 *Y JONES .....*
000100 00000000 00000000 00000000 00000000 00000000 00000000 00000000 *.....*
000120 00000000 00000000 00000000 00000000 00000000 00000000 00000000 *.....*
000140 00000000 00000000 00000000 00000000 00000000 00000000 00000000 *.....*
000160 00000000 00000000 00000000 00000000 00000000 00000000 00000000 *.....*
000180 00000000 00000000 00000000 00000000 00000000 00000000 00000000 *.....*
0001A0 00000000 00000000 00000000 00000000 00000000 00000000 00000000 *.....*
0001C0 00000000 00000000 00000000 00000000 00000000 00000000 00000000 *.....*
0001E0 00000000 00000000 00000000 00000000 00000000 00000000 00000000 *.....*
000200 00000000 00000000 00000000 00000000 00000000 00000000 00000000 *.....*
000220 00000000 00000000 00000000 00000000 00000000 00000000 00000000 *.....*
000240 00000000 00000000 00000000 00000000 00000000 00000000 00000000 *.....*
000260 00000000 00000000 00000000 00000000 00000000 00000000 00000000 *.....*
000280 00000000 00000000 00000000 00000000 00000000 00000000 00000000 *.....*
0002A0 00000000 00000000 00000000 00000000 00000000 00000000 00000000 *.....*
0002C0 00000000 00000000 00000000 00000000 00000000 00000000 00000000 *.....*
0002E0 00000000 00000000 00000000 00000000 00000000 00000000 5CD6D7C2 *.....*OPB*
000300 01400000 00000000 00000000 0000A0F0 00000000 00000000 00000000 00010000 *.....0.....*
000320 00480020 00000000 00000000 00000000 00000000 00000000 00000000 00000000 *.....*
000340 00000000 00000000 00000000 00000000 00000000 00000000 0000D3E3 *.....LT*
000360 D3E5D3C6 F3F10000 006AC66A 50018055 55559555 55555555 55555555 55555555 *LVLVF31...F.&.....*
000380 55555555 55555555 55555555 55555555 55555555 55555555 55555555 55555555 *.....*
0003A0 55555555 55555555 55555555 8097B683 9181A115 949C81B7 15151515 00000902 *.....*
0003C0 D5C2E3D6 C4D4F440 09034040 40404040 40400100 0000C9C9 E2F1C3D5 E2F10000 *NBODM4 .. ...IIS1CNS1..*
0003E0 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000 *.....*
000400 00000000 0000D9D9 C3E7F9F0 F8F00000 00000000 00000000 00000000 00000000 *...RRCX9080.....*
000420 00000100 00000000 00000000 00000000 00000000 00000000 00000000 00000000 *.....*
000440 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000 *.....*
000460 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000 *.....*
000480 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000 *.....*
0004A0 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000 *.....*
```

★ Using the HWS RECORDER TRACE

■ ITOCSN - DELDUMMY

sent to client

*IPB

- at offset x'20' clientid DELDUMMY
- input to the user message exit
- begins at offset x'60'
- output messages from OTMA consist of OTMA headers and the data
- OTMA Tpipe name ID can be found at offset x'66'

*OPB

- output from user message exit
- actual output message after processed by IMS Connect user exit at x'300'

★ Using the HWS RECORDER TRACE

■ ITOCSN -DELDUMMY

```

000000 00000000 C9E3D6C3 E2D50052 00000877 12442855 0103195F 00000000 00000000 00000000
000020 C4C5D3C4 E4D4D4E8 B9B7EC21 B0F8D744 00000000 00000000 00000000 00000000
000040 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000
000060 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000
000080 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000
0000A0 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000
0000C0 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000
0000E0 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000
000100 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000
000120 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000
000140 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000
000160 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000
000180 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000
0001A0 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000
0001C0 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000
0001E0 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000
000200 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000
000220 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000
000240 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000
000260 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000
000280 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000
0002A0 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000
0002C0 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000
0002E0 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000
000300 00140000 5CD9C5D8 E2E3E25C 00000008 00000028 00000000 00000000 00010000
000320 00480020 00000000 00000000 00000000 00000000 00000000 00000000 00000000
000340 00000000 00000000 00000000 00000000 00000000 00000000 00000000 0000D3E3
000360 D3E5D3C6 F3F10000 006AC66A 50010101 0101D501 01015555 55555555 55555555
000380 55555555 55555555 55555555 55555555 55555555 55555555 55555555 55555555
0003A0 55555555 55555555 55555555 8097B683 9181A115 949C81B7 15151515 00000902
0003C0 D5C2E3D6 C4D4F440 09034040 40404040 40400100 0000C9C9 E2F1C3D5 E2F10000
0003E0 00000000 00000000 00000000 00000000 00000000 00000000 0008C9D5 E5C3C8C1
000400 D9400000 00000000 00000000 00000000 00000000 00000000 00000000 00000000
000420 00000100 00000000 00000000 00000000 00000000 00000000 00000000 00000000
000440 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000
000460 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000
000480 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000
0004A0 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000

```

Out Msg

*IPB

*OPB

LLLL LL|ZZ|*REQSTS*|retcode|reasoncode



Agenda

- ★ IMS Connect Overview
- ★ Setup for Debugging
- ★ Documentation Collection
- ★ Diagnostic Aids
- ★ Using HWS Recorder trace
- ★ **Using IPCS for IMS Connect**
- ★ Relating HWS Recorder trace with HWS BPE TCPI trace
- ★ References
- ★ Questions

★ Using IMS Connect IPCS

```
B - STLMVS1 - [24 x 80]
File Edit View Communication Actions Window Help
----- IMS DUMP FORMATTING PRIMARY MENU -----
OPTION  ==> _

 0  INIT          - IMS formatting initialization and content summary
 1  BROWSE        - Browse Dump dataset (IPCS norm)          *****
 2  HI-LEVEL     - IMS Component level formatting          *USERID   - VAGUILA
 3  LOW-LEVEL    - IMS ITASK level formatting              *DATE    - 03/08/01
 4  ANALYSIS     - IMS dump analysis                      *JULIAN   - 03.213
 5  USER        - IMS user formatting routines           *TIME    - 03:18
 6  OTHER COMP  - Other IMS components (BPE, CQS...)      *PREFIX  - VAGUILA
 7  OTHER PROD  - Other IMS-related products             *TERMINAL- 3278
 E  EDA         - IMS Enhanced Dump Analysis            *PF KEYS -
 T  TUTORIAL    - IMS dump formatting tutorial           *****
 X  EXIT        - Exit IMS dump formatting

Enter END or RETURN command to terminate IMS component formatting.
Use PFKeys to scroll up and down if needed.

* THIS PRODUCT CONTAINS "RESTRICTED MATERIALS OF IBM". 5655-B01 (C)      *
* COPYRIGHT IBM CORP. 1991,2000 LICENSED MATERIALS - PROPERTY OF IBM.   *
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MA b 02/015
Connected to remote server/host stlmvs1.stl.ibm.com using lu/pool ST11TH10 and port 23
Friday, August 01, 2003
start Address http://www.audiogon.com/ Go 100% 3:18 AM Friday 8/1/2003
AT&T ... Welco... IBM P... 5 pc... 7 Int... 5 Lo... 2 No... C:\pnr
```



★ Using IMS Connect IPCS

```
B - STLMVS1 - [24 x 80]
File Edit View Communication Actions Window Help

----- IMS-RELATED PRODUCT SELECTION DUMP FORMATTING MENU -----
OPTION  ==> _

 1  BROWSE      - Browse dump dataset (IPCS norm)      *****
 2  IMS Connect - IMS Connect formatting              *USERID  - VAGUILA
 3  ORS         - IMS ORS formatting                  *DATE    - 03/08/01
 4  DRF         - IMS Database Recovery Facility       *JULIAN   - 03.213
 5  IMSPM      - IMS Performance Monitor              *TIME    - 03:23
                                           *PREFIX  - VAGUILA
                                           *TERMINAL- 3278
                                           *PF KEYS - 24
                                           *****

 X  EXIT       - Exit IMS component menu

Enter END or RETURN command to terminate IMS-related product formatting.

The above selections are only valid if the indicated products are installed.

MA b 02/015
Connected to remote server/host stlmvs1.stl.ibm.com using lu/pool ST11TH10 and port 23
start AT&T ... Welco... IBM P... 5 pc... 7 Int... 5 Lo... 2 No... C:\pnr
Address http://www (5) Lotus Freelance Graphics Program File Go 100%
3:23 AM Friday 8/1/2003
```

★ Using IMS Connect IPCS

```
----- IMS CONNECT DUMP FORMATTING MENU -----
OPTION  ==> 0_

  0  INIT      - Show BPE status and initialize dump      *****
  1  BROWSE    - Browse dump dataset (IPCS norm)          *USERID   - VAGUILA
  2  HI-LEVEL  - IMS Connect component level formatting  *DATE     - 03/08/01
  3  LOW-LEVEL - IMS Connect thread level formatting     *JULIAN   - 03.213
                                           *TIME    - 03:26
  B  BPE      - IMS Connect BPE formatting              *PREFIX   - VAGUILA
                                           *TERMINAL- 3278
                                           *PF KEYS - 24
  X  EXIT      - Exit IMS Connect dump formatting menu  *****

Enter  END   or  RETURN  command to terminate IMS Connect formatting.
```

MA b 02/016

Connected to remote server/host stlmvs1.stl.ibm.com using lu/pool ST11TH10 and port 23

start | AT&T ... | Welco... | IBM P... | 5 pc... | 7 Int... | 5 Lo... | 2 No... | C:\pmr

Address http://www.audiogon.com/ Go 100%

3:27 AM Friday 8/1/2003



★ Using IMS Connect IPCS

```
----- IMS CONNECT DUMP CONTENT STATUS AND CONTROL -----  
COMMAND ==> _  
  
Enter the IMS Connect jobname or ASID to cause the IMS  
Connect IPCS symbols to be set for this dump. Press  
ENTER with blank jobname and ASID fields to list all  
IMS Connect address spaces in the dump.  
  
-----  
JOBNAME          ASID          A.S. TYPE      DUMPED?  
-----  
IMS Connect      VO1CONN      0103           HWS           YES  
  
SDWA Address:    00000000      BPE Release:   010300  
CSCD Address:    28701870      HWS Release:   010200  
HWS Sys Name:    ,             HWS Product #: 5655-E51
```



★ Using IMS Connect IPCS

B - STLMVS1 - [24 x 80]

File Edit View Communication Actions Window Help

----- IMS CONNECT DUMP FORMATTING MENU -----

OPTION ==> 2_

0	INIT	- Show BPE status and initialize dump	*****
1	BROWSE	- Browse dump dataset (IPCS norm)	*USERID - VAGUILA
2	HI-LEVEL	- IMS Connect component level formatting	*DATE - 03/08/01
3	LOW-LEVEL	- IMS Connect thread level formatting	*JULIAN - 03.213
B	BPE	- IMS Connect BPE formatting	*TIME - 03:39
			*PREFIX - VAGUILA
			*TERMINAL- 3278
			*PF KEYS - 24
X	EXIT	- Exit IMS Connect dump formatting menu	*****

Enter END or RETURN command to terminate IMS Connect formatting.

MA b 02/016

Connected to remote server/host stlmvs1.stl.ibm.com using lu/pool ST11TH10 and port 23

start AT&T Netwo... Virgil Aguilar... 5 pcsws 7 Internet ... 5 Lotus Fr... 2 Notepad

Address http://www.audiogon.com/ Go 100% 3:40 AM Friday 8/1/2003



★ Using IMS Connect IPCS

```
----- IMS CONNECT HIGH LEVEL DUMP FORMATTING OPTI Row 1 to 13 of 13
Command ==>                               Scroll ==> PAGE

N <====SPOOL OUTPUT? (Y OR N)
  S = SELECT                               Select choice(s) and hit enter
  M = SELECT (minimum data)                to process or UP/DOWN to scroll
  X = SELECT (maximum data)
  T = SELECT (trace STCK formatted as time stamp)

Cmd  Option          Description
-----
ALL  ALL              All options below (overrides others)
EST  EST              Main IMS Connect anchor block
SCT  SCT, SCTE, SVT,   SCT, SCTE, SVT, and CTOKEN
DCT  DCT, DCTE, DST,   DCT, DCTE, DST, DSB, and CXTOKEN
INTT INTT             Interface table, SET, DET, and CET
HCDB HCDB            Configuration data block
SUMMARY SUMMARY        General dump status, registers, failing thread
BPETTRACE BPETTRACE     All BPE traces
HWSTRACE HWSTRACE     All IMS Connect traces
CSCD  CSCD          Main BPE anchor block
THREAD THREAD       BPE thread blocks (save areas)
DISP  DISP        BPE dispatcher control blocks
CBTE  CBTE        BPE storage control blocks

MA b                                     04/002
Connected to remote server/host stlmvs1.stl.ibm.com using lu/pool ST11TH10 and port 23
```



★ Using IMS Connect IPCS

```
B - STLMVS1 - [24 x 80]
File Edit View Communication Actions Window Help
IPCS OUTPUT STREAM ----- Line 5 Cols 1 78
Command ==> _                SCROLL ==> CSR
*****
*****      HWSHCDB - HWS CONFIGURATION DATA BLOCK      *****
*****
HCDB: 2878D000
+0000 ID..... HCDB          BLKSLEN.. 00000160  HWSID.... IMSCON11
+0010 HOSTNAME. TCPIP        RACFID...          XIBAREA.. 000001F4
+0029 ECB..... N            MAXSOC... 000000C8  TIMEOUT.. 00001388
+0028 RACF.... N            PORTID... 2878D050  PORTXIT.. 2878D090
+0038 DATASTOR. 2878D0C0
** DataStore(s):
  HCDBDS: 2878D0C0
    +0000 ID..... IV01          GRPNAME.. BSYS          MNAME.... V11TOV01
    +0020 TMNAME... IV01          DRU.....
  HCDBDS: 2878D110
    +0000 ID..... IV02          GRPNAME.. BSYS          MNAME.... V11TOV02
    +0020 TMNAME... IV02          DRU.....
** Exit Name(s):
    HWSIMSOO
    DBAXHWSB
    DBAXHWST
** Port ID(s):
MA b
```

Connected to remote server/host stlmvs1.stl.ibm.com using lu/pool ST11TH10 and port 23

start | AT&T Netwo... | Virgil Aguilar... | 5 pcsws | 7 Internet ... | 5 Lotus Fr... | 2 Notepad | 100% | 3:43 AM Friday 8/1/2003



★ Using IMS Connect IPCS

B - STLMVS1 - [24 x 80]

File Edit View Communication Actions Window Help

IPCS OUTPUT STREAM ----- Line 242 Cols 1 78
Command ==> SCROLL ==> CSR

```
+002C  CTOKEN... 2881D000  OTOKEN... 287E5000  STATE...  RECV
+0038  FLAGS...  00800000
+003C  OMHDRTOK. 00000000  00000000  00000000  00000000
+004C  TWU_CLS... 00000000  TCBTKN... 28710550  B9B04C88
+0058  DSID...    00000000  00000000  STAT...   2875E158
+0064  MSG_Q...   00000000  USTAT...  00000000  TIMER...  00

CTOKEN: 2881D000
+0000  EYE...    TCPC      OTOKEN... 287E5000  ITOKEN... 00000000
+000C  ATASK...   287AC5D0  AGLOB...  287E9000  AEXIT...  A8708118
+0018  PNUM...    08BB     LSNUM...  0000     ASNUM...  0009
+001E  FLAG...    00       UFLAG1... 00       FAMILY... 0002
+0026  PORT...    0716     ADDRESS.. 0A04002A
+002C  USERID... 00000000 00000000  EXTNAME..
+003C  AUEXT...   00000000  UEMBUF... 00000000  AREQ...   00000000
+0048  RREQ...    2884A278  TRAN...   00000000  00000000
+0054  PC_TOKN... 00000000  00000000  00000000  RREQ...   00000000

SVT: 2875C8A0
+0000  EYE...    SVT      PORTID... 2235     WID...    79827520
+0014  LTOKEN... B9B13ABA  4DA17C44  NEXT...   2875CAB8
+0020  COM_ENTR. 28760D50  TWU...    288007E8  DFNC...   0000D918
+002C  CTOKEN... 28802000  OTOKEN... 287E5000  STATE...  RECV
+0038  FLAGS...  00800810
```

MA b 02/015

Connected to remote server/host stlmvs1.stl.ibm.com using lu/pool ST11TH10 and port 23

start Address http://www.audiogon.com/ Go 100% 3:45 AM Friday 8/1/2003

AT&T Netwo... Virgil Aguilar... 5 pcsws 7 Internet ... 5 Lotus Fr... 2 Notepad



★ Using IMS Connect IPCS

```
B - STLMVS1 - [24 x 80]
File Edit View Communication Actions Window Help
----- IMS CONNECT DUMP FORMATTING MENU -----
OPTION  ===> 3_

  0  INIT      - Show BPE status and initialize dump      *****
  1  BROWSE    - Browse dump dataset (IPCS norm)          *USERID   - VAGUILA
  2  HI-LEVEL  - IMS Connect component level formatting  *DATE     - 03/08/01
  3  LOW-LEVEL - IMS Connect thread level formatting     *JULIAN   - 03.213
                                           *TIME    - 03:46
  B  BPE       - IMS Connect BPE formatting              *PREFIX   - VAGUILA
                                           *TERMINAL- 3278
                                           *PF KEYS - 24
  X  EXIT      - Exit IMS Connect dump formatting menu    *****

Enter  END  or  RETURN  command to terminate IMS Connect formatting.
```

MA b 02/016

Connected to remote server/host stlmvs1.stl.ibm.com using lu/pool ST11TH10 and port 23

start | AT&T Netwo... | Virgil Aguilar... | 5 pcsws | 7 Internet ... | 5 Lotus Fr... | 2 Notepad | Address http://www.audiogon.com/ | Go | 100% | 3:46 AM Friday 8/1/2003





----- IMS CONNECT LOW LEVEL DUMP FORMATTING OPTIONS Row 1 to 9 of 9
 COMMAND ==> Scroll ==> PAGE

N <===== SPOOL OUTPUT? (Y OR N)

Enter S, M, X, or T at left plus required argument value to
 select option. Use UP/DOWN to scroll.

CMD	OPTION	TYPE	ARG	Argument Description
	TWU	ADDR		Thread Work Unit Block
	FWE	ADDR		Function Work Element
s	TRACE	TYPE	tcpi_	Trace table for given trace type
	CBTE	TYPE		BPE CBTE blocks by given type
	CBTE	ADDR		BPE CBTE blocks off CBT header at addr
	DISP	ADDR		BPE dispatcher blocks for TCB addr
	DISP	TYPE		BPE dispatcher block by task type
	THREAD	ADDR		BPE thread blocks - BPETHCBaddr
	THREAD	TYPE		BPE thread blocks for thread type

***** Bottom of data *****

★ Using IMS Connect IPCS

```
B - STLMVS1 - [24 x 80]
File Edit View Communication Actions Window Help
IPCS OUTPUT STREAM ----- Line 467 Cols 1 78
Command ==> SCROLL ==> CSR
TCPI :SDRCV ISSUE TCPIP CLIENT READ      05730000 00010000 28751280
                                           00000000 00000000 00000000
                                           B9B395CF B02E7661
TCPI :SDRCV TCPIP READ COMPLETE          05760000 00000020 00000000
                                           000000AB 2884430C 00000020
                                           B9B395D0 6A308761
TCPI :SDRCV NON-IWEB READ                057B0000 28838040 000000AB
                                           00000020 2884430C 00000000
                                           B9B395D0 6A30DCA1
TCPI :SDRCV MID/LAST CLIENT READ         057C0000 0000008B 00000000
                                           000000AB 288380A0 0000008B
                                           B9B395D0 6A354D21
TCPI :SDRCV BUFFER OBT'D FOR EXIT        05830000 28844790 28803000
                                           28838080 000000AB 28833040
                                           B9B395D0 6A359181
TCPI :SDRCV COMPLETE MSG PROCESSED      05790000 00000000 00000000          BUFF
                                           C2E4C6C6 F7F9F7F5 F7F8F8F8 79757888
                                           B9B395D0 6A36BBA1
TCPI :SDXMT TCPIP TRANSMIT               05B00000 28847970 28803000
                                           287C1040 00000000 00000000
                                           B9B395D0 6A710381
TCPI :SDXMT SEND MSG TO EXIT             05BF0000 00000014 00000000
```

MA b 02/015

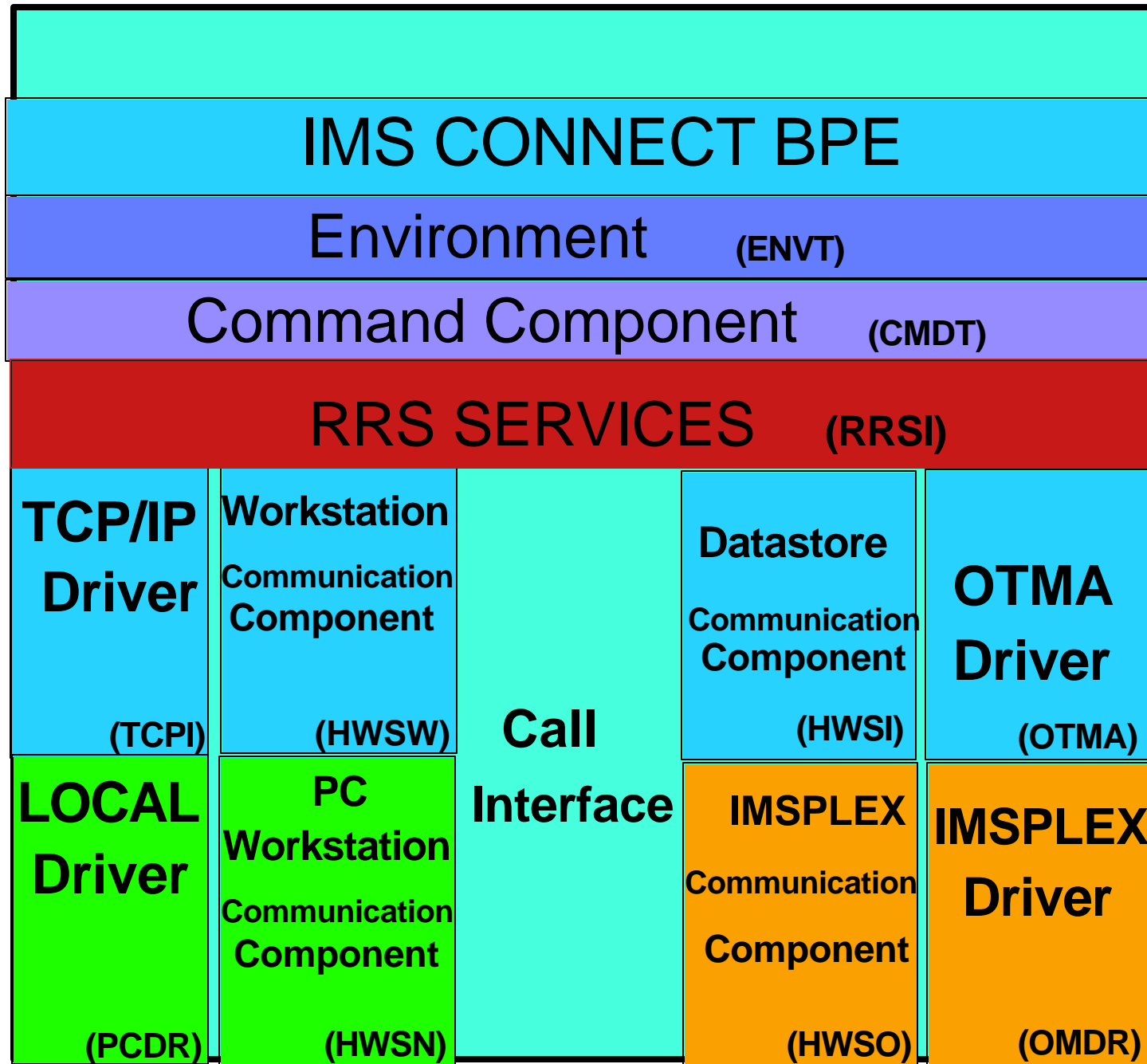
Connected to remote server/host stlmvs1.stl.ibm.com using lu/pool ST11TH10 and port 23

start Address http://www.audiogon.com/ Go 100% 3:51 AM Friday 8/1/2003

AT&T Netwo... Virgil Aguilar... 5 pcsws 7 Internet ... 5 Lotus Fr... 2 Notepad



IMS CONNECT INTERNAL STRUCTURE



Agenda

- ★ IMS Connect Overview
- ★ Setup for Debugging
- ★ Documentation Collection
- ★ Diagnostic Aids
- ★ Using HWS Recorder trace
- ★ Using IPCS for IMS Connect
- ★ Relating HWS Recorder trace with HWS BPE TCPI trace
- ★ References
- ★ Questions

★ Relating HWS Recorder trace with HWS BPE TCPI trace

**x'28': B3B065E8 B4AB9108
Time Msg Received**

**x'30': B3B065FB A51C1E05
Time Msg Enqueued**

**x'04': ITOCRC or ITOCSN
MSG Receive or Send**

RECORD SEQUENCE NUMBER - 1

000000	00000000	<u>C9E3D6C3</u>	<u>D9C3</u>	0052	00000877	17480584	0100063F	00000000	00000000	*..... <u>ITOCRC</u>*
000020	<u>C3D3C9C5</u>	<u>D5E3F0F2</u>	<u>B3B065E8</u>	<u>B4AB9108</u>		<u>B3B065FB</u>	<u>A51C1E05</u>	00000000	00000000	* <u>CLIENT02</u> ...Y.....*
000040	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	<u>5CC9D7C2</u>	*.....* <u>IPB</u>*
000060	<u>0000006A</u>	00500000	<u>2A4E4F41</u>	<u>55544F2A</u>		00000000	00000000	434C4945	<u>4E543032</u>	*.....&...+<...+...*
000080	0200120	<u>43444542</u>	<u>54524E32</u>	<u>534F434B</u>		45594520	20202020	20202020	<u>55535254</u>	*.....+...*
0000A0	30303120	<u>55534552</u>	<u>47525020</u>	<u>20202020</u>		20202020	<u>00120000</u>	<u>43444542</u>	<u>54524E32</u>	*.....&.....+...*
0000C0	<u>2024434F</u>	<u>4E560004</u>	<u>00000000</u>	<u>00000000</u>		00000000	00000000	00000000	00000000	*... +.....*
0000E0	00000000	00000000	00000000	00000000		00000000	00000000	00000000	00000000	*.....*
000100	- 0001E0	equal to	00000000	00000000		00000000	00000000	00000000	00000000	*.....*

X'60': LLLL | IRM | LLZZ | TRANCODE DATA | 00040000

x'20': Client Name



★ Relating HWS Recorder trace with HWS BPE TCPI trace

TCPI Trace Table

TCPI :SDCON TCPIP CONNECT COMPLETE	052F0000	00000000	00000000	00000000	00000000	00000000
	B3B065E8	B489A208				
TCPI :SDCON TCPIP CON, ISSUE ACCEPT	05200000	06F9A378	06F03E00	00000000	00000000	00000000
	B3B065E8	B497EA08				
<u>TCPI :SDRCV RECEIVE CLIENT DATA</u>	<u>05700000</u>	<u>06FC4820</u>	<u>06FBE000</u>	<u>00000000</u>	<u>00000000</u>	<u>00000000</u>
	<u>B3B065E8</u>	<u>B4AD4508</u>	- Recieve Start Timestamp			
<u>TCPI :SDRCV ISSUE TCPIP CLIENT READ</u>	<u>05730000</u>	<u>00010000</u>	<u>06F445E0</u>	<u>00000000</u>	<u>00000000</u>	<u>00000000</u>
**TCPIP Client read begin.						
	B3B065E8	B4AD7208				
<u>TCPI :SDRCV TCPIP READ COMPLETE</u>	<u>05760000</u>	<u>00000001</u>	<u>00000000</u>	<u>00000000</u>	<u>06FC5280</u>	<u>00000020</u>
**Initial Client read (until 20 bytes)		#bytes			A(IO	
read) #Request						
	B3B065FB	6851CF06				
<u>TCPI :SDRCV TCPIP READ COMPLETE</u>	<u>05760000</u>	<u>0000001F</u>	<u>00000000</u>	<u>0000006A</u>	<u>06FC5281</u>	<u>0000001F</u>
**Initial client read (complete at 20 bytes).		#bytes		MsgLngh	A(IO	
read) #Request						
	B3B065FB	A4FBD505				
<u>TCPI :SDRCV NON-IWEB READ</u>	<u>057B0000</u>	<u>06FC9040</u>	<u>0000006A</u>	<u>00000020</u>	<u>06FC5280</u>	<u>00000000</u>
**Non-HWSWEB00 exit called		A(Exit IPB)	MsgLngh	Amt Read	A(IO read)	
	B3B065FB	A5001905				
<u>TCPI :SDRCV MID/LAST CLIENT READ</u>	<u>057C0000</u>	<u>0000004A</u>	<u>00000000</u>	<u>06FC90A0</u>	<u>00000000</u>	<u>00000000</u>
	#Request			A(Exit IPB)		
	B3B065FB	A5145F05				
<u>TCPI :SDRCV BUFFER OBT'D FOR EXIT</u>	<u>05830000</u>	<u>06FC56F8</u>	<u>06FBE000</u>	<u>06FC9080</u>	<u>0000006A</u>	<u>06FCA040</u>
	B3B065FB	A5177D05		A(Exit IPB)		
<u>TCPI :SDRCV COMPLETE MSG PROCESSED</u>	<u>05790000</u>	<u>00000000</u>	<u>00000000</u>	<u>C2E4C6C6</u>	<u>C3D3C9C5</u>	<u>D5E3F0F2</u>
	<u>B3B065FB</u>	<u>A51A3905</u>	<- Receive Complete TS			<u>CLIENT02</u>

TCPI Trace Table

x'28': B3B065E8 B4AB9108
Time Msg Received

The Recorder Trace "received" timestamp will precede the TCPI 0570 trace entry.

<u>TCPI :SDRCV RECEIVE CLIENT DATA</u>	<u>0570</u> 0000 06FC4820 06FBE000 00000000 00000000 00000000
	<u>B3B065E8</u> <u>B4AD4508</u> - Recieve Start Timestamp
<u>TCPI :SDRCV ISSUE TCPIP CLIENT READ</u> **TCPIP Client read begin.	<u>0573</u> 0000 00010000 06F445E0 00000000 00000000 00000000
<u>TCPI :SDRCV TCPIP READ COMPLETE</u> **Initial Client read (until 20 bytes) read) #Request	B3B065E8 B4AD7208 <u>0576</u> 0000 <u>00000001</u> 00000000 00000000 <u>06FC5280</u> <u>00000020</u> #bytes A(IO
<u>TCPI :SDRCV TCPIP READ COMPLETE</u> **Initial client read (complete at 20 bytes). read) #Request	B3B065FB 6851CF06 <u>0576</u> 0000 <u>0000001F</u> 00000000 0000006A <u>06FC5281</u> <u>0000001F</u> #bytes MsgLngh A(IO
<u>TCPI :SDRCV NON-IWEB READ</u> **Non-HWSWEB00 exit called	B3B065FB A4FBD505 <u>057B</u> 0000 <u>06FC9040</u> <u>0000006A</u> <u>00000020</u> <u>06FC5280</u> 00000000 A(Exit IPB) MsgLngh Amt Read A(IO READ)
<u>TCPI :SDRCV MID/LAST CLIENT READ</u>	B3B065FB A5001905 <u>057C</u> 0000 0000004A 00000000 <u>06FC90A0</u> 00000000 00000000 #Request A(Exit IPB)
<u>TCPI :SDRCV COMPLETE MSG PROCESSED</u>	B3B065FB A5145F05 <u>0579</u> 0000 00000000 00000000 C2E4C6C6 C3D3C9C5 D5E3F0F2 <u>B3B065FB</u> <u>A51A3905</u> <- Receive Complete TS <u>CLIENT02</u>

x'30': B3B065FB A51C1E05
Time Msg Enqueued

The Recorder Trace "enqueued" timestamp will follow the TCPI 0570 trace entry.

TCPI Trace Table

```

TCPI :SDRCV RECEIVE CLIENT DATA          05700000 06FC4820 06FBE000 00000000 00000000
00000000

TCPI :SDRCV ISSUE TCPIP CLIENT READ      B3B065E8 B4AD4508 - Recieve Start Timestamp
05730000 00010000 06F445E0 00000000 00000000
00000000
**TCPIP Client read begin.

TCPI :SDRCV TCPIP READ COMPLETE          B3B065E8 B4AD7208
05760000 00000001 00000000 00000000 06FC5280
0000001F
**Initial Client read (until 20 bytes)   #bytes |A(IO
read) |#Request

TCPI :SDRCV TCPIP READ COMPLETE          B3B065FB 6851CF06
05760000 0000001F 00000000 0000006A 06FC5281
0000001F
**Initial client read (complete at 20 bytes). #bytes      MsgLngh|A(IO
read) |#Request

TCPI :SDRCV NON-IWEB READ                B3B065FB A4FBD505
057B0000 06FC9040 0000006A 00000020 06FC5280
00000000
**Non-HWSWEB00 exit called                A(Exit IPB) MsgLngh|Amt Read|A(Buffer)
B3B065FB A5001905

TCPI :SDRCV MID/LAST CLIENT READ         B3B065FB A5145F05
057C0000 0000004A 00000000 06FC90A0 00000000
00000000
**Initial client read (complete at 20 bytes). #Request |
B3B065FB A5145F05

TCPI :SDRCV COMPLETE MSG PROCESSED      05790000 00000000 00000000 C2E4C6C6 C3D3C9C5
D5E3F0F2
**Initial client read (complete at 20 bytes). #Request |
B3B065FB A51A3905 <- Receive Complete TS

```

x'28': B3B065E8 B4AB9108
Time Msg Received

x'30': B3B065FB A51C1E05
Time Msg Enqueued

x'20': Client Name
Recorder Entry



★ Relating HWS Recorder trace with HWS BPE TCPI trace

**x'28': B3B065E8 B4AB9108
Time Msg Received**

**x'30': B3B065FB A51C1E05
Time Msg Enqueued**

**x'04': ITOCRC or ITOCSN
MSG Receive or Send**

```

RECORD SEQUENCE NUMBER - 1
000000 00000000 C9E3D6C3 D9C30052 00000877 17480584 0100063F 00000000 00000000 *...ITOCRC.....*
000020 C3D3C9C5 D5E3F0F2 B3B065E8 B4AB9108 B3B065FB A51C1E05 00000000 00000000 *CLIENT02...Y.....*
000040 00000000 00000000 00000000 00000000 00000000 00000000 00000000 5CC9D7C2 *.....*IPB*
000060 0000006A 00500000 2A4E4F41 55544F2A 00000000 00000000 434C4945 4E543032 *...&...+|...|.....<..+...*
000080 00200120 43444542 54524E32 534F434B 45594520 20202020 20202020 55535254 *.....+..|.....*
0000A0 30303120 55534552 47525020 20202020 20202020 00120000 43444542 54524E32 *.....&.....+.*
0000C0 2024434F 4E560004 00000000 00000000 00000000 00000000 00000000 00000000 *..|+.....*
0000E0 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000 *.....*
000100 - 0001E0 equal to 00000000 00000000 00000000 00000000 00000000 00000000 *.....*
    
```

X'60': LLLL | IRM | LLZZ | TRANCODEDATA | 00040000

x'20': Client Name



TCPI TRACE

■ if client sends message

```
IPCS OUTPUT STREAM ----- Lin
Command ==>
319 111010.587700
TCPI :SDRCV  ISSUE TCPIP CLIENT READ 05730000 0001A000 3B6D2160 00000000 00000000 00000000
319 111010.587701
TCPI :SDRCV  TCPIP READ COMPLETE 05760000 00000020 00000000 00000058 3BA77280 00000020
319 111010.588426
TCPI :SDRCV  NON-IWEB READ 057B0000 3BA7A040 00000058 00000020 3BA77280 00000000
319 111010.588430
TCPI :SDRCV  MID/LAST CLIENT READ 057C0000 00000038 00000000 00000058 3BA7A0A0 00000038
319 111010.588470
TCPI :SDRCV  BUFFER OBT'D FOR EXIT 05830000 3BA776F8 3B76D000 3BA7A080 00000058 3BA79040
319 111010.588472
TCPI :SDRCV  COMPLETE MSG PROCESSED 05790000 00000000 00000000 C2E4C6C6 C8E4C7D6 F0F8F4F2      BUFF HUGO084
319 111010.588485
```

**ENDTRACETCPI

```
. . . . .
ASID(X'0088') ADDRESS(3BA77280.) STORAGE -----
Command ==>
3BA77280 00000058 00500000 5CC9D9D4 D9C5F15C | .....&...*IRMRE1* |
3BA77290 00000000 00001000 C8E4C7D6 F0F8F4F2 | .....HUGO0842 |
3BA772A0.:3BA772BF. LENGTH(X'20')--All bytes contain X'00'
3BA772C0 00000000 C8E4C7D6 F0F8F4F2 00000000 | ....HUGO0842.... |
3BA772D0 00000000 C9D5E3C6 C2D7C5C3 C2C7C5E3 | ....INTFBPECBGET |
3BA772E0 3B1030BC 3BA771B4 3BA771B8 3B74E8B0 | .....x...x....Y. |
3BA772F0 3B76D01C 3BA7727C 3BA7A0A0 00000000 | ..}..x.@.x..... |
```



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- **References**
- Questions

★ REFERENCES



- ✓ ***Version 1 IMS Connect Guide and Reference (SC27--946-00)***
- ✓ ***Version 1 rel 2 IMS Connect Guide and Reference (SC27-946-02)***
- ✓ ***Version 2 rel 1 IMS Connect Guide and Reference (SC27-946-03)***
- ✓ ***IMS e-business Connect Using the IMS Connectors (SG24-5427-00)***
- ✓ ***IMS Version 7 Customization Guide (SG26-9427-00)***
- ✓ ***IMS e-business Connectors Update (SG24-6514-00)***
- ✓ ***IMS e-business Connect Using the IMS Connectors (SG24-27-00)***
- ✓

- *Websites:*
- *<http://www-3.ibm.com/software/data/imsconnect/index.html>*
 - ◆ *Sample programs that can be downloaded to validate the IMS Connect install (JAVA,COBOL,ASSEMBLER,C)*

★ Q & A

★ Questions

THANK YOU !

