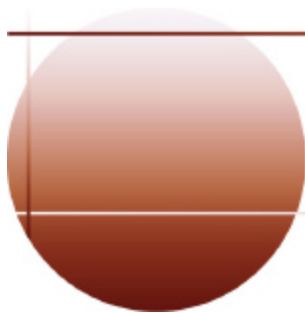


E39

Understanding IMS Connect User Exits

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IMS

technical conference

Las Vegas, NV

September 15 - September 18, 2003

Agenda

- ★ IMS Connect Overview
- ★ IMS Connect and user exits
- ★ User Message Exits and Message Structures
- ★ IMS Connect DRU exit for asynchronous support
- ★ User Initialization Exit
- ★ HWS Recorder Trace
- ★ References
- ★ Question/Answers

Agenda



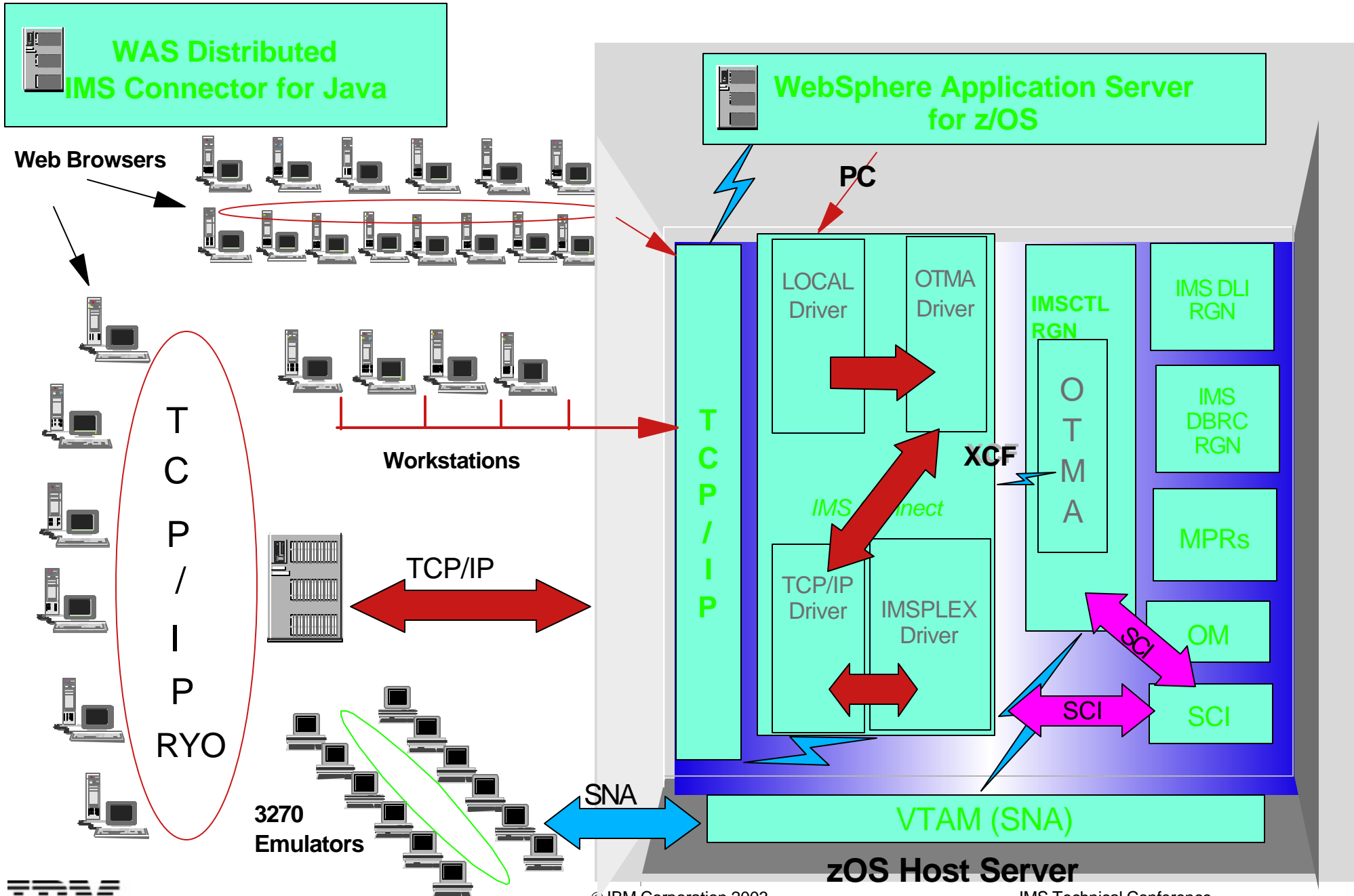
- ★ **IMS Connect Overview**
- ★ IMS Connect and user exits
- ★ User Message Exits and Message Structures
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- ★ References
- ★ Question/Answers

★ IMS Connect Overview

What is IMS Connect ?

- Independent program which runs in its own MVS address space
- Allows the customer to have access to existing and new IMS transactions and their databases via the worldwide web
- Allows fast accessibility of IMS transactions to internet based applications
 - *without modifying IMS transaction*
 - *without heavy workstation development effort when used with IMS Connector for Java*
 - *can be used in any TCP/IP environment*
- SMP/E installable / maintainable
- access to **USER MESSAGE EXIT** and **USER INIT EXIT**
- "IMSTOC" is the predecessor to IMS Connect and is no longer available and supported

External Environment



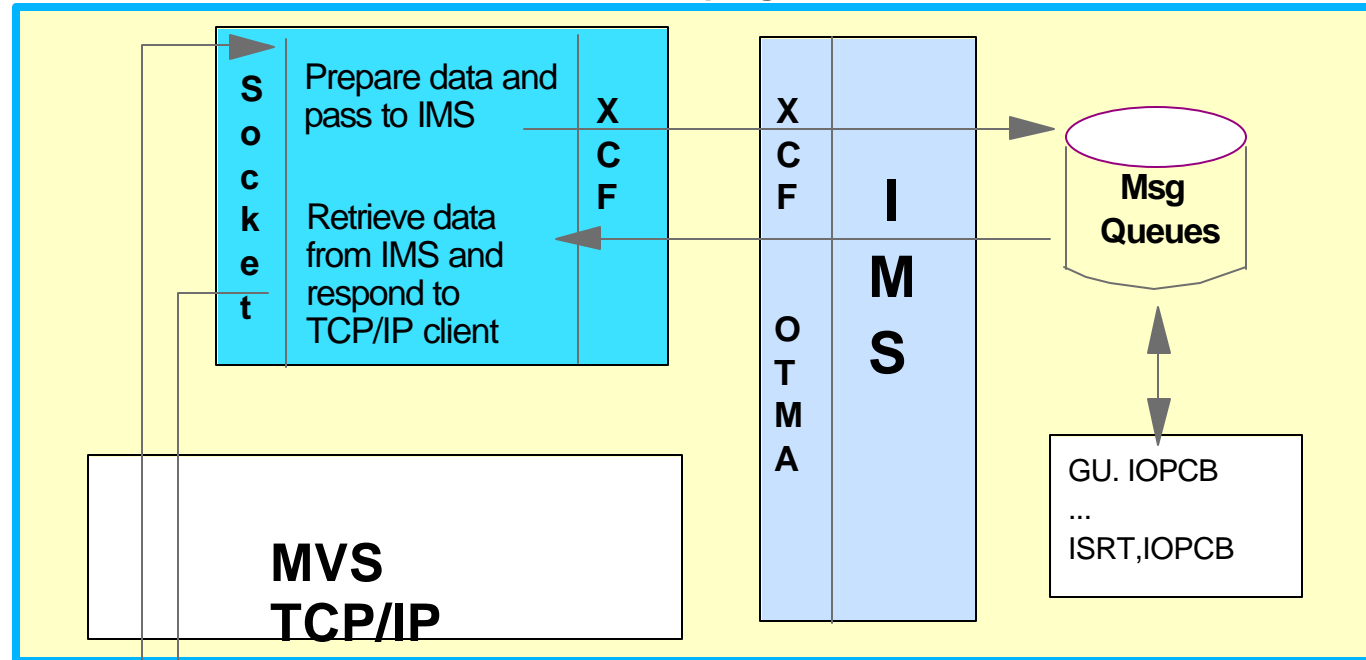
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★ IMS Connect and User Exits

IMS Connect - a TCP/IP Listener program



IMS Connector for Java

Connect
Write (...*HWSJAV*...)
...

Java Sample using Sockets

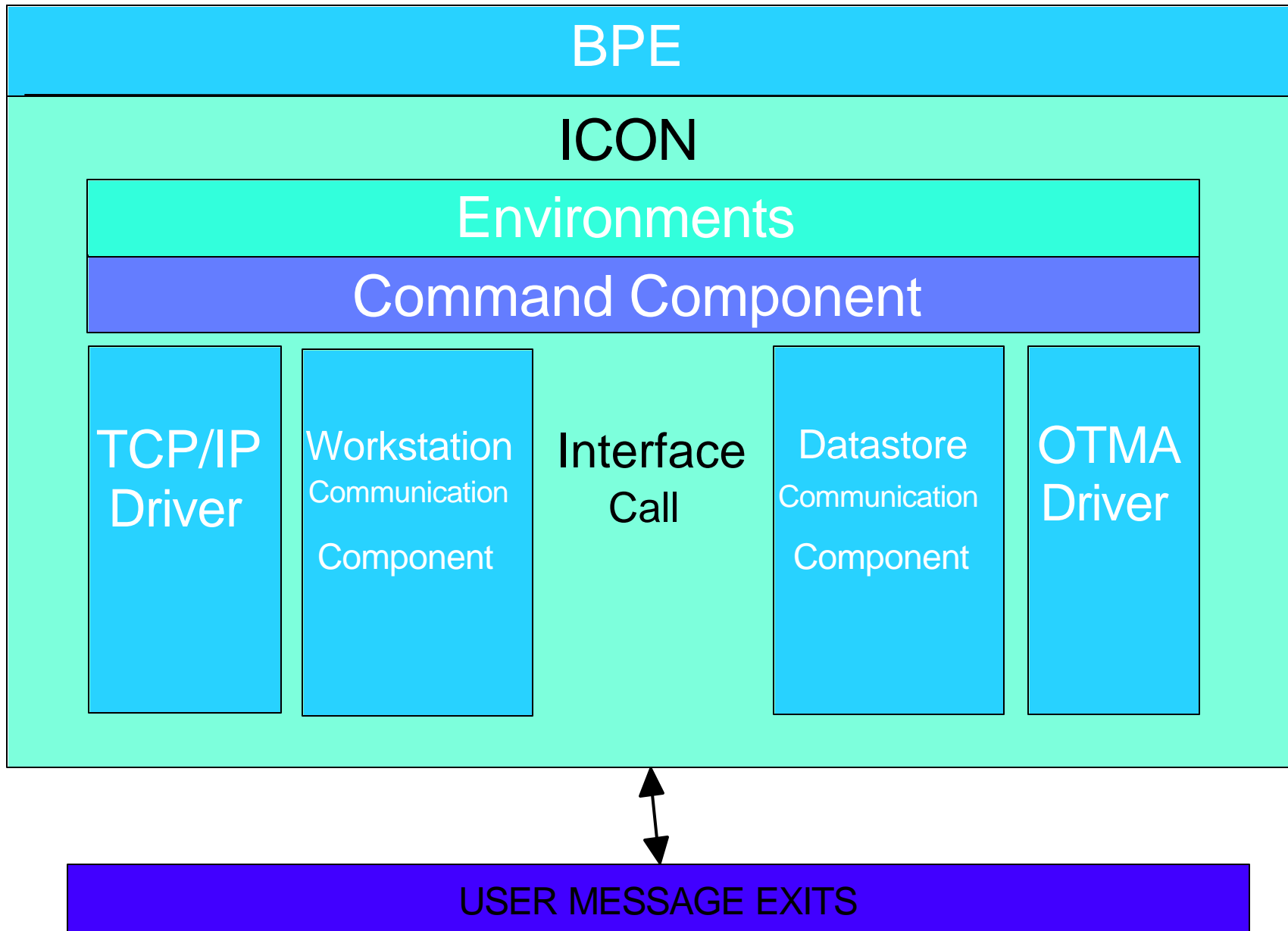
Connect
Write (...*SAMPLE*...)
...

IMS Sockets client

Connect
Write (LLLL
LLZZ*IRMREQ*...)
Write (LLZZ trancode data)
Write (04ZZ)
Read
Disconnect

IMS Connect and user exits

- User Exits invoked on incoming and outgoing messages



IMS Connect and user exits

User Exits invoked on incoming and outgoing messages

- IMS Connect loads each requested exit from *your HWS Config file*

```
!WS (ID=HWS01,RACF=Y,XIBAREA=20)  
[CPIP(HOSTNAME=MVSTCPIP,ECB=Y,RACFID=RACFID,PORTID=(9999,local),MAXSOC=2000,TIMEOUT=8888,EXIT=(HWSSMPL0),  
)ATASTORE ID=IMS1,GROUP=IMSGRPIP,MEMBER=HWSMEM,TMEMBER=IMS1MEM) ,DRU=HWSYDRU0)  
MSPLEX (MEMBER=IMSPLEX1,TMEMBER=PLEX1)
```

- IMS Connect calls each exit's INIT subroutine and determine exits header

```
...*IRMREQ*  
...*SAMPLE*  
.....*HWSJAV*  
...*your own*
```

- IMS Connect only supports *ASSEMBLER* written user exits

★ IMS Connect and user exits

IMS Connect invoked the defined user exits in the following instances and dictated by an option specified in the parameter list to the exit

- ✓ *During IMS Connect initialization phase*
 - INIT phase
- ✓ *After receiving the complete message from the client and prior to sending it to OTMA*
 - READ phase
- ✓ IMS Connect detects an error in the output buffer setup by the user exit
 - EXER phase
- ✓ *After receiving response from OTMA, and prior to sending output to the client*
 - XMIT phase
- ✓ *During IMS Connect termination*
 - TERM phase

★ IMS Connect and user exits

The **INIT** option
Purpose

- ✓ *Ability for user exit to perform any initialization process it needs to.*
- ✓ *Specify the 2 MSGID identifiers for the messages it can process.*
- ✓ *Specify the increase in the IMS Connect computed output buffer size ,that the exit will require during the READ,XMIT and EXER calls*

if any user exit fails to initialize (non zero return code),IMS Connect will not be connected to the TCP/IP address space.

★ IMS Connect and user exits

The **READ** phase

Purpose

- ✓ *Ability for user exit to perform any ASCII/EBCDIC translations that will be required*
- ✓ *Ability for user exit to perform any security checking that may be required.*
- ✓ *Ability for user exit to add or modify OTMA message prefix headers*
- ✓ *Ability for user to generate the client ID*
- ✓ *Ability to add any additional data to the message, as indicated in the increased buffer length, as requested in the INIT phase*
- ✓ *Set up the message, as it is to be delivered to IMS through OTMA in the supplied output buffer*
- ✓ *Specify the required parameter in the parmlist, such as the return code and the length of message in the output buffer.*
 - **if return code setup by user exit is non-zero, the data in the output buffer will be sent back to the client and connection is closed.**
 - ◆ **if IMS Connect detects an error, such as incomplete OTMA headers, IMS Connect will call the EXER option.**

IMS Connect and user exits

The EXER Option

Purpose

- ✓ *Ability for exit to take corrective action,if possible*
- ✓ *Ability for exit to decide on message data*

- *Return Code recieved back from an EXER call*
 - *RC = 0 Continue processing and present the message to the datastore through OTMA*
 - *RC = 4 Send back the data in the output buffer to the tcp/ip client and close the connection*
 - *RC = 8 Abort the message and close the connection*

IMS Connect and user exits

The **XMIT** option

Purpose

- ✓ *Ability for user exit to add or remove any additional data to or from the message, based on the increased buffer length, as requested in the INIT call*
- ✓ *Ability for user exit to perform any ASCII or EBCDIC translations that might be required*
- ✓ *Ability for user exit to remove or modify OTMA msg prefix*
- ✓ *Build the message, as it is to be delivered to the TCP/IP client, in the supplied output buffer*
- ✓ *Build the required parameters in the parmlist, such as the return code, and the length of message in the output buffer*

IMS Connect and user exits

The **TERM** Option

Purpose

- ✓ *Ability for user exit to perform any clean up process it needs to, such as releasing storage, statistical updates or displays.*

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★ User Message Exits and Message Structures

▲ HWSIMSO0/HWSIMSO1

- MSGID Identifier *IRMREQ*(ascii)
- Shipped OCO code only
- Only user exit installed in your system along with IMS Connect
- Purpose: generic user exit to process from any TCP/IP client.
- if the security exit IMSLSECX is linked to HWSIMSO0, then HWSIMSO0 calls the security ext with a designated parameter list to verify client authorization.
- Commit mode:
 - ✓ DEFAULT = *Send-then-Commit* (can be overridden in the IRM header extension)
- Synch Level:
 - ✓ DEFAULT = *NONE* (can be overridden in the IRM header extension)
- Translation:
 - ✓ performs *ASCII to EBCDIC*(input phase) and *EBCDIC to ASCII* (output phase)
- OTMA header:
 - ✓ builds OTMA header structures(*input phase*) and removes them off (*output phase*)
 - ✓ Process the following message header options
- Analyze the following message header options
 - ✓ COMMIT MODE to override default
 - ✓ SYNC LEVEL to override default
 - ✓ MFS MOD name
 - ✓ ACK/NACK/DEALLOCATE
 - ✓ Set up RACF OPTIONS
 - if no Client ID passed (blanks),the message exit will generate the Client ID.
- Applicable functions:
 - ✓ **INIT READ EXER XMIT TERM**

★ User Message Exits and Message Structures

- HWSSMPL0/HWSSMPL1
 - MSGID Identifier *IRMREQ*(ascii)
 - **Shipped source code only (based on HWSIMSO0) . You can modify this code**
 - Purpose: generic user exit to process from any TCP/IP client.
 - if the security exit IMSLSECX is linked to HWSSMPL0, then HWSSMPL0 calls the security ext with a designated parameter list to verify client authorization.
 - Commit mode:
 - ✓ DEFAULT = *Send-then-Commit* (can be overridden in the IRM header extension)
 - Synch Level:
 - DEFAULT = *NONE* (can be overridden in the IRM header extension)
 - Translation:
 - ✓ performs *ASCII to EBCDIC*(input phase) and *EBCDIC to ASCII* (output phase)
 - OTMA header:
 - ✓ builds OTMA header structures(*input phase*) and removes them off (*output phase*)
 - ✓ Process the following message header options
 - Analyze the following header options
 - ✓ COMMIT MODE to override default
 - ✓ SYNC LEVEL to override default
 - ✓ MFS MOD name
 - ✓ ACK/NACK/DEALLOCATE
 - ✓ RACF OPTIONS
 - if no Client ID passed (blanks),the message exit will generate the Client ID.
 - Applicable functions:
 - ✓ **INIT READ EXER XMIT TERM**

★ User Message Exits and Message Structures

HWSJAVA0

- MSGID Identifier *HWSJAV*
- *Shipped Source code.*
- *Need to install this exit because IMS Connect automatically loads this exit.*
- *Do NOT define HWSJAVA0 in the HWSCFG configuration file because IMS Connect automatically loads HWSJAVA0 exit*
- Purpose: process input message from IMS Connector for Java client.
- if the security exit IMSLSECX is linked to HWSSMPL0, then HWSSMPL0 calls the security ext with a designated parameter list to verify client authorization.
- Commit mode:
 - ✓ DEFAULT = *Send-then-Commit (can NOT be overridden in the IRM header extension)*
- Synch Level:
 - ✓ DEFAULT = *NONE (can be overridden in the IRM header extension)*
- Translation:
 - ✓ NONE
- OTMA header:
 - ✓ *DOES NOT build OTMA header structures.*
- **Persistent Socket**
- MFS MOD name
- ACK/NACK/DEALLOCATE
- RACF OPTIONS
 - ✓ *if no Client ID passed (blanks), the message exit will generate the Client ID.*
- Applicable functions:
 - ✓ **INIT READ EXER XMIT TERM**

★ User Message Exits and Message Structures

HWSCSL00

- *Shipped OCO*
- *Need to install this exit because IMS Connect automatically loads this exit.*
- *Do define **HWSCSL00** in the HWSCFG configuration file in the EXIT= paramter of TCPIP statement*
- *Perform data translation of ASCII to EBCDIC for input messages*
- *Perform data translation of EBCDIC to ASCII for output messages*
- *Removes the OM headers for output messages*
- *Commit mode:*
 - ✓ DEFAULT = **Send-then-Commit (can NOT be overridden in the IRM header extension)**
- *Synch Level:*
 - ✓ DEFAULT = **NONE (can be overridden in the IRM header extension)**
- *Analyze the following message header options:*
 - ✓ COMMIT MODE override the default
 - ✓ Synch Level override of the default
 - ✓ ACK/NACK/DEALLOCATE
 - ✓ RACF OPTIONS
 - *if no Client ID passed (blanks),the message exit will generate the Client ID.*

★ User Message Exits and Message Structures

IMSLSECX (Security Exit)

Purpose: **Perform user authentication for HWSIMSO0 / HWSIMSO1**

- *Parameter list for user security exit:*

- ✓ *Address of fullword client's IP address*
- ✓ *Address of halfword client's port*
- ✓ *Address of 8-character string IMS transaction*
- ✓ *Address of halfword data type (data type setting: 0=ASCII, 1=EBCDIC)*
- ✓ *Address of fullword length of user data*
- ✓ *Address of user-supplied data*
- ✓ *Address of fullword set by security exit*

- ✓ **Address of RACF user ID**

NOTE if blanks are returned (in the field pointed to) from the security exit, then the RACF fields in the OTMA security header are not set. The address points to a field containing blanks

- ✓ *Address of RACF group ID*

The address points to a field containing blanks.

★ User Message Exits and Message Structure

Input Message Structure

- LLLL
 - ✓ *length of total message which includes IIII field (four bytes), length of the IRM (variable), the length of the message, and end of message indicator (four bytes)*
- LL
 - ✓ *length of header data*
- IRM (IMS Input Request Message)
 - ✓ *consists of common 28-byte field that IMS Connect interrogates and base processing decisions on.*
- Application data
 - ✓ *includes the OTMA header structure or option to build these OTMA headers in the user exit and decrease the amount of data sent accross the network.*
- End of message indicator - x'00040000'.

★ User Message Exits and Message Structures

★ Input Message Structure : "fixed" IRM HEADER

LLLL	4 bytes	Length of the total message.
IRM_Len	2 bytes	Length of the IRM structure. user written min size x'24' HWSIMSMO0 min size x'50' HWSSMPL0 min size x'50'
IRM_ZZ	2 bytes	reserved
IRM_ID	8 bytes	user exit identifier or the IMS Connect supplied user exit *IRMREQ* - for HWSIMSO0 *SAMPLE* - for HWSSMPL0 *HWSJAV* - for HWSJAVA0
Reserved	4 bytes	binary zeros
IRM_F5**	1 byte	input message type
IRM_TIMER***	1 byte	Time delay for the receive to the datastore after ACK or RESUME TPIPE
IRM_SOCT****	1 byte	Socket connection type
IRM_RESV IRM_CLIENTID	1 byte 8 bytes	binary zero. Character string.

User Message Exits and Message Structures

★ Input Message Structure : "extended" IRM HEADER

IRM_F1	1 byte	Binary value. Value is to specify if the MFS mod name is to be returned
IRM_F2	1 byte	Flag specifies the commit mode B'0100 0000' - commit mode 0 B'0010 0000' - commit mode 1
IRM_F4	1 byte	client indicator of what he is sending * A = ACK positive acknowledge * N =NACK negative acknowledge * D = Deallocate conversation * R = RESUME - Resume pipe * S = SendOnly - send only * blank resp mode or conv trans
IRM_TRNCOD IRM_IMSDESTID IRM_LTERM IRM_RACF_USERID IRM_RACF_GRPNAME IRM_RACF_PW	8 bytes 8 bytes 8 bytes 8 bytes 8 bytes 8 bytes	character string. transaction code character string. datastore name character string IMS LTERM character string RACF user id character string. RACF group name character string. RACF PASSTICKET

★ User Message Exits and Message Structures

Output Message Structure: CSM

- CSM - Complete Status Message

- ✓ *IMS Connect returns CSM as last structure of the output message if input message was processed successful interaction with IMS.*

- length of CSM : 12 bytes

- CSM_Flag1 (1 byte) :

- ✓ Binary byte : 1000 0000 asynchronous message queued

- ✓ Binary byte : 0100 0000 conversational output message

- ✓ Binary byte : 0010 0000 ack/nack required

- CSM_ID : (8 bytes) : **CSMOKY**

LLLL | LL | ZZ | *CSMOKY*

★ User Message Exits and Message Structure

Output Message Structure: RMM

- Request MOD Message
 - ✓ *IMS Connect returns the Request Mod Message(RMM) as the first structure of an output message if MFS MOD is requested and the data output is present.*
- length of RMM : 20 bytes
- MsgID : *REQMOD*
 - ✓ IMS MFS modname: 8 bytes

LLLL | LL | ZZ | *REQMOD* | MFS mod name

Outbound application reply message

LLLL | LL | ZZ | data

User Message Exits and Message Structures

Output Message Structure - Request Status Message

RSM - Request Status Message

✓ returned as the *ONLY* output message if IMS Connect or the user exit detected an error condition during the output phase.

- length of RSM : 20 bytes
- RSM_Flag1 (1 byte) :
 - ✓ Binary byte : 1000 0000 asynchronous message queued
 - ✓ Binary byte : 0100 0000 conversational output message
 - ✓ Binary byte : 0010 0000 ack/nack required
- RSM_ID : (8 bytes) : *REQSTS*
- RSM_RETCOD : return code
- RSM_RSNCOD : reason code

LLLL | LL | ZZ | *REQSTS* | Return code | Reason code

Note: RSM_RETCOD and RSM_RSNCOD are described in
Chapter 15 IMS Connect Return and Reason Codes *Version 1 IMS Connect Guide and Reference*
(SC27-0946-00)

LLLL LL ZZ *REQSTS* Return Code Reason Code

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★ **IMS Connect DRU exit for asynchronous support**

Asynchronous output messages

- **The output from a commit mode 0 transaction is not returned to the client application can be queued on the OTMA asynchronous HOLD QUEUES**

- **An IMS application program inserts an output message to an alternate PCB**

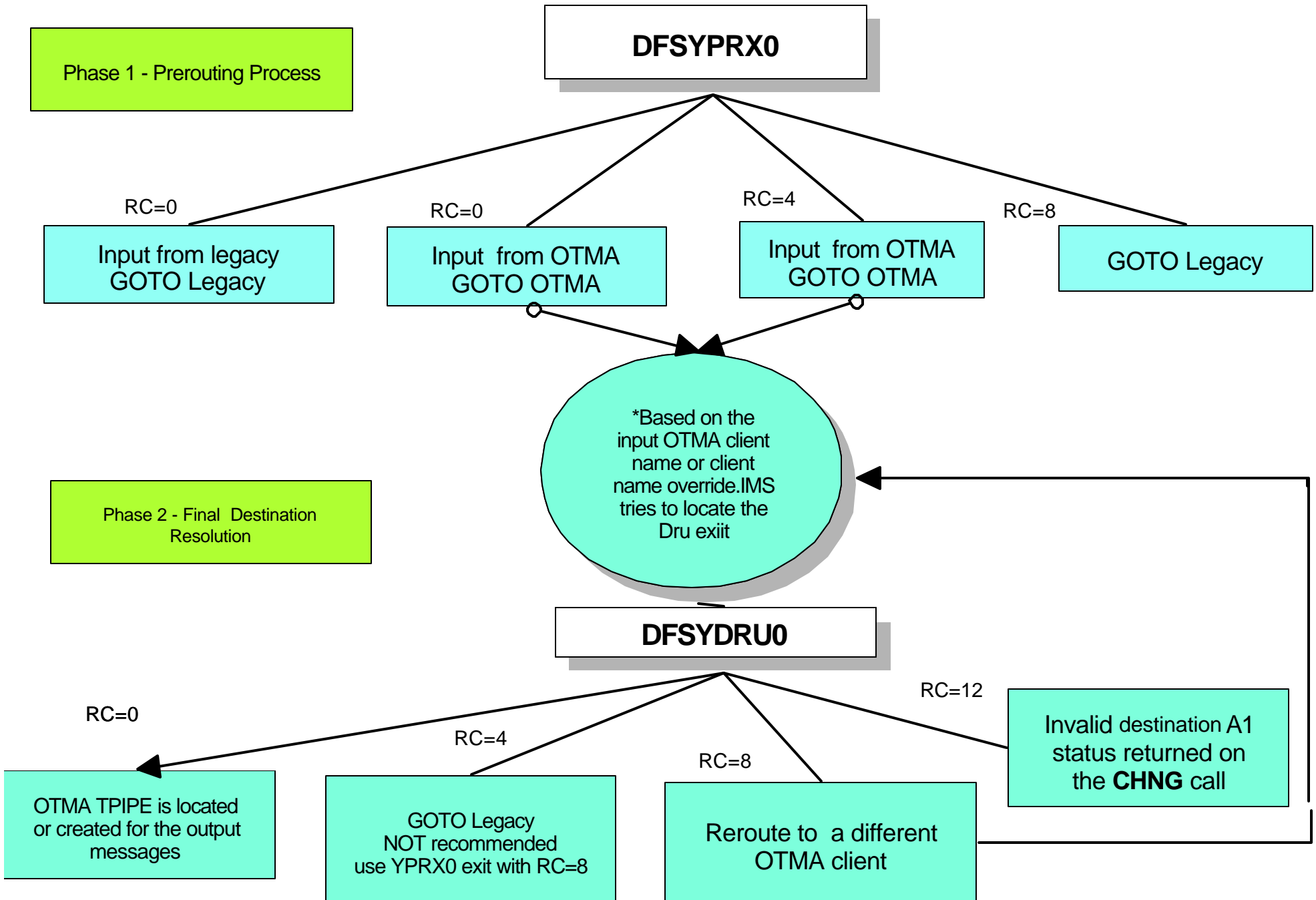
★ IMS Connect DRU exit for asynchronous support

- **ALTPCB ISRT message routing flow using OTMA user exits**

OTMA has provided two optional routing exits namely:

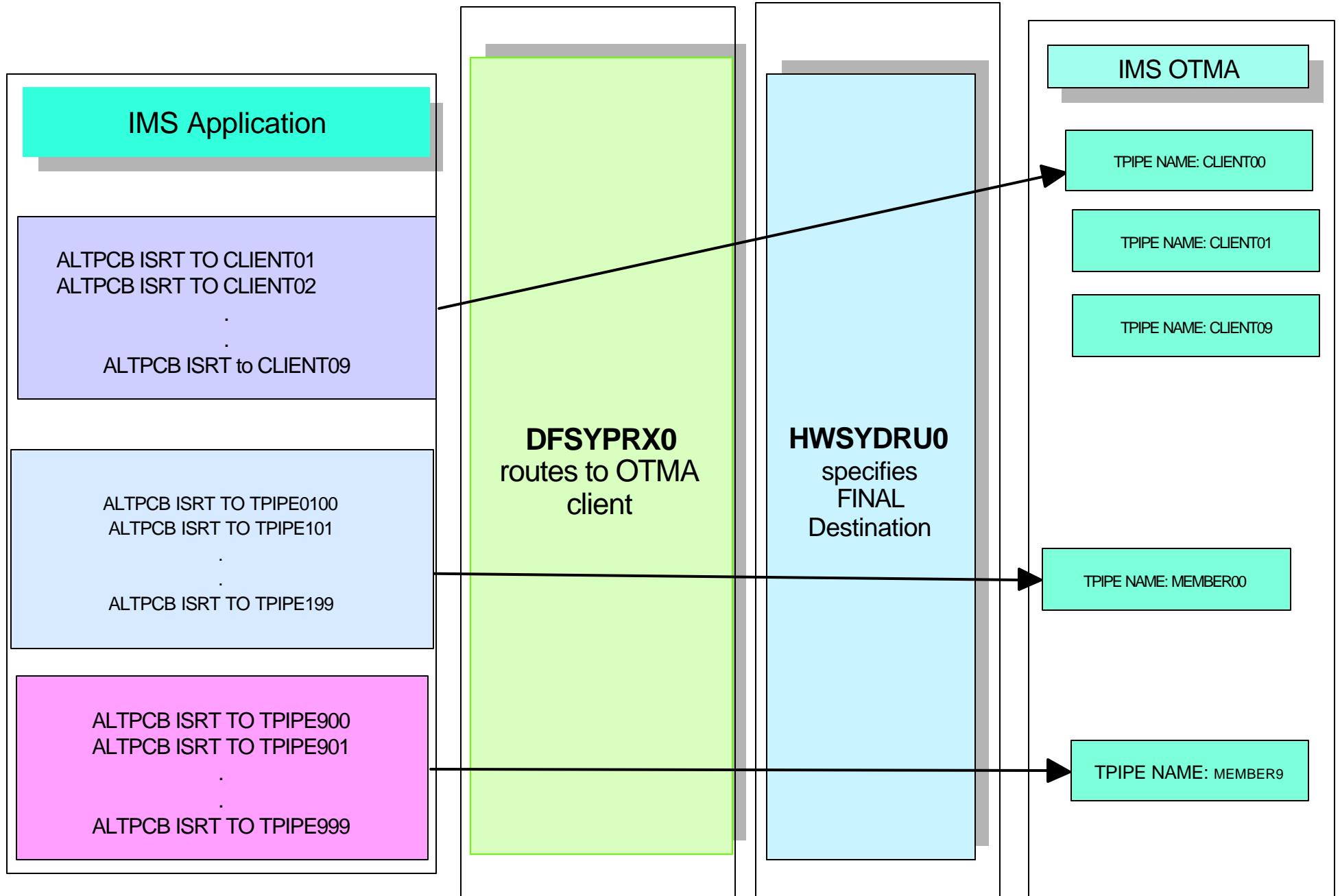
- **DFSYPRX0** exit
 - ✓ called if present
 - ✓ phase 1 prerouting process
 - (performs an initial search for the output destination)*
- **DRU0** exit
 - phase 2 final destination resolution process
 - (determines the final destination for an OTMA output message)*
 - ✓ **DFSYDRU0** is default name
 - ✓ **HWSYDRU0** us IMS Connect provided exit
 - ✓
- **NOTE:** If you have an application that does insert to an ALTPCB when IMS Connect is not available, an OTMA descriptor is needed to provide a valid OTMA client destination name.

OTMA Two Phase Destination Resolution flow



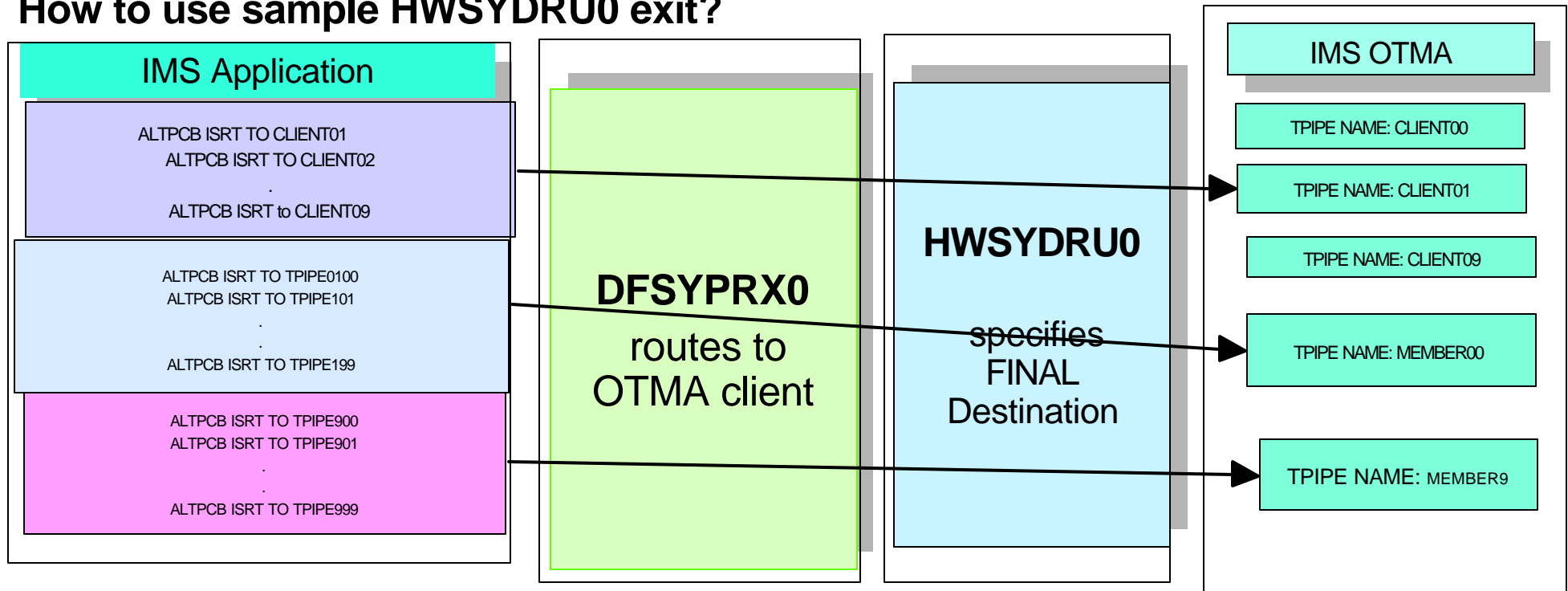
OTMA User Exits

How to use sample HWSYDRU0 exit?



OTMA User Exits

How to use sample HWSYDRU0 exit?



When HWSYDRU0 exit is used, the following sequence of events occur:

- 1. DFSYPRX0 sets up addressability to the parameters that are passed to the HWSYDRU0 exit
- 2. The output member name in the output parameter list is set to blanks
- 3. HWSYDRU0 determines the action based on whether the name in the input destination parameter is an IMS LTERM or an IMS Connect destination. After HWSYDRU0 made this determination, it sets the contents register 15 on exit.

reg 15 = 0

- the input destination name is an IMS Connect client name and the Member name for the destination is the same as the Member name for the origin
- No changes made in the output parameters

reg 15 = 4

- LTERM exists in IMS, is not IMS Connect client
- No changes made in the output parameters

reg 15 = 8

- The input destination name is an IMS Connect client name, and the Member name for the destination is a different name from the Member name for the origin
- the output member name in the output parameters is set to the New Member name

reg 15 = 12

- the input destination name is not an IMS Lterm or IMS Connect does not know the client name

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HWSUINIT

- Purpose: *allows you to perform customized initialization tasks during IMS Connect startup and/or customized termination tasks during IMS Connect shutdown*
- Subroutine Functions
 - ✓ INIT function
 - ✓ TERM function
- Two user control blocks
 - XIB
 - ✓ *contains fixed header section and variable length user area*
 - ✓ *you can specify the size with xibarea parameter in HWS config file*
 - ✓ *default is 20 (allowed size from 20 to 500)*
 - XIBDS
 - ✓ *represents an entry in a list of datastores defined in HWS config file*
 - ✓ *second word in fixed header area points to the datastore list*
- **NOTE: IMS Connect user exits that are provided do not take advantage of the capability (they can be enhanced to do so)**

HWSUINIT

- XIB - INIT TABLE

- ✓ *Points to the datastore table*
- ✓ *Allows user data to be stored*

DSECT of XIB control blocks

```

HWSXIB   DSECT           Exit Interface Block                                0
*****
* XIB Header                                                                * 0
*****
XIB_HEADER      DS  0D                                0
XIB_EYE         DS  CL4'XIB'          EYECATCHER                        0
XIB_DATASTORES DS  A              DataStore list address              0
XIB_UFLD_CNT    DS  F              User field count                    0
               DS  6F              Reserved for ITOC                    0
XIB_HDR_LEN     EQU *-HWSXIB          XIB header fixed length          0
XIB_USERAREA    DS  0F              Start of user area                    0
    
```

User Initialization Exit Support

HWSUINIT

XIBDS - DATASTORE TABLE (an IMS SYSTEM)

- ✓ *Indicates if datastore (IMS) is ACTIVE or INACTIVE*
- ✓ *Contains optional user data*

HWSXIBDS Dsect

HWSXIBDS MACMAC71 E1 16:27:15 14 Sep 2000 Buttons > IM71 8 of

```

-----
. *
*****
***
***      HWSXIBDS - Exit Interface Block Data Store entry
***      This define the layout of the data store entry
***      DSECT for the Data Store list entry.
***      Each of the 16-byte entry contains:
***          - data store name (8-byte)
***          - data store status flag (1-byte)
***              x'00' - data store not active
***              x'01' - data store active
***          - data store entry flag (1-byte)
***              x'80' - last entry in data store list
***          - reserved (2-byte)
***          - User field (4-byte)
***      RESIDENCY: HWS REGION - PRIVATE, KEY 7
*****

```

SPACE 1

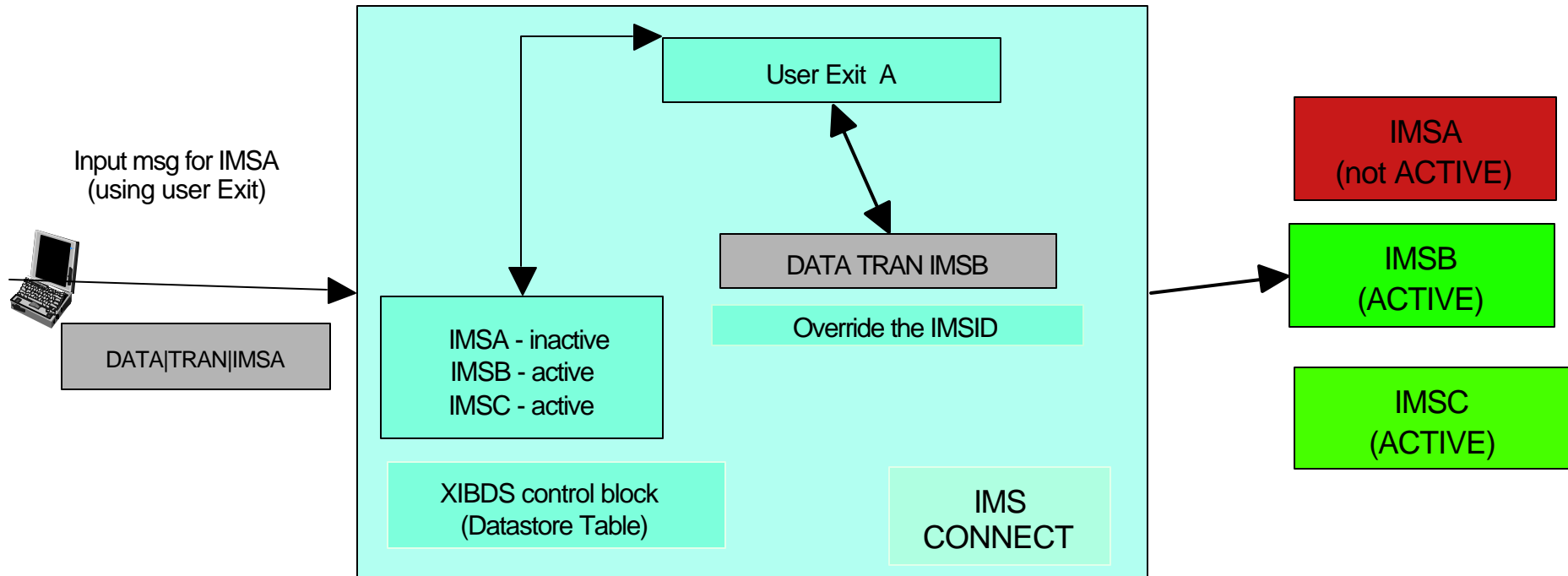
HWSXIBDS	DSECT	Exit Interface Block Data Store entry
XIBDS_NAME	DS CL8	Data store name
XIBDS_STATUS	DS X	Data store status
XIBDS_INACTIVE	EQU X'00'	Data store not active
XIBDS_ACTIVE	EQU X'01'	Data store active
XIBDS_FLAG	DS X	Data store entry flags
XIBDS_LAST_ENTRY	EQU X'80'	Last entry in list
	DS XL2	Reserved
XIBDS_USER	DS XL4	User field
XIBDS_LEN	EQU *-HWSXIBDS	XIB data structure length

SPACE 1



★ User Initialization Exit Support

HWSUNIT - sample 1

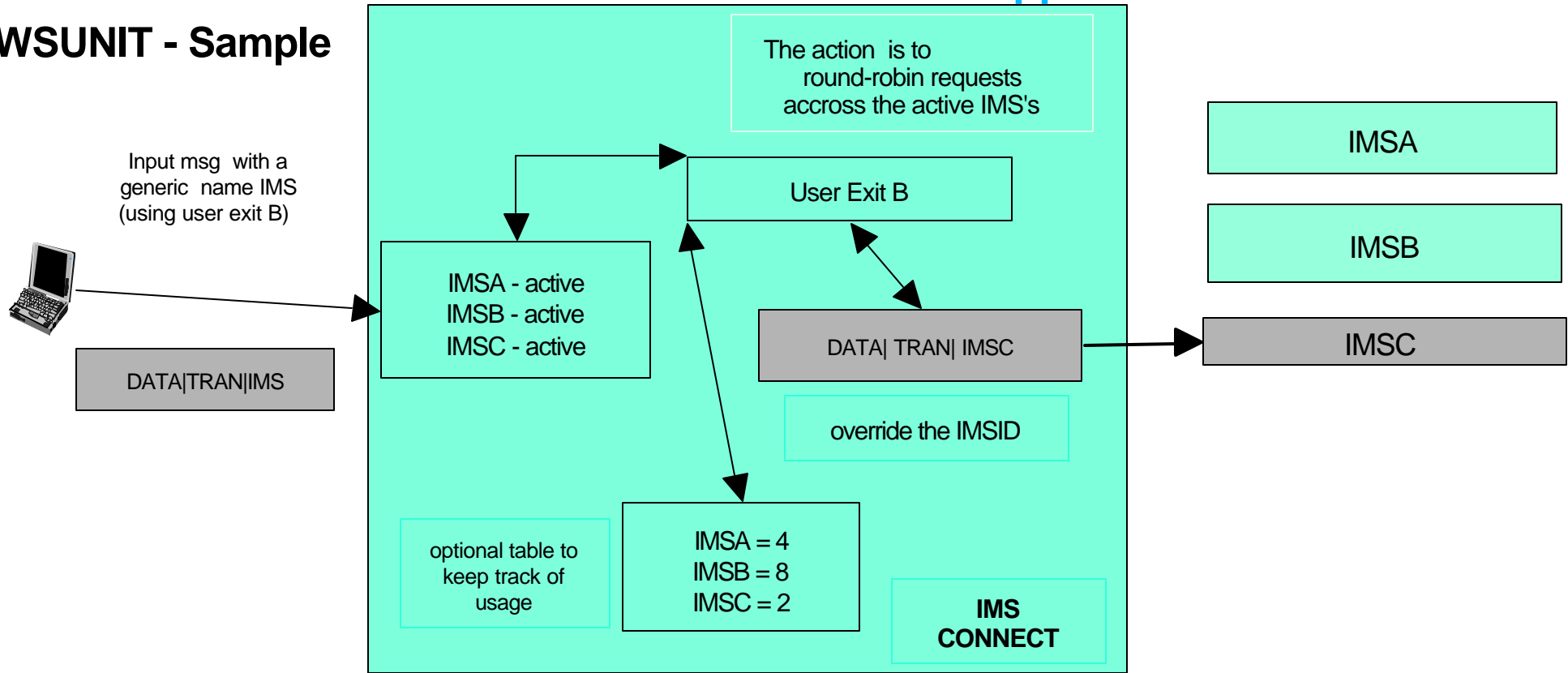


■ HWSUINIT - Sample One flow

- ✓ *Before a user message exit passes the client message to an IMS Connect datastore for processing, the user message exit can query the XIBDS control block area for target datastore's status.*
- ✓ *If the target datastore is not active, the user message exit can switch to an active datastore by modifying the datastore name in the message header.*

★ User Initialization Exit Support

WSUNIT - Sample



■ HWSUINIT - Sample flow

- ✓ *User sends a "generic datastore name" in IRM header*
- ✓ *The user message exit determines which IMS is most appropriate for processing*
- ✓ *and modifies datastore name to action round-robin requests accross IMS's.*

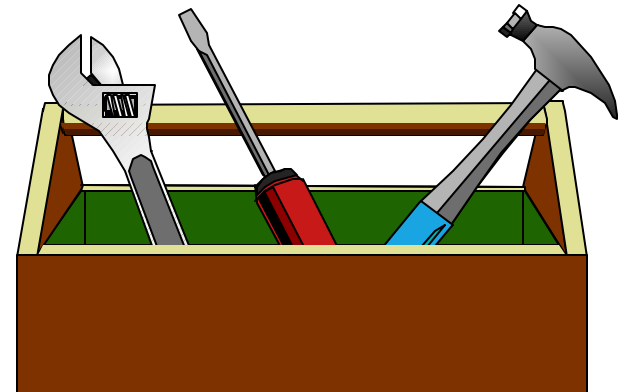
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★ HWS RECORDER TRACE

- Purpose:
 - to assist diagnosing application problems and to trace both IMS Connect and OTMA headers for further investigation
 - to store the line trace information related to IMS Connect input and output data to a dataset
- When IMS Connect recorder trace is enabled:
 - ✓ records the messages and headers received from the client
 - ✓ records the messages and headers received from IMS OTMA and sent to the client
 - ✓ records the messages before and after they are processed by the IMS Connect user exits, such as HWSIMSO0,HWSSMPL0,HWSJAVA0,or any user written exit



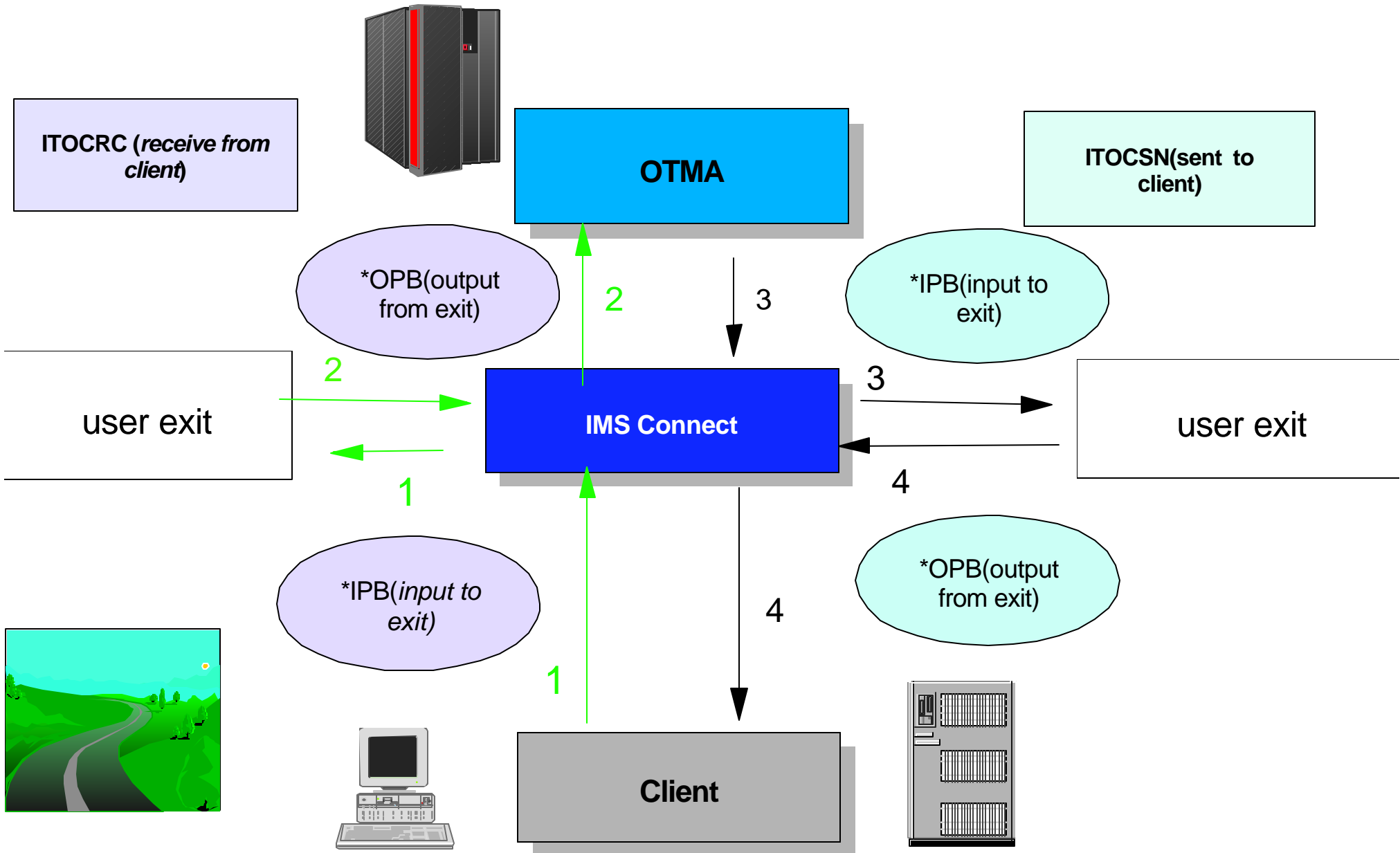
★ HWS RECORDER TRACE

- Enabling the Recorder trace
 - allocating a dataset and adding a HWSRCORD DD-card to the IMS Connect start-up JCL.

- STARTING and STOPPING HWS RECORDER TRACE
 - RECORDER OPEN opens the HWSRCORD dataset
 - RECORDER CLOSE closes the HWSRCORD dataset

- Print the HWS Recorder trace using IDCAMS utility

★ HWS RECORDER TRACE



HWS Recorder Trace

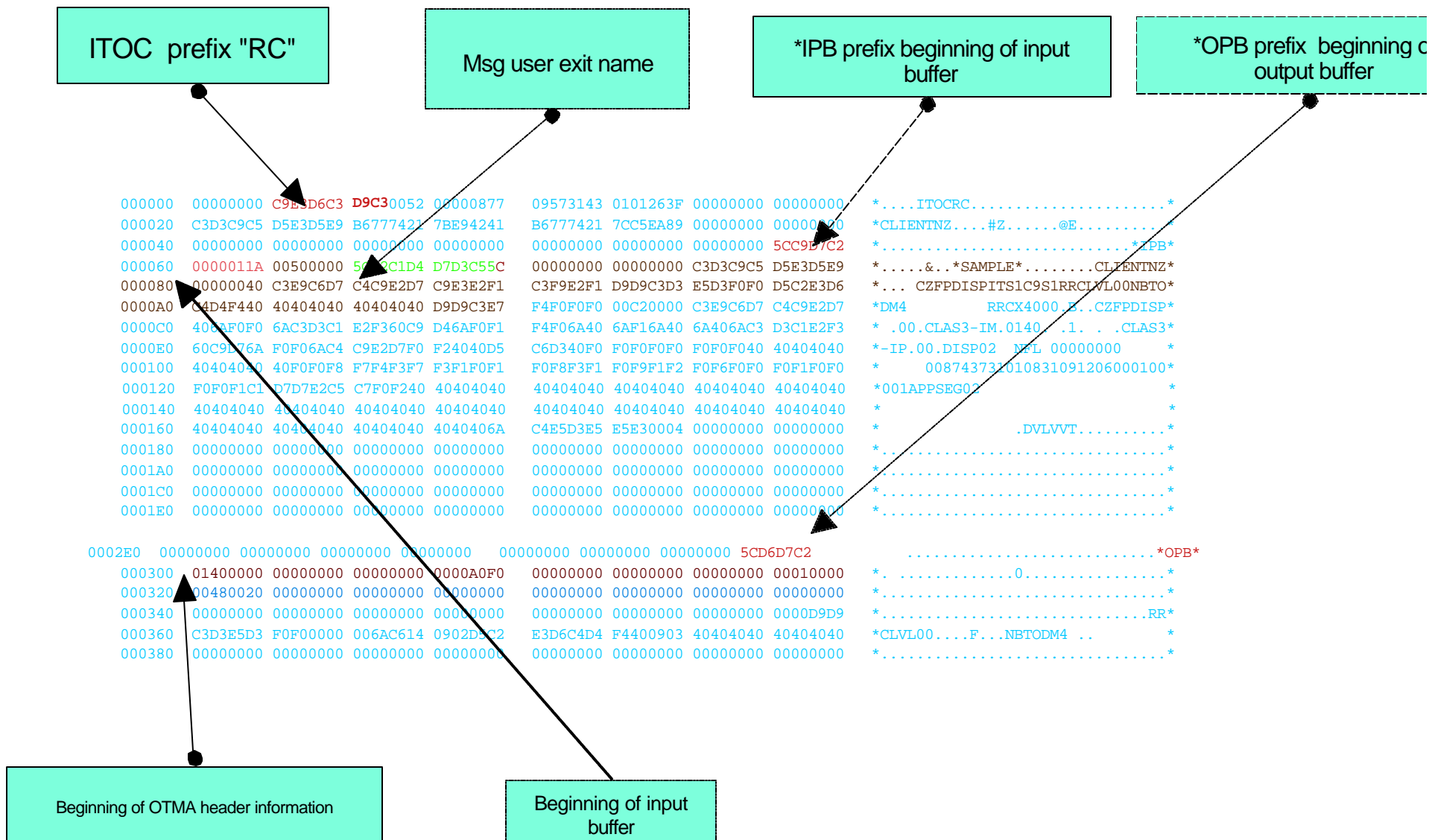
■ Sample IMS Recorder Trace output

```
000000 00000000 C9E3D6C3 D9C30052 00000877 09573143 0101263F 00000000 00000000 *....ITOCRC.....*
000020 C3D3C9C5 D5E3D5E9 B6777421 7BE94241 B6777421 7CC5EA89 00000000 00000000 *CLIENTNZ....#Z.....@E.....*
000040 00000000 00000000 00000000 00000000 00000000 00000000 00000000 5CC9D7C2 *.....*IPB*
000060 0000011A 00500000 5CE2C1D4 D7D3C55C 00000000 00000000 C3D3C9C5 D5E3D5E9 *....&...*SAMPLE*.....CLIENTNZ*
000080 00000040 C3E9C6D7 C4C9E2D7 C9E3E2F1 C3F9E2F1 D9D9C3D3 E5D3F0F0 D5C2E3D6 *... CZFPDISPITS1C9S1RRCXLVLO0NBTO*
0000A0 C4D4F440 40404040 40404040 D9D9C3E7 F4F0F0F0 00C20000 C3E9C6D7 C4C9E2D7 *DM4 RRCX4000.B..CZFPDISP*
0000C0 406AF0F0 6AC3D3C1 E2F360C9 D46AF0F1 F4F06A40 6AF16A40 6A406AC3 D3C1E2F3 * .00.CLAS3-IM.0140. .1. . .CLAS3*
0000E0 60C9D76A F0F06AC4 C9E2D7F0 F24040D5 C6D340F0 F0F0F0F0 F0F0F040 40404040 *-IP.00.DISP02 NFL 00000000 *
000100 40404040 40F0F0F8 F7F4F3F7 F3F1F0F1 F0F8F3F1 F0F9F1F2 F0F6F0F0 F0F1F0F0 * 008743731010831091206000100*
000120 F0F0F1C1 D7D7E2C5 C7F0F240 40404040 40404040 40404040 40404040 *001APPSEG02 *
000140 40404040 40404040 40404040 40404040 40404040 40404040 40404040 * *
000160 40404040 40404040 40404040 4040406A C4E5D3E5 E5E30004 00000000 00000000 * .DVLVVT.....*
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 *.....*0002E0
00000000 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 00000000 0000D9D9 *.....RR*
000360 C3D3E5D3 F0F00000 006AC614 0902D5C2 E3D6C4D4 F4400903 40404040 40404040 *CLVL00....F...NBTODM4 .. *
000380 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000 *.....*
0003A0 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000 *.....*
0003C0 00000000 00000000 00000000 00000000 00000100 0000C9E3 E2F1C3F9 E2F10000 *.....ITS1C9S1..*
0003E0 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000 *.....*
000400 00000000 0000D9D9 C3E7F4F0 F0F00000 00000000 00000000 00000000 00000000 *.....RRCX4000.....*
000420 00000000 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 *.....*
0004C0 00000000 00000000 00000000 00000000 000000C2 0000C3E9 C6D7C4C9 E2D7406A *.....B..CZFPDISP.*
0004E0 F0F06AC3 D3C1E2F3 60C9D46A F0F1F4F0 6A406AF1 6A406A40 6AC3D3C1 E2F360C9 *00.CLAS3-IM.0140. .1. . .CLAS3-I*
```



★ HWS RECORDER TRACE

● ITOCRC - receive from client



★ HWS RECORDER Trace

ITOCASN - *send to client*

```

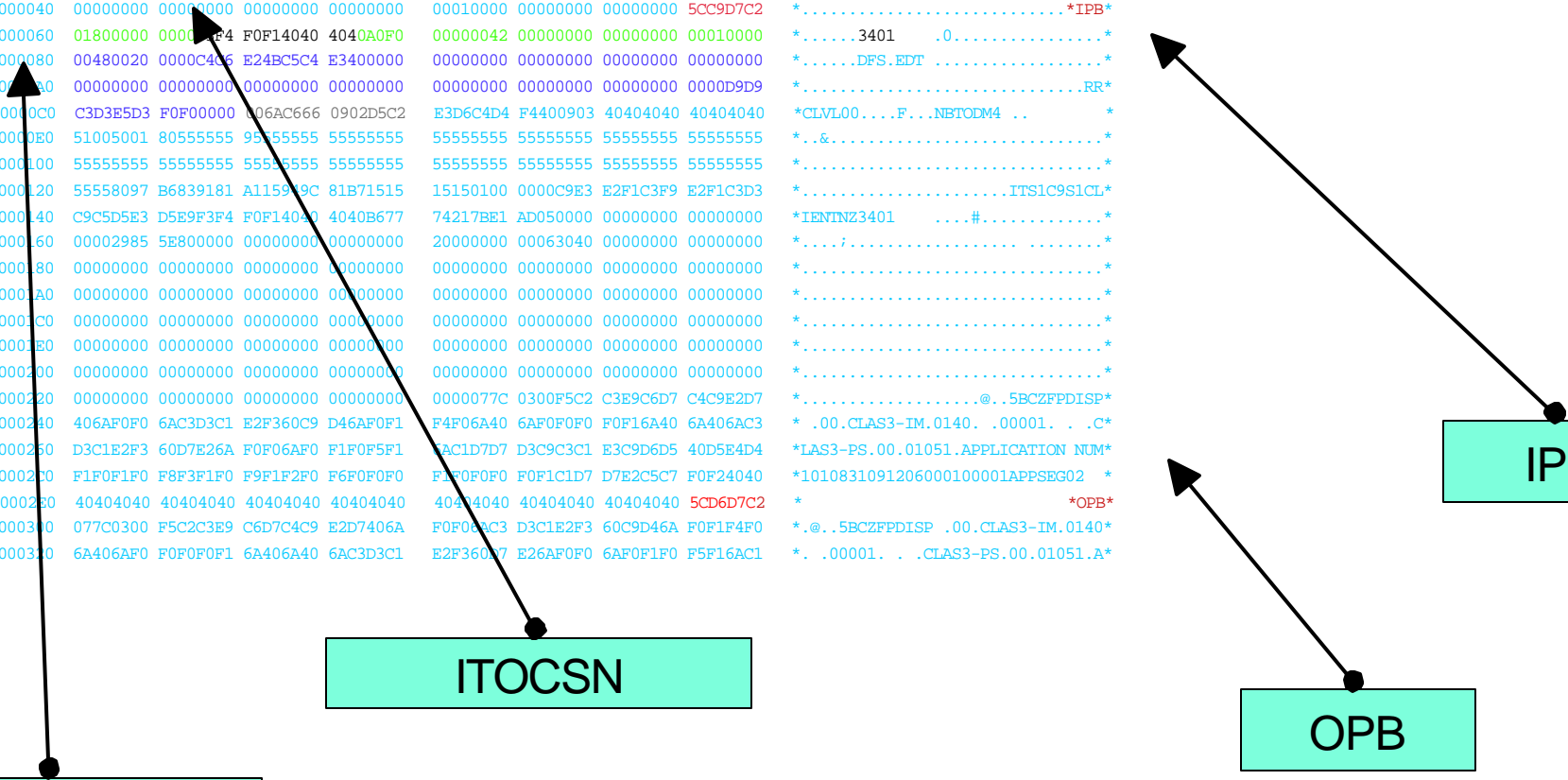
000000 00000000 091526C9 E2D53832 00009877 09574816 0101263F 00000000 00000000 *...ITOCASN.....*
000020 C3D3C9C5 D5E3D5E9 B6777431 6E47B807 00000000 00000000 B6777431 6E482C27 *CLIENINZ...>...>...*
000040 00000000 00000000 00000000 00000000 00010000 00000000 00000000 5CC9D7C2 *.....*IPB*
000060 01800000 00000000 F0F14040 4040A0F0 00000042 00000000 00000000 00010000 *.....3401 .0.....*
000080 00480020 0000C406 E24BC5C4 E3400000 00000000 00000000 00000000 00000000 *.....DFS.EDT.....*
000100 00000000 00000000 00000000 00000000 00000000 00000000 00000000 0000D9D9 *.....RR*
000120 C3D3E5D3 F0F00000 006AC666 0902D5C2 E3D6C4D4 F4400903 40404040 40404040 *CLVL00...F...NBTODM4 ..*
000140 51005001 80555555 95555555 55555555 55555555 55555555 55555555 55555555 *..&.....*
000160 55555555 55555555 55555555 55555555 55555555 55555555 55555555 55555555 *.....*
000180 55558097 B6839181 A115919C 81B71515 15150100 0000C9E3 E2F1C3F9 E2F1C3D3 *.....ITS1C9S1CL*
000200 C9C5D5E3 D5E9F3F4 F0F14040 4040B677 74217BE1 AD050000 00000000 00000000 *IENINZ3401 ....#.....*
000220 00002985 5E800000 00000000 00000000 20000000 00063040 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 *.....*
000300 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000 *.....*
000320 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000 *.....*
000340 00000000 00000000 00000000 00000000 00000077C 0300F5C2 C3E9C6D7 C4C9E2D7 *.....@...5BCZFDPDISP*
000360 406AF0F0 6AC3D3C1 E2F360C9 D46AF0F1 F4F06A40 6AF0F0F0 F0F16A40 6A406AC3 * .00.CLAS3-IM.0140 .00001. . .C*
000380 D3C1E2F3 60D7E26A F0F06AF0 F1F0F5F1 5AC1D7D7 D3C9C3C1 E3C9D6D5 40D5E4D4 *LAS3-PS.00.01051.APPLICATION NUM*
000400 F1F0F1F0 F8F3F1F0 F9F1F2F0 F6F0F0F0 F1F0F0F0 F0F1C1D7 D7E2C5C7 F0F24040 *1010831091206000100001APPSEG02 *
000420 40404040 40404040 40404040 40404040 40404040 40404040 40404040 5CD6D7C2 * *OPB*
000440 077C0300 F5C2C3E9 C6D7C4C9 E2D7406A F0F06AC3 D3C1E2F3 60C9D46A F0F1F4F0 *...5BCZFDPDISP .00.CLAS3-IM.0140*
000460 6A406AF0 F0F0F0F1 6A406A40 6AC3D3C1 E2F360C9 E26AF0F0 6AF0F1F0 F5F16AC1 * .00001. . .CLAS3-PS.00.01051.A*
  
```

OTMA HEADERS

ITOCASN

OPB

IPB

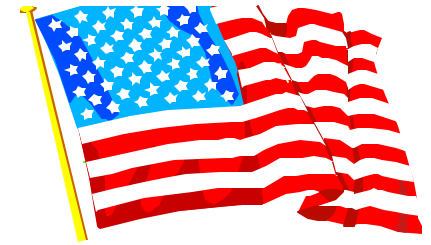


Agenda

- ★ IMS Connect Overview
- ★ IMS Connect and user exits
- ★ User Message Exits and Message Structures
- ★ IMS Connect DRU exit for asynchronous support
- ★ User Initialization Exit
- ★ HWS Recorder Trace
- ★ **References**
- ★ Question/Answers



★ 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)*

★ Questions/Answers

THANK YOU !

