



IMS Version 12

IMS Connect

Information Management software



Topics

- IMS Connect Type-2 Commands
- XML Converter Refresh
- New Recorder Trace Records
- Security Enhancements
 - RACF return Codes
 - USERID caching
- CM0 ACK NoWait for RYO clients
- Partial Read Status
- User Exit Load Modules

IMS Connect Type-2 Commands

Background

- **Commands for IMS Connect**
 - WTOR: reply to the outstanding prompt on the system console
 - R *xx, command* (command: VIEWHWS, VIEWPORT, VIEWDS...)
 - z/OS modify command
 - F *jobname, command* (command: QUERY, UPDATE)

- **IMS Control Center**
 - Capability to send commands from a TCP/IP client to IMS Connect to OM to process IMS Type-2 commands
 - IMSPLEX in the HWSCFGxx configuration

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From its inception, IMS Connect has provided a command interface to control and monitor its resources through a series of commands that can be entered through a WTOR interface. Alternatively, and as a newer interface, IMS Connect commands can also be issued through the z/OS (MVS) interface. The z/OS modify interface enables directing commands to IMS Connect using only the IMS Connect *jobname*.

With the IMS introduction of the Common Service Layer (CSL) and the associated IMS TYPE-2 command support through the Operations Manager and SPOCs, IMS Connect also introduced the IMS Control Center. The IMS Control Center is a TCP/IP SPOC that allows distributed clients to send IMS commands through IMS Connect and OM. This support in IMS Connect requires the inclusion of an IMSPLEX statement in the HWSCFGxx configuration file to define the target environment, along with the implementation of an IMSplex message exit (HWSCSLO0) that is defined for IMSplex support and is required to process IMS Control Center command string messages.

New Type-2 Commands

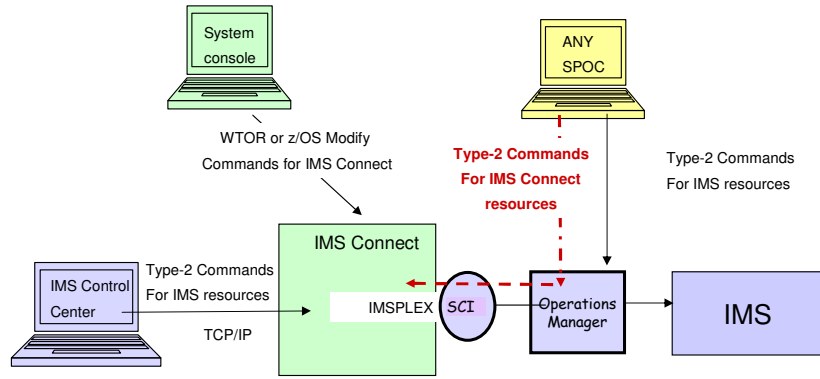
- **New Type-2 commands for IMS Connect resources**
 - QUERY IMSCON
 - UPDATE IMSCON
- **Conform to the IMS command structure using the OM API**
 - Processed by OM clients, e.g., TSO SPOC, REXX SPOC API, Batch SPOC, IMS Control Center, etc.
- **Can coexist with the previous WTOR and z/OS Modify commands**
 - No changes to the existing command functionality

The IMS Connect Type-2 Commands line item introduces new type-2 commands for IMS Connect resources into Version 12. These type-2 commands are equivalents and, in some cases, improvements to the existing WTOR and z/OS commands available to IMS Connect commands. These commands enable you to efficiently manage IMS Connect resources in an IMSplex, and to view consolidated command output. These new commands may be issued from the OM API.

Like all type-2 commands, these new commands are only supported through the Operations Manager (OM) API (for example, TSO SPOC, REXX SPOC API, Batch SPOC, IMS Control Center, or other clients or implementers of the OM API). However, because these type-2 commands are defined and processed by IMS Connect, all enhancements described in this document apply to IMS Connect only. There are no enhancements or modifications to OM, or to any other component of the IMSplex, including IMS.

The Environment

- New command environment for IMS Connect



New Type-2 Command Implementation

- Requires CSL components: SCI and OM
 - RM is not required for Type-2 commands

- Available automatically when Operations Manager is started
 - New commands are not routed to pre-IMS12 IMS Connect systems in an IMSplex

- Requires an IMSPLEX statement in the IMS Connect HWSCFGx file


```
IMSPLEX MEMBER=imsplexmembername,TMEMBER=sciname
```

 - No change to existing IMSPLEX statement
 - Multiple IMSPLEX statements can be specified if IMS Connect is to participate in multiple PLEXes

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The new Type-2 commands for IMS Connect are available in IMS version 12 when the Operations Manager is used. Note that only IMS 12 systems can process these commands. They are not routed to earlier releases of IMS that may be part of the IMSplex. To enable IMSplex support, the IMSPLEX statement in the IMS Connect configuration member is required. This statement already exists in IMS Connect and is not modified by this new capability. The IMSPLEX statement registers IMS Connect as a member of an IMSplex and enables both IMS type-2 command support for IMS Connect and communications between IMS Connect and other members of the IMSplex. Previously, the IMSPLEX statement only supported Type-2 commands for resources associated with IMS systems. The format of the IMSPLEX statement is as follows:

MEMBER= a 1- to 8-character alphanumeric name that identifies IMS Connect in the IMSplex. IMS Connect registers this name with SCI. SCI uses the name to manage communications between IMS Connect and other IMSplex members, such as OM or ODBM. The name must start with an alphabetic character.

TMEMBER= the name of the IMSplex that IMS Connect is joining, as specified on the IMSPLEX(NAME=) statement of the CSLSixxx PROCLIB member of the SCI instance that is managing communications between IMS Connect and the IMSplex.

Although type-2 command support requires the use of existing IMS Connect IMSplex support so that IMS Connect can communicate with OM, the new Type-2 command support does not require the IMS Control Center, nor does it require the IMSplex message exits HWSCSLO0 and HWSCSLO1.

If multiple IMSPLEX statements are defined in the configuration file, type-2 commands will be supported in each IMSplex. Note, however, that an IMS Connect instance can register only a single name in an IMSplex. If the IMSPLEX statement and the IMSPLEX parameter on another configuration statement in the HWSCFGxx PROCLIB member both specify the same IMSplex name on TMEMBER parameter, they must also specify the same IMS Connect name on the MEMBER parameter.

If the IMSplex goes down, IMS Connect is notified (through SCI) of the status of the IMSplex. When the IMSplex is brought back up and restarted, IMS Connect is notified and automatically reconnects to the IMSplex.

QUERY

```
QUERY IMSCON TYPE(type) NAME(name1, name2,...)  
      FILTER(filter) SHOW(attribute(s))
```

– TYPE = Type of resource in IMS Connect

- ALIAS - aliases of associated ODBMs (VIEWIA)
- CLIENT – active IMS Connect clients (no equivalent – information in VIEWPORT)
- CONFIG – IMS Connect status and activity (VIEWHWS)
- DATASTORE – datastores or IMS systems (VIEWDS)
- IMSPLEX – information about the IMSPLEX (VIEWIP)
- LINK – MSC logical link (no equivalent)
- MSC - MSC physical link (VIEWMSC - new for IMS to IMS TCP/IP Communications)
- ODBM – ODBMs and associated IMS aliases (VIEWOD)
- PORT – TCPIP port and associated clients (VIEWPORT)
- RMTIMSCON - remote IMS Connect and associated send clients (VIEWRMT - new for IMS to IMS TCP/IP Communications)
- SENDCLNT – send clients (no equivalent - new for IMS to IMS TCP/IP Communications)
- UOR - display unit of recovery identifier (VIEWUOR)

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The QUERY IMSCON command displays the current status and activity of one or more IMS Connect resources and is only processed by IMS Connect. It is not supported by IMS or any other IMS components. The TYPE keyword on the command specifies the type of IMS Connect resource to display. The default is TYPE(CONFIG), which displays general IMS Connect information. If the TYPE keyword is omitted, then TYPE(CONFIG) is assumed.

The QUERY IMSCON command is processed by every IMS Connect to which OM routes the command, whether or not OM has designated a particular IMS Connect as the command master.

UPDATE

```
UPDATE IMSCON TYPE(type) NAME(name1, name2,...)
      START(condition1,condition2,...) STOP(condition1,condition2,...)
      SET(condition1,condition2,...)
```

- TYPE = Type of resource in IMS Connect
 - ALIAS – IMS aliases and associated ODBMs (STARTIA,STOPIA)
 - CLIENT – TCPIP clients (STOPCLNT)
 - CONFIG – IMS Connect configuration status and activity (CLOSEHWS, SETOAUTO, SETPWC, SETRACF, SETRRS, RECORDER, SETUID)
 - CONVERTER – Refresh XML converters (REFRESH – new IMS Connect enhancement)
 - DATASTORE – update datastore status (OPENDS,STARTDS, STOPDS)
 - IMSPLEX – update connection to the IMSplex (OPENIP,STARTIP,STOPIP)
 - LINK – MSC logical link (STOPLINK - new for IMS to IMS TCP/IP Communications)
 - MSC - MSC physical link (STARTMSC/STOPMSC - new for IMS to IMS TCP/IP Communications)
 - ODBM – ODBMs and associated IMS aliases (STARTOD/STOPOD)
 - PORT – TCPIP port and associated clients (OPENPORT/STOPPORT)
 - RACFUID – update RACF userid caching (REFRESH – new IMS Connect enhancements)
 - RMTIMSCON - remote IMS Connect and associated send clients (STARTMRT/STOPRMT - new for IMS to IMS TCP/IP Communications)
 - SENDCLNT – send clients (STOPSCLN – new for IMS to IMS TCP/IP Communications)

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The Type-2 UPDATE IMSCON command is specified through the OM API and is processed by every IMS Connect to which OM routes the command, whether or not OM has designated a particular IMS Connect as the command master. It is not supported by IMS or any other IMS component.

The TYPE keyword is a required keyword that specifies the type of IMS Connect resource to update. Unlike the QUERY command, there is no default for the TYPE parameter.

Type-2 Command Examples

QUERY ...

- Example of previous WTOR command

```
R 19,VIEWPORT 9999
PORT=9999      STATUS=ACTIVE      KEEPAV=0 NUMSOC=5 EDIT=      TIMEOUT=0
CLIENTID USERID  TRANCODE DATASTORE STATUS      SECOND CLNTPORT IP-ADDRESS APSB-TOKEN
CLIENT04 USRT001 ITOC04  IMS1      CONN          29 4049 0:0:0:0:FFFF:930:6FE6
CLIENT03 USRT003 itoc04  IMS1      RECV          223 4005 0:0:0:0:FFFF:930:6FE6
CLIENT02 USRT003 FESTX2  IMS1      RECV          335 3992 0:0:0:0:FFFF:930:6FE6
CLIENT01 USRT003 APOL12  IMS1      RECV          596 3945 0:0:0:0:FFFF:930:6FE6
TOTAL CLIENTS=4 RECV=3 CONN=1 XMIT=0 OTHER=0
```

- VIEWPORT output:
 - All clients are displayed
 - Individual client information cannot easily be found

This visual is simply a reminder of what the previous VIEWPORT command produces.

QUERY...

- Equivalent command

- QUERY IMSCON TYPE(PORT) SHOW(ALL)

- Output:

- All clients are displayed by default
- Individual client information can easily be found by sorting or filtering

- QUERY IMSCON TYPE(PORT) CLIENT(*clientid*) SHOW(ALL)

- Output:

- Reports information based on the filters provided
- CLIENT() filter displays only those clients specified
- USERID() filter displays only those userids specified

The equivalent QUERY command to the VIEWPORT is the QUERY IMSCON TYPE(PORT) command which allows you to show all the information or to request a filter.

QUERY ...

- Example of new QUERY command

```

QUERY IMSCON TYPE(PORT) NAME(9999) SHOW(ALL)

Port      MbrName      CC  KeepAv      NumSoc Edit      TimeOut  Status
9999     HWS1          0    0            5            0    ACTIVE
9999     HWS1          0
9999     HWS1          0
9999     HWS1          0
9999     HWS1          0
(Screen 2)
Port      MbrName      TotClnts TotRecv TotRead TotConn TotXmit TotOther
9999     HWS1          4        3        0        1        0        0
9999     HWS1
9999     HWS1
9999     HWS1
9999     HWS1
(Screen 3)
Port      MbrName      ClientID  UserID      Trancode  DataStore  CStatus      Second
9999     HWS1          CLIENT03  USRT003     itoc04    IMS1       RECV         229
9999     HWS1          CLIENT02  USRT003     FESTX2    IMS1       RECV         341
9999     HWS1          CLIENT01  USRT003     APOL12    IMS1       RECV         601
9999     HWS1          CLIENT04  USRT001     ITOC04    IMS1       CONN         35
(Screen 4)
Port      MbrName      ClntPort  IPAddress      ApsbToken
9999     HWS1          4005      0:0:0:0:FFFF:930:6FE6
9999     HWS1          3992      0:0:0:0:FFFF:930:6FE6
9999     HWS1          3945      0:0:0:0:FFFF:930:6FE6
9999     HWS1          4049      0:0:0:0:FFFF:930:6FE6

```

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These next two visuals give examples of the output resulting from variations of the QUERY IMSCON TYPE(PORT) command.

Example of the Value of Type-2 Commands

- **Problem: Determine how to find a single active client**
 - In a configuration where there might be multiple IMS Connect systems using Sysplex Distributor
 - And many clients active on each IMS Connect

- **Solutions:**
 - Prior to IMS 12
 - Issue VIEWPORT commands to each system in the IMSplex
 - Scan those results for the one client on that port (there could be hundreds).
 - And repeat for each port if there are multiple ports

 - With IMS 12 Type-2 command support
 - Simply QUERY the client
 - No need to know the system, or the port

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The following example shows the difference in issuing the WTOR commands versus the Type-2 commands. In this scenario which includes multiple IMS Connect systems in a sysplex distributor environment, information about a specific client needs to be retrieved.

Using the WTOR commands interface, a VIEWPORT will need to be issued against each IMS Connect and each port (if multiple) on that IMS Connect system. The subsequent results from each command will need to be scanned to find the client.

Alternatively, using the Type-2 command interface, a single QUERY against the specific client name will be sent to all the IMS Connect systems in the IMSplex. The responses retrieved from all those systems will be ultimately displayed as a single response.

Example of the Value of Type-2 Commands...

- Example scenario: 2 IMS Connect systems
 - On HWS1: 2 clients using port 9999
 - On HWS2: 4 clients using port 5555
- Solution 1: to find CLIENT05, issue VIEWPORTs on each system, and then scan the results

```

On HWS1: R 30,VIEWPORT 9999
HWSC0001I  PORT=9999      STATUS=ACTIVE  KEEPAV=0  NUMSOC=3  EDIT=      TIMEOUT=0
HWSC0001I  CLIENTID USERID  TRANCODE  DATASTORE  STATUS      SECOND  CLNTPORT  IP-ADDRESS      APSB-TOKEN
HWSC0001I  CLIENT02 USRT003  FESTX2   IMS1       RECV        221  1588      0:0:0:0:FFFF:930:68B6
HWSC0001I  CLIENT01 USRT003  FESTX2   IMS1       RECV        435  1541      0:0:0:0:FFFF:930:68B6
HWSC0001I  TOTAL CLIENTS=2  RECV=2  READ=0  CONN=0  XMIT=0  OTHER=0

On HWS2: R 29,VIEWPORT 5555
HWSC0001I  PORT=5555      STATUS=ACTIVE  KEEPAV=0  NUMSOC=5  EDIT=      TIMEOUT=0
HWSC0001I  CLIENTID USERID  TRANCODE  DATASTORE  STATUS      SECOND  CLNTPORT  IP-ADDRESS      APSB-TOKEN
HWSC0001I  CLIENT06 USRT003  DEBSTRAN  IMS2       RECV        39  1637      0:0:0:0:FFFF:930:68B6
HWSC0001I  CLIENT05 USRT003  DEBSTRAN  IMS2       RECV        70  1630      0:0:0:0:FFFF:930:68B6
HWSC0001I  CLIENT04 USRT003  FESTX2   IMS2       RECV        106  1623      0:0:0:0:FFFF:930:68B6
HWSC0001I  CLIENT03 USRT003  DEBSTRAN  IMS2       RECV        144  1607      0:0:0:0:FFFF:930:68B6
HWSC0001I  TOTAL CLIENTS=4  RECV=4  READ=0  CONN=0  XMIT=0  OTHER=0

```

- Solution 2: issue a single Type-2 QUERY on the CLIENT name CLIENT05

```

Single SPOC Command to all IMS systems: QRY IMSCON TYPE(CLIENT) NAME(CLIENT05) SHOW(PORT)
ClientID MbrName      CC CText      Port
CLIENT05 HWS1        10 No resources found
CLIENT05 HWS2         0

```

Example of the Value of Type-2 Commands...

- For more information on a specific client, issue a QUERY command with filtering

```
QUERY IMSCON TYPE(PORT) NAME(5555) CLIENT(CLIENT05) SHOW(ALL)
```

```
(screen 1)
```

Port	MbrName	CC	ClientID	UserID	Trancode	DataStore
5555	HWS2	0	CLIENT05	USRT003	DEBSTRAN	IMS2

```
(screen 2)
```

Port	MbrName	CStatus	Second	ClntPort	IpAddress	ApsbToken
5555	HWS2	RECV	70	1630	0:0:0:0:FFFF:930:68B6	

QUERY...

- **QUERY IMSCON TYPE(CONFIG):**
 - Displays current IMS Connect status and activity
 - Equivalent to the configuration section of the VIEWHWS output
 - Does not show specific port or datastore information
 - **Note: TYPE(CONFIG) is the default for QUERY IMSCON**

```

QUERY IMSCON SHOW (ALL)

(screen 1)
MbrName CC Version IconID IPAddress      MaxSoc   TimeOut NumSoc WarnSoc
HWS1    0 V12      HWS1    009.030.218.072  50      5000   8    80

(screen 2)
MbrName WarnInc UidCache UidAge      RACF PswdMc RRS RRSStat Recorder SMem
HWS1    5 Y        2147483647 N R      Y REGISTERED N SM01

(screen 3)
MbrName Cm0Atoq Adapter ODBMAC      ODBMTO ODBMIpMem ODBMTMem
HWS1    Y          Y          6000 HWS1      PLEX1

```

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Note that TYPE(CONFIG) is the default if TYPE is not specified. Unlike the similar WTOR command VIEWHWS or z/OS command QUERY MEMBER TYPE(IMSCON), individual resources such as PORT and DATASTORE are not displayed with the type-2 QUERY IMSCON TYPE(CONFIG) command.

Benefits

- **Use of the OM API for IMS Connect commands**
 - Improve ease-of-use for managing IMS Connect resources, by enhancing type-2 command architecture to include IMS Connect resources
 - Enables a consolidated command output
 - Greater efficiency especially in an IMSplex environment
 - Reduces the complexity of using WTOR or z/OS commands
 - Increases efficiency by consolidating output of several WTOR and z/OS commands into a single type-2 command

IMS Connect resources can already be managed by existing WTOR and z/OS commands. However, the amount of diagnostic information available with these commands is often insufficient to diagnose certain problems. In addition, the inconsistency and variety of WTOR and z/OS commands supported makes managing the IMSplex difficult at times. The new type-2 commands are intended to enhance the diagnostic information available, make it easier to manage the IMSplex by consolidating the various WTOR and z/OS commands into a limited number of type-2 commands, and standardize the IMS Connect command interface to conform to the same interface used for the base IMS product.

Additional Enhancements

XML Converter Refresh

- New Command to refresh an XML converter file that is already in use

```
UPDATE IMSCON TYPE(CONVERTER)...  
xx,REFRESH CONVERTER NAME(cvtrname)  
F hws,UPDATE CONVERTER NAME(cvtrname) OPTION(REFRESH)
```

- Supported by all command interfaces: Type-2, WTOR, z/OS Modify
- Converter files continue to be:
 - Generated using RDz
 - Loaded by IMS Connect from STEPLIB/JOBLIB/LNKLIST
- Benefit
 - More timely ability to change and implement converter files
 - Without requiring an IMS Connect restart

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The IMS Connect XML Adapter uses COBOL Converter files to perform the transformation from XML to an IMS data stream and vice versa. The Converters are generated from COBOL copybooks and Web Service XML Schema using RDz tooling and then loaded into the IMS Connect address space. Prior to IMS 12, the Converters, once loaded, are static in the IMS Connect address space. For any changes to a Converter that has already been used (and therefore loaded into the IMS Connect address space), a restart of IMS Connect is required to load the new version.

With IMS 12, the WTOR, z/OS Modify and the new Type-2 UPDATE IMSCON TYPE(CONVERTER) can all request a refresh of the converter file that is in memory.

The refresh of PL/I Converters will also be supported.

New IMS Connect Recorder Trace Records

- New level of tracing adds records for TCP/IP and XCF sends/receives

ICONTR – TCP/IP Receive
ICONTS – TCP/IP Send
ICONIR – IMS OTMA Receive
ICONIS – IMS OTMA Send

- Requires the use of the BPE External Trace support introduced in IMS 11
 - Due to the amount of data that can be produced
- Requires tracing to be set to LEVEL(HIGH)
- Benefit
 - Additional trace points provide the ability to capture client errors for improved problem determination and analysis
 - The use of BPE external tracing allows large amounts of data to be captured

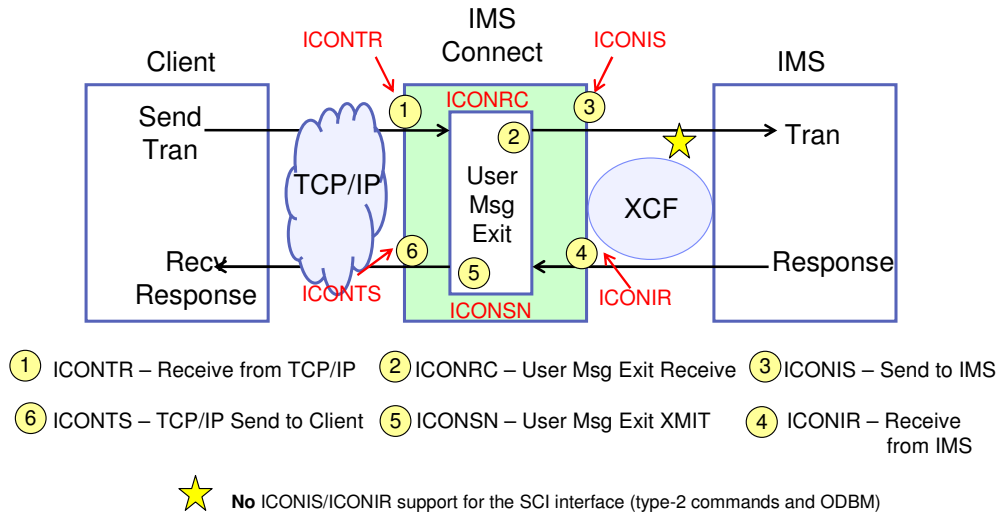
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Some problems with IMS Connect recorder tracing in previous releases included the inability to capture some client errors if they were experienced and rejected prior to being passed to the User Message Exits. As a result, a TCP/IP Packet trace had to be run in order to capture information about these conditions. Similarly many OTMA messages were not written if they were not destined for a User Message Exit.

In IMS 12, enhancements have been made to include new trace points when using the BPE External Trace for IMS Connect. When requested, all messages between TCP/IP and IMS Connect are written as well as all messages between OTMA and IMS Connect if the trace level is set to HIGH. The intent of this new capability is to aid both in client development and problem determination. The BPE External Trace and the use of GDGs is required to handle the larger amounts of data.

New IMS Connect Recorder Trace Records ...

F HWS1,UPDATE TRACETABLE NAME(RCTR) OWNER(HWS) **LEVEL(HIGH)** EXTERNAL(YES)



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The IMS Connect Recorder Trace using the BPE External Trace can be started by either the BPE command UPDATE TRACETABLE NAME(RCTR) OWNER(HWS) LEVEL(MEDIUM) EXTERNAL(YES) or by specifying TRCLEV=(RCTR,MEDIUM,HWS) in the BPECFG proclib member.

Note that trace records ICONIS and ICONIR are only created for the XCF interface between IMS Connect and IMS. This means that these trace records are not written for the SCI interface which is used for Type-2 commands and ODBM interactions.

Changing the BPE trace level from **MEDIUM to HIGH** is what requests the additional writing of the new Recorder Trace records.

Security – RACF Return Codes

- Previously, IMS Connect returned RSM RC=08 RSN=40 for any and all security violations
 - No indication of specific reason,
 - E.g. invalid userid, incorrect password, password expired, etc.
 - With IMS 12, enhancements to RACF Return Codes:
 - In the Request Status Message (RSM) for RYO and the IMS SOAP Gateway
 - RSM_RACFRC
 - In the OTMA User Data section for the IMS TM Resource Adapter
 - OMUSR_RACF_RC
 - New IMS Connect Protocol level indicates support
 - OMUSR_PROLEV = OMUSR_PR03
- **Benefit**
 - Improved explanation and understanding of security violation

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IMS Connect has used a single Return Code and Reason Code to indicate security failures for RACF authentication. This single set of indicators oftentimes makes it difficult for remote client programs to determine the actual cause of the failure that is preventing them from taking corrective action. For example, a client program needs to be able to differentiate an expired password failure from a revoked userid.

With IMS 12, IMS Connect has been enhanced to add the RACROUTE VERIFY return code to the Request Status Message (RSM) returned to the client for security failures. The list of possible return codes are documented in the z/OS Security Server RACROUTE Macro Reference.

Security – RACF Userid Caching

- Existing IMS Connect security with RACF=Y
 - Limited caching of RACF Utoken
 - Consecutive requests on a persistent socket with the same Userid/Password/Group
- IMS 12 enhancement with RACF=Y
 - Common cache for userids across ALL sessions and ALL ports
 - **HWSCFG HWS statement: UIDCACHE={N|Y} , UIDAGE=aging_value**

```

xx,VIEWHWS
      HWSC0001I  HWS ID=HWS1      RACF=Y  PSWDMC=R
      HWSC0001I          UIDCACHE=Y  UIDAGE=300
      HWSC0001I  MAXSOC=2000  TIMEOUT=6000
      HWSC0001I  NUMSOC=6      WARNSOC=80%  WARNINC=5%
      HWSC0001I  RRS=Y      STATUS=ACTIVE
      HWSC0001I  VERSION=V12  IP-ADDRESS=009.030.218.050
      HWSC0001I  SUPER MEMBER NAME=      CMO ACK TOQ=
      HWSC0001I  ADAPTER=Y
  
```

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When IMS Connect is configured to perform RACF userid authentication, a RACROUTE VERIFY is issued using the provided Userid, password/PassTicket, group, and APPL for each client request. This can result in high overhead in both CPU consumption and EXCPs to the RACF database. Up to this point, IMS Connect has had very limited caching for security credentials. For example, the RACF userid is cached for each session. If consecutive requests from the same client have the same userid, password, group and APPL, then the cached Userid is passed to OTMA and the RACROUTE VERIFY call is avoided. Depending on the customer environment, this caching may not be effective.

In IMS 12, IMS Connect has a common cache for RACF Userids across all sessions. This allows the same userid to be used from the cache across different sessions for any request. Additionally, an aging value can be set to specify the interval in which a cached entry may be used before being refreshed. The IMS Connect configuration member can two new parameters that are associated with this new capability:

- UIDCACHE which controls whether RACF Userid Caching is used when RACF authentication is enabled.
- UIDAGE which controls the automatic refresh interval for userids when RACF Userid Caching is enabled.

Note that RACF Utoken caching is only available when security is enabled, e.g., RACF=Y.

Security – RACF Userid Caching ...

- **Commands to enable caching**

- WTOR: xx,SETUIDC ON
- z/OS Modify: F hws,UPDATE MEMBER TYPE(IMSCON) SET(UIDCACHE(ON))
- Type-2: UPDATE IMSCON TYPE(CONFIG) SET(UIDCACHE(ON))

```
HWSP1501I  RACF USERID CACHING {ENABLED | DISABLED},M=SDRC
```

- **Cached userids are refreshed based on aging value**

- Or optionally by commands

```
xx,REFRESH RACFUID NAME(USRT003)
F hws,UPDATE RACFUID NAME(USRT003) OPTION(REFRESH)
UPDATE IMSCON TYPE (RACFUID) ...
```

```
HWSP1504I  RACF USERID uidname WAS SUCCESSFULLY REFRESHED,M=SDRC
```

- **Benefits**

- Elimination of redundant RACROUTE VERIFY calls
 - Reduce CPU usage and RACF I/O

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Commands for enabling the support and for refreshing cache entries manually are also provided as part of this enhancement. Messages HWSP1501I and HWSP1504I, respectively, report on the enabling/disabling of the UIDCACHE and a subsequent refresh.

The potential benefits of the implementation of this capability include a reduction in CPU usage and RACF I/O as a result of eliminating redundant RACROUTE VERIFY calls.

CM0 ACK NoWait for RYO Clients

- Existing protocol for Roll Your Own (RYO) clients requires
 - CM0 Send-Receive interactions to receive a timeout notification after ACK/NAK
 - Receive and timeout flow adds unnecessary overhead to the client application
- New option of NoWait on ACK or NAK
 - Indicates the remote client will not issue subsequent receive

Previous CM0 send-receive flow

Send request
 Receive response
 Send ACK
 Receive T/O

New CM0 send-receive flow

Send request
 Receive response
 Send ACK NoWait

(no need to issue receive
 for final timeout)

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IMS Connect protocol requires Roll-Your-Own (RYO) clients that use Commit-Then-Send (CM0) Send-Receive interactions to receive a timeout notification after they reply ACK or NAK. The ACK or NAK is followed by a minimum 0.01 second delay. This extra receive and timeout can add unnecessary overhead to the client application flow. In IMS 12, the client program now has the option of using NoWait indicator on the ACK or NAK to indicate they will not issue a subsequent receive thereby expediting the message exchange flow.

This capability is the way IMS TM Resource adapter for JEE clients has worked since IMS 10. IMS 12 adds the support for RYO clients.

CM0 ACK NoWait for RYO Clients - Implementation

- IMS Connect indicates to the remote client that the support is available in the CSM on response

CSM_FLG1 = CSM_PRLVLFLG X'10' Protocol Level Available

CSM_PROTOLVL = CSM_PR02 X'02' CM0 Nowait ACK Support

```

*****
* CSM          Complete Status Message
*****
CSMMask       DSECT          Complete status message dsect
CSM_Len       DS           H          Length of CSM
CSM_FLGS      DS           0H        CMS FLAG BYTES
CSM_FLG1      DS           X          FLAG BYTE
CSM_AMSG      EQU          X'80'     ASYNCH MSG Q'D IN IMS
CSM_CONV      EQU          X'40'     CONVERSATIONAL OUTPUT
CSM_ACK_NAK   EQU          X'20'     ACK/NAK REQUIRED
CSM_PRLVLFLG  EQU          X'10'     PROTOCOL LEVEL AVAILABLE
CSM_PROTOLVL  DS           X          IMS CONNECT PROTOCOL LEVEL
CSM_PR00      EQU          X'00'     00 - BASE PROTOCOL LEVEL
CSM_PR01      EQU          X'01'     01 - NOT USED
CSM_PR02      EQU          X'02'     02 - CM0 ACK NOWAIT SUPPORT
CSM_PRLVLFLG  EQU          CSM_PR02  MAXIMUM PROTOCOL LEVEL
CSM_Id        DS           CL8       CSM id '*CSMOKY*' ascii/ebcdic
CSMMask_Len   EQU          *-CSMMask  Size of CSM

```

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IMS Connect responses to remote clients indicate its protocol level in the Complete Status Message (CSM). This allow the client to determine which features are supported by IMS Connect. The IMS Connect protocol level is the same as currently exists in the HWSOMPFX OMUSR_PROLEV. IMS Connect RYO clients can then determine that IMS Connect supports CM0 ACK NoWait.

CM0 ACK NoWait for RYO Clients – Implementation ...

- The remote client
 - Sends an ACK for the previous response and specifies ACK NoWait

```
IRM_F1 = IRM_F1_NoWait X'02'
IRM_TIMER = X'E9' / C'Z'
```

- And no longer issues a final receive

```
Send request
Receive response (CSM_PRLVLFLG+ CSM_PR02)
  check values
Send ACK          (IRM_F1_NoWait + IRM_TIMER = X'E9')
...new work...
```

- Benefit
 - Greater efficiency and simplified interaction
 - Eliminates need for extra send after an ACK/NAK

Once the remote program determines from reading the CSM that IMS Connect supports the ACK NoWait option, it can choose the new IMS Request Message (IRM) flag requesting CM0 ACK NoWait as well as specify a timer value of X'E9' (char Z) in the IRM_TIMER field. The client then proceeds to its next request without having to issue a receive for the time out.

Partial Read Status

- **New READ client status**
 - The message has been received by IMS Connect but is not yet considered a complete input message
 - Should be transient but can be an indicator of a problem
 - Affects VIEWPORT, VIEWHWS, QUERY MEMBER, QUERY PORT, QUERY IMSCON command output

- **Targets the problem**
 - Remote clients sends a request to IMS Connect specifying LLLL
 - IMS Connect reads from TCP/IP until LLLL bytes received
 - If the client incorrectly has LLLL larger than message size
 - Client waits for the response message from IMS Connect
 - BUT, IMS Connect cannot process the message because it has to wait for rest of the input up to the LLLL value
 - Most common in development environments

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A new READ status has been added to the output of several VIEW and QUERY commands to indicate how long a remote program has been waiting in a READ state. This means that IMS Connect is still reading the input message.

The problem that is being addressed is as follows:

- An IMS Connect client begins interaction with IMS Connect by sending an input message specifying the length of the message with a four byte length (LLLL) at the start of the message.
- IMS Connect always reads the first four bytes to determine how much more must be read from TCP/IP.
- Problems can arise if the client miscalculates the length and sends less than the length indicated by the LLLL because typically, after a send, the client turns around and issues a receive to wait for the response. Unfortunately, because of the invalid LLLL specification, IMS Connect remains waiting for the remainder of a message that never come.

Prior to IMS 12, commands against IMS Connect that view the state of the client simply show it as being in RECV state without any indication that there might be an issue.

Partial Read Status ...

Implementation

xx,VIEWPORT 9999

HWSC0001I	PORT=9999	STATUS=ACTIVE	KEEPAV=0	NUMSOC=4	EDIT=	TIMEOUT=0
HWSC0001I	CLIENTID	USERID	TRANCODE	DATASTORE	STATUS	SECOND CLNTPORT IP-ADDRESS
HWSC0001I	CLIENT01	USRT001	APOL12	IMS1	RECV	113 2414 009.023.038.110
HWSC0001I	CLIENT02	USRT002		IMS1	READ	2147 2416 009.023.038.110
HWSC0001I	CLIENT03	USRT003		IMS1	CONN	13 2418 009.023.038.110
HWSC0001I	TOTAL CLIENTS=3 RECV=1 READ=1 CONN=1 XMIT=0 OTHER=0					

- If the client remains in READ for an extended period, then a potential problem exists

Benefit

- Facilitates the detection of a remote application programming error
 - Invalid length specification of an input message

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IMS Connect internally knows when an input message from the client is being read from TCP/IP. This enhancement indicates this condition by showing the client in READ state (instead of RECV) when a command is issued that displays the client state. This state exists once IMS Connect has received the LLLL until the complete message has been read in which case the state turns to RECV. The number of seconds in a given state is already reported on the display output. If a client remains in READ state for an extended period (as indicated by the number of seconds) then corrective action may be required.

IMS Connect User Exit Load Modules

- **IMS Connect ships load modules for User Exits**
 - HWSUNIT0, HWSJAVA0, HWSSMPL0, HWSSMPL1
 - Previously, working samples were provided but always had to be assembled and bound
 - Even if no changes were made to the provided source samples
- **Benefit**
 - Eases installation and maintenance processing if the user exits are to be used unchanged

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IMS Connect requires certain exits be present or else it will abend during initialization. IBM supplies working samples for these exits but requires customers to assemble and bind them even if no changes are made. Each time customers apply IMS Connect maintenance they must remember to assemble and link edit the samples again.

Many customers use the sample exits without any modifications. IMS Connect now provides the load modules in addition to the source for the following exits: HWSUINIT, HWSJAVA0, HWSSMPL0 and HWSSMPL1. IMS Connect will always load HWSUINIT and HWSJAVA0 while HWSSMPL0 and HWSSMPL1 are optional and must be specified in the IMS Connect configuration file on the EXIT parameter of the TCPIP statement.

IMS Connect Enhancements – Overall Benefits ...

- **New Type-2 Commands**
 - Improve ease-of-use for managing IMS Connect resources, by enhancing type-2 command architecture to include IMS Connect resources
- **XML Converter Refresh**
 - Eliminates the requirement to restart IMS Connect to change a converter for IMS SOAP Gateway Adapter customers
- **New Recorder Trace Records at “High” level**
 - Produces more trace information about TCP/IP and XCF activity
- **Security Enhancements**
 - RACF return Codes
 - Provide better information about security violations
 - USERID caching
 - Improve security by eliminating many RACROUTE VERIFY calls

IMS Connect Enhancements – Overall Benefits

- **CM0 ACK NoWait for RYO clients**
 - Greater efficiency and simplified interaction for clients that need to process ACKs and NAKs
- **Partial Read Status**
 - Facilitates the detection of a remote application programming error due to invalid length specification
- **User Exit Load Modules**
 - Eliminates the need to assemble/bind sample exits if they are not modified