IMS 13

IBM

IMS 13 System Enhancements

Information Management software

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IMS System Topics

- IMS Connect Enhancements

- IMS Connect Command Enhancements

- IMS Repository Enhancement

- IMS User Exit Enhancements

- Security

- /DIAG Command Enhancements

- Concurrent Application Threads

- Reduced Total Cost of Ownership (TCO)

IMS Connect Enhancements

Topics

- XML Converter Enhancements
  - Query support for XML Converters
  - Ability to increase the number of Converters that can be loaded
- Auto-restart of the Language Environment (LE)
- Expanded Recorder Trace Records
- Use of RACF Event Notification Facility (ENF) Support for cached RACF UserIDs (UID)
- Reporting of overall health to Workload Manager (WLM)
- Configurable TCP/IP backlog (queue) size
- Passphrase support
- ResumeTPIPE Socket termination enhancement
- Performance enhancements

XML Converter Enhancements

- Support for extending the current limit of 100 up to 2000 for the maximum number of XML converters
  - New IMS Connect configuration parameter MAXCVRT
    ADAPTER(…, **MAXCVRT**= *value)*
  - IMS 12 (PM64487 / UK79728)

- Capability to view converters that are currently loaded
  - New Type-2 Command: **QUERY IMSCON TYPE(CONVERTER)**
    - Requests detailed information about XML converters in IMS Connect
  - Enhanced output displays on existing commands
    - Show current number of converters and maximum limit

- Benefits
  - Enhances the flexibility of converter usage
    - Directly impacts IMS Soap Gateway environments

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The IMS Connect XML Adapter uses COBOL or PL/I converters to perform the transformation from XML to byte data and vice versa for the IMS SOAP Gateway functionality. The Converters are generated from RDz tooling and loaded in the IMS Connect address space. The IMS application COBOL copybook and Web Service XML Schema are used to generate the Converters. The IMS Soap Gateway was originally introduced in IMS V9 as part of the Integration Suite and is currently distributed with the IMS Enterprise Suite as the IMS ES Soap Gateway.
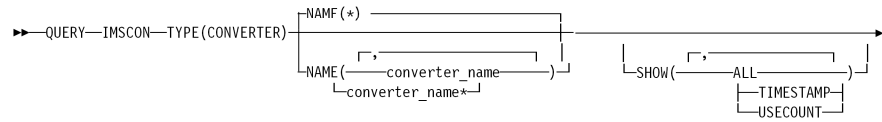
The previous maximum of 100 XML Converters that could be loaded at any one time into an IMS Connect instance has been increased to 2000. This maximum is controlled through a new MAXCVRT configuration parameter in the ADAPTER statement of the IMS Connect HWSCFGx configuration member of PROCLIB.

In IMS V12, the WTOR, z/OS Modify and the Type-2 UPDATE IMSCON TYPE(CONVERTER) commands could all be used to request a refresh of a converter file that was loaded in IMS Connect. IMS V13 has enhanced the Type-2 command interface with a new command to request detailed converter information. Additionally, the output from existing commands that display IMS Connect configuration information, e.g. (WTOR) VIEWHWS, (z/OS MODIFY), and Type-2 QUERY, have been enhance to also show the current and maximum number of XML converters.

Both enhancements impact the flexibility of converter usage.

XML Converter Enhancements ...

- New Type-2 Command Example:

```
►►─QUERY─IMSCON─TYPE(CONVERTER)─┬─NAMF(*)─────────────────────┬───────────────────────────────►◄
                               │        ┌─,───────────┐       │       ┌─,─────────┐
                               └─NAME(──┬─converter_name─┬──)─┘  └─SHOW(──┬─ALL──────┬──)─┘
                                        └─converter_name*─┘              ├─TIMESTAMP─┤
                                                                         └─USECOUNT──┘
```

TSO SPOC input:

```
QUERY IMSCON TYPE(CONVERTER) NAME(*) SHOW(ALL)
```

TSO SPOC output:

```
Converter MbrName CC UseCount TimeAccess          TimeCreate
IMSCVRTD  HWS1     0       30 2011.068 10:50:12.90 2011.067 21:54:11.09
IMSPHBKD  HWS1     0        5 2011.060 21:05:31.78 2011.059 13:55:12.19
```

Note: IMSPHBKD and IMSCVRTD represent two XML Converters loaded in IMS Connect.

- Timestamp: shows information about the converter's last successful execution and when it was last loaded
- Usecount: shows number of times the converter has been used since it was last loaded

The Type-2 command enhancement allows SPOC clients using the OM API to request detailed information about the converters that are currently loaded in the IMS Connect instance. If a specific converter is not named, the default for the command is NAME(*)

By requesting TIMESTAMP information, the command output displays the information about this XML Converter's last successful execution (TimeAccess) as well as the timestamp information when it was last loaded (TimeCreate).

USECOUNT provides the number of times this converter has been used since the last time it gwas loaded.

XML Converter Enhancements ...

– Existing commands that display configuration parameters

• Include displays with two new fields:

– Current number of converters and maximum limit

(WTOR) VIEWHWS and (z/OS MODIFY) F HWS1,QUERY MEMBER TYPE(IMSCON) SHOW (ALL)

```
HWSC0001I  HWS ID=HWS1    RACF=N  PSWDMC=R
HWSC0001I    UIDCACHE=N   UIDAGE=2147483647
HWSC0001I     MAXSOC=50    TIMEOUT=2147483647
HWSC0001I    NUMSOC=5    WARNSOC=55%  WARNINC=5%
HWSC0001I    RRS=Y  STATUS=REGISTERED
HWSC0001I     VERSION=V13 IP-ADDRESS=009.030.114.199
HWSC0001I     SUPER MEMBER NAME=    CM0 ACK TOQ=
HWSC0001I  ADAPTER=Y MAXCVRT=400  NUMCVRT=15
HWSC0001I  ODBM AUTO CONNECTION=Y
HWSC0001I  ODBM TIMEOUT=20000
HWSC0001I  ODBM IMSPLEX MEMBER=HWS1         TARGET MEMBER=PLEX1
```

QUERY IMSCON TYPE(CONFIG) SHOW (ADAPTER)

(Type-2) QUERY IMSCON TYPE(CONFIG) SHOW (ALL)

```
QUERY IMSCON TYPE(CONFIG) SHOW(ALL)

TSO SPOC output:  (screen 1)
MbrName CC  Version IconID IpAddress          MaxSoc TimeOut NumSoc  WarnSoc  WarnInc
HWS1     0   V13    HWS1  009.030.124.150   50    5000     4        80         5

(screen 2)
MbrName  UidCache  UidAge      Racf PswdMc RRS   RRSStat     Recorder  SMem  Cm0Atoq
HWS1       Y       2147483647   N     N      N    REGISTERED     N      SM01

(screen 3)
 MbrName  Adapter  MaxCvrt NumCvrt ODBMAC ODBMTO ODBMIpMem ODBMTMem
 HWS1       Y        400     15       Y      18000    IMSPLEX1 PLEX1
```

As shown on this visual, the WTOR command has not changed but the two new fields MAXCVRT and NUMCVRT are displayed:

•MAXCVRT = the maximum value for the number of XML Converters that can be loaded by this instance of IMS Connect.

•NUMCVRT= the number of XML Converters currently loaded in this instance of IMS Connect.

The same information has also been added to the display of the z/OS Modify command.

The Type 2 command: QUERY IMSCON TYPE(CONFIG) has been enhanced to display the value of the new parameter, MAXCVRT, in the ADAPTER statement as well as the number of XML Converters currently loaded in IMS Connect. Please note that two new columns will be inserted between the columns "Adapter" and "ODMBAC". This insertion will cause the "ODBMAC" column to shift to the right as well as any existing columns to the right of it.

The SHOW(ADAPTER) is a new option in the QUERY IMSCON TYPE(CONFIG) command to display adapter information including: whether XML adapter support is enabled (Y) or disabled (N), the maximum value for the number of XML Converters, and the number of XML Converters currently loaded in this instance of IMS Connect.

XML Converter Enhancements - Migration

- Type-2 commands can only be accepted by IMS Connect V12 and V13 systems

  - IMS Connect V12 systems will reject the new type-2 command to query the XML Converters

Auto-restart of the Language Environment (LE)

- **_Automated_** mechanism to reinitialize the Language Environment when an XML converter ABENDs
  - Without restarting IMS Connect
  - Converters will be reloaded as they are needed

- **_Automatic_** refresh of the BPE User Exit for the XML Adapters (HWSXMLA0) after the ABEND limit ABLIM has been reached
  - The ABLIM value is specified in BPE's EXITDEF() statement for HWS USER EXIT DEFINITION
    - A value of zero means no ABEND limit

- Benefit
  - Improved efficiencies during error conditions
    - Eliminates IMS Connect restart and user interactions

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IMS Connect makes use of the Language Environment (LE) as well as the IMS Base Primitive Environment (BPE) to run the XML Converters when requested by IMS SOAP Gateway. Prior to IMS V13, when one of the XML Converters ABnormally ENDs (ABENDs) it cannot be reused but an issue with LE causes IMS Connect to run the bad XML Converter a total of three times before the LE can be successfully terminated. In order to restart the LE environment, IMS Connect has to be restarted.

This IMS V13 enhancement provides an automated mechanism for restarting the LE after one of the XML Converters ABENDs. This means that previously loaded converters will be reloaded the next time they need to be used.

IMS Connect also automatically make a request to BPE to refresh the XMLADAP BPE User Exit after the ABEND limit (ABLIM), specified in BPE's EXITDEF() statement for HWS USER EXIT DEFINITION, has been reached. This auto refresh allows IMS Connect users to keep IMS Connect running without having to manually refresh the XMLADAP BPE User Exit for IMS Connect after the ABEND limit has been reached. Keep in mind that if the ABLIM specified is a small integer, the XMLADAP user exit will be refreshed more frequently during multiple ABENDs. Also, BPE captures a dump for the very first ABEND that takes place and for the first ABEND after the XMLADAP BPE User Exit for IMS Connect is refreshed.

Auto-restart of the Language Environment (LE) ...

- BPE DISPLAY provides information about the XML Adapter exit

```
F HWS1,DIS USRX NAME(XMLADAP) OWNER(HWS) SHOW(ABLIM,ABENDS,CALLS)


Output:
BPE0030I EXITTYPE MODULE        ABENDS       ABLIM       CALLS
BPE0000I XMLADAP  HWSXMLA0           0           0           1

BPE0032I DIS USRX COMMAND COMPLETED
```

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Expanded Recorder Trace Records

- The Recorder trace records have been expanded to:
  - Capture entire messages sent and received using:
    - All TCP/IP communications
      - Including DRDA sockets and ISC TCP/IP
    - SCI (OM, ODBM, MSC, and ISC communications)
    - Requires a Trace Level HIGH and use of the external trace data set

      UPDATE TRACETABLE NAME(RCTR) OWNER(HWS) **LEVEL(HIGH) EXTERNAL(YES** | NO)

- Macro HWSUSTAT – maps the recorder trace records
  - Enhanced and converted to non-Object Code Only (non-OCO)
    - Shipped as a member of the data set IMS.SDFSMAC

- Benefits
  - Improved diagnostics and problem determination

IMS Connect V12 introduced new Recorder Trace Records that made use of BPE's External Trace Tables. In IMS Connect V13, these trace records have been expanded to capture the entire messages sent and received on the DRDA sockets as well as all messages sent and received to/from OM and ODBM via SCI.

Changing the BPE trace level from MEDIUM to HIGH is the trigger to write the enhanced trace records. Additionally they must be written to the external trace data set since they will not be written to the fixed size HWSRCDR trace data set.

The macro HWSUSTAT containing the mapping of the recorder trace records has been enhanced and converted to non-Object Code Only (non-OCO). The macro HWSUSTAT is shipped as a member of the data set "IMS.SDFSMAC."

Expanded Recorder Trace Records ...

- HWSUSTAT macro contains 2 DSECTs:
  1. HWSUSTAT – maps the short recorder trace records
     – Only captures the first 100 bytes of input/output messages
       • Contains both *IPB / OPB* sections

  2. HWSLRCTR – maps the large recorder trace records
     – Captures the entire input/output message
       • Contains either *IPB or *OPB but not both
     – Differentiated from the shorter ones by inspecting
       • CALLID and contents at LRCTR_MSG_TYPE

```
    Eye ID    MsgType
a- ICONTR..  OTMA ... *IPB   full_message_is_here   <<- TCP/IP receive
b- ICONIS..  OTMA ... *OPB full_message_is_here     <<- XCF send
c- ICONIR..  OTMA ... *IPB   full_message_is_here    <<- XCF receive
d- ICONTS..  OTMA ... *OPB full_message_is_here     <<- TCP/IP send

The other message types are 'ISC ', 'MSC ', 'ODBM', and 'OM  '.
```

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There are two mappings, DSECTs, inside the now non-OCO HWSUSTAT macro: the HWSUSTAT DSECT and the HWSLRCTR DSECT.

•HWSUSTAT DSECT: contains the mapping for the short recorder trace records produced by IMS Connect. These recorder trace records only capture the first few hundred bytes of the input/output message. These recorder trace records are composed of two sections; an *IPB section for the input message and an *OPB section for the output message.

•HWSLRCTR DSECT: contains the mapping for the large recorder trace records produced by IMS Connect starting with IMS Connect V12. The large recorder trace records capture the entire message when it comes into and out of IMS Connect. The large recorder trace records can be differentiated from the short recorder trace records by inspecting the contents of the field _CALLID and further more by inspecting the contents at the field LRCTR_MSG_TYPE. Also, each of these recorder trace records contain wither an *IPB or an *OPB section, but not both.

Expanded Recorder Trace Records - Migration

- Consideration
  - Setting trace Level equal to HIGH for Recorder Trace Records could produce a significant amount of trace records
    - Ensure that BPE external tracing is enabled

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RACF Event Notification Facility (ENF) Support

- Background
  - IMS Connect V12 provided the option to cache RACF UserIDs (UIDs) along with a command to refresh them

- IMS Connect V13:   RACF ENF Support for Cached UserIDs (UID)
  - *Automatically* refreshes cached UIDs by listening to RACF events (ENF signals) indicating that a change has been made to a UID
    - RACF commands: CONNECT, REMOVE, and ALTUSER REVOKE
  - NOTE: This function applies only when RACF UID caching has been enabled in IMS Connect

- Benefit
  - Allows IMS Connect to listen for certain RACF events indicating that a change has been made to a specific UserID
    - Avoids manual intervention

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IMS Connect V12 enabled RACF UserID Caching by defining the parameter UIDCACHE=Y in the HWS statement in the HWSCFGx configuration or via the type-2 command UPDATE IMSCON TYPE(CONFIG) SET(UIDCACHE(ON)); the WTOR command SETUIDC OFF; or the z/OS command UPDATE MEMBER TYPE(IMSCON) SET(UIDCACHE(OFF)). Additionally, these cached userids could be refreshed based on an aging value or manually by issuing: a WTOR (xx,REFRESH RACFUID..), a z/OS Modify (F hws,UPDATE RACFUID NAME..OPTION(REFRESH)) or a Type-2 command (UPDATE IMSCON TYPE (RACFUID)).

The RACF Event Notification Facility (ENF) Support for Cached UserIDs (UID) allows notification of changes to UIDs affected by the following RACF commands: CONNECT, REMOVE, and ALTUSER REVOKE. IMS Connect has been enhanced to listening for the type 71 ENF signals produced by these RACF commands, and act on that signal to refresh the affected UID. This new capability is applicable only when RACF UID caching has been enabled in IMS Connect.
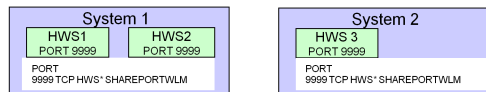
Reporting of Overall Health to WLM

- **WLM (Workload Manager) Health Report**
  - New function to automatically report the overall health of IMS Connect
    - Allows Sysplex Distributor to use the information for workload balancing by:
      - Coding a distribution method of SERVERWLM

        ```
        VIPADYNAMIC …
        VIPADISTRIBUTE DEFINE DISTMETHOD SERVERWLM
        ```

      - Note: the health value is not used when DISTMETHOD is ROUNDROBIN or BASEWLM
      - Coding SHAREPORTWLM parameter if a PORT is shared

System 1		System 2
HWS1 PORT 9999	HWS2 PORT 9999	HWS 3 PORT 9999
PORT 9999 TCP HWS* SHAREPORTWLM		PORT 9999 TCP HWS* SHAREPORTWLM

- **Benefit**
  - Allows WLM to know when resources are constrained or available
  - Minimizes the possibility of Sysplex Distributor assigning work that IMS Connect is unable to handle

Workload Manager (WLM) provides facilities that allow servers to indicate their health back to WLM. This health information can be used by the Sysplex Distributor and taken into account when connection requests are to be routed to a server.

IMS Connect V13 takes advantage of the facilities provided by WLM to inform WLM of its overall health. As the health of IMS Connect deteriorates or improves, IMS Connect will notify WLM accordingly so that WLM has the most recent health information available for use by the Sysplex Distributor. Sysplex Distributor uses the health of each server when the distribution method has been set to SERVERWLM in the VIPADISTRIBUTE statement of the TCP/IP profile.

Note on SERVERWLM: Incoming connections are routed to multiple stacks based upon the defined distribution method. ROUNDROBIN requests an even distribution to all targets. BASEWLM uses WLM system weights. SERVERWLM which is what the enhancement for IMS Connect uses requests WLM server-specific weights.

Note, however, that the Sysplex Distributor registers each system with WLM, rather than each server on each system. If there are multiple servers using the same port on the same system and TCP/IP stack, the health of the system depends on the health of all the servers. Therefore, the connection requests are routed on a per system health basis first and then on a per server health basis at each system. This assumes that SHAREPORTWLM is coded in the PORT statement of the TCP/IP PROFLE for the port being shared by the servers on the same system.

Reporting of Overall Health to WLM

- IMS Connect informs WLM of its health during initialization and whenever its health changes
  - Initial health value is 100, minimum is 0
  - Notification algorithm
    - Reporting to WLM occurs whenever health increases/decreases by 5%
      - Value is last multiple of 5 when moving to the new value
        - If value is 80%, the health % could actually be in the range of 76% - 84%
    - Decreasing example:
      - Last report: 80%
      - 2 problems reduce health by 10%
        - Since 10% > 5% (the trigger) then the value is 70%
      - Another problem reduces health by 6%
        - Since this is greater than trigger (5%), health change is reported
        - Value is 65% (not 64%) since it is the last multiple of 5
    - Increasing the value is similar

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IMS Connect will automatically inform WLM of its overall health during initialization and any changes in its health there after. The initial health is 100 and the minimum health can be 0. IMS Connect will report its health to WLM whenever the health increases or decreases by at least 5 percentage points from the last reported value. Also, the reported value will be the last multiple of 5 that is encountered going from the last reported health value to the new health value. This notification algorithm was chosen to reduce the number of times IMS Connect reports its health to WLM. This means that the actual health of IMS Connect at any given point in time is within plus or minus 5 percentage points of the last reported health value. So, if the last reported health is 80%, the health of the IMS Connect at any given point in time can be from 76% up to 84%, inclusive, without causing an update in the health value reported to WML.

For example, let's look at the case where the health is decreasing; suppose that the last reported health is 80%. Now, suppose that three actions will take place which will reduce the health of the IMS Connect by about 16%. Suppose two of the activities bring the health down by 10%. Since the reporting threshold is 5% and 10% is larger than or equal to 5%, IMS Connect reports its new health of 70% to WLM. The last activity takes place and the health is reduced by the last 6%, bringing the health down to 64%. Because 6% is larger than or equal to 5%, IMS Connect reports a change in health to WLM. The health is reported as 65% and not 64% because 65% is the last multiple of 5 that was encountered going down from 70% to 64%.

The opposite scenario where the health is increasing is as follows; if the last reported health is 50% and it increases to 64%, IMS Connect will report its health as 60%. The health is reported as 60% and not as 64% because 60% is the last multiple of 5 that was encountered going up from 50% to 64%.

Reporting of Overall Health to WLM ...

- WLM assigns a weight ranging from 1- 64
  - Adjusts system loads when a workload is not meeting its goals
    - Higher weights for systems with more displaceable capacity or lower importance work

  - Each system's health is a maximum of 100% for determining connections
    - Single IMS Connect on a system starts at 100%
    - Multiple IMS Connects sharing a port may each be 100% but both equal 100% for the system
    - Note that pre-IMS Connect 13 systems are not considered
      - In a mixed environment, earlier releases could receive more connection requests compared to IMS Connect V13 systems

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The Sysplex Distributor and the TCP/IP stack can take advantage of the health value to determine which IMS Connect is the most viable for routing connection requests. The following should be noted:

- WLM assigns a weight ranging from 1-64. WLM can initiate a weight adjustment in favor of one system to help workloads not meeting their goals. SERVERWLM weights are based on a comparison of target servers within the same service class, e.g., how well is the server meeting the goals of its service class, how much displaceable capacity is available on this system for new work based on the importance of the service class, etc. The target systems poll WLM for their server weights each minute and forward the weights to the distributor. When all systems are running at or near 100% utilization, WLM assigns higher weights to the systems with higher amounts of lower importance work, i.e., those with the most displaceable capacity.

- If there are multiple IMS Connects on each system that have coded the SHAREPORTWLM parameter, the connection requests will be divided among the IMS Connects based on their health. Each system's health can be a maximum of 100%. Two IMS Connects at 100% each on a single system equal 100%.

Note that WLM does not take into account the health of IMS Connect prior to V13 when determining the weight to assign to each IMS Connect. In a mixed environment, therefore, earlier releases of IMS Connect could receive more connection requests compared to IMS Connects at V13 level.

Reporting of Overall Health to WLM ...

- **Single (System 1) Examples:**

System 1
| HWS1 PORT 9999 | HWS2 PORT 9999 |

PORT
9999 TCP HWS* SHAREPORTWLM
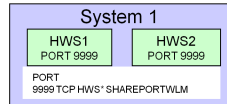
Setup assumes either IMS Connect
can accept any of the connection requests

– **Example 1:**

HWS1 has health = 100%
HWS2 has health = 100%

Out of every 64 connection requests:
~ 32 will be sent to HWS1
~ 32 will be sent to HWS2

64 connection requests / 2 IMS Connects
= 32 connection requests per IMS Connect

32 connection requests * 100% = **32 for HWS1**
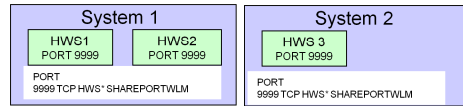32 connection requests * 100% = **32 for HWS2**

– **Example 2:**

HWS1 has health = 50%
HWS2 has health = 100%

Out of every 64 connection requests:
~ 16 will be sent to HWS1
~ 48 will be sent to HWS2

64 connection requests / 2 IMS Connects
= 32 connection requests per IMS Connect

32 connection requests * 50% = **16 for HWS1**
Functioning at 100%, balance = **48 for HWS2**

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Single (System 1) Examples:

Suppose System 1 has two IMS Connects: HWS1 and HWS2. Both IMS Connects can process the same transactions and thus are using the same port, PORT 9999. To allow the TCP/IP stack to consider the health of each IMS Connect before a connection request is sent, the PORT statement in the TCP/IP PROFILE must be modified to use SHAREPORTWLM for PORT 9999.

Example 1 nonSD System 1:

Suppose HWS1 has health = 100%, HWS2 has health = 100%. Out of every 64 connection requests, approximately 32 will be sent to HWS1 and 32 will be sent to HWS2. Why?

64 connection requests / 2 IMS Connects = 32 connection requests per IMS Connect; 32 connection requests * 100% = 32 for HWS1; 32 connection requests * 100% = 32 for HWS2

Example 2 nonSD System 1:

Suppose HWS1 has health = 50%, HWS2 has health = 100%. Out of every 64 connection requests, approximately 16 will be sent to HWS1 and the rest will be sent to HWS2. Why?

64 connection requests / 2 IMS Connects = 32 connection requests per IMS Connect; 32 connection requests * 50% = 16 for HWS1

Reporting of Overall Health to WLM ...

- **Sysplex Distributor (SD) (System 1 and System 2) Examples:**

System 1	System 2	Setup assumes any
HWS1 PORT 9999 · HWS2 PORT 9999	HWS 3 PORT 9999	IMS Connect can accept any of the connection requests
PORT 9999 TCP HWS * SHAREPORTWLM	PORT 9999 TCP HWS * SHAREPORTWLM	

- **Example 1:** — **Example 2:**

HWS1 has health = 100%, HWS2 has health = 100% **HWS1 has health = 50%, HWS2 has health = 50%**
HWS3 has health = 100% **HWS3 has health = 100%**

Out of every 64 connection requests: Out of every 64 connection requests:
~ 32 will be sent to System 1 (2 IMS Connects) ~ 16 will be sent to System 1 (2 IMS Connects)
~ 32 will be sent to System 2 (1 IMS Connect) Remainder will go to System 2 (1 IMS Connect)
64 connection requests / 2 systems
   = 32 connection requests per system 64 connection requests / 2 systems
      = 32 connection requests per system

System 1:
32 connection requests / 2 IMS Connects BUT for System 1:
   = 16 conn requests per IMS Connect 32 connection requests / 2 IMS Connects
  16 connection requests * 100% = **16 for HWS1**   = 16 conn requests per IMS Connect
  16 connection requests * 100% = **16 for HWS2**   16 connection requests * 50% = **8 for HWS1**
  16 connection requests * 50% = **8 for HWS2**
System 2: → Total of 16
32 connection requests for 1 IMS Connect System 2:
32connection requests * 100% = **32 for HWS 3** Functioning at 100%, the balance is **48 for HWS3**

Sysplex Distributor (SD) (System 1 and System 2) Examples:

Suppose System 1 has two IMS Connects: HWS1 and HWS2, and System 2 has one IMS Connect: HWS3. All three IMS Connects can process the same transactions and thus are using the same port, PORT 9999. To allow the TCP/IP stack to consider the health of each IMS Connect at each system before a connection request is sent, the PORT statement in the TCP/IP PROFILE must be modified to use SHAREPORTWLM for PORT 9999.

Example 1: SD System 1 & System 2:

Suppose HWS1 has health = 100%, HWS2 has health = 100%, HWS3 has health = 100%. Out of every 64 connection requests, approximately 32 will be sent to System 1 and 32 will be sent to System 2. Why?

64 connection requests / 2 Systems at 100% each = 32 connection requests per system.

On System 1 we have two IMS Connects (HWS1 and HWS2):

32 connection requests / 2 IMS Connects = 16 connection requests per IMS Connect

16 connection requests * 100% = 16 for HWS1; 16 connection requests * 100% = 16 for HWS2

On System 2 we have one IMS Connect (HWS3):

32 connection requests / 1 IMS Connect = 32 connection requests for HWS3

32 connection requests * 100% = 32 for HWS3

Example 2: SD System 1 & System 2:

Suppose HWS1 has health = 50%; HWS2 has health = 50%; HWS3 has health = 100%. Out of every 64 connection requests, approximately 16 will be sent to System 1 and the rest will be sent to System 2. Why?

64 connection requests / 2 Systems = 32 connection requests per system.

On System 1 we have two IMS Connects (HWS1 and HWS2):

32 connection requests / 2 IMS Connects = 16 connection requests per IMS Connect

16 connection requests * 50% = 8 for HWS1; 16 connection requests * 50% = 8 for HWS2

Thus System 1 will get 16 connection requests out of every 64.

Sample outputs for the DISPLAY TCPIP command for a System using SERVERWLM, versus BASEWLM, versus ROUNDROBIN.

Notice that you can see the health of the System for the specified port when SERVERWLM is used.

With BASEWLM or ROUNDROBIN the health of the system is not reported by the DISPLAY command or taken into consideration.

Configurable TCP/IP backlog (Queue) size

- New parameter TCPIPQ
  - Specifiable in the TCPIP statement of the HWSCFGx configuration
    - Allows users to configure the length of the queue in TCP/IP for connection requests that have not yet been assigned a socket.
      - Connection requests are held on this queue until IMS Connect can assign a socket
    - Overrides the default which is equal to the maxsoc value
      - Actual value used is the smaller of IMS Connect's TCPIPQ value and SOMAXCONN in TCP/IP

- Benefit
  - Provides a configurable option to increase the backlog queue size in TCP/IP

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When IMS Connect starts up, it establishes a TCP/IP listening socket on every port that is configured for its use. When these listening sockets are established, IMS Connect also sets the corresponding TCP/IP backlog or queue value to be equal to the MAXSOC value for IMS Connect. (Note that the default for MAXSOC, if not specified, is 50). This backlog or queue is the number of connection requests that can be queued in TCP/IP while waiting for IMS Connect to assign sockets to them, e.g., during peak processing times. This means that requests up to this value can be queued in TCP/IP without their connections being rejected pending IMS Connect action. Note that if IMS Connect's value is higher than that specified for SOMAXCONN in the TCP/IP profile, the smaller of the two values (SOMAXCONN or MAXSOC) is used by the TCP/IP stack.

IMS Connect V13 adds a new parameter to the configuration member for IMS Connect. This new parameter supports a value that can be different than MAXSOC for the TCP/IP backlog. The same rules, however, with respect to SOMAXCONN in the TCP/IP profile continue to apply. If TCPIPQ is greater than SOMAXCONN, the number used is the one defined for SOMAXCONN. The new TCPIPQ parameter value should therefore be coordinated with the value in the SOMAXCONN. See the z/OS Communications Server: IP Configuration Reference for details. If TCPIPQ is not specified in the IMS Connect configuration definition, then the default used is the value specified in MAXSOC.

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Configurable TCP/IP backlog (Queue) size ...

- HWSCFGx : TCPIP... TCPIPQ = 0 – 2147483647
  - Default is 50
  - A value of 0 – 49, uses the default of 50
  - A value less than zero or larger that 2147383647
    - IMS Connect abend
    - Message indicating invalid value in existing HWSX0909E and BPE0003E

TCPIPQ can be set to a maximum of 2147483647 (X'7FFFFFFF'). IMS Connect uses a default value of 50 which was the value automatically set in previous releases. If the value is between 0 and 49, IMS Connect defaults to 50. If the value is less than zero or larger than 2147483647, IMS Connect will ABEND with a message indicating the value is outside the legal range by issuing the existing HWSX0909E and BPE0003E error messages.

Passphrase Support

- Support for security Passphrases
  - Phrase (max 100 characters) instead of password (max 8 characters)
  - Provided in conjunction with IMS TM Resource Adapter enhancements

  - Discussed in the Security Enhancements Topic

ResumeTPIPE Socket Termination Enhancement

- Socket enhancement for ResumeTPIPE Wait-For-Ever session (listening socket)
  - Immediate detection of a remote client session termination
    - When the IMS Connect session is in CONN state (waiting on reply from datastore) with execution timeout value of 'wait-for-ever' as a result of a ResumeTpipe auto or single wait

  - APAR PM90777/UK95578

    (Also mentioned in the OTMA part of the TM enhancements topic)

With this service the IMS Connect session that is in CONN state (waiting on reply from datastore) with execution timeout value of 'wait-for-ever' as a result of a ResumeTpipe 'auto' or 'single wait' will immediately detect a session termination of the client application.

Performance Enhancements

- ■ Use of CPOOL instead of STORAGE OBTAIN in XCF message exit
  - – This is needed for performance
  - – Add 167MB of Extended Private to the IMS Connect address space
  - – Plan to increase the REGION size or size allowed by the IEFUSI exit

- ■ Use of zIIP where appropriate and available
  - – DRDA threads
  - – SOAP Gateway threads
  - – MSC over TCP/IP threads
  - – ISC over TCP/IP threads

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With this service the IMS Connect session that is in CONN state (waiting on reply from datastore) with execution timeout value of 'wait-for-ever' as a result of a ResumeTpipe 'auto' or 'single wait' will immediately detect a session termination of the client application.

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Summary

Summary

- XML Converter Enhancements
  - Enhances the flexibility of converter usage
    - Directly impacts IMS Soap Gateway environments
- Auto-restart of the Language Environment (LE)
  - Improved efficiencies during error conditions
    - Eliminates IMS Connect restart and user interactions
- Expanded Recorder Trace Records
  - Improved diagnostics and problem determination
- RACF Event Notification Facility (ENF) Support for cached RACF UserIDs (UID)
  - Allows IMS Connect to listen for certain RACF events indicating that a change has been made to a specific UserID
    - Avoids manual intervention

Summary ...

- Reporting of overall health to Workload Manager (WLM)
  - Allows WLM to know when resources are constrained or available
  - Minimizes the possibility of Sysplex Distributor assigning work that IMS Connect is unable to handle

- Configurable TCP/IP backlog (queue) size
  - Provides a configurable option to increase the backlog queue size in TCP/IP to be greater than 50

- Passphrase support
  - Provides the ability to support a password greater that 8 bytes

- Socket termination enhancement
  - Releases a listening socket waiting for a reply from a datastore

- Performance Enhancements