

IMS Connect Extensions - Extending the Power of IMS Connect

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IBM recently released a new tool that allows users to increase the performance, availability, and security of the connections between your e-business applications and your IMS databases.

The tool—Information Management System (IMS) Connect Extensions for z/OS—as its name implies, it is a companion tool for IMS Connect for z/OS, IBM's high-performance TCP/IP server that connects TCP/IP clients and local z/OS applications to IMS, IBM's transaction and hierarchical database management system.

IMS Connect Extensions provides a new level of control, enabling users to easily monitor, manage, tune, and secure IMS Connect for z/OS as it opens and closes TCP/IP sockets and routes transactions. Figure 1 shows an example configuration using IMS Connect Extensions.

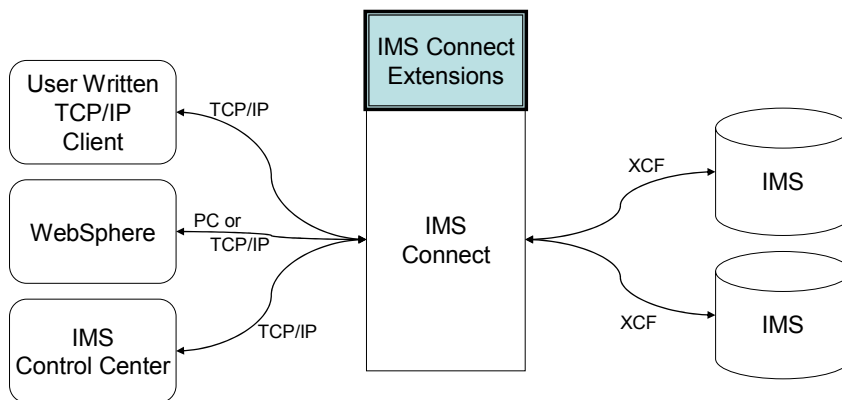


Figure 1: IMS Connect Environment with IMS Connect Extensions

This article explores the functions and services that IMS Connect Extensions provides to IMS Connect users. As shown in Figure 2, these functions and services include:

- Event collection and reporting
- Transaction routing
- Workload balancing
- Transaction pacing
- Enhanced security management
- Online command interface
- Status Monitor

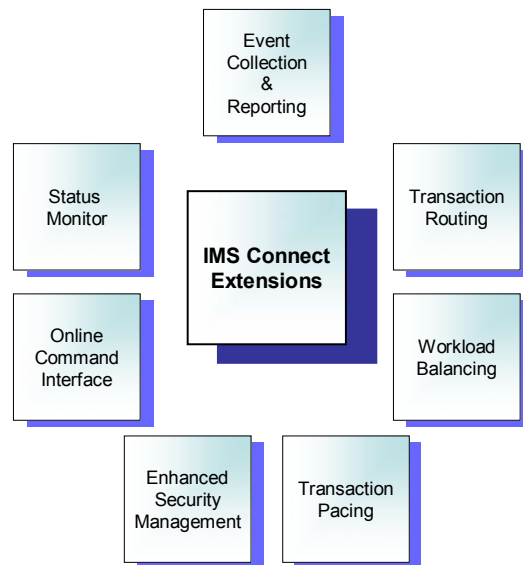


Figure 2. Major services provided by IMS Connect Extensions for z/OS

Event Collection and Reporting

IMS Connect Extensions monitors and records four different categories of events related to the management of TCP/IP connections, the processing of transactions and IMS Connect trace functions. For each event of a given type, IMS Connect Extensions creates an event record and stores that record in an active journal data set. Each event record contains an event number and details about the event.

The types of events that IMS Connect Extensions records include:

- Connect status events
- Message related events
- Recorder trace events
- IMS Connect trace events

A Connect status event record identifies a change in the status of the IMS Connect system, such as the initialization and termination of the z/OS region in which Connect runs, the beginning and ending of accept socket actions, changes in the availability of the IMS datastores, and the opening and pre-closing of recorder trace data control blocks (DCBs) on the operating system.

A message status event record identifies events related to the processing of incoming message requests, such as the beginning and ending of the close socket action, the beginning and ending of a z/OS System Authorization Facility (SAF) request, the sending and receiving of messages to IMS Open Transaction Manager Access (OTMA), the entry and return from user message exits, the reading from and writing to sockets and the timing out of OTMA.

Both a recorder trace event record and an IMS Connect trace event record identify and capture selected events recorded by traces initiated from IMS Connect.

Recording and Reporting Events

While event collection is active, IMS Connect Extensions continuously records the events at the specified collection level in its Active Journal data set on DASD. You can then create either summarized or detailed reports from the formatted records in the Active Journal data set using the IMS Connect Extensions Print utility.

For more in-depth analysis and reporting of the records stored in the Active Journal data set, you can use IBM IMS Performance Analyzer Version 3.3, Program Number 5655-E15. The reports of the IMS Performance Analyzer provide performance, response time and throughput information. For example:

- The Transit Log report provides performance details about every transaction processed by IMS Connect
- The Transit Analysis report provides a summary of IMS Connect transaction performance
- The Trace report provides a detailed list of all IMS Connect events for every transaction processed by IMS Connect
- The Transaction Exception report provides the details of transactions that exceed certain performance threshold.

When Active Journal data sets become full, or when a time or activity interval you have specified has been reached, IMS Connect Extensions archives the records in the Active Journal data set to the Archive Journal data set on tape or DASD.

Levels of Event Collection

You can specify one of five event collection levels. The collection levels determine the events and event categories that IMS Connect Extensions records. Collection level 0 records the minimum number of events and collection level 4 records all events. Table 1 presents a summary of the five collection levels.

Collection Level #	Description
Level 0 - Minimum level	Collect start up and shut down events along with some error events.
Level 1 - Accounting level	Collects Return from Exit events, OTMA timeout and session error events. This level provides accounting information in terms of the number of messages by Transaction, User Exit, etc.,
Level 2 – Transit time reporting	Collects the minimum number of records to run simple transit time reports.

Level 3 – Comprehensive performance analysis	Collects all TCP/IP read and write events which provide for analysis of TCP/IP activity.
Level 4 – Maximum level	Collects all event records

Table 1. Summary of Collection Levels

Table 2 represents a sample message flow for an incoming IMS Connect transaction message with a synchronization level of NONE. For each event, the event number and the collection level required to record the event are shown. To record all of the events of the message flow shown in the table below, you would have to specify a collection level of 4.

Event Number	Event Description	Collection Level Required to Record the Event
X'3C'	Prepare Read Socket – the beginning of this message request	2
X'49'	Read Socket	3
X'3D'	Message Exit called for READ	2
X'3E'	Message Exit return for READ	1
X'41'	Message sent to IMS	2
X'42'	Message received from IMS	2
X'3D'	Message Exit called for XMIT	2
X'3E'	Message Exit return for XMIT	1
X'4A'	Write Socket	3
X'OC'	Begin Close Socket	4
X'0D	End Close Socket	3
X'48'	Trigger event CLO – the end of this message request	2

Table 2. Event Numbers and Collection Levels for Events in a Message Flow.

Transaction Routing

The Transaction Routing function of IMS Connect Extensions allows you to reroute incoming transactions to different IMS data stores than those specified by the client applications that are submitting the transactions. Transaction Routing provides you with

more control and flexibility over which IMS data stores process your incoming transactions without requiring changes to the client applications.

Transaction Routing processing is defined by rules and logical groupings of data stores. This feature provides for the redistribution of system resources that is transparent to the client. For example, if a data store is taken offline for maintenance, the workload can be redistributed among the remaining available data stores without modifying the client.

IMS Connect Extensions will not reroute all incoming message requests. For example, a Resume TPIPE message cannot be rerouted and, for conversational messages, all subsequent messages of a conversational transaction are routed to the data store that processed the first message in the conversation.

It should be noted that, if your incoming transactions must run on the destination data store specified by the submitting client application, you do not need to use the Transaction Routing feature.

Workload Balancing

The Workload Balancing function of IMS Connect Extensions allows you to redirect transactions based on the capabilities of individual data stores rather than the destination of the transactions.

For example, in a group of three data stores, if one of the data stores can process transactions at twice the speed/volume of the others, it should receive twice the number of transactions to process as the others in order to balance the workload and make optimal utilization of the resources.

If Workload Balancing is not active, transactions are routed based on an algorithm that distributes transactions equally among all available data stores.

Transaction Pacing

Transaction pacing allows IMS Connect Extensions to protect data stores from surges in the numbers of transactions to be processed by detecting the surge and automatically rejecting the incoming message requests. Transaction Pacing allows IMS Connect Extensions to issue warning messages or to reject transactions if your specified incoming transaction threshold values are exceeded.

You can define Transaction Pacing during system definition or dynamically using online commands.

Security

You can improve performance by using IMS Connect Extensions to check security for User IDs and passwords, and for authority to access IMS Connect.

To validate User IDs and passwords, IMS Connect Extensions can cache the access control environment element (ACEE) control block structures for each User ID to reduce the system overhead incurred by each security call. You can also specify how long each ACEE structure remains cached for inactive User IDs.

To validate access to IMS Connect, IMS Connect Extensions verifies that users are authorized to use the IMS Connect system by checking a pre-defined security resource

class. To improve performance, the security resource class is preloaded in storage if this security function is active.

Online Command Interface

You can manage IMS Connect Extensions and your IMS Connect user exits dynamically using the online command interface. Using it, you can perform the following tasks:

- Modify your user exit routines without interrupting IMS Connect execution.
- Refresh SAF class rules and delete cached ACEE control blocks.
- Rebuild the IMS Connect Extensions system definitions.
- Temporarily override IMS Connect Extensions system definitions.
- Rotate the data set that the Active Journal is using.

Status Monitor

The Status Monitor of IMS Connect Extensions displays the current activity and processing rates over a selected period of time for either an IMS Connect system or for the ports in the IMS Connect system.

Using the System View of the Status Monitor, you can view information about the IMS Connect system, data store groups, data stores and user exits. The system overview panel of the Status Monitor provides a global view of activity on all four of these elements. In the system detail panel, you can view detailed statistics for each of the elements individually.

Using the Port View of the Status Monitor, you can view the message activity on the ports in the IMS Connect system. The port overview panel displays activity on all ports. The port detail panel displays information for a single port. You can tailor the display by the Status Monitor to present only the information you need.

In Summary

IMS Connect Extensions is a powerful tool that allows users to monitor, manage, tune, and secure IMS Connect as it processes TCP/IP transaction requests. With the Event Collection function and the Status Monitor of IMS Connect Extensions, you can analyze message flows to spot problems and improve performance. With the Transaction Routing and Workload Balancing functions of IMS Connect Extensions you can ensure the availability and responsiveness of your data stores for you TCP/IP clients. Finally, with the security features of IMS Connect Extensions, you can reduce the overhead associated with security checking.

More information about IMS Connect Extensions can be found at the following Web site: www.ibm.com/software/data/db2imstools/imstools/imsconnectext.html