
Rule CIC280: High number of CICS-DB2 tasks on Entry Ready Queue

Finding: The peak number of tasks on an Entry Ready Queue is high for the CICS-DB2 connection.

Impact: This finding should normally have a MEDIUM IMPACT or HIGH IMPACT on the performance of CICS tasks in the region that use the CICS-DB2 connection.

Logic flow: This is a basic finding, based upon an analysis of the CICS statistics. This finding applies only with CICS/Transaction Server for OS/390 Release 1.2 and subsequent releases of CICS.

Discussion: The CICS DB2 attachment facility creates an overall connection between CICS and DB2. CICS applications use this connection to issue commands and requests to DB2.

A CICS transaction accesses DB2 via a *thread*, which is an individual connection into DB2. Threads are created when they are needed by transactions, at the point when the application issues its first SQL or command request. The transaction uses the thread to access resources managed by DB2.

There are three types of threads: Command threads, Pool threads, and DB2ENTRY threads,.

C Command threads are used by the CICS DB2 attachment facility for issuing commands to DB2 via the DSNB transaction.

C Pool threads are used for all transactions and commands that are not using a Command thread (because the transaction is not DSNB), are not using an Entry thread (because an Entry thread had not been defined for the transaction), or have been “overflowed” to the pool because a Command thread or an Entry thread was not available.

C One or more Entry thread categories optionally can be defined (using the DB2ENTRY definition) for specific transactions or groups of transactions. Entry threads are used for transactions that need to be managed separately from the normal transactions, or for transactions that have special accounting needs.

When a thread is no longer needed by the transaction, the thread is released. The thread release typically occurs after syncpoint completion.

The thread may be terminated immediately upon release or it may be retained for a period of time, depending on the type of thread and whether “thread protection” has been specified.

Transactions can use Entry threads in one of two ways:

C A transaction id optionally can be associated with the Entry by the TRANSID attribute of the DB2ENTRY definition. While only one transaction can be specified using the TRANSID, one or more wildcard characters in the TRANSID can be used to allow a group of transactions to be represented.

C A DB2TRAN definition can be used to define a transaction or a group of transactions, that are associated with a DB2ENTRY. These transactions are in addition to any transaction specified via the TRANSID attribute of the DB2ENTRY definition.

Regardless of how transactions are assigned to a DB2 Entry, an Entry thread must be available when the transaction assigned to a DB2 Entry attempts acquire an Entry thread.

The number of Entry threads that can be available is controlled by the THREADLIMIT attribute for the DB2ENTRY definition. Specifying an optimal value for the THREADLIMIT parameter is a balance between specifying a value that is too large for the environment (and wasting storage) or specifying a value that is too small for the environment (and incurring either transaction abends or transaction waits).

If an Entry thread is not available, the transaction (1) is placed on an Entry Ready Queue, waiting for a pool thread to become available; (2) overflows to the Pool to use Pool threads, or (3) is abended (aborted). The THREADWAIT parameter for the DB2ENTRY definition controls the action that should be taken for transactions assigned to the Entry.

A large number of transactions on the Entry Ready Queue waiting for a pool thread to become available normally indicates that the THREADLIMIT is too low. Consequently, CPEXpert examines the peak number of transactions that were on the Entry Ready Queue.

CICS-DB2 Entry statistics are available in MXG file CICDB2RE. CPEXpert produces Rule CIC280 when the peak number of tasks on the Entry Ready Queue (MXG variable D2RRDQPK) is larger than the **ENTRYRDQ** guidance variable in USOURCE(CICGUIDE). The default value for the ENTRYRDQ is 1, indicating that CPEXpert will produce Rule CIC280 when more than one transaction was on the Entry Ready Queue waiting for an Entry thread to become available.

Suggestion: If Rule CIC280 is produced, you should consider the following alternatives:

C **Increase THREADLIMIT value.** It normally is not wise to have more than one transaction on the Entry Ready Queue, since this indicates that there is a delay to transaction response caused by internal queuing. You can increase the THREADLIMIT value on the DB2ENTRY definition for the DB2 Entry if you wish to allow more Entry threads to be used.

C **Use transaction class limits.** If you wish to limit the amount of CISC-DB2 activity, you should consider using transaction class limits rather than using the THREADLIMIT value. IBM states that it is better to limit transactions using a transaction class than allow them to queue for threads.

C **Modify guidance.** You can modify the ENTRYRDQ guidance variable in USOURCE(CICGUIDE) if you feel that Rule CIC280 is produced prematurely.

Reference: *CICS/TS Release 1.3 CICS DB2 Guide*: Section 5.4 (Creating, using, and terminating threads)

CICS/TS Release 1.3 Resource Definition Guide: Section 5.1.4 (DB2ENTRY) and Section 5.1.5 (DB2TRAN)

CICS/TS for z/OS Release 2.2 CICS DB2 Guide: Section 5.4 (How threads are created, used, and terminated)

CICS/TS for z/OS Release 2.2 Resource Definition Guide: Section 2.4 (DB2 entry definitions) and Section 2.5 (DB2 transaction definitions)