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**Rule CIC278:** CICS-DB2 task abended because pool thread was unavailable

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**Finding:** At least one CICS-DB2 task abended because a pool thread was unavailable, and the THREADWAIT attribute specified abend.

**Impact:** This finding should normally have a 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

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retained for a period of time, depending on the type of thread and whether “thread protection” has been specified .

Transactions can use Pool threads in one of four ways:

- C If a transaction is not a DSNC transaction and is it not defined using DB2NTRY, the transaction automatically attempts to use a Pool thread.
- C If a DSNC transaction is submitted and no command threads are available, the transaction automatically “overflows” to use a Pool thread.
- C If a transaction is defined using DB2NTRY, but no Entry threads are available, the transaction can either wait, can abend, or can “overflow” to use a Pool thread (the THREADWAIT attribute for the DB2ENTRY definition controls the action that should be taken).
- C A transaction is defined using DB2NTRY, but the DB2ENTRY is disabled. Consequently, a pool thread is used.

Regardless of how transactions use pool threads, a pool thread must be available when the transaction attempts to acquire a thread. The maximum number of pool threads is specified via the DB2CONN definition, using the THREADLIMIT attribute. Once the number of pool threads in use reaches the value of the THREADLIMIT attribute, no more pool threads are available.

If a pool thread is not available, the transaction is either abended or placed, on a Ready Queue to wait for a pool thread to become available.

The THREADWAIT attribute for the DB2CONN definition controls the action that should be taken:

- **THREADWAIT=YES** means that the transaction will wait (be placed on the Pool Ready Queue) until a Pool thread becomes available.
- **THREADWAIT=NO** means that the transaction will be abended (aborted) if no Pool thread is available. The CICS DB2 attachment issues abend code AD3T, when THREADWAIT=NO is coded and the number of pool threads is exceeded.

When transactions are abended, the performance of the transaction obviously experiences poor performance, and the transaction must be resubmitted in order to successfully complete. Additionally, the resources that were required to schedule and initiate the transaction are wasted. Unless there are unusual situations, transactions should not be allowed to abend. If necessary, other techniques should be used to control transaction activity.

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CICS-DB2 global statistics are available in MXG file CICDB2GL. CPExpert uses data in CICDB2GL to determine whether THREADWAIT=NO was specified for pool threads, whether the maximum number of threads specified by the THREADLIMIT attribute of the DB2CONN definition had been reached, and whether any pool threads were aborted

CPExpert produces Rule CIC278 when THREADWAIT=NO was specified for pool threads, when the maximum number of threads specified by the THREADLIMIT attribute had been reached, and when the number of aborted pool threads was greater than the **POOLABND** guidance variable in USOURCE(CICGUIDE).

The default value for the POOLABND guidance variable is zero, indicating that Rule CIC278 should be produced when any pool threads were aborted.

**Suggestion:** If Rule CIC278 is produced, you should consider the following alternatives:

C **Increase THREADLIMIT value.** You can increase the THREADLIMIT value on the DB2CONN definition if you wish to allow more pool threads to be used.

C **Change the THREADWAIT attribute.** You can change the THREADWAIT attribute from THREADWAIT=NO to THREADWAIT=YES in the DB2CONN definition.

C **Use transaction class limits.** If you wish to limit the amount of CICS-DB2 activity, you should consider using transaction class limits rather than using the THREADLIMIT value and THREADWAIT=NO attribute. 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 POOLABND guidance variable in USOURCE(CICGUIDE) if you feel that Rule CIC278 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 5.1.3 (DB2CONN)

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

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CICS/TS for z/OS Release 2.2 *Resource Definition Guide*: Section 2.3.4  
(DB2 connection definition attributes)