Rule CIC210 The number of Transient Data buffers may be too low

Finding: CPExpert believes that the number of buffers specified for Transient Data destinations may be too low.

Impact: This finding should normally have a LOW IMPACT or MEDIUM IMPACT on the performance of the CICS region.

Logic flow: This is a basic finding, based upon an analysis of the CICS statistics.

Discussion: Transient data is used for a variety of purposes within CICS (e.g., servicing request from CICS, servicing requests from user tasks, passing requests to the operating system, initiating tasks based on queue trigger level specifications, etc.). Transient data destinations are defined by the DFHDCT macros. Transient data may be directed to extrapartition destinations or to intrapartition destinations.

- Extrapartition destinations are used to specify data that is outside the CICS region, but which are allocated to CICS. Extrapartition destinations are used for two purposes:

  - Sending data outside the CICS region. For example, data created by a transaction may be sent to an extrapartition destination to be processed by a batch job.

  - Retrieving data from outside the CICS region. For example, input to a transaction may be received from a terminal, using an extrapartition destination.

  Extrapartition requests are processed by QSAM, and requests are issued by CICS (rather than by CICS tasks). Consequently, the entire CICS region can wait for completion of an extrapartition request if something delays the request.

- Intrapartition destinations are used for data that is to be stored temporarily. An intrapartition destination may be a terminal, a file, or another system. All intrapartition destinations are retained in a single VSAM data set. Consequently, intrapartition destinations require allocation of VSAM buffers and strings. The performance of intrapartition destinations is affected by the number of buffers and the number of strings.

A VSAM buffer is used to hold each VSAM control interval (CI) required to respond to a request for an intrapartition destination. The number of buffers is explicitly specified using the TD operand in the System Initialization Table (SIT). The default is three buffers for the intrapartition destinations (recall that all intrapartition destinations reside in a single VSAM file).

An intrapartition request is queued if (1) the CI required is already in use or (2) no buffers are available. Intrapartition requests are queued by destination. If multiple buffers are specified (as is the default), requests for other intrapartition destinations can proceed even though a queue might exist for a different destination.

Providing multiple buffers has another, potentially more important, benefit. This benefit arises because CICS retains several VSAM CIs in storage. The use of multiple buffers increases the probability that the CI required by a particular request is already available in a buffer. If the CI is in a buffer, no physical I/O operation will be required by VSAM. This can lead to a significant reduction in the number of VSAM I/O operations, resulting in better response to tasks and resulting in decreased use of system I/O resources.

If no VSAM buffers are available to handle an intrapartition destination request, the request must wait for a buffer. The CICS statistics report the number of intrapartition requests that must wait for VSAM buffers.

CPExpert produces Rule CIC210 if the CICS statistics revealed that intrapartition requests must wait for VSAM buffers, and if CICS did not exhibit a short-on-storage condition. CPExpert provides information regarding the CI size and the number of buffers.

Suggestion: CPExpert suggests that you consider increasing the number of buffers assigned to intrapartition transient data. This is accomplished by increasing the number of buffers specified in the TD operand of the SIT.

There is a tradeoff between improving transient data performance and the increased storage requirements implicit in increasing the number of VSAM buffers assigned to intrapartition transient data. If storage is not constrained, you should not allow intrapartition requests to wait for buffers. However, if storage is constrained, you may wish to accept some small number of waits for transient data buffers.

In general, it may be better to restrict the number of tasks processed by CICS (using MXT or CMXT) and minimize the time each task spends in the system, rather than allowing tasks to wait for buffers and use system resources while they wait.

Reference: *CICS/OS/VS Version 1.7 Performance* Guide: pages 74-76, pages 269-273, and page 384.

CICS/MVS Version 2.1.2 Performance Guide: pages 198-202, page 345, and pages 403-405.

CICS/ESA Version 3.1.1 Performance Guide: pages 138-143 and pages 263-268.

CICS/ESA Version 3.2.1 Performance Guide: pages 235-241 and pages 349-353.

CICS/ESA Version 3.3.1 Performance Guide: pages 254-255 and pages 367-371.

CICS/ESA Version 4.1.1 Performance Guide: Section 4.10.2 and Appendix A.1.32.

CICS/TS Release 1.1 Performance Guide: Section 4.10.3 and Appendix 1.1.29.

CICS/TS Release 1.2 Performance Guide: Section 4.10.3 and Appendix 1.1.30.

CICS/TS Release 1.3 Performance Guide: Section 4.14.3 and Appendix 1.1.33.

CICS/TS for z/OS Release 2.1 *Performance Guide*: Chapter 26 (CICS Transient Data) and Appendix A (Table 139).

CICS/TS for z/OS Release 2.2 *Performance Guide*: Section 4.13.3 (Optimizing the performance of the CICS transient data (TD) facility) and Appendix 1.1.33.

