
Rule CIC188: The number of Temporary Storage strings may be too low

Finding: CPExpert believes that the number of temporary storage strings may be too low.

Impact: This finding should normally have a fairly LOW IMPACT on the performance of the CICS region. However, if the VSAM string wait occurs often, then this finding will have a MEDIUM IMPACT or HIGH IMPACT on performance of the CICS region.

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

Discussion: Temporary storage programs issue VSAM requests to perform I/O between the temporary storage buffers and the VSAM temporary storage data sets (defined by the DFHTEMP DD name). If multiple strings are available, multiple VSAM requests can be executed concurrently. If multiple VSAM requests are executed concurrently, the buffers will be transferred to DASD quicker, since several I/O requests can be outstanding at one time.

If no buffer is available when a task attempts to access temporary storage, the task must wait. This situation is called "wait on buffers" and is analyzed in Rules CIC185 and CIC186. However, the CICS statistics provide additional information about whether the VSAM strings might contribute to the unavailability of buffers. The statistics report the number of times a wait for buffer occurred and not all buffers were being serviced because of a lack of VSAM strings. This situation is called "wait on VSAM string".

If the number of strings is as high as the number of buffers, no CICS task will wait for a string (although the task may wait for a buffer if all buffers are full). This is because all buffers are being serviced by a VSAM string. However, if the number of VSAM strings is less than the number of buffers, not all buffers can be serviced if they are all full.

The CICS statistics analyzed by CPExpert indicated that the percent of temporary storage I/O operations waiting for VSAM strings was higher than the TSIOWAIT guidance variable in USOURCE(CICGUIDE). The default value for the TSIOWAIT guidance variable causes this rule to be produced when **any** of the temporary storage I/O operations waited for strings. This usually means that additional strings should be allocated for temporary storage.

Note that IBM's CICS Performance Guides suggest that up to 5% of temporary storage I/O operations waiting for strings may be tolerable.

However, IBMLINK Document Q467834 suggests that the number of temporary storage buffers should be increased if **any** buffer waits occur. CPExpert agrees with the IBMLINK Document, and applies the same reasoning to waits for temporary storage strings.

Suggestion: CPExpert suggests that you consider increasing the number of VSAM strings allocated for temporary storage. The number of VSAM strings that CICS allocates for temporary storage is specified by the third parameter of the TS operand in the System Initialization Table (SIT).

NOTE: The significance of this finding depends upon whether the finding is based upon analyzing daily information or based upon analyzing historical information.

- If this finding is based upon an analysis of daily information, the finding may be applicable only to the performance of CICS for this day. Unless you feel that the analysis is generally applicable (or unless the workload processed on this day is particularly critical), please wait until CPExpert performs an analysis of historical information before taking action.
- If this finding is based upon an analysis of historical data covering a prolonged period, the finding is more definite than a tentative finding based upon analysis of only a single day's data.

Reference: *CICS/OS/VS Version 1.7 Performance Guide*: page 79 and pages 264-268.

CICS/MVS Version 2.1.2 Performance Guide: pages 193-197 and page 408.

CICS/ESA Version 3.1.1 Performance Guide: page 125 and pages 259-263.

CICS/ESA Version 3.2.1 Performance Guide: pages 231-235 and page 339.

CICS/ESA Version 3.3.1 Performance Guide: pages 249-253 and page 357.

CICS/ESA Version 4.1.1 Performance Guide: Section 4.10.1 and Appendix A.1.26.

CICS/TS Release 1.1 Performance Guide: Section 4.10 and Appendix 1.1.25.

CICS/TS Release 1.2 Performance Guide: Section 4.10 and Appendix 1.1.26.

CICS/TS Release 1.3 Performance Guide: Section 4.14 and Appendix 1.1.29.

CICS/TS for z/OS Release 2.1 Performance Guide: Chapter 26 (CICS temporary storage) and Appendix A (Table 124).

CICS/TS for z/OS Release 2.1 Performance Guide: Section 4.13.1 Tuning the use of CICS temporary storage and Appendix 1.1.29. |

IBMLINK Document Q467834
TITLE: Questions about CICS Shutdown Statistics

IBMLINK Document Q326699
TITLE: Implications of STRNO, STRNOG (Strings reserved for GET) in a VSAM-LSR context.