
Rule CIC170: More than one string specified for write-only ESDS file

Finding: CPExpert has detected that a VSAM ESDS was used exclusively for write operations and that the ESDS had more than one string specified.

Impact: This finding should normally have a MEDIUM IMPACT or HIGH IMPACT on the performance of the CICS region. The level of impact depends on the amount of write activity that occurred and the number of strings concurrently used.

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

Discussion: An entry-sequenced data set is one in which each record is identified by its relative byte address (RBA).

Records are held in an ESDS in the order in which they were first loaded into the data set. New records that are added to an ESDS always go after the last record in the data set. Records in an ESDS may not be deleted, nor can the record lengths be altered. After a record has been stored in an ESDS, its relative byte address (RBA) remains constant. When browsing, records are retrieved in the order in which they were added to the data set.

A record added to an ESDS is always added to the end of the file. Records cannot be inserted in an ESDS between existing records. After the operation is completed, the relative byte address in the file where the record was placed is returned to the application program.

A VSAM "string" is a request to a VSAM data set requiring "positioning" within the data set. Each string results in a number of VSAM control blocks being built. The number of concurrent requests to individual data sets is restricted to the number of strings associated with each data set.

The number of concurrent requests to the data set is specified by (1) the STRNO operand in the DFHFCT TYPE=DATASET macro (for NSR VSAM files), (2) the STRNO operand DFHFCT TYPE=SHRCTL macro (for LSR VSAM files), or (3) the STRINGS operand in the Resource Definition Online FILE definition. Alternatively, CICS can automatically compute the number of strings for the LSR pool for LSR VSAM files, based upon the characteristics of files assigned to the pool.

If no string is available when a file access is attempted, the file access must for an available string. Some waiting is tolerable for NSR VSAM files, since the number of strings concurrently required is highly dependent on the file

access patterns. Tasks generally should not wait on strings for files assigned to a LSR pool for LSR VSAM files. Rule CIC160 and Rule CIC161 analyze waits for available strings for NSR VSAM files and LSR pools, respectively.

There are some special performance considerations when choosing a STRINGS value for an ESDS file.

If an ESDS VSAM file is used as an 'add-only' file (that is, it is used only in write mode to add records to the end of the file), IBM strongly recommends that a single string be specified. Any string number greater than one can significantly affect performance, because of exclusive control conflicts that occur when more than one task attempts to write to the ESDS at the same time. With a string number greater than one, the cost of resolving exclusive control conflicts is greater than waiting for a string. Each time exclusive control is returned, a GETMAIN is issued for a message area, followed by a second call to VSAM to obtain the owner of the control interval.

If an ESDS VSAM file is used for both writing and reading, with writing being 80% of the activity, IBM suggests that it is better to define two file definitions--using one file for writing and the other for reading.

CPEXpert analyzes all files in which the A17DSTYP variable in CICFCT data set indicates that the file is VSAM ESDS data set type, and the A17STRNO value is greater than one. CPEXpert examines the file activity characteristics for the ESDS to determine the read/write characteristics. CPEXpert produces Rule CIC170 if the CICS statistics revealed that the file activity is exclusively write operations.

This finding does not apply to ESDS participating in record level sharing (RLS). For RLS, the value specified for strings is ignored and a value of 1024 strings is returned after OPEN of the ESDS (indicating the maximum number of strings). Consequently, CPEXpert tests A17DSRLS in CICFCR to verify that the ESDS is a non-RLS file.

Suggestion: CPEXpert suggests that you consider specifying only one string in the ESDS file definition.

Before taking this action, you should verify that the file access characteristics in the CICS interval statistics analyzed by CPEXpert are representative of the ESDS (that is, verify that the ESDS is used exclusively for write activity during normal CICS processing).

Reference: *CICS/ESA Version 4.1.1 Performance Guide*: Appendix A.1.11.

CICS/TS Release 1.1 Performance Guide: Appendix 1.1.9.

CICS/TS Release 1.2 Performance Guide: Section 4.4.1.2.1 and Appendix 1.1.10.

CICS/TS Release 1.3 Performance Guide: Section 4.6.1 and Appendix 1.1.11.

CICS/TS for z/OS Release 2.1 Performance Guide: Chapter 18 (VSAM and file control - number of strings considerations for ESDS files) and Appendix A (Table 61).

CICS/TS for z/OS Release 2.2 Performance Guide: Section 4.5.1.2.1 (Number of strings considerations for ESDS files) and Appendix 1.1.11. |