Rule WLM055: Local page data sets are on same volume as swap data sets

Finding: CPExpert has determined that local page data sets are defined on the same volume as swap data sets.

Impact: This finding can have a LOW impact, MEDIUM impact, or HIGH impact on performance of your computer system. The level of impact depends upon the amount of page delay being experienced. This rule does not apply with OS/390 V2R10, as swap data sets are not supported beginning with this release of MVS.

Logic flow: The following rule causes this rule to be invoked:

Rule WLM400: Page-in from auxiliary storage significantly delayed the service class

Discussion: Local page data sets generally should be allocated on separate volumes, and generally should not be allocated on volumes containing swap data sets nor should they be allocated on volumes containing other data sets which have a high level of activity. This is because (1) the device must perform seeks between the data sets, (2) the data transfer time to the device may significantly elongate resolution of page faults, and (3) the Auxiliary Storage Manager (ASM) will be unable to implement the suspend/resume function if you place more than one data set on the same volume.

- The device must perform seeks to position the arm between local page data sets and other data sets on the device. This seeking can be a major contributor to elongating the page fault resolution, since seeking typically requires 10-20 milliseconds per arm movement.

- Data transfer time to the device may significantly elongate page fault resolution. Swap data sets cause relatively large amounts of data to be transferred. The swaps are split into page groups of 12 pages if swap data sets are used. Each page group requires about 20 milliseconds of device activity to transfer the data (average latency plus data transfer time to transfer the page group).

- Each I/O request for another data set will interrupt the suspended I/O for the local page data set. The suspended I/O end, and must be restarted through the I/O Supervisor STARTIO function. Consequently, all potential performance gains resulting from the suspend/resume function of the ASM will be lost.

Please note that the suspend/resume function is not particularly important unless a relatively large amount of paging is done.

CPExpert produces Rule WLM055 only if a service class missed its performance goal and (1) page-in delay from auxiliary storage a major performance problem or (2) swap-in delay from auxiliary storage was a major performance problem.

The following example illustrates the output from Rule WLM055:

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RULE WLM055:  LOCAL PAGE DATA SETS ARE ON SAME VOLUME AS SWAP DATA SETS

  CPExpert has determined that a local page data set and a swap data set
  are defined on VOLSER PG3041.  In most environments, allocating local
  page data sets and swap data sets on the same volume will result in
  overall poor performance of the paging subsystem.  In this case, page
  fault resolution from VOLSER PG3041 was significantly longer than the
  page fault resolution of other local page data sets.
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Suggestion: CPExpert suggests that you separate the local page data sets and swap data sets onto different volumes, preferably on different paths.

Additionally, you may wish to reconsider the wisdom of defining swap data sets (see the discussion in Rule WLM061).

Reference: MVS Initialization and Tuning Guide
MVS/ESA SP5.1: Section 2.4 (Performance recommendations)

MVS Initialization and Tuning Guide
OS/390 MVS (V2R10): Changes

Please note that while this reference applies to MVS/ESA SP5 (Compatibility Mode), the finding is applicable to MVS/ESA SP5 (Goal Mode) and OS/390 (Goal Mode), except for OS/390 V2R10 and later versions of MVS.

