Rule WLM058: Device response for local page data sets was significantly imbalanced

Finding: CPExpert has detected that the device response time for a local page data set was significantly worse than the average device response time for other local page data sets in the paging subsystem.

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.

For paging data sets that reside on a mixture of PAV devices and non-PAV devices, the finding applies:

- Only to those paging data sets that reside on PAV devices when compared within the set of paging data sets that reside on PAV devices.
- Only to those paging data sets that reside on non-PAV devices when compared within the set of paging data sets that reside on non-PAV devices.

Paging data sets that reside on PAV devices are examined first when the Auxiliary Storage Manager (ASM) searches for an available paging data set. Consequently, paging data sets that reside on PAV devices can have a higher utilization than paging data sets that reside on non-PAV devices.

See APAR OA04644 ("Paging PAV devices page data sets unequal distribution") for additional information.

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

Rule WLM400: Page-in from auxiliary storage was a major performance problem

Discussion: The device response time experienced by local page data sets will usually vary somewhat between DASD devices on which the local page data sets reside. This variance is typically caused by such factors as the number of pages transferred in a single I/O operation, the activity of other devices on the device controller, the activity of other devices on the path, etc.

A relatively minor variance in device response times between local page data sets is unavoidable.

However, if the device response time for a particular local page data set is significantly worse than the average for other local page data sets, there may be opportunities for performance improvement by eliminating the cause of the poor device response. These opportunities exist because the paging I/O is experiencing unusual contention at the device, controller, or path.

CPExpert analyzes the average device response time for all devices containing local page data sets. For each PAV device, CPExpert computes the average device response time of **other** PAV devices containing local page data sets. For each non-PAV device, CPExpert computes the average device response time of **other** non-PAV devices containing local page data sets.

CPExpert produces Rule WLM058 if:

- Page-in from auxiliary storage was a major performance problem for any service class.
- The device response time for any PAV device containing a local page data set was significantly worse than the average response for the other local page data sets residing on PAV devices
- The device response time for any non-PAV device containing a local page data set was significantly worse than the average response for the other local page data sets residing on non-PAV devices

The following example illustrates the output from Rule WLM058:

```
RULE WLM058:  LOCAL PAGE RESPONSE WAS SIGNIFICANTLY WORSE THAN AVERAGE

   CPExpert has detected that the device response time for a local page
   data set was significantly worse than the average device response time
   for other local page data sets.  This situation usually is caused by
   overloading the path to the local page data set or by placing local page
   data sets on volumes with other data sets.  During the below intervals,
   there was a significant imbalance of page transfer times among the local
   page data sets, and at least one service class missed its performance
   goal because of delays for page-in from auxiliary storage.

                                  AVERAGE      VOLUME                VOLUME
                                 PAGE XFR     WITH POOR    PAGES    AVG PAGE
   MEASUREMENT INTERVAL            TIME       XFR  TIME    XFR'D    XFR TIME
    8:00- 8:30, 16AUG1995         0.006        PG3040     10,875      0.010
```

Suggestion: CPExpert suggests that you determine and correct the cause of the poor device response time provided to the local page data set. These actions

should be taken if the problem is persistent, or if the problem occurs at times when page response time is critical. (That is, you probably shouldn't worry if the problem doesn't happen often or if it happens only at relatively unimportant times.)

If you have licensed the DASD Component of CPExpert, you may wish to select the specific VOLSER for detailed analysis (using the SELECT option). If you do not license the DASD Component of CPExpert, you may be able to identify the cause of the problem by simple inference using standard RMF reports.

- You can examine the activity of other devices on the controller, using the RMF *Device Activity Report*. If the activity of these devices is high, then the problem probably is at the controller level. You may wish to move the local page data set to a different controller.

- You can examine the activity of all paths through which the device is accessed, using the RMF *Channel Path Activity Report*. If the activity of all paths is high (and the problem was not at the controller level), then the problem probably is at the path level. You may wish to move the local page data set to different paths (or provide more paths).

Please refer to the suggestions in Rule WLM400 for general ways to improve the performance of your paging subsystem.

You can alter the value CPExpert uses to assess whether page-in delay is unacceptable (unbalanced) by changed the OKPAGEIN value in USOURCE(WLMGUIDE).

