Rule DAS235: PEND DELAY TIME WAS CAUSED BY OTHER DELAYS

Finding: A significant amount of the PEND time delay was caused by delays that were not unexplained by either the causes of PEND time as reported by SMF, or estimated causes as calculated by CPExpert.

Impact: This finding may have a MEDIUM IMPACT or HIGH IMPACT on the performance of the device.

Logic flow: The following rules cause this rule to be invoked:

DAS200: Volume with the worst overall performance
DAS230: Major cause of I/O delay was PEND time

Discussion: PEND time is the time from the issuance of the SSCH instruction until the device is selected by the control unit. This time is caused by queuing for the path (wait for channel, wait for director port, wait for control unit, wait for device, or wait for other reasons).

SMF contains information describing the PEND delay time caused by wait for director port (SMF74DPB), wait for control unit (SMF74CUB), and wait for device (SMF74DVB). As described in Rule DAS131, CPExpert computes an estimated PEND time caused by channel busy.

After computing an estimated PEND for channel busy, CPExpert subtracts the wait for channel, wait for director port, wait for control unit, and wait for device from the total Device PEND time reported by SMF in SMF74PEN. After this subtraction, there often is a remainder. This remainder[1] has been titled "other" PEND time since it is PEND time that is not reflected in the measured or estimated causes of PEND delay time.

For many systems, "other" PEND time is zero or very small. For some systems, the "other" PEND time is dramatically large (often, 75% or more of the average response time).

Suggestion: There are no suggestions with Rule DAS235. The finding is produced simply to alert you that the PEND delay data contains a large amount of

[1] MXG does not calculate the PEND due to channel busy, but simply sets the AVGPNCHA equal to the AVGPNDIR. MXG does subtract the PEND for director port, PEND for control unit, and PEND for device from the total device PEND delay. Since MXG does not calculate an estimated PEND time due to channel busy, MXG produces a much larger PEND "other" value than does CPExpert's calculations.

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delay that was unexplained by either the causes of PEND time as reported by SMF, or estimated causes as calculated by CPExpert.

At present, there is only conjecture[2] about additional cause of this “other” PEND time. Perhaps either IBM will better describe this “other” PEND time in future, or perhaps research will reveal likely causes of the “other” PEND time.

[2] According to MXG (ADOC74 comments), Dr. H. Pat Artis believes that the “other” PEND is often the internal response time of the subsystem, i.e., the time it takes the subsystem to accept, validate, and acknowledge the first Channel Control Word (CCS) of the channel program.