Rule WLM140: Sysplex performance index was significantly less than local performance index

Finding: The average sysplex performance index was significantly less than the average performance index on the local system. This finding applies only to environments that have multiple systems in the sysplex running under Goal Mode.

Impact: This finding can have a HIGH IMPACT on performance of the service class period.

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

Rule WLM101:	Service Class did not achieve average response goal
Rule WLM102:	Service Class did not achieve percentile response goal
Rule WLM103:	Service Class did not achieve execution velocity goal
Rule WLM104:	Subsystem Service Class did not achieve average response goal
Rule WLM105:	Subsystem Service Class did not achieve percentile response goal

Discussion: As described in Section 4 (Chapter 3.5: Policy Adjustment), the Workload Manager periodically assesses the performance of each service class period, comparing the performance achieved by the service class period against the performance goals specified for the service class period. The comparison of performance is based on the performance index computed for the service class periods, and on the goal importance of the service class periods.

The Workload Manager initially assesses performance based on the *sysplex performance index* computed for each service class period. This assessment is done at each goal importance level. Policy adjustment actions are evaluated for the worst-performing service class period at the highest goal importance, then the next worst-performing, etc. It is important to realize that only one service class period will be "helped" by the policy adjustment algorithms per policy adjustment interval[1].

If the Workload Manager has evaluated the performance of all service class periods at the highest goal importance *based on sysplex performance index*

[1]Recall that the policy adjustment interval is 10 seconds of elapsed time.

and no action has been taken, the next step depends on whether APAR OW25542 has been applied.

- **OW25542 has not been applied**. With the normal logic, the Workload Manager will examine the performance of all service class periods at the next-highest goal importance *based on sysplex performance index*. The Workload Manager will continue analyzing performance at successively lower goal importance levels, based on sysplex performance index. After the performance of all service class periods with goals have been analyzed with no action, the Workload Manager will perform the analysis beginning with the highest goal importance, **using the local performance index** as the measure of performance.

- **OW25542 has been applied**. With OW25542[2], the Workload Manager will examine the performance of all service class periods at the highest goal importance **using the local performance index** as the measure of performance. The Workload Manager will continue examining performance at successively lower goal importance levels, analyzing performance based on sysplex performance index followed by an analysis of performance based on local performance index.

Both the original design of the Workload Manager and the fix for OW25542 operate under a basic assumption: that a sysplex consists of multiple systems configured in a symmetric manner, and that service class periods can operate on any system in the sysplex. If the workload being processed consists of transaction service classes such as CICS transactions managed by CICSplex/SM and routed to any system in the sysplex to be processed in cloned CICS regions, this view of the sysplex makes sense.

From this perspective, all systems in the sysplex can be viewed collectively as a pool of resources and the performance of the transactions can be evaluated based on how well the transactions perform on the sysplex. If a service class period is not meeting its performance goal *on the sysplex*, action may or may not be necessary at a local system level. Consequently, **sysplex performance index** is the basic measure of performance used in the Workload Manager design.

Unfortunately, this logic does not work in all situations. Consider a site that has established a service class for TSO trivial transactions. The TSO users might log onto, for example, two systems: SYSA and SYST. The users on SYSA might represent production work while the users on SYST might represent TSO testing (and might not be as important to the site as the production work).

[2] OW25542 is standard with OS/390 Version 1 Release 4.

It is conceivable that the test TSO user could receive good response while some of the production TSO users could receive very poor response. From a sysplex performance index calculation, the test and production response times would be grouped together by the algorithm. Depending on the distribution of response times, the sysplex performance index might be relatively low.

One result of this could be that the Workload Manager would not attempt to "help" the production TSO service class since the sysplex performance index might indicate that there was no performance problem. However, the production users might feel quite differently about the performance!

CPExpert evaluates performance based on a calculated average **local performance index** for each service class period. This is because we believe that the Workload Manager approach is fatally flawed in practically every existing environment. There **will** be environments with the sysplex-centric view will be a proper way to evaluate performance, but few such environments exist today. Rather, most environments operating in Goal Mode run in a monoplex, or in a sysplex with a wide variety of work executing on different systems.

Consequently, CPExpert evaluates performance at the local system level, and makes suggestions or comments based on potential performance improvement actions at the local system level.

On the other hand, the Workload Manager does evaluate the sysplex performance index as the primary indicator of performance. Thus, CPExpert computes the average sysplex performance index and displays both the local performance index and sysplex performance index in appropriate rules.

When CPExpert detects that a service class period misses its performance goal (based on the local performance index), CPExpert examines the sysplex performance index. If the sysplex performance index is *significantly less* than the local performance index, the Workload Manager might take no action to improve performance for the service class. CPExpert reports this potential problem via Rule WLM140. Rule WLM140 is produced when the sysplex performance index is less than 75% of the local performance index.

The following example illustrates the output from Rule WLM140:


```
RULE WLM140: SYSPLEX PERFORMANCE INDEX WAS SIGNIFICANTLY LESS THAN LOCAL

   IMS (Period 1):  The sysplex performance index for this service class
   period was significantly less than the local performance index.  One
   implication of this is that the Workload Manager might not attempt to
   improve performance of the service class period on the local system.
   Please refer to the WLM Component User Manual for a discussion of how
   the sysplex performance index and local performance index are used by
   the Workload Manager.  This finding applies to the following measurement
   intervals:

                                      PERFORMANCE INDEX
   MEASUREMENT INTERVAL               LOCAL     SYSPLEX
   11:00-11:15,06MAR1997               1.83       0.97
   11:15-11:39,06MAR1997               2.14       0.82
```

Suggestion: If this finding occurs, CPExpert suggests that you review the relative values of the sysplex performance index and the local performance index presented by Rule WLM140.

You should be concerned if the sysplex performance index is significantly less than the local performance index for important work since this would indicate that the Workload Manager **might not** take action to improve performance on the local system.

You should become alarmed if the sysplex is less than 1.0 for important work, since this would indicate that the Workload Manager probably **would not** take action to improve performance on the local system!

In either case, you should consider the following alternatives:

- Review the information presented with the predecessor rules and other rules related to the "missed goal" analysis for the service class period. Based on this review and considering the importance of the work in the service class period, you should assess whether any action is necessary or whether you should ignore the finding. If you ignore the finding, you should be aware that the Workload Manager might not take actions to improve the performance of the service class period.

- If you decide that action is warranted, you should revise the workload classification scheme to place the work assigned to the service class period missing its goal into a different service class. This might involve creating a new service class for the work executing on the local system, or creating a new service class for the work executing elsewhere in the sysplex.

Reference: MVS Programming: Workload Management Services

MVS/ESA(SP 5):	Chapter 4: Using SMF Record Type 99
OS/390 (V1R1):	Chapter 7: Using SMF Record Type 99
OS/390 (V1R2):	Chapter 7: Using SMF Record Type 99
OS/390 (V1R3):	Chapter 9: Using SMF Record Type 99
OS/390 (V2R4):	Chapter 9: Using SMF Record Type 99
OS/390 (V2R5):	Chapter 10: Using SMF Record Type 99
OS/390 (V2R6):	Chapter 10: Using SMF Record Type 99
OS/390 (V2R7):	Chapter 10: Using SMF Record Type 99
OS/390 (V2R8):	Chapter 10: Using SMF Record Type 99
OS/390 (V2R9):	Chapter 10: Using SMF Record Type 99
OS/390 (V2R10):	Chapter 10: Using SMF Record Type 99
z/OS (V1R1):	Chapter 10: Using SMF Record Type 99
z/OS (V1R2):	Chapter 10: Using SMF Record Type 99
z/OS (V1R3):	Chapter 10: Using SMF Record Type 99
z/OS (V1R4):	Chapter 10: Using SMF Record Type 99
z/OS (V1R5):	Chapter 10: Using SMF Record Type 99
z/OS (V1R6):	Chapter 10: Using SMF Record Type 99
z/OS (V1R7):	Chapter 11: Using SMF Record Type 99
z/OS (V1R8):	Chapter 11: Using SMF Record Type 99
z/OS (V1R9):	Chapter 11: Using SMF Record Type 99
z/OS (V1R10):	Chapter 11: Using SMF Record Type 99
z/OS (V1R11):	Chapter 11: Using SMF Record Type 99
z/OS (V1R12):	Chapter 11: Using SMF Record Type 99
z/OS (V1R13):	Chapter 11: Using SMF Record Type 99
z/OS (V2R1):	Chapter 11: Using SMF Record Type 99
z/OS (V2R2):	Chapter 11: Using SMF Record Type 99

