
Rule WLM134: Significant transaction time was switched in network

Finding: A significant amount of the transaction response time for the service class missing its performance goal was spent switched outside the sysplex somewhere in the network. This finding applies to service classes which are part of a subsystem (e.g., CICS transactions).

Impact: This finding has MEDIUM IMPACT or HIGH IMPACT on performance of the service class. The level of impact depends on the percent of transaction response time spent switched to another system in the sysplex.

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

- Rule WLM104: Subsystem Service Class did not achieve average response goal
- Rule WLM105: Subsystem Service Class did not achieve percentile response goal

Discussion: When CPExpert produces Rule WLM104 or Rule WLM105 to indicate that a subsystem service class did not achieve its performance goal, the logic of these rules tries to identify the cause of the delay. The cause of the delay initially is analyzed from the "served" service class view. The delays from the served service class are reported by CICS/ESA Version 4.1 or IMS Version 5 interaction with the Workload Manager, using the Workload Management Services macros¹.

CICS/ESA Version 4.1 reports two separate views of the transactions: the *begin_to_end phase* and the *execution phase*².

- **Begin_to_end phase.** The *begin_to_end phase* starts when CICS/ESA Version 4.1 has classified the transaction³. This action normally is done in a CICS Terminal Owning Region (TOR).
- **Execution phase.** The *execution phase* starts when either CICS/ESA Version 4.1 or IMS Version 5 has started an application task to process

¹Please refer to Section 4 of this document for more detail about the Workload Management Services macros and how the subsystems use these macros to exchange information with the Workload Manager.

²IMS Version 5 reports only *execution phase* samples.

³Classifying the transaction into a service class is actually done by the Workload Manager when CICS issues the IWMCLSFY macro. Please refer to Section 4 for a more complete discussion of the subsystem work manager (e.g., CICS) interaction with the Workload Manager.

the transaction. For CICS, this normally is done in a CICS Application Owning Region (AOR).

Within each phase, CICS or IMS reports the "state" of the transaction, from the view of CICS or IMS. The state of the transaction is reported in the following categories⁴:

- **Idle state.**
- **Active state.**
- **Ready state.**
- **Wait state.**
- **Switched state.**

If the subsystem supports work manager delay reporting, the delay information is available in the "Work Manager/Resource Manger State Section" of SMF Type 72 (Subtype 3) records. When a transaction service class fails to achieve its performance goal, CPExpert analyzes the information to identify the primary and secondary causes of delay.

The Switched state indicates that processing of the transaction had been switched from the work manager (e.g., a CICS region) that was providing information to the Workload Manager. The transaction could have been switched to another CICS region (for example) in the same MVS image, switched to another MVS image in the sysplex, or switched to somewhere in the network.

- **Switched in the MVS image.** When the transaction is switched to another subsystem in the same MVS image, the subsystem from which the transaction is being shipped indicates that the monitoring environment transaction is being transferred to another subsystem (another "server"). The receiving subsystem provides transaction delay information to the Workload Manager.

CPExpert will acquire information about the server service class to which the transaction is switched. The server information will be analyzed to identify delays. If the server serves multiple transaction service classes, CPExpert prorates the delays based on amount of service provided to the different transaction service classes (the service information is contained in the R723SCS# variable in SMF TYPE 72 records). Other rules

⁴Please refer to Section 4 of this document for a more comprehensive discussion of the transaction states and the interaction between the subsystem (CICS or IMS) and the Workload Manager.

provide information about delays when a transaction has been switched in the MVS image (for example, Rule WLM120 to Rule WLM132 provide information about the transaction delays. Rules WLM150-WLM152, WLM210, WLM211, etc. provide information about the server executing in the same MVS image.)

- **Switched in the sysplex.** When the transaction is switched to or switched to another MVS image in the sysplex, the subsystem from which the transaction is being shipped indicates that the monitoring environment transaction is being transferred to another subsystem. The receiving subsystem on the new MVS image provides transaction delay information to the Workload Manager.

CPEXpert provides Rule WLM133 when a significant amount of transaction delay can be attributed to the "switched in the sysplex" state.

- **Switched in the network.** If the transaction is switched somewhere in the network, the Workload Manager has no more information about the status of the transaction; it is simply "switched in the network" from the Workload Manager's view.

CPEXpert provides Rule WLM134 when a significant amount of transaction delay can be attributed to the "switched in the sysplex" state.

The following example illustrates the output from Rule WLM105 (to show the primary cause of delay), followed by the output from Rule WLM134:

```
RULE WLM134:  SIGNIFICANT TRANSACTION TIME WAS SWITCHED OUTSIDE SYSPLEX

A significant amount of the transaction response time for the APPCGRPA
Service Class was spent switched outside the sysplex, to somewhere in
the network.  No additional information is available in SMF records, and
no further analysis can be done.
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Suggestion: There are no suggestions with this finding, since it simply explains why further analysis is not possible.