Rule WLM125: Significant transaction time was in Waiting for Conversation state

Finding: A significant amount of the transaction response time for the service class missing its performance goal was spent in the Waiting for Conversation state. This finding applies to service classes that 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 in the Waiting for Conversation state.

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 (with CICS/ESA Version 4.1 and later) or by IMS (with IMSVersion 5 or later). Interaction with the Workload Manager is accomplished using the Workload Management Services macros[1].

CICS 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 has classified the transaction[3]. This action normally is done in a CICS Terminal Owning Region (TOR).

[1]Please 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.

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

[3]Classifying the transaction into a service class is done by the Workload Manager when the subsystem manager 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.

- **Execution phase**. The execution phase starts when either CICS or IMS (Version 5 or later) has started an application task to process the transaction. For CICS, this normally is done in a CICS Application Owning Region (AOR). For IMS, this is done in an IMS Message Processing Region (MPR).

Within each phase, CICS or IMS report the "state" of the transaction, from the view of CICS or IMS. The state of the transaction is reported in the following categories[4]:

- **Idle state**. (Both CICS and IMS report this state.

- **Ready state**. Only CICS reports this state.

- **Active state**. Both CICS and IMS report this state.

- **Wait state**. Both CICS and IMS report this state, but IMS provides only Wait for I/O state and Wait for Lock state.

- **Switched state**. Only CICS reports this 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 Wait state indicates that a task in support of the transaction was waiting on some activity. The Wait state is broken into several categories: waiting for lock, waiting for I/O, waiting for conversation, waiting for distributed request, waiting for a session to be established (locally, somewhere in the network, or somewhere in the sysplex), waiting for a timer, waiting for another product, waiting for a new latch, waiting for SSL thread, waiting for regular thread, waiting for work table, or waiting for an unidentified resource.

CPExpert produces Rule WLM125 when the primary or secondary cause of delay was that the transaction service class was in the Waiting for Conversation state for a significant percent of its response time. These tasks would be shown as "Suspended" by the CEMT INQUIRE TASK command.

[4]Please 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.

The Waiting on Conversation state means that a transaction has been switched across an intersystem communication link (MRO or ISC) to another work manager.

A CICS transaction typically enters the system through a TOR and may be routed to an AOR. The Waiting on Conversation state in the TOR would include the time the transaction was switched to the AOR, plus any queue time waiting for the AOR to accept the transaction and notify the Workload Manager, plus the time in the AOR processing the transaction. The Waiting on Conversation state in the TOR would terminate when the TOR received the transaction back from the AOR. All of this Waiting on Conversation time would show up in the BTE Phase of the transaction.

Most of the Waiting on Conversation state (particularly for the BTE Phase) is explained in the Switched state:

- **Switched - Local**. The transaction has been switched, across an MRO link, to another CICS region in same MVS image.

- **Switched - Sysplex**. The transaction has been switched, across an XCF/MRO link, to another CICS region in another MVS image in the sysplex.

- **Switched - Network**. The transaction has been switched, across an ISC link, to another CICS region (which may, or may not, be in the same MVS image).

The following example illustrates the output from Rule WLM125:

```
RULE WLM125:  SIGNIFICANT TRANSACTION TIME WAS WAITING FOR CONVERSATION

 A significant amount of the transaction response time for CICUSERC Service
 Class was spent waiting on a conversation between subsystems:  waiting
 on another CICS region, an IMS region, DBCTL, etc.
```

Suggestion: There are no suggestions with this rule. The finding is provided for information purposes.

Reference: CICS/ESA Version 4.1 Performance Guide
Section 2.7.1.1: The response time breakdown in percentage section
Section 2.7.1.2: The state section

CICS/TS Release 1.1 Performance Guide
Section 2.7.1.1: The response time breakdown in percentage section

Section 2.7.1.2: The state section

CICS/TS Release 1.2 Performance Guide
Section 2.7.1.1: The response time breakdown in percentage section
Section 2.7.1.2: The state section

CICS/TS Release 1.3 Performance Guide
Section 2.6.1.1: The response time breakdown in percentage section
Section 2.6.1.2: The state section

CICS/TS for z/OS Release 2.1 *Performance Guide*: Chapter 8 (Managing Workloads).

CICS/TS for z/OS Release 2.2 *Problem Determination Guide: Section* 2.3.3.6.7 (The meanings of the WLM_WAIT_TYPE parameter)