Rule WLM114: BTE Phase had large number of Ready samples

Finding: CPExpert has detected that a large percent of the begin_to_end (BTE) phase samples were in the Ready state. This finding applies only to service classes representing transactions under CICS/ESA Version 4 or later versions of CICS.

Impact: This finding means that CICS transactions were waiting for dispatch in the Transaction Owning Region but were not dispatched by CICS.

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: CICS/ESA Version 4.1 (or later versions) reports two separate views of the transactions: the *begin_to_end phase* and the *execution phase*[1].

- **Begin_to_end phase**. The begin_to_end phase starts when CICS has classified the transaction[2]. This action normally is done in a CICS Terminal Owning Region (TOR).

- **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).

CICS provides the System Resources Manager (SRM) with information about the phase (begin_to_end or execution) of transactions by executing the IWMMINIT ("Initialize the Monitoring Environment") macro. The DURATION parameter of the IWMMINIT macro tells the SRM whether the following information related to a transaction is associated with the begin_to_end phase or with the execution phase.

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

[2]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.

The IWMMINIT macro is issued immediately after CICS has issued the IWMCLSFY ("Assigning Incoming Work Requests to a Service Class") macro to establish a service class for a transaction. Thus, the SRM quickly knows (1) the service class to which a transaction belongs and (2) whether the transaction is in its begin_to_end phase or in its execution phase.

CICS or IMS will provide the SRM with information about the state of the transaction (active state, ready state, waiting state, etc.) by issuing the IWMMCHST ("Change State of Work Request") macro. The SRM simply sets bits in a status word to indicate the state of a transaction.

The SRM periodically samples the status word associated with each transaction[3], and updates counters representing the state of transactions executing in the service class. There is a status word for the begin_to_end phase and a status word for the execution phase, and separate sets of counters are maintained for the various begin_to_end states and execution states for each service class

Included in the state reported by CICS are the times the transaction is in a Ready state. The Ready state indicates that there was a program ready to execute on behalf of a work request in the "served" service class, but that the work manager has given priority to another work request. In the case of a CICS region, this means that there were more CICS tasks ready to execute in the "served" service class than were dispatched by CICS.

CICS transactions typically enter the system via a CICS TOR. The transactions receive some initial processing in the TOR and are routed to an AOR for actual application processing. CICS signals the beginning of the execution phase for the transaction when the transaction is received by the AOR.

Some transactions are not routed to an AOR, however. These transactions are completely processed in the TOR. Since the AOR signals the beginning of the execution phase, these transactions never enter the execution phase.

The service class being analyzed by CPExpert exceeded its performance objective (as reported by Rule WLM104 or Rule WLM105). Further, CPExpert had been directed to analyze response time based on the begin_to_end phase[4].

CPExpert produces Rule WLM114 when the Ready samples account for more than 25% of the number of begin_to_end samples AND when you have directed CPExpert to analyze response delays based on the

[3]With MVS/ESA SP5.1, the SRM takes its samples every 250 milliseconds.

[4]That is, you had specified **%LET PHASE=BEGIN_TO_END** in USOURCE(WLMGUIDE).

begin_to_end phase. CPExpert concludes that a large percentage of non-routed transactions are processed in the service class if more than 25% of the transaction samples occurred in the Ready state of the begin_to_end phase.

This means that CICS tasks were waiting dispatch in the TOR, but could not be dispatched because (1) the CICS TOR was denied access to a CPU because its MVS dispatching priority was not high enough or (2) the CICS TOR was processing other CICS tasks.

The following example illustrates the output from Rule WLM114:

```
RULE WLM114:  BTE PHASE HAD LARGE READY SAMPLES

   CPExpert has detected that a large number of BEGIN_TO_END PHASE Ready
   samples were recorded for the CICS Service Class.  These Ready tasks
   would be shown as "Dispatchable" by the CEMT INQUIRE TASK command.
   This means that CICS tasks were waiting dispatch in the TOR, but could
   not be dispatched because (1) the CICS TOR was denied access to a CPU
   because its MVS dispatching priority was not high enough or (2) the CICS
   TOR was processing other CICS tasks.  Please refer to Rule WLM114 in the
   WLM Component User Manual for alternatives to correct the situation.  This
   finding applies to the following RMF measurement intervals:

                                  BEGIN TO END        READY     ACTIVE
   MEASUREMENT INTERVAL           PHASE SAMPLES      SAMPLES    SAMPLES
   10:00-10:30,26MAR1996             511,574         209,486      7,238
   10:30-11:00,26MAR1996             513,461         289,929      6,895
```

Suggestion: CPExpert suggests that you consider the following alternatives:

- **The CICS TOR was denied access to a CPU**. Please refer to Rule WLM250 for a discussion and alternatives when a service class is denied access to a CPU.

- **The CICS TOR was processing other CICS tasks**. Please refer to Rule WLM121 for a discussion and alternatives when the CICS TOR was processing other CICS tasks.

Reference: CICS/ESA Version 4.1 Performance Guide
Section 2.6.3.1: Service Definitions

CICS/TS Release 1.1 Performance Guide
Section 2.6.3.1: Service Definitions

CICS/TS Release 1.2 Performance Guide
Section 2.6.3.1: Service Definitions

CICS/TS Release 1.3 Performance Guide
Section 2.5.7.1: Service Definitions

CICS/TS for z/OS Release 2.1 *Performance Guide*: Chapter 8 (Managing Workloads - Setting up service definitions).

CICS/TS for z/OS Release 2.2 *Performance Guide*: Chapter 8 (Managing Workloads - Setting up service definitions).

