

# IBM Education Assistant (IEA) for z/OS V2R3

RMF: Support Shorter WLM Response Time Goals

# Agenda

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# Trademarks

- See url <http://www.ibm.com/legal/copytrade.shtml> for a list of trademarks.
- Additional Trademarks: None.

# Session Objectives

- This item delivers the RMF support for shorter response time goals which are provided by WLM with z/OS V2R3:  
The lowest response time goal which can be specified for service class periods changes from 15 milliseconds to one millisecond.
- RMF adapts workload reporting in various Monitor III reports, Postprocessor Workload Activity report (WLMGL) and SMF type 72 records to properly display response times of transactions which run faster than one millisecond on the average.  
The Distributed Data Server is extended to deliver new performance metrics for the shorter response time values.

# Overview

- Problem Statement / Need Addressed
  - Currently, the shortest average or percentile response time that can be specified in the WLM service definition is 15 milliseconds. This makes it difficult to manage such transactional work effectively where transactions complete well below 15 milliseconds (e.g. in DB2 DDF and CICS environments).
  - With z/OS V2R3, WLM replaces the current lower bound of 15 milliseconds for a response time goal by one millisecond. This allows to specify meaningful goal values for very fast running transactions.
- Solution
  - With z/OS V2R3, RMF gathers these more granular response time and distribution information from WLM by calling the IWMRCOLL service.
  - RMF adapts all reporting of workload manager response times to properly display this more precise information within the sub-second range.
- Benefit / Value
  - Transactions that have response times below 15 milliseconds, can be monitored using RMF Monitor III, Postprocessor WLMGL reporting, Distributed Data Server and SMF 72 subtype 3 records.

# Usage & Invocation: Postprocessor WLMGL Report

## Summary of changes:

- The Postprocessor Workload Activity (WLMGL) report is adapted to present the response time goal, transaction times, and response time distributions with higher precision to reflect actual response times lower than one millisecond.
- The representation of response times in the format HH.MM.SS.TTT is changed to HHH.MM.SS.FFFFFFFF in every place where an actual or average response time has to be reported.
- TTT stands for ~~t~~housandths of seconds, FFFFFFFF stands for ~~f~~ractional representation of seconds, thus microseconds can be displayed.
- The format for response time goals itself will remain unchanged because the smallest possible response time goal of one millisecond can be represented as 000.00.00.001 (HHH.MM.SS.TTT).
- The data in the resource consumption section is re-arranged to allow for a better usage of the available space.

Examples on the next slides ...

# Usage & Invocation: Postprocessor WLMGL Report

This example shows the re-arranged resource consumption section for service and report classes and workloads.

- It includes the new formatting of response times.
- APPL% values for transactions with service class attributes CategoryA/B have been added.

W O R K L O A D   A C T I V I T Y									
z/OS V2R3		SYSPLEX UTCPLXCB		DATE 12/19/2016		INTERVAL 15.00.003		MODE = GOAL	
		RPT VERSION V2R3 RMF		TIME 02.45.00					
POLICY ACTIVATION DATE/TIME 12/18/2016 09.00.11									
----- SERVICE CLASS PERIODS									
POLICY=BASEPOL		WORKLOAD=STC_WLD		SERVICE CLASS=STCLOW		RESOURCE GROUP=*NONE		PERIOD=1 IMPORTANCE=3	
				CRITICAL =NONE					
-TRANSACTIONS--		TRANS-TIME		HHH.MM.SS.FFFFFF		TRANS-APPL%----		CP-IIPCP/AAPCP-IIP/AAP	
AVG 46.51		ACTUAL		5.637787		TOTAL		1.04 0.00 0.00	
MPL 46.49		EXECUTION		4.957964		MOBILE		0.00 0.00 0.00	
ENDED 11		QUEUED		679822		CATEGORYA		0.00 0.00 0.00	
END/S 0.01		R/S AFFIN		0		CATEGORYB		0.00 0.00 0.00	
#SWAPS 971		INELIGIBLE		0					
EXCTD 0		CONVERSION		190650					
		STD DEV		2.506325					
---ENCLAVES---									
						AVG ENC		0.00	
						REM ENC		0.00	
						MS ENC		0.00	
-----SERVICE-----									
IOC 23349		CPU 9.021		CP 1.06		BLK 0.000		SSCHRT 2.8	
CPU 566054		SRB 0.383		IIPCP 0.00		ENQ 0.000		RESP 0.1	
MSO 0		RCT 0.107		IIP 0.00		CRM 0.000		CONN 0.0	
SRB 24025		IIT 0.012		AAPCP 0.00		LCK 708670.7		DISC 0.0	
TOT 613428		HST 0.000		AAP N/A		SUP 0.000		Q+PEND 0.0	
/SEC 682		IIP 0.000				IOSQ 0.0			
ABSRPTN 15		AAP N/A							
TRX SERV 15									
-----STORAGE-----									
						AVG 4118.93		SINGLE 0.0	
						TOTAL 191482.5		BLOCK 0.3	
						SHARED 0.00		SHARED 0.0	
								HSP 0.0	
-PAGE-IN RATES-									

# Usage & Invocation: Postprocessor WLMGL Report

This example shows the response times format in the goals and actuals report section for a service class period.

GOAL: RESPONSE TIME 000.00.05.000 AVG

SYSTEM	RESPONSE TIME HHH.MM.SS.FFFFFFFF	EX VEL%	PERF INDX	AVG ADRSP	--EXEC USING%--				----- EXEC DELAYS % -----		-USING%-		--- DELAY % ---				%	
					CPU	AAP	IIP	I/O	TOT	CPU		CRY	CNT	UNK	IDL	CRY	CNT	QUI
*ALL	000.00.15.590291	30.8	3.1	4.4	0.0	N/A	0.0	0.0	0.1	0.1		0.0	0.0	0.0	100	0.0	0.0	0.0
CB8A	000.00.15.858951	40.0	3.2	2.9	0.0	N/A	0.0	0.0	0.0	0.0		0.0	0.0	0.1	100	0.0	0.0	0.0
CB88	000.00.15.108366	25.0	3.0	1.5	0.0	N/A	0.0	0.0	0.1	0.1		0.0	0.0	0.0	100	0.0	0.0	0.0

This example shows the response times format in the goals and actuals section for a service class as part of a workload group and service class period report.

PER	IMPORTANCE	PERF	--TRANSACTIONS--		-----RESPONSE TIME-----		-EX VEL%-		TOTAL	-EXE--
		INDX	-NUMBER-	-%-	-----GOAL-----	-----ACTUAL-----	TOTAL	GOAL	ACT	USING% DELAY%
1	1	0.8	468	96	00.00.00.400	90%	87.3%	84.6	0.1	0.0
2	2	0.4	19	4	00.00.03.000	AVG	00.00.01.174936	100	40.3	0.0
TOTAL			487	100						



# Usage & Invocation: Postprocessor WLMGL Report

This example shows the response time distributions section for an execution velocity goal.

```

-----RESPONSE TIME DISTRIBUTIONS-----
SYSTEM: CB8A ----INTERVAL: 00.15.00.003 ---MRT CHANGES: 0 ---
-----TIME-----
HH.MM.SS.FFFFFF CUM TOTAL IN BUCKET CUM TOTAL IN BUCKET
<= 00.00.00.192500      12      12      52.2      52.2
<= 00.00.00.231000      18       6      78.3      26.1
<= 00.00.00.269500      21       3      91.3      13.0
<= 00.00.00.308000      22       1      95.7       4.3
<= 00.00.00.346500      22       0      95.7       0.0
<= 00.00.00.385000      22       0      95.7       0.0
<= 00.00.00.423500      22       0      95.7       0.0
<= 00.00.00.462000      22       0      95.7       0.0
<= 00.00.00.500500      22       0      95.7       0.0
<= 00.00.00.539000      22       0      95.7       0.0
<= 00.00.00.577500      22       0      95.7       0.0
<= 00.00.00.770000      22       0      95.7       0.0
<= 00.00.01.540000      22       0      95.7       0.0
> 00.00.01.540000      23       1      100       4.3

SYSTEM: CB88 ----INTERVAL: 00.15.00.002 ---MRT CHANGES: 0 ---
-----TIME-----
HH.MM.SS.FFFFFF CUM TOTAL IN BUCKET CUM TOTAL IN BUCKET
<= 00.00.00.247000      24      24      53.3      53.3
<= 00.00.00.296400      25       1      55.6       2.2
<= 00.00.00.345800      28       3      62.2       6.7
<= 00.00.00.395200      31       3      68.9       6.7
<= 00.00.00.444600      36       5      80.0      11.1
<= 00.00.00.494000      37       1      82.2       2.2
<= 00.00.00.543400      37       0      82.2       0.0
<= 00.00.00.592800      37       0      82.2       0.0
<= 00.00.00.642200      37       0      82.2       0.0
<= 00.00.00.691600      37       0      82.2       0.0
<= 00.00.00.741000      38       1      84.4       2.2
<= 00.00.00.988000      38       0      84.4       0.0
<= 00.00.01.976000      40       2      88.9       4.4
> 00.00.01.976000      45       5      100      11.1

```

This example shows the response time distributions section for a response time average goal.

```

-----RESPONSE TIME DISTRIBUTION-----
-----TIME-----
HH.MM.SS.FFFFFF CUM TOTAL IN BUCKET CUM TOTAL IN BUCKET
<= 00.00.00.250000      171      171      19.1      19.1
<= 00.00.00.300000      174       3      19.4       0.3
<= 00.00.00.350000      174       0      19.4       0.0
<= 00.00.00.400000      176       2      19.6       0.2
<= 00.00.00.450000      177       1      19.7       0.1
<= 00.00.00.500000      181       4      20.2       0.4
<= 00.00.00.550000      185       4      20.6       0.4
<= 00.00.00.600000      196      11      21.9       1.2
<= 00.00.00.650000      206     10      23.0       1.1
<= 00.00.00.700000      220     14      24.5       1.6
<= 00.00.00.750000      225       5      25.1       0.6
<= 00.00.01.000000      233       8      26.0       0.9
<= 00.00.02.000000      285     52      31.8       5.8
> 00.00.02.000000      897    612      100      68.2

```

# Usage & Invocation: Overview Conditions

New Postprocessor overview conditions (OVW) based on the new SMF72.3 values to present response times in milliseconds:

Condition	Condition Name	Qualifier	Source	Algorithm
Transaction total response time (in milliseconds)	TRXMRTT	type	R723CTETX R723CRCP	$\text{Sum}(\text{R723CTETX}) / \text{Sum}(\text{R723CRCP})$
Transaction execution time (in milliseconds)	TRXMRTX	type	R723CXETX R723CRCP	$\text{Sum}(\text{R723CXETX}) / \text{Sum}(\text{R723CRCP})$
Transaction queue time (in milliseconds)	TRXMQUE	type	R723CQDTX R723CRCP	$\text{Sum}(\text{R723CQDTX}) / \text{Sum}(\text{R723CRCP})$
Transaction ineligible queue time (in milliseconds)	TRXMIQT	type	R723CIQTX R723CRCP	$\text{Sum}(\text{R723CIQTX}) / \text{Sum}(\text{R723CRCP})$
Transaction r/s affinity delay time (in milliseconds)	TRXMADT	type	R723CADTX R723CRCP	$\text{Sum}(\text{R723CADTX}) / \text{Sum}(\text{R723CRCP})$
Transaction JCL conversion time (in milliseconds)	TRXMCVT	type	R723CCVTX R723CRCP	$\text{Sum}(\text{R723CCVTX}) / \text{Sum}(\text{R723CRCP})$

The type qualifier can take one of the following values: S . scname or S . scname . period for a service class (period), R . rcname or R . rcname . period for a report class (period), W . wname for a workload or POLICY for a WLM policy.

# Usage & Invocation: Overview Conditions

New Postprocessor overview conditions (OVW) based on the SMF72.3 values for service and report class attributes CategoryA/B, they are defined in the same manner as the already existing OVWs for the MOBILE class attribute:

Condition	Condition Name	Qualifier	Source	Algorithm
Service per second, consumed by transactions classified with reporting attribute CATEGORYA, executed on general purpose processors	TACPSRV	type	R723ASUCP Interval	$\text{SUM}(\text{R723ASUCP}) / \text{Interval}$
Application execution time, consumed by transactions classified with reporting attribute CATEGORYA in seconds, executed on general purpose processors	TACPSEC	type	R723ASUCP R723MADJ R723MCPU	$\text{SUM}((\text{R723ASUCP} * \text{R723MADJ}) / (1600 * \text{R723MCPU}))$
Percentage of general purpose processors used by transactions classified with reporting attribute CATEGORYA	AAPPLCP	type	R723ASUCP R723MADJ R723MCPU R723MCF Interval	$\text{SUM}((\text{R723ASUCP} * \text{R723MADJ}) / (1600 * \text{R723MCPU})) / (\text{Interval} * \text{R723MCF} / 1024) * 100$
Service per second, consumed by transactions classified with reporting attribute CATEGORYA, executed on specialty processors	TASPSRV	type	R723ASUSP Interval	$\text{SUM}(\text{R723ASUSP}) / \text{Interval}$
Application execution time, consumed by transactions classified with reporting attribute CATEGORYA in seconds, executed on specialty processors	TASPSEC	type	R723ASUSP R723MADJ R723MCPU	$\text{SUM}((\text{R723ASUSP} * \text{R723MADJ}) / (1600 * \text{R723MCPU}))$

# Usage & Invocation: Overview Conditions

New Postprocessor overview conditions (OVW) based on the SMF72.3 values for service and report class attributes CategoryA/B:

Condition	Condition Name	Qualifier	Source	Algorithm
Percentage of specialty processor time used by transactions classified with reporting attribute CATEGORYA	AAPPLSP	type	R723ASUSP R723MADJ R723MCPU R723MCFS Interval	$\text{SUM}((\text{R723ASUSP} * \text{R723MADJ}) / (\text{Interval} * \text{R723MCFS} / 1024)) * 100$
Service per second, consumed by transactions classified with reporting attribute CATEGORYA, eligible to run on specialty processors but executed on general purpose processors	TAOCPSRV	type	R723ASUOCP Interval	$\text{SUM}(\text{R723ASUOCP}) / \text{Interval}$
Application execution time, consumed by transactions classified with reporting attribute CATEGORYA in seconds, eligible to run on specialty processors but executed on general purpose processors	TAOCPSEC	type	R723ASUOCP R723MADJ R723MCPU	$\text{SUM}((\text{R723ASUOCP} * \text{R723MADJ}) / (\text{Interval} * \text{R723MCPU}))$
Percentage of general purpose processor time used by transactions classified with reporting attribute CATEGORYA eligible to run on specialty processors	AAPPLOCP	type	R723ASUOCP R723MADJ R723MCPU R723MCF Interval	$\text{SUM}((\text{R723ASUOCP} * \text{R723MADJ}) / (\text{Interval} * \text{R723MCF} / 1024)) * 100$
Service per second, consumed by transactions classified with reporting attribute CATEGORYB, executed on general purpose processors	TBCPSRV	type	R723BSUCP Interval	$\text{SUM}(\text{R723BSUCP}) / \text{Interval}$

# Usage & Invocation: Overview Conditions

New Postprocessor overview conditions (OVW) based on the SMF72.3 values for service and report class attributes CategoryA/B:

Condition	Condition Name	Qualifier	Source	Algorithm
Application execution time, consumed by transactions classified with reporting attribute CATEGORYB in seconds, executed on general purpose processors	TBCPSEC	type	R723BSUCP R723MADJ R723MCPU	$\text{SUM}((\text{R723BSUCP} * \text{R723MADJ}) / (1600 * \text{R723MCPU}))$
Percentage of general purpose processors used by transactions classified with reporting attribute CATEGORYB	BAPPLCP	type	R723BSUCP R723MADJ R723MCPU R723MCF Interval	$\text{SUM}((\text{R723BSUCP} * \text{R723MADJ}) / (1600 * \text{R723MCPU})) / (\text{Interval} * \text{R723MCF} / 1024) * 100$
Service per second, consumed by transactions classified with reporting attribute CATEGORYB, executed on specialty processors	TBSPSRV	type	R723BSUSP Interval	$\text{SUM}(\text{R723BSUSP}) / \text{Interval}$
Application execution time, consumed by transactions classified with reporting attribute CATEGORYB in seconds, executed on specialty processors	TBSPSEC	type	R723BSUSP R723MADJ R723MCPU	$\text{SUM}((\text{R723BSUSP} * \text{R723MADJ}) / (1600 * \text{R723MCPU}))$
Percentage of specialty processor time used by transactions classified with reporting attribute CATEGORYB	BAPPLSP	type	R723BSUSP R723MADJ R723MCPU R723MCFS Interval	$\text{SUM}((\text{R723BSUSP} * \text{R723MADJ}) / (1600 * \text{R723MCPU})) / (\text{Interval} * \text{R723MCFS} / 1024) * 100$

# Usage & Invocation: Overview Conditions

New Postprocessor overview conditions (OVW) based on the SMF72.3 values for service and report class attributes CategoryA/B:

Condition	Condition Name	Qualifier	Source	Algorithm
Service per second, consumed by transactions classified with reporting attribute CATEGORYB, eligible to run on specialty processors but executed on general purpose processors	TBOCPSRV	type	R723BSUOCP Interval	$\text{SUM}(\text{R723BSUOCP}) / \text{Interval}$
Application execution time, consumed by transactions classified with reporting attribute CATEGORYB in seconds, eligible to run on specialty processors but executed on general purpose processors	TBOCPSEC	type	R723BSUOCP R723MADJ R723MCPU	$\text{SUM}((\text{R723BSUOCP} * \text{R723MADJ}) / (1600 * \text{R723MCPU}))$
Percentage of general purpose processor time used by transactions classified with reporting attribute CATEGORYB eligible to run on specialty processors	BAPPLOCP	type	R723BSUOCP R723MADJ R723MCPU R723MCF Interval	$\text{SUM}((\text{R723BSUOCP} * \text{R723MADJ}) / (1600 * \text{R723MCPU})) / (\text{Interval} * \text{R723MCF} / 1024) * 100$

# Usage & Invocation: SMF record type 72.3

RMF record type 72 subtype 3 is extended to contain the response times in microseconds.

Service/Report Class Period Data Section				
Offsets	Name	Length	Format	Description
720 2D0	R723CTETX	8	floating	Total transaction elapsed time. Same as R723CTET, but in microseconds.
728 2D8	R723CXETX	8	floating	Total transaction execution time. Same as R723CXET, but in microseconds.
736 2E0	R723CETSX	8	floating	Sum of transaction elapsed times squared. Same as R723CETS, but in microseconds
744 2E8	R723CQDTX	8	floating	Total queue delay time. Same as R723CQDT, but in microseconds.
752 2F0	R723CADTX	8	floating	Total time batch jobs were ineligible to run because a resource that the job had affinity to was unavailable. Same as R723CADT, but in microseconds.
760 2F8	R723CCVTX	8	floating	Total time batch jobs spent in JCL conversion. Same as R723CCVT, but in microseconds.
768 300	R723CIQTX	8	floating	Total time batch jobs spent on job queue (after JCL conversion) while ineligible to run on any system for reasons other than resource affinities. Same as R723CIQT, but in microseconds.

# Usage & Invocation: SMF record type 72.4

RMF record type 72 subtype 4 is extended to contain the response times in microseconds.

Service Class Period Data Section				
Offsets	Name	Length	Format	Description
208 D0	R724ET	8	floating	Total <a href="#">execution</a> time for all transactions that ended in the group ( <a href="#">1024-microsecond units</a> ). Does not include queued time.
216 D8	R724QT	8	floating	Total time spent on JES or APPC queues by all transactions that ended in the group ( <a href="#">1024-microsecond units</a> ).
224 E.0	R724END	8	floating	Number of transactions that ended in the group.
...				
264 108	<a href="#">R724ETX</a>	8	floating	Total execution time for all transactions that ended in the group. Same as R724ET, but in microseconds.
272 110	<a href="#">R724QTX</a>	8	floating	Total time spent on JES or APPC queues by all transactions that ended in the group. Same as R724QT, but in microseconds.



# Usage & Invocation: Monitor III

- Monitor III SYSINFO, SYSSUM, SYSWKM, SYSRTD, and GROUP reports are adapted to display response time goals and actual response times with higher precision.
- The columns reporting on goal and average response times now represent milliseconds, the values are scaled with factors K ( $10^3$ ), M ( $10^6$ ) or G ( $10^9$ ) if they do not fit into the defined column width.
- Examples:
  - A response time goal of five milliseconds (defined as 00.005 seconds in the WLM policy definition) is reported as 5 (milliseconds).
  - A goal of one second is reported as 1000 (milliseconds).
  - A goal of one minute is reported as 60000 (milliseconds).
  - A goal of one hour is reported as 3600K (milliseconds) which is  $3600 * 10^3$ .

# Usage & Invocation: Monitor III SYSINFO

The "RESP Time" column displays the average response time for all transactions that ended during the report interval in milliseconds.

RMF V2R3 System Information

Line 1 of 34

Command ==> \_

Scroll ==> CSR

Samples: 60 System: CB8D Date: 01/27/17 Time: 02.07.00 Range: 60 Sec

Partition: CB8D 2964 Model 7A2 Appl%: 5.6 Policy: BASEPOL

CPs Online: 20.0 Avg CPU Util%: 7 EAppl%: 5.8 Date: 01/26/17

AAPs Online: - Avg MVS Util%: 26 Appl% AAP: - Time: 09.00.02

IIPs Online: 2.0 Appl% IIP: 0.1

Group	T	WFL	--Users--	RESP	TRANS	-AVG	USG-	-Average	Number	Delayed	For	-	
		%	TOT	Time	/SEC	PROC	DEV	PROC	DEV	STOR	SUBS	OPER	ENQ
*SYSTEM		77	386	3	1.88	1.5	0.8	0.6	0.1	0.0	0.0	0.0	0.0
*TSO			13	0	1.87	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
*BATCH		82	148	1	0.02	0.4	0.0	0.1	0.0	0.0	0.0	0.0	0.0
*STC		78	213	2	0.00	0.9	0.8	0.4	0.1	0.0	0.0	0.0	0.0
*ASCH			0	0	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
*OMVS		62	9	0	0.00	0.2	0.0	0.1	0.0	0.0	0.0	0.0	0.0
*ENCLAVE			3	N/A	N/A	0.0	N/A	0.0	N/A	0.0	N/A	N/A	N/A
AZKWKLD	W	91	2	0	0.000	0.00	0.2	0.0	0.0	0.0	0.0	0.0	0.0
AZK_SCTX	S	91	2	0	0.000	0.00	0.2	0.0	0.0	0.0	0.0	0.0	0.0
CICS_WLD	W		0	0	0.558	0.17	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CICSLOW	S		0	0	0.558	0.17	0.0	0.0	0.0	0.0	0.0	0.0	0.0
IMS_WLD	W		0	0	405.3	2.82	0.0	0.0	0.0	0.0	0.0	0.0	0.0
IMSLOW	S		0	0	405.3	2.82	0.0	0.0	0.0	0.0	0.0	0.0	0.0
JES_WLD	W	82	148	1	780K	0.02	0.4	0.0	0.1	0.0	0.0	0.0	0.0
JESLOW5	S	100	125	0	780K	0.02	0.0	0.0	0.0	0.0	0.0	0.0	0.0
JESMED4	S	82	23	0	0.000	0.00	0.4	0.0	0.1	0.0	0.0	0.0	0.0
OMVS_WLD	W	62	9	0	284.6	0.08	0.2	0.0	0.1	0.0	0.0	0.0	0.0
OMVSLOW	S	62	9	0	284.6	0.08	0.2	0.0	0.1	0.0	0.0	0.0	0.0

# Usage & Invocation: Monitor III SYSSUM

The response time goal, actuals and average response times are displayed in milliseconds.

RMF V2R3 Sysplex Summary - UTCPLXCB Line 19 of 34

WLM Samples: 479 Systems: 8 Date: 02/09/17 Time: 12.00.00 Range: 120 Sec

>>>>>>>XXXXXXXXXXXXXXXXXXXX<<<<<<<<

Service Definition: SYSTEST Installed at: 11/15/16, 08.18.14  
Active Policy: BASEPOL Activated at: 02/09/17, 09.00.02

Name	T	I	Exec Goal	Vel Act	Goals versus Actuals	Response Time	Perf Indx	Trans Ended Rate	-Avg. Resp. Time-	WAIT Time	EXECUT Time	Time- ACTUAL
			Goal	Act	---	Goal---	---	Actual---	Indx			
STCHI	S	2	35	69			0.50	0.000				
STCLOW	S	3	25	45			0.56	0.192				
SYSTEM	W			81				0.192	812.3	489.5	1165	
SYSSTC	S		N/A	64	N/A			0.192				
SYSTEM	S		N/A	84	N/A			0.000	0.000	0.000	0.000	
TSO_WLD	W			22				5.175	3.502	10395	10399	
TSOHIGH	S			67				0.092	197.7	324.8	522.5	
	1	1		60	400	90%	67%	4.00	0.075	0.000	284.5	284.5
	2	2		100	3000	AVG	1593	AVG	0.53	1087	506.1	1593
TSOLOW	S			19				5.083	0.000	10577	10577	
	1	3		27	500	85%	21%	***	3.583	0.000	8396	8396
	2	3		7.1	5000	AVG	15786	AVG	3.16	1.500	15786	15786
CONSOLES	R			40			N/A	0.000	0.000	0.000	0.000	
IXGLOGR	R			82			N/A	0.000	0.000	0.000	0.000	
TCPIP	R			20			N/A	0.000	0.000	0.000	0.000	
XCFAS	R			32			N/A	0.000	0.000	0.000	0.000	

# Usage & Invocation: Monitor III SYSWKM

The response time goal, actuals and average response times are displayed in milliseconds.

RMF V2R3 Work Manager Delays - UTCPLXCB Line 1 of 109  
 Command ==> \_ Scroll ==> CSR

WLM Samples: 239 Systems: 8 Date: 01/27/17 Time: 02.08.00 Range: 60 Sec

Class:	CICSLow	Period:	1	Avg. Resp. time:	10.70 ms	for	55558	TRX.
Goal:	500.0 ms	for	80%	Avg. Exec. time:	11.01 ms	for	49932	TRX.
Actual:	500.0 ms	for	100%	Abnormally ended:			0	TRX.

  

Sub	P	Response time breakdown (in %)												-Switched-		
Type		Tot	Act	Rdy	Idle	Delayed by								Time (%)		
						MISC	TIME	CONV	PROD	I/O	LOCK	SESS	DIST	LOC	SYS	REM
CICS	B	20.8	0.0	0.0	3.6	14.9	2.2	0.1	0	0.0	0.0	0	0	0.1	0.0	0
CICS	X	0.1	0.0	0.0	0.0	0.0	0	0	0.0	0.0	0	0	0	0.0	0.6	0
DB2	X	0.0	0.0	0	0	0.0	0	0	0	0.0	0.0	0	0	0	0	0



# Usage & Invocation: Monitor III SYSRTD

- The upper part of the report has been redesigned and now contains a table with the complete information of all response time distribution buckets for the selected service class period.
- The average response times in the scrollable lower part of the report are displayed in milliseconds.

Command ==> \_

RMF V2R3 Response Time - UTCPLXCB Line 1 of 9  
Scroll ==> CSR

WLM Samples: 239 Systems: 8 Date: 01/27/17 Time: 02.08.00 Range: 60 Sec

Class: CICSLOW Period: 1 Goal: 500.0 ms for 80%

	50%	60%	70%	80%	90%	100%	110%	120%	130%	140%	150%	200%	400%	>400%
Trx #	55K	24	14	25	13	12	12	14	12	13	8	48	121	11
Trx %	99.4	0.04	0.03	0.05	0.02	0.02	0.02	0.03	0.02	0.02	0.01	0.09	0.22	0.02

  

System	Data	--Avg. Resp. Time--	Trx	--Subsystem Data--	--Exec Data--
		WAIT EXECUT ACTUAL	Rate	Actv Ready Delay	Ex Vel Delay
*ALL		0.000 11.01 10.70	926.0	17 1 62	N/A 7
CB8A	all	0.000 11.74 0.491	0.100	0 0 0	N/A 0
CB8B	all	0.000 13.52 0.930	0.483	10K 0 95K	N/A 1
CB8C	all	0.000 18.80 0.894	0.117	48K 0 272K	N/A 4
CB8D	all	0.000 15.41 0.402	0.150	6912 0 366K	N/A 0
CB8E	all	0.000 0.796 0.796	0.117	0 0 0	N/A 0
CB86	all	0.000 33.87 38.90	59.33	59 0 53	N/A 10
CB88	all	0.000 7.447 8.775	865.5	3 2 48	N/A 38
CB89	all	0.000 16.49 0.490	0.150	0 0 414K	N/A 0

# Usage & Invocation: Monitor III GROUP

The average response times in the upper part of the report are displayed in milliseconds.

```

RMF V2R3      Group Response Time

Command ==> _

Samples: 60      System: CB8D  Date: 01/27/17  Time: 02.12.00  Range: 60      Sec

Class: TSOLW      Period: 1      Description: Low priority for USER ID's
Primary Response Time Component:

WFL      Users      Frames      Vector      EXCP      PGIN      TRANS
%      TOT  ACT      %ACT      UTIL      Rate      Rate      Rate
  0      0    0        0        0        0.0      0.0      1.717

--- Response Time ---
-- Ended TRANS-(ms) --
      WAIT  EXECUT  ACTUAL
      0.000    4634    4634

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```

# Usage & Invocation: Monitor III Pop-up

The "Response Time Components Data" pop-up panel which is invoked by cursor-sensitivity from the SYSSUM, SYSRTD and GROUP report shows the average response times and a breakdown of the different wait times in milliseconds.

RMF V2R3 Sysplex Summary - UTCPLXCB Line 1 of 17											
RMF Response Time Components Data ==> CSR											
The following details are available for SYSTEM 60 Sec											
Press Enter to return to the report panel.											
Response Time Components: 8.14											
Actual : 704.1 0.02											
Execution : 216.0 p. Time-											
Wait : 488.1 UT ACTUAL											
- Queued : 488.1 me Time											
- R/S Affinity : 0.000											
- Ineligible : 0.000 57 10.21											
- Conversion : 0.000 57 10.21											
F1=Help F2=Split F3=Exit F9=Swap F12=Cancel 3K 354K											
1 3 63 1000 85% 79% 1.10 18.62 0.668 420.0 420.7											
2 4 15 59 0.25 0.900 0.993 4666 4667											
STC_WLD W 51 0.067 0.000 398.3 398.3											
SYSTEM W 67 0.067 488.1 216.0 704.1											
TSO_WLD W 49 13.23 0.000 4658 4658											
TSOLOW S 49 13.23 0.000 4658 4658											

# Usage & Invocation: Distributed Data Server

- All new fields from SYSSUM and SYSINFO reports are available in the RMF Distributed Data Server when requesting the full Monitor III reports with HTTP request:

[http://<host>:8803/gpm/rmfm3.xml?report=SYSSUM&resource=",SYSPLEX"](http://<host>:8803/gpm/rmfm3.xml?report=SYSSUM&resource=)

[http://<host>:8803/gpm/rmfm3.xml?report=SYSINFO&resource=",SYSN,MVS\\_IMAGE"](http://<host>:8803/gpm/rmfm3.xml?report=SYSINFO&resource=)

- New metrics are available for the SYSPLEX resource:

active time (ms) by WLM service class	Explanation	8D5E20
active time by WLM service class	Explanation	8D0E60
execution velocity by WLM service class	Explanation	8D0F50
queue time (ms) by WLM service class	Explanation	8D5E80
queue time by WLM service class	Explanation	8D10C0
response time (ms) by WLM service class	Explanation	8D5F20
response time by WLM service class	Explanation	8D1160

- by WLM service class
- by WLM service class period
- by WLM report class
- by WLM report class period
- by WLM workload

response time goal (ms) by WLM service class period	Explanation	8D5F80
response time goal by WLM service class period	Explanation	8D11C0

- by WLM service class period

- New metrics are available for the MVS\_IMAGE resource:

response time (ms) by WLM service class	Explanation	8D5F10
response time by WLM service class	Explanation	8D1150

- by WLM service class
- by WLM service class period
- by WLM report class
- by WLM report class period
- by WLM workload



# Usage & Invocation: Monitor III Reporter Data Tables

**SYSINFO** - Tabular report data table ERBSYST3

Name	T	Description of the Variable	Report
<a href="#">SYSRSPM</a>	N	<a href="#">Average response time per transaction in milliseconds</a>	Yes
SYSRSPVC	N	Average response time per transaction <a href="#">in seconds</a>	Util

# Usage & Invocation: Monitor III Reporter

## Data Tables

**SYSSUM** - Tabular report data table ERBSUMT3

Name	T	Description of the Variable	Report
SUMRTGTM	N	Response time goal in milliseconds	Yes
SUMRTATM	N	Response time actual in milliseconds	Yes
SUMARTWM	N	Wait time in milliseconds	Yes
SUMARTAM	N	Execution time in milliseconds	Yes
SUMARTTM	N	Actual (total) response time in milliseconds	Yes
SUMARTQM	N	Queued time in milliseconds	Util
SUMARTRM	N	R/S affinity time in milliseconds	Util
SUMARTIM	N	Ineligible queue time in milliseconds	Util
SUMARTCM	N	JCL conversion time in milliseconds	Util
SUMRTGT	N	Response time goal in seconds	Util
SUMRTAT	N	Response time actual in seconds	Util
SUMARTW	N	Wait time in seconds	Util
SUMARTA	N	Execution time in seconds	Util
SUMARTT	N	Actual (total) response time in seconds	Util
SUMARTQ	N	Queued time in seconds	Util
SUMARTR	N	R/S affinity time in seconds	Util

# Usage & Invocation: Monitor III Reporter

## Data Tables

**SYSRTD** - Tabular report data table ERBRTDT3

Name	T	Description of the Variable	Report
RTDRTWM	N	Wait time / trx in milliseconds	Yes
RTDRTAM	N	Execution time / trx in milliseconds	Yes
RTDRTTM	N	Actual (total) response time / trx in milliseconds	Yes
RTDRTQM	N	Queued time / trx in milliseconds	Pop-Up
RTDRTRM	N	R/S affinity time in milliseconds	Pop-Up
RTDRTIM	N	Ineligible queue time in milliseconds	Pop-Up
RTDRTCM	N	JCL conversion time in milliseconds	Pop-Up
RTDRTW	N	Wait time / trx in seconds	Util
RTDRTA	N	Execution time / trx in seconds	Util
RTDRTT	N	Actual (total) response time / trx in seconds	Util
RTDRTQ	N	Queued time / trx in seconds	Util
RTDRTTR	N	R/S affinity time in seconds	Util
RTDRTI	N	Ineligible queue time in seconds	Util
RTDRTC	N	JCL conversion time in seconds	Util

# Interactions & Dependencies

- Software Dependencies
  - None.
- Hardware Dependencies
  - None.

# Migration & Coexistence Considerations

- None.

# Installation

- This support is provided with z/OS V2R3 RMF (HRM77B0).

# Session Summary

- With z/OS V2R3, the current lower bound of 15 milliseconds for a response time goal in the WLM policy is replaced by one millisecond allowing to specify meaningful goal values for very fast running transactions.
  - Thus, important work such as DDF or CICS transactions that have response times below 15 milliseconds, can be managed more effectively.
- RMF supports the reporting of shorter response time goals throughout all of its components:
  - Postprocessor WLMGL report uses new format HHH.MM.SS.FFFFFFFF
  - SMF records 72.3 and 72.4 include response times in milliseconds
  - Monitor III SYSINFO, GROUP, SYSSUM, SYSRTD and SYSWKM display response times in millisecond granularity
  - Distributed Data Server offers new metrics for the shorter response time components

# Appendix

- RMF website: [www.ibm.com/systems/z/os/zos/features/rmf](http://www.ibm.com/systems/z/os/zos/features/rmf)
  - Product information, newsletters, presentations, ...
  - Downloads
    - RMF Spreadsheet Reporter
    - RMF Postprocessor XML Toolkit
- RMF email address: [rmf@de.ibm.com](mailto:rmf@de.ibm.com)
- Documentation and news:
  - RMF Report Analysis, SC34-2665
  - RMF User's Guide, SC34-2664
  - RMF Programmer's Guide SC34-2667
  - RMF Messages & Codes SC34-2666
  - PDF files can be downloaded from:  
[www.ibm.com/systems/z/os/zos/library/bkserv](http://www.ibm.com/systems/z/os/zos/library/bkserv)