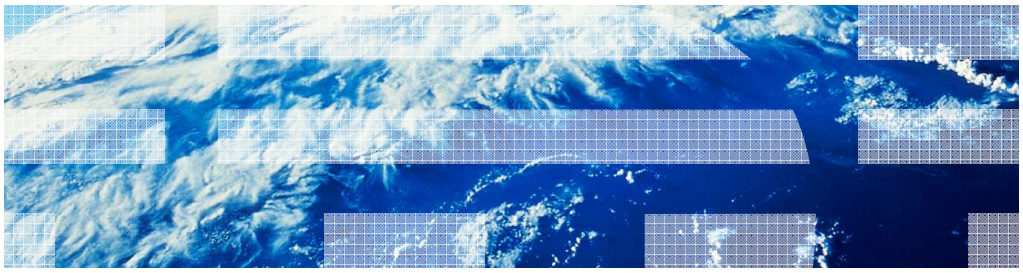
z/OS V1R13

RMF: GRS and supervisor delay monitoring enhancements



Session objectives

- Explain the purpose and usage of RMF z/OS V1.13
  - GRS and supervisor delay monitoring enhancements
    - New Monitor III data collection
    - New SMF record subtype 70.5
    - New postprocessor report SDELAY

Overview

- Problem Statement / Need Addressed
  - Analyze performance problems due to resource contention situations
- Solution
  - Collect and display system-wide contention information and contention information on address space level in
    - New SMF 72 subtype 5 record
    - New RMF XML Serialization Delay Report
- Benefit / Value
  - The new Serialization Delay Report helps the customer to obtain contention information on system level and/or address space level

Usage and invocation (1 of 2)

- Using this line item, you can get contention information about
  - System Suspend lock types:
    - CMS
    - CMSEQDQ
    - CMSLatch
    - CMSSMF
    - Local
    - CML Lock Owner and
    - CML Lock Requestor
  - GRS lock types:
    - GRS Latch locks
    - GRS Enqueue Step
    - GRS Enqueue System and
    - GRS Enqueue Systems locks

Usage and invocation (2 of 2)

- The support is invoked by:
  - starting Monitor III for data collection into SMF 72.5 records
  - XML report is produced by calling the Serialization Delay Postprocessor Report SDELAY
  - XML report can be created
    - via RMF Data Portal (SMF buffer)
    - via Spreadsheet Reporter (any SMF source)
- New External Output:
  - SMF record 72 subtype 5
  - Postprocessor Serialization Delay Report in XML format

Usage and invocation: SDelay Report – SMF Record 72.5 (1 of 17)

SMF record type 72 subtype 5 – Header extension for subtype 5				
Offsets	**Name**	**Len**	**Format**	**Description**
Individual header extension for subtype 5				
36 24	SMF72SES	4	Binary	Offset to serialization control section
40 28	SMF72SEL	2	Binary	Length of serialization control section
42 2A	SMF72SEN	2	Binary	Number of serialization control sections
System suspend lock data sections				
44 2C	SMF72CMS	4	Binary	Offset to CMS Lock data section
48 30	SMF72CML	2	Binary	Length of CMS Lock data section
50 32	SMF72CMN	2	Binary	Number of CMS Lock data sections
52 34	SMF72EDS	4	Binary	Offset to CMS EnqueueDequeue Lock data section
56 38	SMF72EDL	2	Binary	Length of CMS EnqueueDequeue Lock data section
58 3A	SMF72EDN	2	Binary	Number of CMS EnqueueDequeue Lock data sections

New SMF record type 72 subtype 5 created.
The individual header extension for subtype 5 starts at offset 36.

Usage and invocation: SDelay Report – SMF Record 72.5 (2 of 17)

SMF record type 72 subtype 5 – Header extension - continuation				
Offsets	**Name**	**Len**	**Format**	**Description**
Individual header extension for subtype 5 - continuation				
60 3C	SMF72LAS	4	Binary	Offset to CMS Latch Lock data section
64 40	SMF72LAL	2	Binary	Length of CMS Latch Lock data section
66 42	SMF72LAN	2	Binary	Number of CMS Latch Lock data sections
68 44	SMF72SMS	4	Binary	Offset to CMS SMF Lock data section
72 48	SMF72SML	2	Binary	Length of CMS SMF Lock data section
74 4A	SMF72SMN	2	Binary	Number of CMS SMF Lock data sections
76 4C	SMF72LOS	4	Binary	Offset to Local Lock data section
80 50	SMF72LOL	2	Binary	Length of Local Lock data section
82 52	SMF72LON	2	Binary	Number of Local Lock data sections
84 54	SMF72COS	4	Binary	Offset to CML Lock Owner data section
88 58	SMF72COL	2	Binary	Length of CML Lock Owner data section
90 5A	SMF72CON	2	Binary	Number of CML Lock Owner data sections
92 5C	SMF72CRS	4	Binary	Offset to CML Lock Requestor data section
96 60	SMF72CRL	2	Binary	Length of CML Lock Requestor data section
98 62	SMF72CRN	2	Binary	Number of CML Lock Requestor data sections

Usage and invocation: SDelay Report – SMF Record 72.5 (3 of 17)

SMF record type 72 subtype 5 – Header extension - continuation				
Offsets	**Name**	**Len**	**Format**	**Description**
GRS data sections				
100 64	SMF72LCS	4	Binary	Offset to GRS Latch Set Creator data section
104 68	SMF72LCL	2	Binary	Length of GRS Latch Set Creator data section
106 6A	SMF72LCN	2	Binary	Number of GRS Latch Set Creator data sections
108 6C	SMF72LRS	4	Binary	Offset to GRS Latch Requestor data section
112 70	SMF72LRL	2	Binary	Length of GRS Latch Requestor data section
114 72	SMF72LRN	2	Binary	Number of GRS Latch Requestor data sections
116 74	SMF72TDS	4	Binary	Offset to GRS ENQ SCOPE=STEP data section
120 78	SMF72TDL	2	Binary	Length of GRS ENQ SCOPE=STEP data section
122 7A	SMF72TDN	2	Binary	Number of GRS ENQ SCOPE=STEP data sections
124 7C	SMF72YDS	4	Binary	Offset to GRS ENQ SCOPE=SYSTEM data section
128 80	SMF72YDL	2	Binary	Length of GRS ENQ SCOPE=SYSTEM data section
130 82	SMF72YDN	2	Binary	Number of GRS ENQ SCOPE=SYSTEM data sections
132 84	SMF72SDS	4	Binary	Offset to GRS ENQ SCOPE=SYSTEMS data section
136 88	SMF72SDL	2	Binary	Length of GRS ENQ SCOPE=SYSTEMS data section
138 8A	SMF72SDN	2	Binary	Number of GRS ENQ SCOPE=SYSTEMS data sections

Usage and invocation: SDelay Report – SMF Record 72.5 (4 of 17)

SMF record type 72 subtype 5 – Serialization Delay Data

Serialization Control Section - contains system wide serialization delay data for all address spaces.				
Offsets	**Name**	**Len**	**Format**	**Description**
0 0	R725SGMO	1	Binary	GRS Mode Value Meaning 0 None 1 Ring 2 Star
1 1		15		Reserved
CMS Lock Summary - system wide data for all address spaces				
16 10	R725SCMS	8	Binary	Total number of times that a unit of work was suspended on a CMS lock.
24 18	R725SCMA	8	Binary	Total number of times that a unit of work was suspended on a CMS lock when there was already at least one other unit of work suspended for the lock.
32 20	R725SCMT	8	Binary	Total amount of time in milliseconds that a unit of work was suspended on a CMS lock.
40 28		8		Reserved

Usage and invocation: SDelay Report – SMF Record 72.5 (5 of 17)

SMF record type 72 subtype 5 – Serialization Control Section - Continuation				
Offsets	**Name**	**Len**	**Format**	**Description**
CMS EnqueueDequeue Lock Summary - system wide data for all address spaces.				
48 30	R725SEDS	8	Binary	Total number of times that a unit of work was suspended on a CMS EnqueueDequeue lock.
56 38	R725SEDA	8	Binary	Total number of times that a unit of work was suspended on a CMS EnqueueDequeue lock when there was already at least one other unit of work suspended for the lock.
64 40	R725SEDT	8	Binary	Total amount of time in milliseconds that a unit of work was suspended on a EnqueueDequeue lock.
72 48		8		Reserved
CMS Latch Lock Summary - system wide data for all address spaces				
80 50	R725SLAS	8	Binary	Total number of times that a unit of work was suspended on a CMS Latch lock.
88 58	R725SLAA	8	Binary	Total number of times that a unit of work was suspended on a CMS Latch lock when there was already at least one other unit of work suspended for the lock.
96 60	R725SLAT	8	Binary	Total amount of time in milliseconds that a unit of work was suspended on a CMS Latch lock.
104 68		8		Reserved

Usage and invocation: SDelay Report – SMF Record 72.5 (6 of 17)

SMF record type 72 subtype 5 – Serialization Control Section - Continuation				
Offsets	**Name**	**Len**	**Format**	**Description**
CMS SMF Lock Summary - system wide data for all address spaces.				
112 70	R725SSMS	8	Binary	Total number of times that a unit of work was suspended on a CMS SMF lock.
120 78	R725SSMA	8	Binary	Total number of times that a unit of work was suspended on a CMS SMF lock when there was already at least one other unit of work suspended for the lock.
128 80	R725SSMT	8	Binary	Total amount of time in milliseconds that a unit of work was suspended on a CMS SMF lock.
136 88		8		Reserved
Local Lock Summary - system wide data for all address spaces.				
144 90	R725SLOS	8	Binary	Total number of times that a unit of work was suspended on a Local lock.
152 98	R725SLOA	8	Binary	Total number of times that a unit of work was suspended on a Local lock when there was already at least one other unit of work suspended for the lock.
160 A0	R725SLOT	8	Binary	Total amount of time in milliseconds that a unit of work was suspended on a Local lock.
168 A8		8		Reserved

Usage and invocation: SDelay Report – SMF Record 72.5 (7 of 17)

SMF record type 72 subtype 5 – Serialization Control Section - Continuation				
Offsets	**Name**	**Len**	**Format**	**Description**
CML Lock Owner Summary - system wide data for all address spaces.				
176 B0	R725SCLS	8	Binary	Total number of times that a unit of work from another address space was suspended when requesting the Local lock of an address space.
184 B8	R725SCLA	8	Binary	Total number of times that a unit of work from another address space was suspended when requesting the Local lock of an address space when there was already at least one other unit of work suspended for the lock.
192 C0	R725SCLT	8	Binary	Total amount of time in milliseconds that a unit of work from another address space was suspended when requesting the Local lock of an address space.
200 C8		8		Reserved
GRS Latch Obtain Request Summary - system wide data for all address spaces.				
208 D0	R725SLRS	8	Binary	Total number of suspended Latch Obtain requests.
216 D8	R725SLRA	8	Binary	Total amount of time in milliseconds that Latch Obtain requests were suspended.
224 E0	R725SLRQ	16	Binary	Total sum of squares of time in milliseconds that Latch Obtain requests were suspended.

Usage and invocation: SDelay Report – SMF Record 72.5 (8 of 17)

SMF record type 72 subtype 5 – Serialization Control Section - Continuation					
Offsets		**Name**	**Len**	**Format**	**Description**
GRS ENQ SCOPE=STEP Summary - system wide data for all address spaces.					
240	F0	R725SSTR	8	Binary	Total number of ENQ SCOPE=STEP requests.
248	F8	R725SSTS	8	Binary	Total number of ENQ SCOPE=STEP requests that were suspended.
256	100	R725SSTT	8	Binary	Total amount of contention time in milliseconds caused by ENQ SCOPE=STEP requests.
264	108		8		Reserved
272	110	R725SSTQ	16	Binary	Total sum of squares of contention time in milliseconds caused by ENQ SCOPE=STEP requests.
GRS ENQ SCOPE=SYSTEM Summary - system wide data for all address spaces.					
288	120	R725SSYR	8	Binary	Total number of ENQ SCOPE=SYSTEM requests.
296	128	R725SSYS	8	Binary	Total number of ENQ SCOPE=SYSTEM requests that were suspended.
304	130	R725SSYT	8	Binary	Total amount of contention time in milliseconds caused by ENQ SCOPE=SYSTEM requests.
312	138		8		Reserved
320	140	R725SSYQ	16	Binary	Total sum of squares of contention time in milliseconds caused by ENQ SCOPE=SYSTEM requests.

Usage and invocation: SDelay Report – SMF Record 72.5 (9 of 17)

SMF record type 72 subtype 5 – Serialization Control Section - Continuation					
Offsets		**Name**	**Len**	**Format**	**Description**
GRS ENQ SCOPE=SYSTEMS Summary - system wide data for all address spaces.					
336	150	R725SSSR	8	Binary	Total number of ENQ SCOPE=SYSTEMS requests.
344	158	R725SSSS	8	Binary	Total number of ENQ SCOPE=SYSTEMS requests that were suspended.
352	160	R725SSST	8	Binary	Total amount of contention time in milliseconds caused by ENQ SCOPE=SYSTEMS requests.
360	168		8		Reserved
368	170	R725SSSQ	16	Binary	Total sum of squares of contention time in milliseconds caused by ENQ SCOPE=SYSTEMS requests.

Usage and invocation: SDelay Report – SMF Record 72.5 (10 of 17)

Offsets		Name	Length	Format	Description
R725CMSD – CMS Lock Type Data					
0	0	R725CMJN	8	EBCDIC	Name of Job
8	8		3		Reserved
11	B	R725CMSP	1	Binary	Service Class Period
12	C	R725CMAS	2	Binary	Address Space ID
14	E		2		Reserved
16	10	R725CMST	8	EBCDIC	Address Space SToken
24	18	R725CMSN	8	EBCDIC	Service Class Name
32	20	R725CMTY	1	Binary	Lock Type Value Meaning 1 CMS Lock 2 CMS EnqueueDequeue Lock 3 CMS Latch Lock 4 CMS SMF Lock
33	21		7		Reserved
40	28	R725CMSU	8	Binary	Number of times that a unit of work of this address space was suspended on the CMS lock type as specified in R725CMTY.
48	30	R725CMAL	8	Binary	Number of times that a unit of work of this address space was suspended on the CMS lock type as specified in R725CMTY when there was already at least one other unit of work suspended for this lock.
56	38	R725CMTI	8	Binary	Total amount of time in milliseconds that a unit of work of this address space was suspended on the CMS lock type as specified in R725CMTY.

Usage and invocation: SDelay Report – SMF Record 72.5 (11 of 17)

Local Lock Data Section

Offsets		Name	Length	Format	Description
0	0	R725LOJN	8	EBCDIC	Name of job
8	8		3		Reserved
11	B	R725LOSP	1	Binary	Service Class Period
12	C	R725LOAS	2	Binary	Address Space ID
14	E		2		Reserved
16	10	R725LOST	8	EBCDIC	Address Space SToken
24	18	R725LOSN	8	EBCDIC	Service Class Name
32	20		8		Reserved

Usage and invocation: SDelay Report – SMF Record 72.5 (12 of 17)

Local Lock Data Section - Continuation

Offsets		Name	Length	Format	Description
Local Lock data					
40	28	R725LOSU	8	Binary	Number of times that a unit of work of this address space was suspended on a Local lock.
48	30	R725LOAL	8	Binary	Number of times that a unit of work of this address space was suspended on a Local lock when there was already at least one other unit of work suspended.
56	38	R725LOTI	8	Binary	Total amount of time in milliseconds that a unit of work of this address space was suspended on a Local lock.
CML Lock Owner data					
64	40	R725LCSU	8	Binary	Number of times that a unit of work from another address space was suspended when requesting the Local lock of this address space.
72	48	R725LCAL	8	Binary	Number of times that a unit of work from another address space was suspended when requesting the Local lock of this address space and there was already at least one other unit of work waiting for that lock.
80	50	R725LCTI	8	Binary	Total amount of time in milliseconds that a unit of work was suspended when requesting the Local lock of this address space.

Usage and invocation: SDelay Report – SMF Record 72.5 (13 of 17)

CML Lock Owner Data Section

Offsets		Name	Length	Format	Description
0	0	R725COJN	8	EBCDIC	Name of job
8	8		3		Reserved
11	B	R725COSP	1	Binary	Service Class Period
12	C	R725COAS	2	Binary	Address Space ID
14	E		2		Reserved
16	10	R725COST	8	EBCDIC	Address Space SToken
24	18	R725COSN	8	EBCDIC	Service Class Name
32	20		8		Reserved

Usage and invocation: SDelay Report – SMF Record 72.5 (14 of 17)

CML Lock Owner Data Section - Continuation

Offsets		Name	Length	Format	Description
CML Lock Owner data					
40	28	R725COSU	8	Binary	Number of times that a unit of work from another address space was suspended when requesting the Local lock of this address space.
48	30	R725COAL	8	Binary	Number of times that a unit of work from another address space was suspended when requesting the Local lock of this address space and there was already at least one other unit of work waiting for that lock.
56	38	R725COTI	8	Binary	Total amount of time in milliseconds that a unit of work was suspended when requesting the Local lock of this address space.
Local Lock data					
64	40	R725CLSU	8	Binary	Number of times that a unit of work of this address space was suspended on a Local lock.
72	48	R725CLAL	8	Binary	Number of times that a unit of work of this address space was suspended on a Local lock when there was already at least one other unit of work suspended.
80	50	R725CLTI	8	Binary	Total amount of time in milliseconds that a unit of work of this address space was suspended on a Local lock.

Usage and invocation: SDelay Report – SMF Record 72.5 (15 of 17)

CML Lock Requestor Data Section

Offsets		Name	Length	Format	Description
0	0	R725CRJN	8	EBCDIC	Name of job
8	8		3		Reserved
11	B	R725CRSP	1	Binary	Service Class Period
12	C	R725CRAS	2	Binary	Address Space ID
14	E		2		Reserved
16	10	R725CRST	8	EBCDIC	Address Space SToken
24	18	R725CRSN	8	EBCDIC	Service Class Name
32	20		8		Reserved
40	28	R725CRSU	8	Binary	Number of times that a unit of work from this address space was suspended when requesting the Local lock of another address space.
48	30	R725CRAL	8	Binary	Number of times that a unit of work from this address space was suspended when requesting the Local lock of another address space and there was already at least one other unit of work waiting for that lock.
56	38	R725CRTI	8	Binary	Total amount of time in milliseconds that a unit of work was suspended when requesting the Local lock of another address space.

Usage and invocation: SDelay Report – SMF Record 72.5 (16 of 17)

GRS Latch Type Data

Offsets		Name	Length	Format	Description
R725LATD – GRS Latch Type Data					
0	0	R725LAJN	8	EBCDIC	Name of job
8	8		3		Reserved
11	B	R725LASP	1	Binary	Service Class Period
12	C	R725LAAS	2	Binary	Address Space ID
14	E		2		Reserved
16	10	R725LAST	8	EBCDIC	Address Space SToken
24	18	R725LASN	8	EBCDIC	Service Class Name
32	20	R725LATY	1	Binary	Request Type Value Meaning 1 Latch Obtain requests against a Latch Set created by this address space 2 Latch Obtain requests from this address space
33	21		7		Reserved
40	28	R725LASU	8	Binary	Number of times a Latch Obtain request was suspended for the Request Type as specified in R725LATY.
48	30	R725LATI	8	Binary	Total amount of suspend time in milliseconds that was caused by Latch Obtain requests for the Request Type as specified in R725LATY.
56	38	R725LASQ	8	Binary	Sum of squares of the individual suspend times in milliseconds that was caused by Latch Obtain requests for the Request Type as specified in R725LATY.

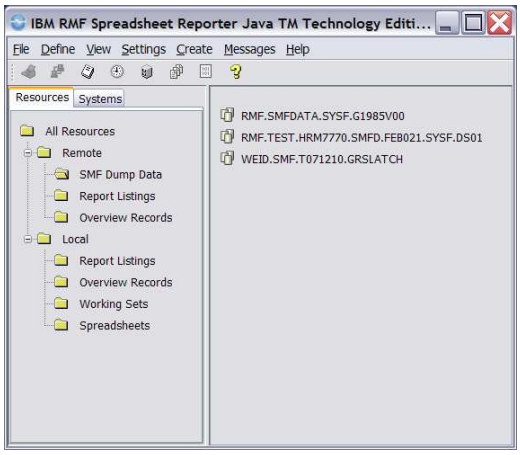
Usage and invocation: SDelay Report – SMF Record 72.5 (17 of 17)

GRS Enqueue Data

Offsets		Name	Length	Format	Description
R725ENTD – GRS Enqueue Data					
0	0	R725ENJN	8	EBCDIC	Name of job
8	8		3		Reserved
11	B	R725ENSP	1	Binary	Service Class Period
12	C	R725ENAS	2	Binary	Address Space ID
14	E		2		Reserved
16	10	R725ENST	8	EBCDIC	Address Space SToken
24	18	R725ENSN	8	EBCDIC	Service Class Name
32	20	R725ENSC	1	Binary	Enqueue Scope Type Value Meaning 1 Scope = Step 2 Scope = System 3 Scope = Systems
33	21		7		Reserved
40	28	R725ENRC	8	Binary	Number of GRS ENQ requests with the scope as specified in R725ENSC for this address space.
48	30	R725ENSU	8	Binary	Number of GRS ENQ requests with the scope as specified in R725ENSC that were suspended for this address space.
56	38	R725ENTI	8	Binary	Total amount of suspend time in milliseconds that was caused by GRS ENQ requests with the scope as specified in R725ENSC for this address space.
64	40	R725ENSQ	16	Binary	Sum of squares of the individual suspend times in milliseconds.

Usage and invocation: RMF spreadsheet reporter (1 of 6)

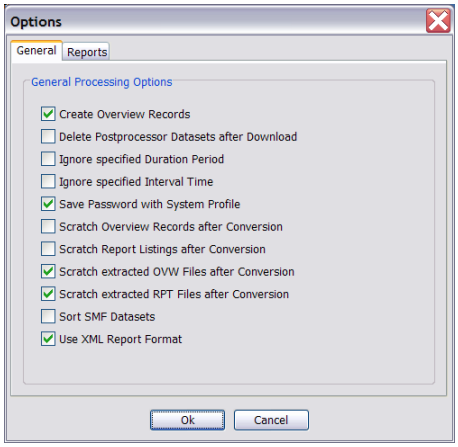
- The Postprocessor SDELAY report can be invoked by using the RMF spreadsheet reporter

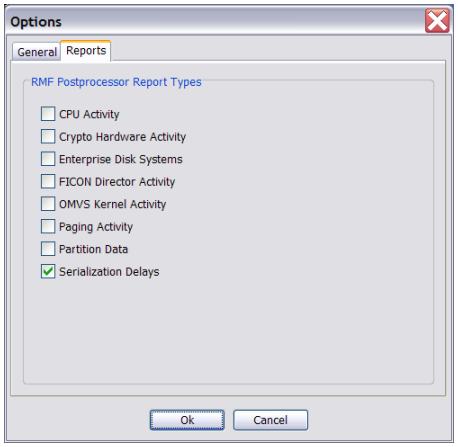


The RMF Spreadsheet Reporter can be downloaded from the RMF homepage.

Usage and invocation: RMF spreadsheet reporter (2 of 6)

- In the Settings/Options/General dialog it is important to select 'Use XML Report Format'
- In the Settings/Options/Reports dialog select 'Serialization Delays'

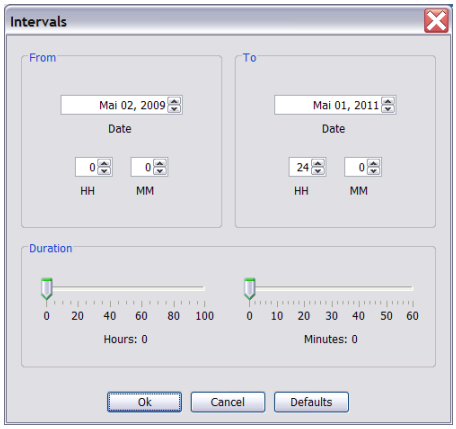




On the Options/General panel it is important to select 'Use XML Report Format' and on Options/Reports panel select 'Serialization Delays'

Usage and invocation: RMF spreadsheet reporter (3 of 6)

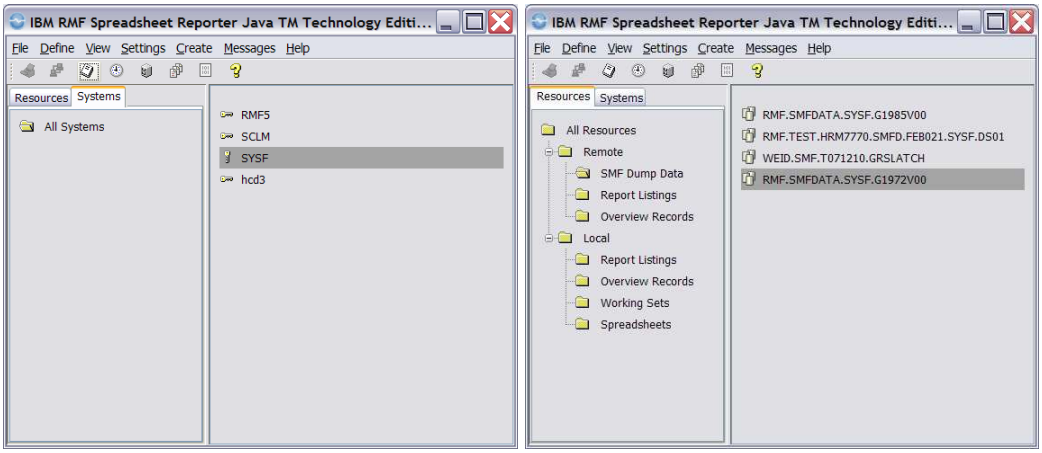
- In the Settings/Intervals dialog you can specify the start and end time for the data collection.
- It is important to specify **no** Duration for SDELAY report.



On the Settings/Intervals panel it is important to specify the Interval and a **no** Duration because no Duration Report exists for SDELAY.

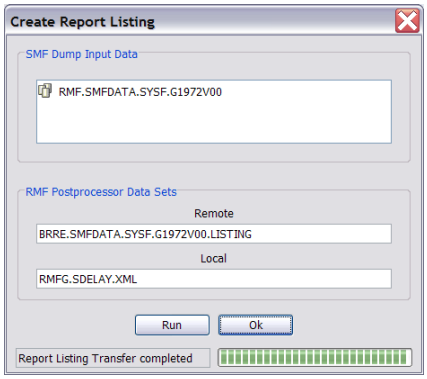
Usage and invocation: RMF spreadsheet reporter (4 of 6)

- Select a system and
- Select an SMF dataset which is used to create the XML report.



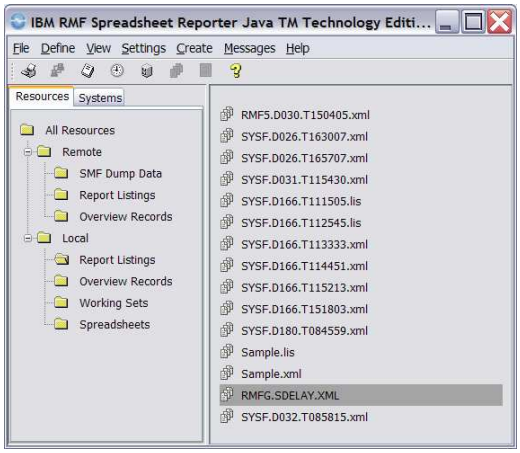
Usage and invocation: RMF spreadsheet reporter (5 of 6)

- Select Create/Report Listing ... to create the XML SDELAY Report in the file specified in 'Local'

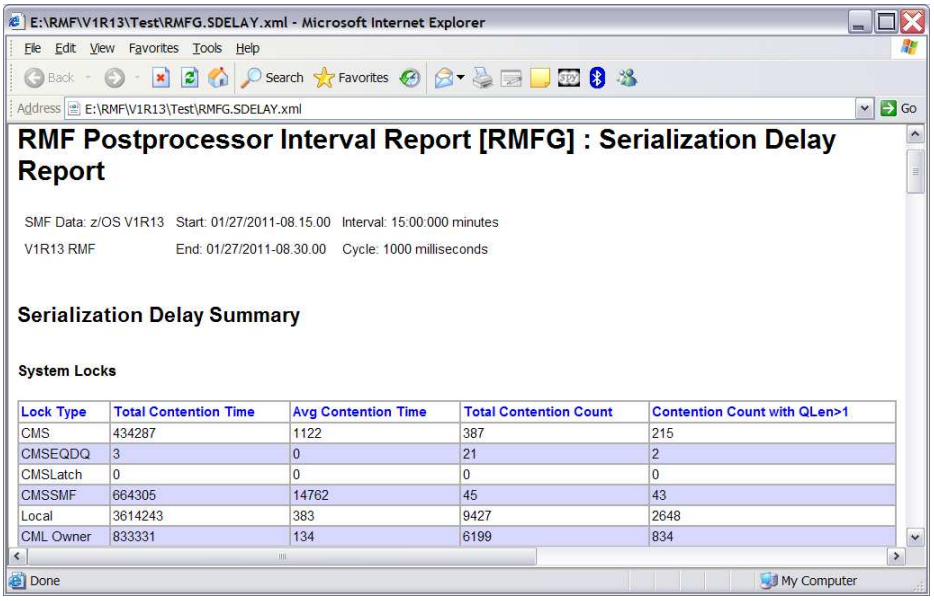


Usage and invocation: RMF spreadsheet reporter (6 of 6)

- In Resources/Local/Report Listings 'double click' on the XML report you created before to view the SDELAY report in your standard browser



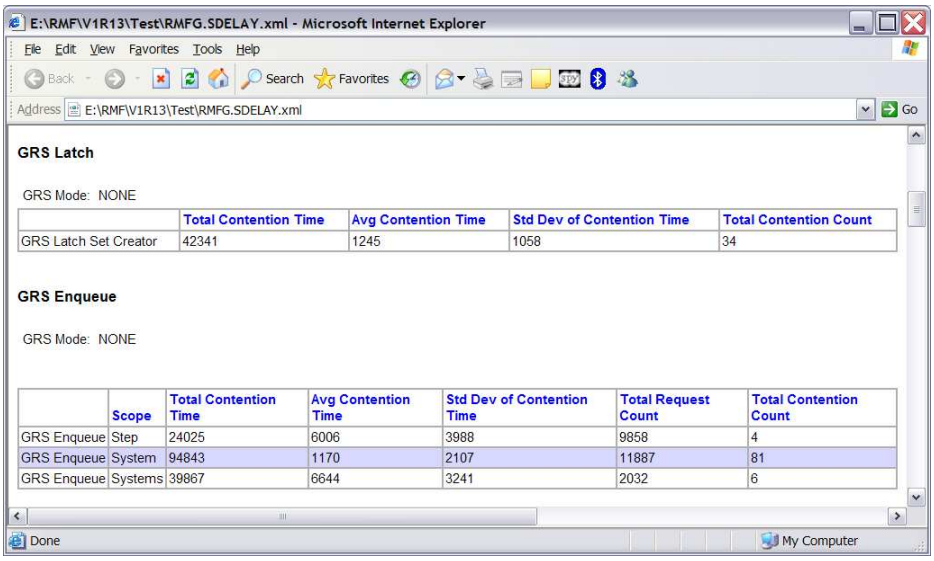
Usage and invocation: Serialization delay report - Summary



Usage and invocation: SDelay report – Field descriptions

Field Heading	Meaning
System Locks – contains system-wide summary data on system suspend locks for all address spaces	
Lock Type	Defines the system suspend lock type: ▪CMS Lock ▪CMS EnqueueDequeue Lock ▪CMS Latch Lock ▪CMS SMF Lock ▪Local Lock ▪CML Lock Owner
Total Contention Time	The total amount of time in milliseconds that a unit of work was suspended on the lock type as specified in the field 'Lock Type'.
Avg Contention Time	The average amount of time in milliseconds that a unit of work was suspended on the lock type as specified in the field 'Lock Type'.
Total Contention Count	The total number of times that a unit of work was suspended on the lock type as specified in the field 'Lock Type'.
Contention Count with QLen>1	The total number of times that a unit of work was suspended on the lock type as specified in the field 'Lock Type' when there was already at least one other unit of work suspended for the lock.

Usage and invocation: Serialization delay report - Summary



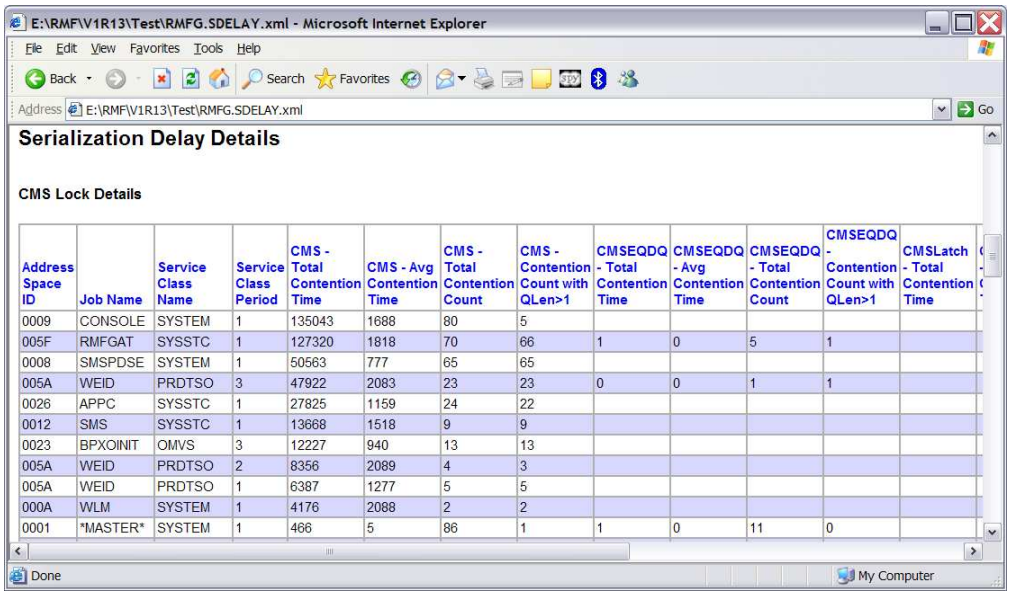
Usage and invocation: SDelay report – Field descriptions (1 of 2)

Field Heading	Meaning
GRS Latch – contains system-wide summary data about GRS Latches for all address spaces.	
GRS Mode	The operation mode of GRS: ▪NONE ▪RING ▪STAR
Total Contention Time	The total amount of time in milliseconds that Latch requests were suspended.
Avg Contention Time	The average amount of time in milliseconds that Latch requests were suspended.
Std Dev of Contention Time	The standard deviation of the Total Contention Time in milliseconds.
Total Contention Count	The total number of suspended Latch requests.

Usage and invocation: SDelay report – Field descriptions (2 of 2)

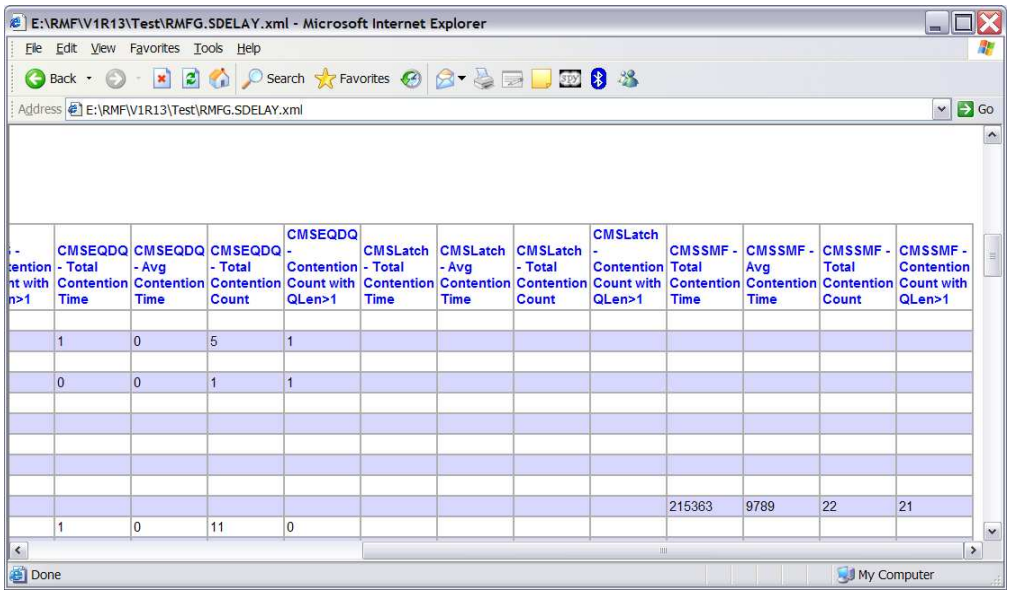
Field Heading	Meaning
GRS Enqueue – contains system-wide summary data about GRS Enqueue requests for all address spaces.	
GRS Mode	The operation mode of GRS: ▪NONE ▪RING ▪STAR
Scope	The scope of an ENQ request: ▪STEP ▪SYSTEM ▪SYSTEMS
Total Contention Time	The total amount of time in milliseconds that GRS ENQ requests with the specified 'Scope' were suspended.
Avg Contention Time	The average amount of time in milliseconds that GRS ENQ requests with the specified 'Scope' were suspended.
Std Dev of Contention Time	The standard deviation of the Total Contention Time in milliseconds.
Total Request Count	The total number of GRS ENQ requests with the specified 'Scope'.
Total Contention Count	The total number of GRS ENQ requests with the specified 'Scope' that were suspended.

Usage and invocation: Serialization delay report - Details (1 of 2)



Address Space ID	Job Name	Service Class Name	Service Class Period	CMS - Total Contention Time	CMS - Avg Contention Time	CMS - Total Contention Count	CMS - Contention Count with QLen>1	CMSEQDQ - Total Contention Time	CMSEQDQ - Avg Contention Time	CMSEQDQ - Total Contention Count	CMSEQDQ - Contention Count with QLen>1	CMSLatch - Total Contention Time
0009	CONSOLE	SYSTEM	1	135043	1688	80	5					
005F	RMFGAT	SYSSTC	1	127320	1818	70	66	1	0	5	1	
0008	SMSPDSE	SYSTEM	1	50563	777	65	65					
005A	WEID	PRDTSO	3	47922	2083	23	23	0	0	1	1	
0026	APPC	SYSSTC	1	27825	1159	24	22					
0012	SMS	SYSSTC	1	13668	1518	9	9					
0023	BPXOINIT	OMVS	3	12227	940	13	13					
005A	WEID	PRDTSO	2	8356	2089	4	3					
005A	WEID	PRDTSO	1	6387	1277	5	5					
000A	WLM	SYSTEM	1	4176	2088	2	2					
0001	*MASTER*	SYSTEM	1	466	5	86	1	1	0	11	0	

Usage and invocation: Serialization delay report - Details (2 of 2)



- tention nt with n>1	CMSEQDQ - Total Contention Time	CMSEQDQ - Avg Contention Time	CMSEQDQ - Total Contention Count	CMSEQDQ - Contention Count with QLen>1	CMSLatch - Total Contention Time	CMSLatch - Avg Contention Time	CMSLatch - Total Contention Count	CMSLatch - Contention Count with QLen>1	CMSSMF - Total Contention Time	CMSSMF - Avg Contention Time	CMSSMF - Total Contention Count	CMSSMF - Contention Count with QLen>1
	1	0	5	1								
	0	0	1	1								
									215363	9789	22	21
	1	0	11	0								

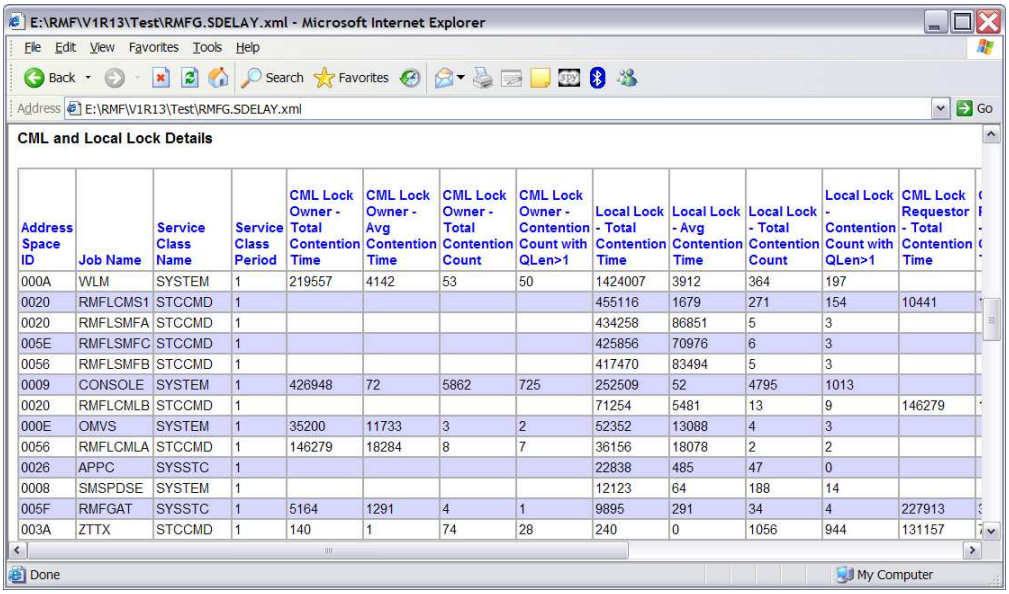
Usage and invocation: SDelay Report – Field descriptions (1 of 2)

Field Heading	Meaning
CMS Lock Details section – contains detail data about CMS/CMSEQDQ/CMSLatch/CMSSMF locks per address space	
Address Space ID	Hexadecimal address space identifier (ASID) of the job requesting the lock or waiting for it.
Jobname	Name of job
Service Class Name	The name of the service class that the job has been running in.
Service Class Period	Service class period the job has been running in.
CMS - Total Contention Time	The total amount of time in milliseconds that a unit of work of this address space was suspended on a CMS lock.
CMS - Avg Contention Time	The average amount of time in milliseconds that a unit of work of this address space was suspended on a CMS lock.
CMS - Total Contention Count	The number of times that a unit of work of this address space was suspended on a CMS lock.
CMS - Contention Count with Qlen>1	The number of times that a unit of work of this address space was suspended on a CMS lock when there was already at least one other unit of work suspended for the lock.
CMSEQDQ - Total Contention Time	The total amount of time in milliseconds that a unit of work of this address space was suspended on a CMSEQDQ lock.
CMSEQDQ - Avg Contention Time	The average amount of time in milliseconds that a unit of work of this address space was suspended on a CMSEQDQ lock.
CMSEQDQ - Total Contention Count	The number of times that a unit of work of this address space was suspended on a CMSEQDQ lock.
CMSEQDQ - Contention Count with Qlen>1	The number of times that a unit of work of this address space was suspended on a CMSEQDQ lock when there was already at least one other unit of work suspended for the lock.

Usage and invocation: SDelay Report – Field descriptions (2 of 2)

Field Heading	Meaning
CMS Lock Details section – continuation	
CMSLatch - Total Contention Time	The total amount of time in milliseconds that a unit of work of this address space was suspended on a CMSLatch lock.
CMSLatch - Avg Contention Time	The average amount of time in milliseconds that a unit of work of this address space was suspended on a CMSLatch lock.
CMSLatch - Total Contention Count	The number of times that a unit of work of this address space was suspended on a CMSLatch lock.
CMSLatch - Contention Count with Qlen>1	The number of times that a unit of work of this address space was suspended on a CMSLatch lock when there was already at least one other unit of work suspended for the lock.
CMSSMF - Total Contention Time	The total amount of time in milliseconds that a unit of work of this address space was suspended on a CMSSMF lock.
CMSSMF - Avg Contention Time	The average amount of time in milliseconds that a unit of work of this address space was suspended on a CMSSMF lock.
CMSSMF - Total Contention Count	The number of times that a unit of work of this address space was suspended on a CMSSMF lock.
CMSSMF - Contention Count with Qlen>1	The number of times that a unit of work of this address space was suspended on a CMSSMF lock when there was already at least one other unit of work suspended for the lock.

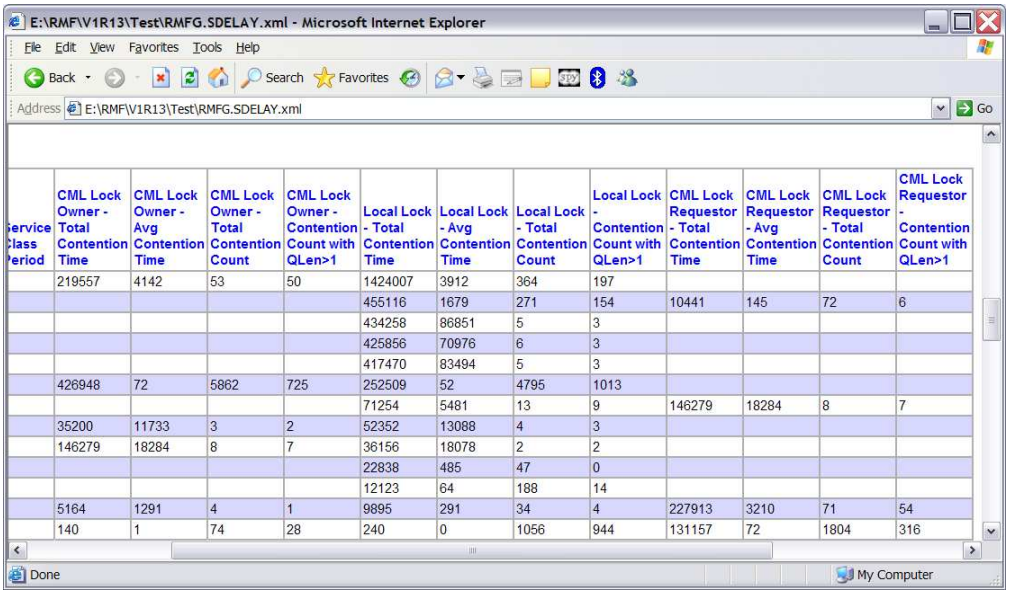
Usage and invocation: Serialization delay report - Details (1 of 2)



CML and Local Lock Details

Address Space ID	Job Name	Service Class Name	Service Class Period	CML Lock Owner - Total Contention Time	CML Lock Owner - Avg Contention Time	CML Lock Owner - Total Contention Count	CML Lock Owner - Contention Count with QLen>1	Local Lock - Total Contention Time	Local Lock - Avg Contention Time	Local Lock - Total Contention Count	Local Lock - Contention Count with QLen>1	CML Lock Requestor - Total Contention Time
000A	WLM	SYSTEM	1	219557	4142	53	50	1424007	3912	364	197	
0020	RMFLCMS1	STCCMD	1					455116	1679	271	154	10441
0020	RMFLSMFA	STCCMD	1					434258	86851	5	3	
005E	RMFLSMFC	STCCMD	1					425856	70976	6	3	
0056	RMFLSMFB	STCCMD	1					417470	83494	5	3	
0009	CONSOLE	SYSTEM	1	426948	72	5862	725	252509	52	4795	1013	
0020	RMFLCMLB	STCCMD	1					71254	5481	13	9	146279
000E	OMVS	SYSTEM	1	35200	11733	3	2	52352	13088	4	3	
0056	RMFLCMLA	STCCMD	1	146279	18284	8	7	36156	18078	2	2	
0026	APPC	SYSSTC	1					22838	485	47	0	
0008	SMSPDSE	SYSTEM	1					12123	64	188	14	
005F	RMFGAT	SYSSTC	1	5164	1291	4	1	9895	291	34	4	227913
003A	ZTTX	STCCMD	1	140	1	74	28	240	0	1056	944	131157

Usage and invocation: Serialization delay report - Details (2 of 2)



Service Class Period	CML Lock Owner - Total Contention Time	CML Lock Owner - Avg Contention Time	CML Lock Owner - Total Contention Count	CML Lock Owner - Contention Count with QLen>1	Local Lock - Total Contention Time	Local Lock - Avg Contention Time	Local Lock - Total Contention Count	Local Lock - Contention Count with QLen>1	CML Lock Requestor - Total Contention Time	CML Lock Requestor - Avg Contention Time	CML Lock Requestor - Total Contention Count	CML Lock Requestor - Contention Count with QLen>1
	219557	4142	53	50	1424007	3912	364	197				
					455116	1679	271	154	10441	145	72	6
					434258	86851	5	3				
					425856	70976	6	3				
					417470	83494	5	3				
	426948	72	5862	725	252509	52	4795	1013				
					71254	5481	13	9	146279	18284	8	7
	35200	11733	3	2	52352	13088	4	3				
	146279	18284	8	7	36156	18078	2	2				
					22838	485	47	0				
					12123	64	188	14				
	5164	1291	4	1	9895	291	34	4	227913	3210	71	54
	140	1	74	28	240	0	1056	944	131157	72	1804	316

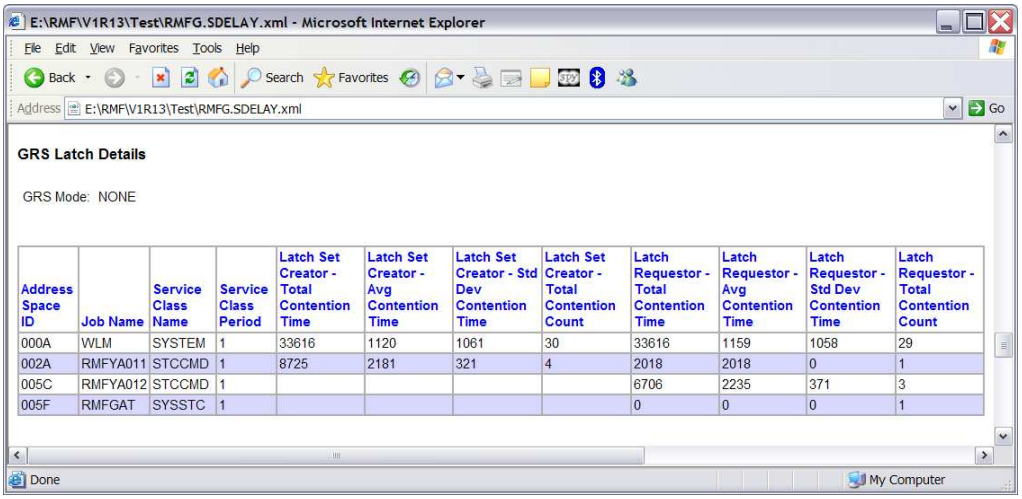
Usage and invocation: SDelay report – Field descriptions (1 of 2)

Field Heading	Meaning
CML and Local Lock Details section – contains detail data about CML and Local locks per address space	
Address Space ID	Hexadecimal address space identifier (ASID) of the job requesting the lock or waiting for it.
Jobname	Name of job
Service Class Name	The name of the service class that the job has been running in.
Service Class Period	Service class period the job has been running in.
CML Lock Owner - Total Contention Time	The total amount of time in milliseconds that a unit of work from another address space was suspended when requesting the Local lock of this address space.
CML Lock Owner - Avg Contention Time	The average amount of time in milliseconds that a unit of work from another address space was suspended when requesting the Local lock of this address space.
CML Lock Owner - Total Contention Count	The number of times that a unit of work from another address space was suspended when requesting the Local lock of this address space.
CML Lock Owner - Contention Count with Qlen>1	The number of times that a unit of work from another address space was suspended when requesting the Local lock of this address space and there was already at least one other unit of work waiting for this lock.

Usage and invocation: SDelay Report – Field descriptions (2 of 2)

Field Heading	Meaning
CML and Local Lock Details section – continuation	
Local Lock - Total Contention Time	The total amount of time in milliseconds that a unit of work of this address space was suspended on a Local lock.
Local Lock - Avg Contention Time	The average amount of time in milliseconds that a unit of work of this address space was suspended on a Local lock.
Local Lock - Total Contention Count	The number of times that a unit of work of this address space was suspended on a Local lock.
Local Lock - Contention Count with Qlen>1	The number of times that a unit of work of this address space was suspended on a Local lock when there was already at least one other unit of work suspended.
CML Lock Requestor - Total Contention Time	The total amount of time in milliseconds that a unit of work of this address space was suspended when requesting the Local lock of another address space.
CML Lock Requestor- Avg Contention Time	The average amount of time in milliseconds that a unit of work of this address space was suspended when requesting the Local lock of another address space.
CML Lock Requestor - Total Contention Count	The number of times that a unit of work from this address space was suspended when requesting the Local lock of another address space.
CML Lock Requestor - Contention Count with Qlen>1	The number of times that a unit of work from this address space was suspended when requesting the Local lock of another address space and there was already at least one other unit of work waiting for that lock.

Usage and invocation: Serialization Delay Report - Details



Address Space ID	Job Name	Service Class Name	Service Class Period	Latch Set Creator - Total Contention Time	Latch Set Creator - Avg Contention Time	Latch Set Creator - Std Dev Contention Time	Latch Set Creator - Total Contention Count	Latch Requestor - Total Contention Time	Latch Requestor - Avg Contention Time	Latch Requestor - Std Dev Contention Time	Latch Requestor - Total Contention Count
000A	WLM	SYSTEM	1	33616	1120	1061	30	33616	1159	1058	29
002A	RMFYA011	STCCMD	1	8725	2181	321	4	2018	2018	0	1
005C	RMFYA012	STCCMD	1					6706	2235	371	3
005F	RMFGAT	SYSSTC	1					0	0	0	1

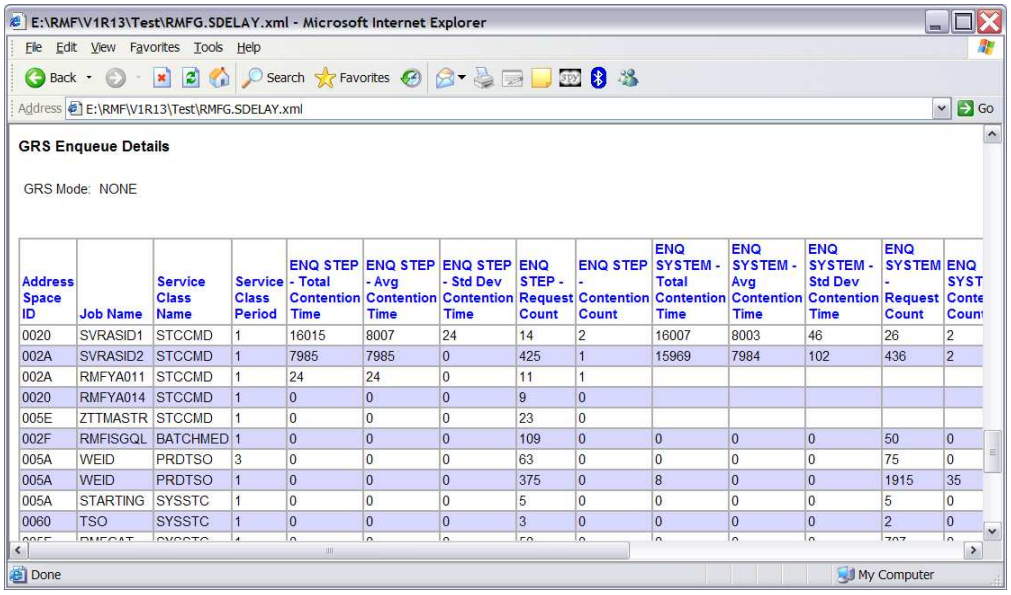
Usage and invocation: SDelay Report – Field descriptions (1 of 2)

Field Heading	Meaning
GRS Latch Details section – contains detail data about GRS Latches per address space	
GRS Mode	The operation mode of GRS: ▪NONE ▪RING ▪STAR
Address Space ID	Hexadecimal address space identifier (ASID) of the job requesting the lock or waiting for it.
Jobname	Name of job
Service Class Name	The name of the service class that the job has been running in.
Service Class Period	Service class period the job has been running in.

Usage and invocation: SDelay Report – Field descriptions (2 of 2)

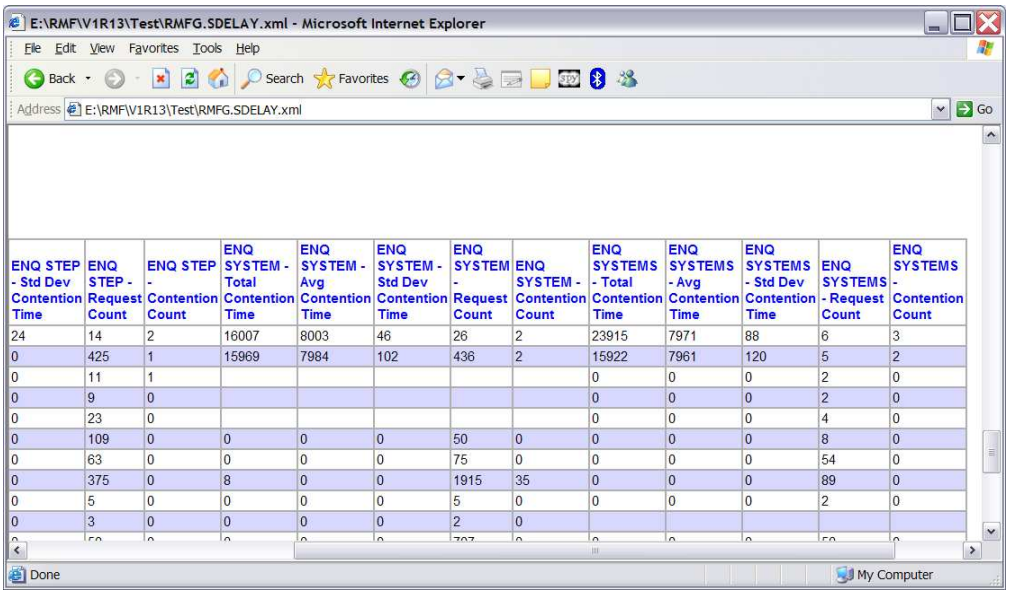
Field Heading	Meaning
GRS Latch Details section – continuation	
Statistics for Latch Obtain requests against Latch Sets created by this address space	
Latch Set Creator - Total Contention Time	The total amount of time in milliseconds that a unit of work of this address space was suspended on a Local lock.
Latch Set Creator - Avg Contention Time	The average amount of time in milliseconds that a unit of work of this address space was suspended on a Local lock.
Latch Set Creator - Std Dev of Contention Time	The number of times that a unit of work of this address space was suspended on a Local lock.
Latch Set Creator - Total Contention Count	The number of times that a unit of work of this address space was suspended on a Local lock when there was already at least one other unit of work suspended.
Statistics for Latch Obtain requests from this address space	
Latch Requestor - Total Contention Time	The total amount of time in milliseconds that a unit of work of this address space was suspended when requesting the Local lock of another address space.
Latch Requestor - Avg Contention Time	The average amount of time in milliseconds that a unit of work of this address space was suspended when requesting the Local lock of another address space.
Latch Requestor - Std Dev of Contention Time	The number of times that a unit of work from this address space was suspended when requesting the Local lock of another address space.
Latch Requestor - Total Contention Count	The number of times that a unit of work from this address space was suspended when requesting the Local lock of another address space and there was already at least one other unit of work waiting for that lock.

Usage and invocation: Serialization Delay Report - Details (1 of 2)



Address Space ID	Job Name	Service Class Name	Service Class Period	ENQ STEP - Total Contention Time	ENQ STEP - Avg Contention Time	ENQ STEP - Std Dev Contention Time	ENQ STEP - Request Count	ENQ STEP - Contention Count	ENQ SYSTEM - Total Contention Time	ENQ SYSTEM - Avg Contention Time	ENQ SYSTEM - Std Dev Contention Time	ENQ SYSTEM - Request Count	ENQ SYST Conte Count
0020	SVRASID1	STCCMD	1	16015	8007	24	14	2	16007	8003	46	26	2
002A	SVRASID2	STCCMD	1	7985	7985	0	425	1	15969	7984	102	436	2
002A	RMFYA011	STCCMD	1	24	24	0	11	1					
0020	RMFYA014	STCCMD	1	0	0	0	9	0					
005E	ZTTMASTR	STCCMD	1	0	0	0	23	0					
002F	RMFISGQL	BATCHMED	1	0	0	0	109	0	0	0	0	50	0
005A	WEID	PRDTSO	3	0	0	0	63	0	0	0	0	75	0
005A	WEID	PRDTSO	1	0	0	0	375	0	8	0	0	1915	35
005A	STARTING	SYSSTC	1	0	0	0	5	0	0	0	0	5	0
0060	TSO	SYSSTC	1	0	0	0	3	0	0	0	0	2	0

Usage and invocation: Serialization Delay Report - Details (2 of 2)



ENQ STEP - Std Dev Contention Time	ENQ STEP - Request Count	ENQ STEP - Contention Count	ENQ SYSTEM - Total Contention Time	ENQ SYSTEM - Avg Contention Time	ENQ SYSTEM - Std Dev Contention Time	ENQ SYSTEM - Request Count	ENQ SYSTEM - Contention Count	ENQ SYSTEMS - Total Contention Time	ENQ SYSTEMS - Avg Contention Time	ENQ SYSTEMS - Std Dev Contention Time	ENQ SYSTEMS - Request Count	ENQ SYSTEMS - Contention Count
24	14	2	16007	8003	46	26	2	23915	7971	88	6	3
0	425	1	15969	7984	102	436	2	15922	7961	120	5	2
0	11	1						0	0	0	2	0
0	9	0						0	0	0	2	0
0	23	0						0	0	0	4	0
0	109	0	0	0	0	50	0	0	0	0	8	0
0	63	0	0	0	0	75	0	0	0	0	54	0
0	375	0	8	0	0	1915	35	0	0	0	89	0
0	5	0	0	0	0	5	0	0	0	0	2	0
0	3	0	0	0	0	2	0					

Usage and invocation: SDelay Report – Field descriptions (1 of 2)

Field Heading	Meaning
GRS Enqueue Details section – contains detail data about GRS Enqueue requests per address space	
GRS Mode	The operation mode of GRS: ▪NONE ▪RING ▪STAR
Address Space ID	Hexadecimal address space identifier (ASID) of the job requesting the lock or waiting for it.
Jobname	Name of job
Service Class Name	The name of the service class that the job has been running in.
Service Class Period	Service class period the job has been running in.
ENQ STEP - Total Contention Time	The total amount of contention time in milliseconds that was caused by GRS ENQ SCOPE = STEP requests for this address space.
ENQ STEP - Avg Contention Time	The average amount of contention time in milliseconds.
ENQ STEP - Std Dev of Contention Time	The standard deviation of the Total Contention Time.
ENQ STEP - Request Count	The total number of GRS ENQ SCOPE = STEP requests for this address space.
ENQ STEP - Contention Count	The total number of GRS ENQ SCOPE = STEP requests that were suspended for this address space.

Usage and invocation: SDelay Report – Field descriptions (2 of 2)

Field Heading	Meaning
GRS Enqueue Details section – continuation	
ENQ SYSTEM - Total Contention Time	The total amount of contention time in milliseconds that was caused by GRS ENQ SCOPE = SYSTEM requests for this address space.
ENQ SYSTEM - Avg Contention Time	The average amount of contention time in milliseconds.
ENQ SYSTEM - Std Dev of Contention Time	The standard deviation of the Total Contention Time.
ENQ SYSTEM - Request Count	The total number of GRS ENQ SCOPE = SYSTEM requests for this address space.
ENQ SYSTEM - Contention Count	The total number of GRS ENQ SCOPE = SYSTEM requests that were suspended for this address space.
ENQ SYSTEMS - Total Contention Time	The total amount of contention time in milliseconds that was caused by GRS ENQ SCOPE = SYSTEMS requests for this address space.
ENQ SYSTEMS - Avg Contention Time	The average amount of contention time in milliseconds.
ENQ SYSTEMS - Std Dev of Contention Time	The standard deviation of the Total Contention Time.
ENQ SYSTEMS - Request Count	The total number of GRS ENQ SCOPE = SYSTEMS requests for this address space.
ENQ SYSTEMS - Contention Count	The total number of GRS ENQ SCOPE = SYSTEMS requests that were suspended for this address space.

Interactions and dependencies

- Software Dependencies
  - None
- Hardware Dependencies
  - None
- Exploiters
  - None

Migration and coexistence considerations

- With z/OS V1.13 RMF serialization delay data collection for SMF72.5 is new.
- If this data is not needed by the customer, data collection for SMF72.5 should be turned off. This can be set in the SMF Parmlib member SMFPRMxx by specifying TYPE/NOTYPE. For further information please see *z/OS V1R10.0 MVS Initialization and Tuning Reference.*

Installation

- No changes for z/OS V1.13.
- This support is included in the GA shipment of z/OS V1.13 RMF (HRM7780)

Session summary

- RMF now provides:
  - new data collection for GRS & Supervisor Delay Data
  - the data is reported in SMF record subtype 70.5
  - or in the new postprocessor serialization report SDELAY

Appendix - References

- RMF homepage: http://www.ibm.com/systems/z/os/zos/features/rmf/
  - Product information, newsletters, presentations, ...
  - Downloads
    - Spreadsheet Reporter
    - RMF PM Java Edition
- Documentation and news
  - RMF Report Analysis, SC33-7991
  - RMF User's Guide, SC33-7990
  - Latest version of PDF files can be downloaded from:
    - http://www.ibm.com/systems/z/os/zos/bkserv/

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