2085980 - New features in memory management as of Kernel Release 7.40

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Language	English	Master Language	German
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Component	BC-CST-MM (Memory Management)		

Please find the original document at https://launchpad.support.sap.com/#/notes/ 2085980

Symptom

New features in memory management as of Kernel Release 7.40

Other Terms

ROLL, ROLL-FILE, ZAMM, zero administration memory management, PROC memory

Reason and Prerequisites

This information applies to SAP NetWeaver Kernel Release 7.40 and above.

Solution

The following changes/new features for memory management have been introduced in Kernel Release 7.40.

1. Abolition of "classic" ROLL memory, which was configured using the profile parameters "ztta/roll_first" and "ztta/roll_area" in kernel releases below 7.40. The four parameters

ztta/roll_area, ztta_roll_first, rdisp/ROLL_MAXFS, and rdisp/ROLL_SHM

are obsolete as of Kernel 740.

All data that was stored in the classic ROLL area in earlier releases will as of immediately be stored in the extended memory together with the other data contained in the ABAP user context to simplify configuration.

2. Availability of zero administration memory management, which was already available for the Microsoft Windows platform in kernel releases below 7.40, on UNIX platforms, too.

The values of the individual memory configuration parameters (for example, for program buffers and so on) are automatically derived from the value of the central profile parameter PHYS_MEMSIZE with the help of formulas, as described in 88416 - Zero administration memory management for the ABAP server.

The following table contains the profile parameters that are relevant in the memory management environment with their default values as of the 7.40 kernel. The default values of some parameters are different on different operating system platforms; this is noted in the column for the operating system platforms.

Profile parameter	Default value	Unit

PHYS_MEMSIZE	Main memory (RAM) of the ABAP application server	MB
em/initial_size_MB	(min(512000, $(PHYS_MEMSIZE) * 0.7))	MB
em/initial_size_MB	($(EM/TOTAL_SIZE_MB))	MB
EM/TOTAL_SIZE_MB	($(PHYS_MEMSIZE) * 0.7)	MB
EM/TOTAL_SIZE_MB	($(em/initial_size_MB))	MB
em/blocksize_KB	(ceil($(em/initial_size_MB) * 1024 / 100000 / 4096) * 4096)	KB
em/global_area_MB	min($(em/initial_size_MB) * 0.05, 32000)	MB
em/max_size_MB	($(em/initial_size_MB))	MB
em/max_size_MB	(min(512000, $(PHYS_MEMSIZE) * 1.5))	MB
em/address_space_MB	4096	MB
em/address_space_MB	($(em/initial_size_MB))	MB
rdisp/PG_SHM	(min(1000+40*max(5,floor(($(PHYS_MEMSIZE)-128)/20)),256000))	8 KB
rdisp/PG_MAXFS	($(rdisp/PG_SHM))	8 KB
ES/SHM_PROC_SEG_COUNT	16	Integer
ES/SHM_PROC_SEG_COUNT	3	Integer
ES/SHM_MAX_SHARED_SEGS	1	Integer
ES/SHM_MAX_SHARED_SEGS	(($(em/global_area_MB) + $(abap/shared_objects_size_MB) + $(rtbb/buffer_length)/1024 + $(zcsa/table_buffer_area)/1024/1024) / $(ES/SHM_SEG_SIZE) + 1)	Integer
ES/SHM_MAX_PRIV_SEGS	(max(1, 16 - $(ES/SHM_MAX_SHARED_SEGS)))	Integer
ES/SHM_MAX_PRIV_SEGS	2	Integer

abap/heaplimit	150000000	Bytes
abap/buffersize	(ceil($(em/initial_size_MB)*1024*0.15/4096) * 4096)	KB
abap/programs	($(abap/buffersize)/4)	Integer
abap/heap_area_dia	2000000000	byte
abap/heap_area_nondia	0	byte
abap/heap_area_nondia	2000000000	byte
abap/heap_area_total	($(PHYS_MEMSIZE) * 1024 * 1024)	Bytes
abap/heap_area_total	(max($(PHYS_MEMSIZE)*1024*1024 * 0.1, $(abap/heap_area_dia) * 2))	Bytes
abap/shared_objects_size_MB	(min(4000, $(em/initial_size_MB)*0.02))	MB
abap/shared_objects_size_MB	(min(20000, $(em/initial_size_MB)*0.02))	MB
zcsa/table_buffer_area	(min(3333333333, (max(30000000,($(em/initial_size_MB) * 1024 * 1024 * 0.1)))))	Bytes
rtbb/buffer_length	($(zcsa/table_buffer_area) * 0.1 / 1024)	KB

3. Introduction of the new memory class "PROC-Memory" ("PROCess-Local Memory") for the improved control of the server-wide HEAP and SWAP memory consumption. PROC memory is introduced with ABAP Release 740 SP08 (Kernel 742). PROC memory comprises local HEAP memory in the work process that is not assigned to a user context.

To support the analysis of memory leaks (the unexpected and significant uncontrolled increase in the HEAP/SWAP consumption of an ABAP server), you can monitor the consumption of PROC memory using the report RSMEMORY (in "PROC Memory").

If required, you can use the following new profile parameter to restrict the total consumption of PROC memory of an ABAP server:

em/proc_max_size_MB

For more information about this, see SAP Note 2019744 - How to limit overall swap space consumption of the ABAP Server in NW 7.40.

Software Components

Software Component	Release
KRNL64NUC	7.40 - 7.40
KRNL64NUC	7.41 - 7.41
KRNL64NUC	7.42 - 7.42
KRNL64NUC	7.43 - 7.43
KRNL64NUC	7.44 - 7.44
KRNL64UC	7.40 - 7.40
KRNL64UC	7.41 - 7.41
KRNL64UC	7.42 - 7.42
KRNL64UC	7.43 - 7.43
KRNL64UC	7.44 - 7.44
SAP_BASIS	740 - 740
KERNEL	7.40 - 7.40
KERNEL	7.41 - 7.41
KERNEL	7.42 - 7.42
KERNEL	7.43 - 7.43
KERNEL	7.44 - 7.44
KERNEL	7.45 - 7.45
KERNEL	7.46 - 7.46
KERNEL	7.47 - 7.47
KERNEL	7.48 - 7.48
KERNEL	7.49 - 7.49

This document is referenced by

SAP Note/KBA	Title
2152126	EgAlloc: MmxMalloc failed errors followed by ST22 dumps, SM21 errors or additional sympthoms

2207756	SAP kernel process terminated / restarted without any information in its trace file
2553792	LOAD_NO_ROLL dump in ST22 on Windows
2560709	[WEBINAR] Understanding and Troubleshooting SAP Memory Management
2098347	IBM i: Upgrade to SAP_BASIS 7.40 or SAP NetWeaver kernel 7.4x
2256424	Memory overflow when executing check
2031037	Upgrade to SAP_BASIS 740 or NetWeaver Kernel 74x
941735	SAP memory management system for 64-bit Linux systems