



Virtual Memory Required by SAP System Components

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VIRTUAL MEMORY REQUIRED BY SAP SYSTEM COMPONENTS

This document describes the minimum virtual memory and page file size the SAP system components require to start and run properly.

The first table provides a general overview of the SAP system components and instances, third-party software, backup tools, and the virtual memory and page file size they need. You can use this table to determine the virtual memory and page file size you require for your SAP system.

After that we give examples for calculating the virtual memory and page file size for the SAP components of a:

- Central ABAP system
- Central Java system
- Central ABAP+Java system
- Distributed ABAP+Java system
- High-availability ABAP system

All settings refer to the classical SAP view memory model.

TERMINOLOGY AND EXPLANATIONS

As of SAP NetWeaver 7.1 there are the following terminology changes:

- The central instance is called primary application server (PAS)
- The dialog instance is called additional application server (AAS)
- The central system is called standard system

For practical reasons we are continuing to use the old terms in this document, which are still used for SAP systems based on SAP NetWeaver 7.0<x>. In this case, “central instance” also means “primary application server”, “dialog instance” also means “additional application server”, and central system also means standard system.

PHYS_MEMSIZE

PHYS_MEMSIZE is the available main memory for the SAP instance; by default this value equals the available RAM size. If you want to limit the main memory used for the SAP instance, you can change this parameter in the instance profile.

As of kernel patch level 7.20, the default value for parameter `em/max_size_MB` has changed from hard-coded 100 GB to $1.5 \times \text{PHYS_MEMSIZE}$. Make sure that PHYS_MEMSIZE is set to a value that is not too low. Otherwise, `em/max_size_MB` limits the extended memory resources.

If you have several instances on one physical host (or virtual machine) and you do not change the parameter PHYS_MEMSIZE all instances assume that the physical RAM is exclusively available for each of them.

For development and test systems, use $1 \times \text{PHYS_MEMSIZE}$ for the calculation.

For production systems, use $2 \times \text{PHYS_MEMSIZE}$ for the calculation.

Virtual Machine Container

For more information about the usage of Virtual Machine Container (VMC) (CRM system, enabled by switch “`vmcj/enable = on`”), see **SAP note 854170** and the referenced SAP notes about memory consumption and configuration. If the page file is too small, the VMC cannot be initialized.

GENERAL OVERVIEW OF REQUIRED VIRTUAL MEMORY BY SAP SYSTEM COMPONENTS

SAP System Components	Virtual Memory Needed	GB
ABAP central instance (per instance)	Approx. 500 MB + 1 to 2 times PHYS_MEMSIZE + 2.5 GB + 250 MB per work process	
Java central instance (per Java server process)	Approx. 5 GB	
(A)SCS instance, ERS instance (per instance)	Approx. 500 MB	
ABAP dialog instance (per instance)	1 to 2 times PHYS_MEMSIZE + 2.5 GB + 250 MB per work process	
Java dialog instance (per Java server process)	Approx. 5 GB	
Database instance (per instance)	Approx. 2 GB	
SAP agents (SMD, SAP Host Agent) (per host)	Approx. 300 MB	
Operating system	5 to 10% of RAM of physical host, minimum 3 GB	
Third-party applications (backup programs, hardware agents, etc.)	Depends on third-party application	
Total virtual memory needed	Total virtual memory	
Page file size needed	Total virtual memory – RAM	

EXAMPLES FOR CALCULATING THE VIRTUAL MEMORY AND PAGE FILE SIZE FOR DIFFERENT SAP SYSTEMS SCENARIOS

Scenario 1: Central ABAP System

Server has 4 cores, 16 GB of RAM and at least 16 work processes; PHYS_MEMSIZE is not set in the profile and equals RAM size (16 GB).

SAP System Components	Virtual Memory Needed	GB
Central instance (per instance)	500 MB + 1 to 2 times PHYS_MEMSIZE + 2.5 GB + 250 MB per work process	23
Database instance	Approx. 2 GB	2

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SAP System Components	Virtual Memory Needed	GB
(per instance)		
SAP agents (SMD, SAP Host Agent) (per host)	Approx. 300 MB	0.3
Operating system	5 to 10% of RAM of physical host, minimum 3 GB	3
Third-party applications (backup programs, hardware agents, etc.)	Depends on third-party application	2
Total virtual memory needed	Total sum of virtual memory	30.3
Page file size needed	Total virtual memory – RAM	14.3

Scenario 2: Central Java System

Server has 4 cores, 20 GB of RAM, PHYS_MEMSIZE is not set in the profile and equals RAM size (16 GB).

SAP System Components	Virtual Memory Needed	GB
SCS instance (per instance)	Approx. 500 MB	0.5
Java central instance (per Java server process)	Approx. 5 GB	5
Java dialog instance	Approx. 5 GB	5
Database instance (per instance)	Approx. 2 GB	2
SAP agents (SMD, SAP Host Agent) (per server)	Approx. 300 MB	0.3
Operating System	5 to 10% of RAM of physical host, minimum 3 GB	3
Third-party applications (backup programs, hardware-agents, etc.)	Depends on third-party application	2
Total virtual memory needed	Total sum of virtual memory	17.8
Page file size needed	Total virtual memory – RAM	-2.2*

* no page file needed

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Scenario 3: Central ABAP+Java System

Server has 4 cores, 16 GB of RAM and at least 16 work processes; PHYS_MEMSIZE is not set in the instance profile and equals RAM size (16 GB).

SAP System Components	Virtual Memory Needed	GB
SCS instance (per instance)	Approx. 500 MB	0.5
ABAP central instance (per instance)	500 MB + 1 to 2 times PHYS_MEMSIZE + 2.5 GB + 250 MB per work process	23
Java central instance (per Java server process)	Approx. 5 GB	5
Database instance (per instance)	Approx. 2 GB	2
SAP agents (SMD, SAP Host Agent) (per server)	Approx. 300 MB	0.3
Operating system	5 to 10% of RAM of physical host, minimum 3 GB	3
Third-party applications (backup programs, hardware agents, etc.)	Depends on third-party application	2
Total virtual memory needed	Total sum of all virtual memory	35.8
Page file size needed	Total virtual memory – RAM	19.8

Scenario 4: Distributed ABAP+Java System on 3 Hosts

Host 1 is used for the database instance.

For page file settings, see the recommendations of the database vendor.

Host 2 is used for the (A)SCS + central instance

Server has 2 cores, 8 GB RAM and at least 10 work processes; PHYS_MEMSIZE is not set in the instance profile and equals RAM size (8 GB).

SAP System Components	Virtual Memory Needed	GB
SCS instance (per instance)	Approx. 500 MB	0.5
ABAP central instance (per instance)	500 MB + 1 to 2 times PHYS_MEMSIZE + 2.5 GB + 250 MB per work process	13.5

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SAP System Components	Virtual Memory Needed	GB
Java central instance (per instance)	Approx. 5 GB	5
SAP agents (SMD, SAP Host Agent) per host	Approx. 300 MB	0.3
Operating system	5 to 10% of RAM of physical host, minimum 3 GB	3
Third-party applications (backup programs, hardware agents, etc.)	Depends on third-party application	2
Total virtual memory needed	Total sum of virtual memory	24.3
Page file size needed	Total virtual memory – RAM	16.3

Host 3 is used for the dialog instance:

Server has 4 core, 16 GB RAM and at least 20 work processes; PHYS_MEMSIZE is not set in the instance profile and equals RAM size (16 GB)

SAP System Components	Virtual Memory Needed	GB
ABAP dialog instance (per instance)	1 to 2 times of PHYS_MEMSIZE + 2,5 GB + 250 MB per work process	23.5
Java dialog instance (per instance)	Approx. 5 GB	5
SAP agents (SMD, SAP Host Agent) (per server)	Approx. 300 MB	0.3
Operating system	5 to 10% of RAM of physical host, minimum 3 GB	3
Third- party applications (backup programs, hardware agents, etc.)	Depends on third-party application	2
Total virtual memory needed	Total sum of virtual memory	33.8
Page file size needed	Total virtual memory – RAM	17.8

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Scenario 5: High-Availability ABAP System

2 cluster nodes with Windows 2008 (R2), with 8 cores, 32 GB RAM and at least 40 work processes each; PHYS_MEMSIZE is not set in the instance profile and equals RAM size (32 GB).

Cluster node 1 + 2 configuration:

SAP System Components	Virtual Memory Needed	GB
ASCS, ERS (per instance)	Each approx. 500 MB	1
Central instance (cluster node 1) Dialog instance (cluster node 2)	1 to 2 times of PHYS_MEMSIZE parameter + 2,5 GB + 250 MB per workprocess	44.5
Database (per instance)	Approx. 2 GB	2
SAP agents (SMD, SAP Host Agent) (per host)	Approx. 300 MB	0.3
Operating system	5 to 10% of RAM of physical host, minimum 3 GB	3
Third-party applications (backup programs, hardware-agents, etc.)	Depends on third-party application	2
Total virtual memory needed	Total sum of all virtual memory	52.8
Page file size needed	Total virtual memory – RAM	20.8

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