



## Memory Limits for Windows Releases

This topic describes memory limits for supported Windows releases:

- [Memory and Address Space Limits](#)
- [Physical Memory Limits: Windows Server 2008](#)
- [Physical Memory Limits: Windows Vista](#)
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- [Physical Memory Limits: Windows Server 2003](#)
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Limits on memory and address space vary by platform, operating system, and by whether the `IMAGE_FILE_LARGE_ADDRESS_AWARE` value of the [LOADED\\_IMAGE](#) [ [http://msdn.microsoft.com/en-us/library/ms680349\(VS.85\).aspx](http://msdn.microsoft.com/en-us/library/ms680349(VS.85).aspx) ] structure and [4-gigabyte tuning](#) [ [http://msdn.microsoft.com/en-us/library/bb613473\(VS.85\).aspx](http://msdn.microsoft.com/en-us/library/bb613473(VS.85).aspx) ] (4GT) are in use. `IMAGE_FILE_LARGE_ADDRESS_AWARE` is set or cleared by using the [/LARGEADDRESSAWARE](#) [ <http://go.microsoft.com/fwlink/?LinkId=132948> ] linker option.

Limits on physical memory for 32-bit platforms also depend on the [Physical Address Extension](#) [ [http://msdn.microsoft.com/en-us/library/aa366796\(VS.85\).aspx](http://msdn.microsoft.com/en-us/library/aa366796(VS.85).aspx) ] (PAE), which allows 32-bit Windows systems to use more than 4 GB of physical memory.

### Memory and Address Space Limits

The following table specifies the limits on memory and address space for supported releases of Windows.

Memory type	Limit in 32-bit Windows	Limit in 64-bit Windows
User-mode virtual address space for each 32-bit process	2 GB  Up to 3 GB with <code>IMAGE_FILE_LARGE_ADDRESS_AWARE</code> and 4GT	2 GB with <code>IMAGE_FILE_LARGE_ADDRESS_AWARE</code> cleared (default)  4 GB with <code>IMAGE_FILE_LARGE_ADDRESS_AWARE</code> set
User-mode virtual address space for each 64-bit process	Not applicable	With <code>IMAGE_FILE_LARGE_ADDRESS_AWARE</code> set (default):  <b>x64:</b> 8 TB  <b>Intel IPF:</b> 7 TB  2 GB with <code>IMAGE_FILE_LARGE_ADDRESS_AWARE</code> cleared
Kernel-mode virtual address space	2 GB  From 1 GB to a maximum of 2 GB with 4GT	8 TB
Paged pool	Limited by available kernel-mode virtual address space or the <a href="#">PagedPoolLimit</a> [ <a href="http://msdn.microsoft.com/en-us/library/aa366778(printer).aspx">http://msdn.microsoft.com/en-us/library/aa366778(printer).aspx</a> ]	128 GB  <b>Windows Server 2003 and Windows XP:</b> Up to

	<p>us/library/bb870880(VS.85).aspx ] registry key value.</p> <p><b>Windows Vista:</b> Limited only by kernel mode virtual address space. Starting with Windows Vista with Service Pack 1 (SP1), the paged pool can also be limited by the PagedPoolLimit registry key value.</p> <p><b>Windows Home Server and Windows Server 2003:</b> 530 MB</p> <p><b>Windows XP:</b> 490 MB</p> <p><b>Windows 2000:</b> 350 MB</p>	<p>128 GB depending on configuration and RAM.</p> <p><b>Windows 2000:</b> Not applicable</p>
Nonpaged pool	<p>Limited by available kernel-mode virtual address space, the <a href="http://msdn.microsoft.com/en-us/library/bb870880(VS.85).aspx">NonPagedPoolLimit</a> [ http://msdn.microsoft.com/en-us/library/bb870880(VS.85).aspx ] registry key value, or physical memory.</p> <p><b>Windows Vista:</b> Limited only by kernel mode virtual address space and physical memory. Starting with Windows Vista with SP1, the nonpaged pool can also be limited by the <a href="http://msdn.microsoft.com/en-us/library/bb870880(VS.85).aspx">NonPagedPoolLimit</a> [ http://msdn.microsoft.com/en-us/library/bb870880(VS.85).aspx ] registry key value.</p> <p><b>Windows Home Server, Windows Server 2003, and Windows XP/2000:</b> 256 MB, or 128 MB with 4GT.</p>	<p>75% of RAM up to a maximum of 128 GB</p> <p><b>Windows Vista:</b> 40% of RAM up to a maximum of 128 GB.</p> <p><b>Windows Server 2003 and Windows XP:</b> Up to 128 GB depending on configuration and RAM.</p> <p><b>Windows 2000:</b> Not applicable</p>
System cache virtual address space (physical size limited only by physical memory)	<p>Limited by available kernel-mode virtual address space or the <a href="http://msdn.microsoft.com/en-us/library/bb870880(VS.85).aspx">SystemCacheLimit</a> [ http://msdn.microsoft.com/en-us/library/bb870880(VS.85).aspx ] registry key value.</p> <p><b>Windows Vista:</b> Limited only by kernel mode virtual address space. Starting with Windows Vista with SP1, system cache virtual address space can also be limited by the <a href="http://msdn.microsoft.com/en-us/library/bb870880(VS.85).aspx">SystemCacheLimit</a> [ http://msdn.microsoft.com/en-us/library/bb870880(VS.85).aspx ] registry key value.</p> <p><b>Windows Home Server, Windows Server 2003, and Windows XP/2000:</b> 860 MB with <a href="http://go.microsoft.com/fwlink/?LinkId=97918">LargeSystemCache</a> [ http://go.microsoft.com/fwlink/?LinkId=97918 ] registry key set and without 4GT; up to 448 MB with 4GT.</p>	<p>Always 1 TB regardless of physical RAM</p> <p><b>Windows Server 2003 and Windows XP:</b> Up to 1 TB depending on configuration and RAM.</p> <p><b>Windows 2000:</b> Not applicable</p>

### Physical Memory Limits: Windows Server 2008

The following table specifies the limits on physical memory for Windows Server 2008. Limits greater than 4 GB for 32-bit Windows assume that PAE is enabled.

Version	Limit in 32-bit Windows	Limit in 64-bit Windows
Windows Server 2008 Datacenter (full installation)	64 GB	2 TB
Windows Server 2008 Datacenter (Server Core installation)	64 GB	2 TB
Windows Server 2008 Enterprise	64 GB	2 TB
Windows Server 2008 HPC Edition	Not applicable	128 GB
Windows Server 2008 Standard	4 GB	32 GB
Windows Server 2008 for Itanium-Based Systems	Not applicable	2 TB
Windows Web Server 2008	4 GB	32 GB

### Physical Memory Limits: Windows Vista

The following table specifies the limits on physical memory for Windows Vista.

Version	Limit in 32-bit Windows	Limit in 64-bit Windows
Windows Vista Ultimate	4 GB	128 GB
Windows Vista Enterprise	4 GB	128 GB
Windows Vista Business	4 GB	128 GB
Windows Vista Home Premium	4 GB	16 GB
Windows Vista Home Basic	4 GB	8 GB
Windows Vista Starter	1 GB	Not applicable

### Physical Memory Limits: Windows Home Server

Windows Home Server is available only in a 32-bit edition. The physical memory limit is 4 GB.

### Physical Memory Limits: Windows Server 2003

The following table specifies the limits on physical memory for Windows Server 2003. Limits over 4 GB for 32-bit Windows assume that PAE is enabled.

Version	Limit in 32-bit Windows	Limit in 64-bit Windows
Windows Server 2003 with Service Pack 2 (SP2), Datacenter Edition	128 GB 64 GB with 4GT	2 TB

Windows Server 2003 with Service Pack 2 (SP2), Enterprise Edition	64 GB	2 TB
Windows Storage Server 2003, Enterprise Edition	8 GB	Not applicable
Windows Storage Server 2003	4 GB	Not applicable
Windows Server 2003 R2 Datacenter Edition	128 GB	1 TB
Windows Server 2003 with Service Pack 1 (SP1), Datacenter Edition	16 GB with 4GT	
Windows Server 2003 R2 Enterprise Edition	64 GB	1 TB
Windows Server 2003 with Service Pack 1 (SP1), Enterprise Edition	16 GB with 4GT	
Windows Server 2003 R2 Standard Edition	4 GB	32 GB
Windows Server 2003, Standard Edition SP1		
Windows Server 2003, Standard Edition SP2		
Windows Server 2003, Datacenter Edition	128 GB	512 GB
	16 GB with 4GT	
Windows Server 2003, Enterprise Edition	32 GB	64 GB
	16 GB with 4GT	
Windows Server 2003, Standard Edition	4 GB	16 GB
Windows Server 2003, Web Edition	2 GB	Not applicable
Windows Small Business Server 2003	4 GB	Not applicable
Windows Compute Cluster Server 2003	Not applicable	32 GB

### Physical Memory Limits: Windows XP

The following table specifies the limits on physical memory for Windows XP.

Version	Limit in 32-bit Windows	Limit in 64-bit Windows
Windows XP	4 GB	128 GB
Windows XP Starter Edition	512 MB	Not applicable

### Physical Memory Limits: Windows 2000

The following table specifies the limits on physical memory for Windows 2000.

Version	Limit in 32-bit Windows
Windows 2000 Professional	4 GB
Windows 2000 Server	4 GB

Windows 2000 Advanced Server	8 GB
Windows 2000 Datacenter Server	32 GB

## See Also

[4-Gigabyte Tuning](http://msdn.microsoft.com/en-us/library/bb613473(VS.85).aspx) [ [http://msdn.microsoft.com/en-us/library/bb613473\(VS.85\).aspx](http://msdn.microsoft.com/en-us/library/bb613473(VS.85).aspx) ]

[IMAGE FILE LARGE ADDRESS AWARE](http://msdn.microsoft.com/en-us/library/ms680349(VS.85).aspx) [ [http://msdn.microsoft.com/en-us/library/ms680349\(VS.85\).aspx](http://msdn.microsoft.com/en-us/library/ms680349(VS.85).aspx) ]

[Physical Address Extension](http://msdn.microsoft.com/en-us/library/aa366796(VS.85).aspx) [ [http://msdn.microsoft.com/en-us/library/aa366796\(VS.85\).aspx](http://msdn.microsoft.com/en-us/library/aa366796(VS.85).aspx) ]

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Build date: 5/7/2009

## Tags:



## Community Content

### Memory Limits

Last Edit 9:47 PM by Thomas Lee

Well, that's not logical - 64-bit Vista Business can have up to 128GB RAM, while 64-bit Windows Server 2008 Standard can only have 32GB. Standard Edition is expensive enough to justify increasing the limit to 128GB in my opinion. Why should buying the next version up, Enterprise Edition, allow a 64-increase in memory (up to 2TB!) - unless Standard Edition is being gradually phased out? Hopefully this will be done with Windows Server 2008 Service Pack 1? I can understand Web Edition being limited to just 32GB though.

That said, most of the memory limits make sound sense.

**Tags:** contentbug windows server

### Windows 2003 x64

Last Edit 2:35 AM by 8026mn

There was a Windows 2003 x64 version i.e. NON R2 so why does it list this as Not applicable ? Should be 32gb for x64 same as R2 version?

**Tags:**

### XP / Vista x86

Last Edit 9:47 PM by Thomas Lee

WROTE:

XP and Vista can only truly manage ~3GB of Physical RAM. 4GB is misleading.

Quote:

Xp and Vista can truly manage ~4GB of physical RAM, but shows only the "available" ram. If you have a onboard video with 512mb and something else on-board to complete 1gb, your manager will show only 3GB "available".

QUOTE: PP

Xp and Vista can truly manage ~4GB of physical RAM

**Tags:** contentsuggestion

### Enable PAE for full use of 4GB RAM

Last Edit 11:59 AM by hany ibrahim

[http://...](#)

The above link describes how to set up PAE (Physical Address Extension) on Vista 32 bits (It can be done in other 32 bits Windows), so that it can make use of 4GB RAM, not just ~3.5GB.

To authors of this message: Please, read how PAE works.

**Tags:** contentbug 32bit dead pae

### Facts

Last Edit 9:47 PM by Thomas Lee

- A 32 bit OS can only use 4GB of memory total, that means if you have 4GB of ram and your graphic card has 1GB of ram, you have a total of 5GB of memory.
- Out of that 5GB of memory, you can only use 4GB total. 1GB the graphic card will take up, so now the 32bit OS can only use 3GB.
- Enabling PAE, will limit to the OS to 2GB total. What PAE does is dedicate 2GB to OS and the other 2GB to anything other then the OS. Apparently some people don't understand how PAE works and think that some how it can magically make a 32bit XP use more then 4GB, which is impossible, so after noticing my explanation is not getting through, I thought a visual from MS itself might help sink it in, you can see it here: <http://www.microsoft.com/whdc/system/platform/server/PAE/PAEdrv.msp>x
- Vista 32bit can see only 3.5GB of ram total. The new sp1 only reports how much memory you have intalled, not how much memory you can use.

**Tags:** contentbug 32bit os 4gb ram

### Conflicting information about 64-bit XP limit (inconsistent with KB 283247)

Last Edit 2:38 PM by eezvmt

The limit for 64-bit XP is given as 128 GB, while on the support site, <http://support.microsoft.com/kb/283247/en-us> [ <http://support.microsoft.com/kb/283247/en-us> ] , it is given as 16 GB!

What is correct, 16 GB or 128 GB?

Some customers have been reported problems with running 64-bit XP on 32 GB RAM. Can you clarify if 32 Gb RAM is supported and if so, what was the purpose of information in KB 283247

**Tags:**

### How much windows VISTA 64-bit dedicates to a 32-bit application!

Last Edit 2:51 PM by Chikitin

I running windwos Vista 64-bit with 8-GB of ram. Most of my applications are 32-bit applications. How much RAM can VISTA dedicates to 32-bit application?

cs

<b>Tags:</b>
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