

# VMware virtual machines HW versions and memory limits.

## Table of Contents

Virtual machine hardware versions (1003746) .....	1
Symptoms .....	1
Purpose .....	1
Resolution .....	1
VMware products and their virtual hardware version.....	1
Upgrading the virtual hardware.....	3
Additional Information.....	3
Virtual machine memory limits and hardware versions (1014006) .....	3
Details .....	3
Solution.....	3
Memory limits for VMware products.....	4
ESXi/ESX .....	4
Workstation .....	4
Fusion.....	5
Player .....	5

## Virtual machine hardware versions (1003746)

<http://kb.vmware.com/selfservice/search.do?cmd=displayKC&externalId=1003746>

### Symptoms

- A virtual machine does not power on.
- Some virtual machine operations are greyed out and unavailable.
- You experience unexpected behavior in a guest operating system.

### Purpose

This article guides you through the process of determining if your virtual machine's hardware version is the most up to date for the VMware product that you are using. The article also explains why a virtual machine created with one product may not power on from another product.

If you are experiencing a problem related to a virtual machine's hardware version, following this article resolves the problem.

For information specific to VMware Fusion, see [Virtual machine hardware versions for Fusion \(1022060\)](#).

### Resolution

## VMware products and their virtual hardware version

This table lists VMware products and their virtual hardware version:

Virtual Hardware Version	Products
11	Fusion 7.x Workstation 11.x Player 7.x
10	ESXi 5.5 Fusion 6.x Workstation 10.x

	Player 6.x
9	ESXi 5.1 Fusion 5.x Workstation 9.x Player 5.x
8	ESXi 5.0 Fusion 4.x Workstation 8.x Player 4.x
7	ESXi/ESX 4.x Fusion 3.x Fusion 2.x Workstation 7.x Workstation 6.5.x Player 3.x Server 2.x
6	Workstation 6.0.x
4	ACE 2.x ESX 3.x Fusion 1.x Player 2.x
3 and 4	ACE 1.x Lab Manager 2.x Player 1.x Server 1.x Workstation 5.x Workstation 4.x
3	ESX 2.x GSX Server 3.x

Consider this information about virtual hardware versions when dealing with related problems:

- A VMware product cannot power on a virtual machine with a virtual hardware version that is higher than what it supports.
- **Note:** If a virtual machine is created on a VMware product that supports a given virtual hardware version and is then migrated to a VMware product that does not support this level of virtual hardware, it does not power on. Consult the chart above. Virtual machines created by VMware products and versions located higher up in the chart cannot be powered on by products lower on the chart.
- A VMware product can power on a virtual machine with a virtual hardware version that is lower than what it supports, but functionality may be lost. Lost functionality results in menu items related to virtual machine operations being grayed out and unavailable.
- A virtual machine's hardware version can be downgraded only by Workstation 6.x or later, Converter 3.x or later, and Fusion 2.x or later.
- Any VMware product in the chart above, with the exception of VMware Player, is able to upgrade the version of a virtual machine's hardware to the highest version that it supports.

## Upgrading the virtual hardware

To upgrade the virtual hardware:

**Note:** For Lab Manager virtual machines, they must be undeployed, have their virtual hardware version upgraded from their configuration, then redeployed.

1. Power on the virtual machine.
2. Install VMware Tools.
3. Power off the virtual machine.
4. Change the hardware setting:
5. In Workstation 8, go to **VM > Manage > Change Hardware Compatibility**.
6. In ESXi/ESX, Server, Lab Manager, or GSX, depending on the version in use, right-click the entry for the virtual machine, then select:
  - o **Upgrade or Change Version**
  - o **Upgrade Virtual Machine**
7. In VMware Player, open the virtual machine's .vmx file using a text editor, For more information on editing, see [Editing the .vmx file of a VMware Workstation and VMware Player Virtual machine\(2057902\)](#).
8. Locate the entry virtualHW.version = "8".
9. Change the above entry to:
10. virtualHW.version = "11"
11. Save the .vmx file.
12. **Note:** Changes made to the .vmx file do not take effect until the next time VMware Workstation or VMware Player is opened.

### Additional Information

Reactivation of a Windows guest operating system is not needed after upgrading the virtual hardware version. Update the VMware Tools version on the virtual machine for better performance, if prompted.

For information on virtual hardware versions and limitations, see [Virtual machine memory limits and hardware versions \(1014006\)](#).

## Virtual machine memory limits and hardware versions (1014006)

[http://kb.vmware.com/selfservice/search.do?cmd=displayKC&docType=kc&docTypeID=DT\\_KB\\_1\\_1&externalId=1014006](http://kb.vmware.com/selfservice/search.do?cmd=displayKC&docType=kc&docTypeID=DT_KB_1_1&externalId=1014006)

### Details

This article provides information about virtual machine memory limits and hardware versions

### Solution

Virtual machines that use hardware versions earlier than 7 do not account for reserved memory. Virtual machines using more than 4 GB of memory actually used 0.25 GB or 0.5 GB less memory, because the additional memory size was used to specify the highest space available as system RAM, ignoring the space occupied by PCI devices.

To determine the current hardware version of a virtual machine in the vSphere Client:

1. Click the virtual machine.

2. Click the **Summary** tab.
3. Find the hardware version in the **VM Version** field.

Due to this, the guest recognizes less physical memory than you configured for the virtual machine. For example, if you configured 4 GB (memsize = 4096 in the .vmx configuration file) of memory, the guest only sees or recognizes 3.75 GB.

This behavior is expected and does not negatively affect the operation of the guest. Physical Address Extension (PAE) will not enable the guest to recognize all 4 GB of memory.

When you configure the virtual hardware to have 4 GB of physical memory, the virtual machine monitor (VMM) provides it to the guest as a single contiguous block of virtual physical memory. The guest also maps other devices in its address space, some of which must be at addresses less than 4 GB. As a result, this also makes some of the physical memory inaccessible. Therefore, the guest can only use 3.75 GB of physical memory from the 4 GB you originally configured.

**Note:** This does not waste 0.25 GB of memory. The VMM does not need to allocate the memory that the guest cannot access. There is only a slight difference between the size of memory you specify and the memory the guest recognizes. This also happens natively on some systems.

With hardware version 7 and later, VMware products reserve 1 GB for PCI devices. As a result, all the memory specified in the virtual machine configuration is available to the guest operating system. Memory settings now specify the amount of memory available, not the highest address available as system RAM, which is now 1 GB higher for virtual machines with more than 3 GB of memory.

## Memory limits for VMware products

### ESXi/ESX

ESXi/ESX virtual machines	Hardware version	Memory limit
5.1	9	32-bit and 64-bit virtual machines: 1011 GB All specified memory is accessible to the guest. The guest accounts for space obscured by PCI devices.
5.0	8	32-bit and 64-bit virtual machines: 1011 GB All specified memory is accessible to the guest. The guest accounts for space obscured by PCI devices.
4.x	7	32-bit and 64-bit virtual machines: 255 GB All specified memory is accessible to the guest. The guest accounts for space obscured by PCI devices.
3.5	4	32-bit and 64-bit virtual machines: 65532 MB
3.x	4	32-bit and 64-bit virtual machines: 16384 MB
2.x	3	32-bit and 64-bit virtual machines: 3600 MB

### Workstation

Workstation virtual machines	Hardware version	Memory limit
11.x	11	64 GB for systems with 64-bit host operating systems

		8 GB for systems with 32-bit host operating systems
10.x	10	64 GB for systems with 64-bit host operating systems 8 GB for systems with 32-bit host operating systems
9.x	9	64 GB for systems with 64-bit host operating systems 8 GB for systems with 32-bit host operating systems
8.x	8	64 GB for systems with 64-bit host operating systems 8 GB for systems with 32-bit host operating systems
7.x	7	32 GB for systems with 64-bit host operating systems 8 GB for systems with 32-bit host operating systems
6.5	7	32-bit and 64-bit virtual machines: 8 GB All specified memory is accessible to the guest.
6.x	6	32-bit and 64-bit virtual machines: 8 GB
5.x	3 and 4	32-bit and 64-bit virtual machines: 3600 MB All specified memory is accessible to the guest.
4.x	3 and 4	32-bit and 64-bit virtual machines: 3600 MB All specified memory is accessible to the guest

## Fusion

<b>Fusion virtual machines</b>	<b>Hardware version</b>	<b>Memory limit</b>
7.x	11	64 GB for systems with 64-bit host operating systems 8 GB for systems with 32-bit host operating systems
6.x	10	64 GB for systems with 64-bit host operating systems 8 GB for systems with 32-bit host operating systems
5.x	9	32-bit and 64-bit virtual machines: 8 GB
4.x	8	32-bit and 64-bit virtual machines: 8 GB
3.x	7	32-bit and 64-bit virtual machines: 8 GB
2.x	7	32-bit and 64-bit virtual machines: 8 GB
1.x	4	32-bit and 64-bit virtual machines: 8 GB

## Player

<b>Player virtual machines</b>	<b>Hardware version</b>	<b>Memory limit</b>
7.x	11	64 GB for systems with 64-bit host operating systems 8 GB for systems with 32-bit host operating systems

6.x	10	64 GB for systems with 64-bit host operating systems 8 GB for systems with 32-bit host operating systems
5.x	9	64 GB for systems with 64-bit host operating systems 8 GB for systems with 32-bit host operating systems
4.x	8	64 GB for systems with 64-bit host operating systems 8 GB for systems with 32-bit host operating systems
3.x	7	32 GB for systems with 64-bit host operating systems 8 GB for systems with 32-bit host operating systems
2.5	7	32-bit and 64-bit virtual machines: 8 GB All specified memory is accessible to the guest.
2.x	6	32-bit and 64-bit virtual machines: 8 GB
1.x	3 and 4	32-bit and 64-bit virtual machines: 3600 MB All specified memory is accessible to the guest.

The PC architecture reserves a portion of the address space that is below 4 GB for PCI devices. This space cannot be used for system memory. Also note that this is one of the main reasons for guests not recognizing all allocated physical memory.

For more information on the reservation for PCI devices, see [PCI Hole](#).

**Note:** The information provided in this link is provided as-is and VMware does not guarantee the accuracy or applicability of this information.

This table lists the address space size available for system memory under 4 GB for each hardware version:

Hardware version	Reserved memory	Supported memory
11	1024 MB	3 GB (3072 MB)
10	1024 MB	3 GB (3072 MB)
9	1024 MB	3 GB (3072 MB)
8	1024 MB	3 GB (3072 MB)
7	1024 MB	3 GB (3072 MB)
6	512 MB	3.5 GB (3584 MB)
4	256 MB	3.75 GB (3840 MB)
3	496 MB*	3.52 GB (3600 MB)

\* Hardware version 3 does not support virtual machines larger than 3600 MB. As a result, the restrictions listed in this article do not apply to these virtual machines.