

# Frequently Asked Questions about VMware Fusion

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Disclaimer: This is a personal document and is not official or endorsed by VMware. Feedback and suggestions are welcome.

This document is intended to address common questions not already covered by various other sources, such as the [official Fusion FAQ](#), the official [Fusion support FAQ](#), the [release notes](#), or anything else in the Fusion forum [documents category](#). It may also answer questions in more depth than is appropriate for a normal forum post. The document assumes familiarity with common terms such as *guest* or *host*; see [A Beginner's Guide to VMware Fusion](#) for an explanation. For guest-specific questions, see [Frequently Asked Questions about Guest OSes](#).

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## Quick Answers

### Postflight script failed

When upgrading Fusion, in some cases the networking kernel extensions don't get unloaded properly. The easiest way to work around the problem is to reboot OS X.

### Can't find CD/DVD a.k.a. What's this PXE thing?

If the BIOS is unable to find any bootable media, by default it will fall back to attempting to PXE boot (i.e. boot off the network). If possible, verify that your installation media is good (have you used it successfully before?). If you're using a physical CD/DVD to install from, it should disappear from the desktop when the virtual machine starts, which indicates that the virtual machine managed to get ownership of the drive.

### Ctrl-click

Ctrl-click is a Mac shortcut for right click, and many users expect it to work that way. However, some guest applications may actually want to receive ctrl-click events. To disable this mapping, look under Fusion's Preferences and uncheck the Mac OS mouse shortcuts option.

If you still need right-click, you can get this on Mac laptops by enabling two-finger clicks, under System Preferences > Keyboard & Mouse > Trackpad > "Place two fingers..."

### Boot Camp virtual machine has a Blue Screen of Death with error code 0x0000007b

See [Re: Bluescreen trying to run Fusion 1.1.2 from Boot Camp partition on MacBook Air](#).

## Bluetooth stops working when Fusion runs

Apple's Bluetooth adapter is a USB device. As explained in *Virtual Hardware* later in this document, USB devices can only be controlled by one OS at a time. You've probably (accidentally) told Fusion to automatically connect the Bluetooth adapter to the virtual machine, which will cause OS X to lose track of it. The solution is to disconnect the Bluetooth adapter from the virtual machine (e.g. Virtual Machine > USB). If your mouse is Bluetooth, the easiest way to do this is to borrow a USB mouse.

## Function keys

By default, many Mac keyboards (laptop keyboards, the thin aluminum keyboard) have what appear to be "function keys" but are actually special media keys (sound, brightness, etc.). You can get normal function key behavior by pressing fn-F# (or in System Preferences > Keyboard & Mouse > Use all F1, F2, etc. keys as standard function keys).

Other things to try are unchecking "Enable Mac OS keyboard shortcuts" in Fusion's Preferences and/or checking that other shortcuts (such as Spaces) don't conflict.

## Number lock

On full Mac keyboards, try the "clear" button above numberpad 7. On laptop keypads, try numlck/F6 (you may also have to enable this elsewhere in the guest; for example in Window's on-screen keyboard).

## Keyboard layout in the guest doesn't match the host

<http://www.harbar.net/archive/2008/06/30/Apple-Keyboard-Layout-for-Virtual-Machines.aspx> has a nice explanation and instructions to fix.

## Force Quitting

As [A Beginner's Guide to VMware Fusion](#) notes, Fusion uses a frontend GUI process and a backend vmware-vmx process. If you force quit Fusion, you're only killing the GUI process; the vmware-vmx process continues to run. If you want to stop Fusion, you need to kill vmware-vmx as well.

If *Fusion* is still responding but the *guest* has crashed or become unusable, a better choice is to tell Fusion to stop or restart the virtual machine. Select the Virtual Machine menu and hold the option key - "Shut Down Guest" should change to "Shut Down", and "Restart Guest" should change to "Reset" (note: for certain virtual machine configurations, this may be reversed).

## Upgrading or updating Fusion

Installing new version over an old version should work; another option is to uninstall the old version first. It shouldn't matter. You usually shouldn't have to restart afterwards, though it can't hurt - if you have network problems after updating, this would be a good thing to try.

You should avoid having a virtual machine suspended when you update Fusion - while it usually works, it's safer to shut down virtual machines before updating Fusion.

## Firewire

It is not possible to use Firewire devices in a guest as Firewire devices, our virtual hardware doesn't support it. Depending on the device, though, you may be able to access it in other ways - for example, if it's a Firewire hard drive, you could use a shared folder (or for advanced users, a raw disk map). If it's an optical drive, you could use it as a physical drive.

See also [FireWire and VMware Fusion FAQ](#)

## When is the next release coming out?

VMware policy is to not comment on unannounced things such as timelines, so we're not allowed to say. Although every product and release cycle is different, here is some historical information you might find interesting:

Date	Version	Notable changes
Dec 22, 2006	<a href="#">Public Beta</a>	Already had 64-bit guest support, USB 2, and multiple virtual CPUs. There was a private beta before this.
Mar 1, 2007	<a href="#">Beta 2</a>	Experimental DirectX 8.1 support. Single snapshot. Vista as a normal guest.
Apr 5, 2007	<a href="#">Beta 3</a>	Boot Camp support. Easy Install. Newly created virtual machines are bundles instead of folders.
Jun 7, 2007	Beta 4	Unity. Customizable toolbar.
Jun 21, 2007	<a href="#">Beta 4.1</a>	Refresh to have experimental support for Leopard as a host, fix USB bug in 10.4.10 and Santa Rosa MBPs.
Jul 3, 2007	<a href="#">Release Candidate 1</a>	Minor changes, ability to optimize for guest disk or host application performance.
Aug 6, 2007	<a href="#">1.0</a>	Whew!
Sep 27, 2007	<a href="#">1.1 Beta 1</a>	Experimental DirectX 9.0 support. iPhone fix.
Oct 25, 2007	<a href="#">1.1 Release Candidate 1</a>	Leopard compatibility improvements (GA of Leopard is Oct 26, we <i>don't</i> have it yet). Vista in Boot Camp.
Nov 12, 2007	<a href="#">1.1</a>	Localization in French, German, and Japanese (this may have been in 1.1b1 or 1.1rc1). Leopard compatibility. Importer Beta 1 was also released at the same time.

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Jan 29, 2008	<a href="#">1.1.1</a>	(optional) key combo (cmd-z/c/v/p/a/f to ctrl-z/c/v/p/a/f) remapping in all modes, not just Unity.
Apr 23, 2008	<a href="#">1.1.2</a>	Localization in Simplified Chinese. MacBook Air Superdrive fix.
May 5, 2008	<a href="#">2.0 Beta 1</a>	Multiple monitors. Experimental DirectX 9.0 with shaders. Easier printer sharing. Redesigned UI. Integrated Importer.
May 30, 2008	<a href="#">1.1.3</a>	Boot Camp Vista SP1 support. Fixed prebuilt HGFS modules for Linux guests.
July 30, 2008	<a href="#">2.0 Beta 2</a>	Multiple snapshots, AutoProtect. Cross-platform file associations. Linux Unity, Linux Easy Install (select distros only). Leopard Server guest. Improved DirectX support. Customizable key remapping. 4 vCPUs. vmrun.
August 29, 2008	<a href="#">2.0 Release Candidate</a>	Bundled antivirus. Localization in Italian and Spanish. Various stabilization fixes.
September 15, 2008	<a href="#">2.0</a>	Whew!
November 14, 2008	<a href="#">2.0.1</a>	Performance fixes, nested shared folder fix, numerous other minor fixes.
???	???	???

The timeline may be off by a few days - I don't have official sources at hand so am going by what the internet tells me. Past performance is no guarantee of future returns.

If we're in the middle of a beta cycle, you can get some idea of the next update by checking when the current beta expires. There should be an update before then.

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## Detailed Answers

## High CPU Usage

### Description

A virtual machine that's not doing anything consumes an abnormally high amount of CPU (exact numbers depend on the guest, but most should idle at below 10%, usually around 5%).

There are many possible causes, this section will point out some known issues.

### Explanation

#### Is the guest *really* idle?

Even though you might not be doing anything in the guest, this doesn't mean the guest is idle. For example, some OSes automatically index the contents of the hard disk. There might be a runaway process in the guest, or you may have forgotten about that helper program you installed months ago.

You can check whether the guest is really idle by using guest-specific tools (e.g. Task Manager in Windows, top in Linux, etc.)

This is the only cause which should provoke 100% CPU usage, all the others produce elevated CPU usage but would not individually go all the way to 100%.

#### Host CPU throttling

On laptops, depending on your power settings, OS X might throttle the CPU speed. The CPU usage reported by Activity Monitor doesn't adjust for this (or does, depending on your point of view), so for example 24% of a core that is throttled 6x slower would be the same as 4% of an unthrottled core.

You can check this by doing something that causes the CPU to run at full speed (for example, run **while true; do true; done** in a Terminal window, use ctrl-C to break it when you're finished). If the CPU usage of the guest drops, this was the issue. As long as the laptop isn't actually running hotter, host CPU throttling isn't a problem.

#### Guest timer interrupts

Especially in Fusion 1.x, it is more expensive to take an interrupt in a guest than it is in native hardware. Some programs, such as QuickTime and iTunes, can raise the timer interrupt rate. Some guests, especially certain Linux distros, have a high (1 kHz as opposed to 100 Hz) timer interrupt rate compiled in to the kernel.

#### Devices

Having USB devices connected to the virtual machine can cause additional CPU usage, even if they're not doing anything. USB is a host-driven protocol; in physical machines, the USB controller must periodically poll all devices to see if they have any new data. In a virtual machine, the CPU has to do this work.

## Multiple virtual processors

There is overhead in synchronizing virtual CPUs, since we have to wait for the host to schedule us properly. As a wild guess, I would expect an idle vSMP guest to use perhaps 30% more CPU than an idle single vCPU guest.

## Unity

In Unity mode, Fusion must do additional work to keep track of each guest window and see whether they have moved, changed size, etc.

## SecureInput (a.k.a. "I get a beep every time I press a key!")

### Description

To see if you're hitting this problem, run the following command in Terminal.app when you are unable to type in Fusion:

```
ioreg -l -w 0 | grep SecureInput
```

If you get a result, you can search for the process matching `kCGSSessionSecureInputPID` to determine which program is responsible (e.g. with ``ps auxww | grep putPIDhere`` or Activity Monitor).

Known offenders include some versions of Checkpoint SecureClient, Microsoft Entourage, Quicken, Opera, Sofa Control, last.fm, and Version Tracker Pro.

An unrelated problem with similar symptoms is Boot Camp virtual machines which fail preprocessing - in those cases, the keyboard driver may not be installed. That problem can be differentiated because you don't get a beep after every keystroke, and other virtual machines would still work.

### Explanation

Fusion uses an API called Event Taps to grab keyboard input. Another API, SecureInput, is used by some programs to prevent Event Taps from working - for example, you might want to use this to prevent your passwords from being picked up by a malicious keylogger. The problem is how these APIs interact. When Fusion was written, the way SecureInput worked was that it disabled Event Taps if an application using SecureInput had focus. In a later security update, Apple changed this so that Event Taps were disabled if *any* application is using SecureInput, not just the one that had focus.

The original model works fine for us, since your passwords get protected, but when you switch back to Fusion, the secure app no longer has focus and Event Taps (and thus typing in Fusion) works. However, in the new model, a secure app *anywhere* will break Fusion's ability to get keyboard input. This is exacerbated by applications which ignore [Apple Tech Note 2150](#) and enable SecureInput all the time, whether or not they need it. The SecureInput/Event Taps problem isn't specific to Fusion, other applications which use Event Taps are also affected.

This is fixed in 2.0, which has a rewrite of the keyboard code. For 1.x users, one possible workaround is to use Unity mode.

# Disk Space

## Description

The on-disk space (i.e. the space that OS X sees as used) doesn't always match what the guest thinks the size of the disk is. On-disk space may exceed the maximum size of the virtual disk, and is frequently less.

A related question is why deleting a file in the virtual machine does not reduce the on-disk size.

A related question is why deleting a virtual machine does not free as much space as the maximum size of the virtual disk.

## Explanation

A virtual disk is only one part of a virtual machine, although it's usually the largest. The notable exception is a snapshot - a snapshot can potentially expand the required on-disk size by as much as the maximum size of all virtual disks in the virtual machine. As a thought experiment, consider what happens if you fill up your virtual disk, take a snapshot, then fill up the virtual disk with completely new data. Since a snapshot should let you revert to the state at the time of the snapshot, in this situation we could need to use (at least) twice the maximum capacity of the disk on the host. Remember that **snapshots can increase the size of a virtual machine beyond the maximum disk size you chose when setting up the VM.**

The default disk settings are set to use sparse disks. As [A Beginner's Guide to VMware Fusion](#) explains, sparse disks start out small and grow as needed, but an important thing to be aware of is that virtual disks don't shrink automatically. The reason is because Fusion has a very low-level view of the world - it doesn't know what files are to the guest, just that a guest wants to write some data to a particular block. For efficiency, most (all?) filesystems not only store *data* (e.g. the contents of that document you've been working on) but also *metadata* (e.g. the name, path, date modified, size, and so on). When you delete a file, most of the time you're deleting the metadata, not the actual data - this is why a giant file doesn't take long to delete, and is key for how data recovery software works (they try to guess/reconstruct the metadata). However, from Fusion's point of view, it doesn't know what the data *means*, so deleting metadata doesn't look any different from writing a small amount of data - Fusion has no idea that the data the file referred to isn't important anymore.

Enter Tools and the shrink process. Tools can use the guest operating system to tell what's actually a file (and thus contains valuable data) vs. what's wasted space (and can thus be gotten rid of and save space). Remember that **the shrink process is necessary to free up unused space, and that it cannot be used if you have a snapshot or are using a preallocated disk.**

Sparse disks confuse some people - if they tell Fusion to use 20 GB for a guest, then delete it and only recover 5 GB of space, some people get confused and wonder what happened to the other 15 GB. The answer is simple - Fusion never used that space in the first place, because sparse disks grow as needed.

If you use a sparse disk, one thing to watch out for is any program which constantly reads and writes data to the virtual disk - for example, defragmenters. These programs can cause the virtual disk to constantly grow (remember how it doesn't shrink automatically?), even though you're not actually doing anything. Either periodically shrink the disk (this doesn't work if you have a snapshot), avoid such programs, or accept that the virtual disk will grow (and perhaps use a preallocated disk, since at least then the size will be constant and you won't be surprised).

# Virtual Hardware

## Description

Virtual machines see a very different set of virtual hardware than is actually on the host. The most commonly asked-about one is the video card; other examples include (but are not limited to) the network card, keyboard/mouse, drives, and more.

A related question is why a device (such as an optical drive or a USB device) can only be used by one OS at a time.

A related question is why you can't dedicate a PCI cards to a guest.

## Explanation

One of the [key concepts of virtualization](#) is resource control (along with equivalence and efficiency). In other words, a guest should not be able to affect things that the virtualization software does not allow it to affect. This was one of the major challenges to x86 virtualization - there are certain x86 instructions that cannot be easily handled, and was why VMware's Binary Translation technique was a big deal when it was new - it made x86 virtualization possible.

Many, if not all, devices assume they are controlled by exactly one OS - that is, whoever is talking to them is the one they should listen to. If two or more OSes were to give conflicting commands, devices would get confused, and then so would the OSes as they started to get unexpected errors. In these cases, we must either dedicate, or *passthrough*, the device to one OS, or *emulate* a similar device. Passthrough devices must be safe in the sense that anything a guest can do to a passed-through device must maintain the resource control criteria. As a concrete example, passthrough devices include USB devices, emulated devices include the default keyboard/mouse and sound.

Note that **even Fusion goes through the host's drivers** (again, only one OS controls the hardware, so that means everything funnels through the host drivers) - this means **we're subject to any bugs or limitations of the host drivers**.

Video cards are an example of a device which assumes it is controlled by exactly one OS. If a guest were to be able to access a graphics card directly, it could draw anywhere on screen it wanted, affect host textures, etc. Even a well-intentioned guest would cause problems, because it wouldn't be aware of what the host is doing ("Hey, what's this texture? I don't recognize it, must not be important!" and then your windows/icon/desktop/menus/etc. disappear). It's not possible to dedicate an entire graphics card to the guest either, since the underlying buses are also not safe to pass through - see for example [Re: Guest able to directly access PCI cards](#) for a good explanation.

Because of this, we take the emulation approach. The guest sees a VMware video card, and we do the work of converting guest commands into something that's safe and usable for the host video card. There's no point in installing drivers for the host video card in the guest (with the exception of Boot Camp virtual machines, where you might want to native boot) since the guest never gets to speak directly to the host video card.

One future possibility is the notion of virtualization-aware hardware, which does *not* make the assumption that it's only ever talking to one OS. Such hardware would have different contexts that the host can switch between for its own use or for guest use. Intel's Vanderpool and AMD's Pacifica are examples of virtualization-aware *CPU* technology. Other virtualization-aware hardware, such as for graphics, network, or storage, is theoretically possible but I don't think any currently exist, especially not for the consumer market. I'm am not sure when or even if they might become available.

# Major Known Issues

## MacBook Air

The disk sharing feature of MacBook Airs is not sufficient to install a virtual machine from because the shared disk is missing some crucial boot information (for the technical minded, it's file based, not block based). Instead, make a disk image on the other computer using Disk Utility (or equivalent). For Disk Utility, be sure to choose CD/DVD master and no encryption.

## Fusion 2.0

A major known issue with 2.0 is that some people are not able to get Fusion to accept mouse clicks (i.e. the mouse doesn't grab). There seem to be two cases of error so far: one for Boot Camp users, and a different one for normal virtual machine users. These cases don't seem to be related. For normal virtual machine users, examining vmware.log will show "MKSHostInit: Failed to create mouse event tap". [Fusion 2.0 Does Not Grab Mouse Input](#) is the main thread tracking this problem. 2.0.1 has a fix for the normal virtual machine case.

A major known issue with 2.0 is that a number of people are reporting extremely slow boot times (on the order of minutes) after upgrading to Fusion 2.0. There are a number of causes, and it's possible we haven't pinpointed all of them, but most of the ones we do know about have been fixed in 2.0.1.

A major known issue with 2.0 is that some people are reporting that VMwareUser.exe flips out and takes 100% CPU. One trigger for this is an [aborted drag-and-drop operation](#) and is fixed in 2.0.1, but this does not seem to be the only cause.

There is a minor bug with 2.0 and printing passthrough. If you don't reboot after installing Fusion 2.0, you may see what appears to be garbage text (raw postscript, if you happen to recognize it) when you print from a guest using printing passthrough. Rebooting the host should clear it up. This should only be necessary once.

There is a minor bug with 2.0 and drag-and-drop. If you're using Windows and the guest color depth is not set to 32-bit, drag-and-drop will fail. The workaround is to use 32-bit color in the guest. This is fixed in 2.0.1.

On upgrading to 2.0, Windows users may see a PCI-to-PCI bridge being detected over and over. See [Frequently Asked Questions about Guest OSES](#).