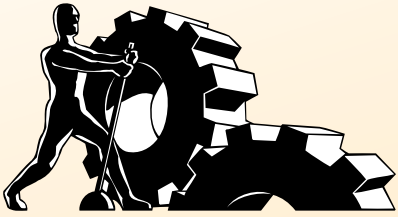


**Check for Updates**

Make sure you have the latest information!



TidBITS Publishing Inc.

**Take Control of**

**v1.0**

**Speeding Up**  
**Your**

**Mac** **Joe Kissell**

**\$15**

[Help](#)

[Catalog](#)

[Feedback](#)

[Blog](#)

[Order Print Copy](#)

Click here to buy the full 196-page "Take Control of Speeding Up Your Mac" for only \$15!

# Table of Contents

## Read Me First

Updates and More .....	5
Basics .....	6

## Introduction

## Speeding Up Your Mac Quick Start

## Learn What Makes a Mac Fast (or Slow)

The Three Most Important Determiners of Mac Performance .....	13
Myths, Misconceptions, and Half-Truths .....	23

## Try a Few Quick Fixes

Restart Your Mac .....	37
Quit Inactive Applications .....	39
Prune Login Items .....	39
Log Out of Other Accounts .....	40
Upgrade Your Firmware .....	41
Reset the SMC .....	42
Update Mac OS X .....	43
Upgrade Your RAM .....	45

## Diagnose Common Speed Problems

Understand Diagnostic Principles .....	46
Benchmark Your Mac's Performance .....	48
Check Your Resource Usage .....	53
Test Specific Speed Problems .....	61

## Fix File and Directory Problems

Run Disk Utility .....	62
Check for Damaged Preference Files .....	64
Check Your Fonts .....	66

## Lighten Your CPU Load

Cut Back on Startup and Background Items .....	69
--	----

Update Your Software .....	73
Watch for CPU Hogs .....	75
Pause Background Applications .....	79
Adjust Application Priority .....	79

## **Increase Your Free RAM**

Reduce the Number of Open Applications, Windows, and Tabs .....	82
Reduce the Number of Desktop Icons .....	85
Watch Out for Memory Leaks .....	85
Disable Unused Dashboard Widgets .....	87

## **Improve Your Disk Performance**

Tame Disk Access .....	88
Free Up Disk Space .....	98
Defragment Your Disk .....	105

## **Speed Up Your Browser**

Quit and Reopen Your Browser.....	108
Have Fewer Tabs and Windows Open .....	110
Manage or Disable Flash .....	110
Manage Extensions, Plug-ins, and Add-ons.....	115
Use a Faster Browser .....	117

## **Speed Up Your Email**

Adjust Checking Frequency .....	119
Consolidate Your Accounts .....	120
Keep Your Inbox Trim .....	124
Optimize Your Rules or Filters .....	125
Rebuild Mailboxes or Database .....	126
Monitor What Your Email Client Is Doing .....	129

## **Speed Up Your Network**

Understand Factors Influencing Network Speed .....	130
Monitor Network Activity.....	132
Check Your Wi-Fi Connection .....	134
Check Your Wired Ethernet Connection .....	140
Use a Faster DNS Provider .....	141

Test Your Broadband Service .....	145
<b>Speed Up Booting, Sleeping, and Waking</b>	
Understand What Influences Startup Speed .....	148
Speed Up Startups.....	149
Manage or Disable Safe Sleep .....	150
<b>Speed Up Mouse and Keyboard Input</b>	
Speed Up Your Pointer.....	152
Enhance Your Mouse, Trackball, or Trackpad .....	155
Speed Up Typing .....	156
Speed Up Keyboard Control.....	158
<b>Upgrade Your Hardware</b>	
Add RAM .....	162
Upgrade Your Hard Drive .....	165
Add an SSD .....	170
Add a Secondary Drive .....	176
Use a RAID .....	177
Use a Faster Disk Interface .....	178
Add a Faster Video Card .....	180
Add a Second (or Larger) Display.....	181
Buy a New Mac.....	182
<b>Speed Up Your Peripherals</b>	
Learn about Buses and Ports .....	184
Optimize USB and FireWire Configurations .....	187
<b>About This Book</b>	
Ebook Extras.....	192
About the Author.....	192
Author’s Acknowledgments .....	193
Shameless Plug .....	193
About the Publisher.....	194
<b>Copyright and Fine Print</b>	
<b>Featured Titles</b>	

# Read Me First

Welcome to *Take Control of Speeding Up Your Mac*, version 1.0, published in May 2011 by TidBITS Publishing Inc. This book was written by Joe Kissell and edited by Adam Engst.

Don't settle for a sluggish Mac! This comprehensive book teaches you how to find the exact causes of slow performance and take steps to make your Mac snappy and responsive.

If you have an ebook version of this title, please note that if you want to share it with a friend, we ask that you do so as you would a physical book: "lend" it for a quick look, but ask your friend to buy a new copy to read it more carefully or to keep it for reference. Discounted [classroom and Mac user group copies](#) are also available.

Copyright © 2011, Joe Kissell. All rights reserved.

---

## Updates and More

---

You can access extras related to this book on the Web (use the link in [Ebook Extras](#), near the end of the book; it's available only to purchasers). On the ebook's Take Control Extras page, you can:


- Download any available new version of the ebook for free, or purchase any subsequent edition at a discount.
- Download various formats, including PDF, EPUB, and—usually—Mobipocket. (Learn about reading this ebook on handheld devices at <http://www.takecontrolbooks.com/device-advice>.)
- Read postings to the ebook's blog. These may include new information and tips, as well as links to author interviews. At the top of the blog, you can also see any update plans for the ebook.
- Get a discount when you order a print copy of the ebook.

---

## Basics

---

Here are a few “rules of the road” that will help you read this book:

- **Menus:** Where I describe choosing a command from a menu in the menu bar, I use an abbreviated description. For example, to create a new folder in the Finder, you choose New Folder from the File menu; I abbreviate this by saying “File > New Folder.”
- **Contextual menus:** In Mac OS X, when you hold down the Control key and click, a pop-up *contextual menu* appears, with commands appropriate to whatever is under the mouse pointer. For example, if you Control-click a file in the Finder, you’ll see commands such as Get Info, Duplicate, and Make Alias. Control-clicking nearly always works to open a contextual menu, but your mouse or trackpad might support a better method. The default behavior, the alternative methods, and the ways to set them vary depending on the type of input device; the typical alternative (for right-handed users) is to *right-click* with a mouse—click the right-hand mouse button—so that’s the term this book uses by default for the action that opens a contextual menu.
- **Finding System Preferences:** I sometimes refer to settings in System Preferences that you may want to adjust. To open System Preferences, click its icon in the Dock or choose Apple  > System Preferences. When the System Preferences window opens, click the icon of the pane whose settings you want to adjust. I refer to these panes using an abbreviated notation such as “the Network preference pane.”
- **Finding an application’s preferences:** I often refer to preferences in an application that you may want to adjust. Don’t confuse an application’s preferences with the system-wide settings found in System Preferences. To access an application’s preferences, choose *Application Name* > Preferences. For example, in the program Disk Utility, you would choose Disk Utility > Preferences.
- **Path syntax:** This book occasionally uses a *path* to show the location of a file or folder in your file system. For example, Mac OS X stores most utilities, such as Terminal, in the Utilities folder. The path to Terminal is: `/Applications/Utilities/Terminal`.

The slash at the beginning of the path tells you to start from the root level of the disk. You will also encounter paths that begin with ~ (tilde), which is a shortcut for the user's home directory. For example, if a person with the user name `joe` wants to install fonts that only he can access, he would install the fonts in his `~/Library/Fonts` folder, which is just another way of writing `/Users/joe/Library/Fonts`.

- **Disks and drives:** Not so long ago, every Mac came with a hard disk as its main data storage device. These days, one can no longer assume that; a new Mac you buy today might have one or more hard disk drives, one or more solid-state drives (SSDs), or a combination of the two. In this book, I frequently use the term *disk* to refer to your Mac's main storage device, regardless of the technology it uses; when my instructions vary depending on whether that device is a mechanical hard drive or an SSD, I spell out those differences.
- **Big cats:** I frequently mention features specific to a particular version of Mac OS X, which Apple usually refers to by a "big cat" code name:
  - ▶ Lion: Mac OS X 10.7
  - ▶ Snow Leopard: Mac OS X 10.6
  - ▶ Leopard: Mac OS X 10.5
  - ▶ Tiger: Mac OS X 10.4
  - ▶ Panther: Mac OS X 10.3

# Introduction

Tell me if this sounds familiar. You get a new Mac, and your initial impression is “Wow! So fast!” Everything seems so snappy compared to that old computer you were using before. Without even thinking about it, you find yourself opening more applications and documents than you ever could, and it all just works. Everything you do—playing games, running Photoshop filters, searching your massive email archive—seems to happen almost instantly.

But as time passes, a funny thing happens. You begin to notice, every now and then, that something takes a bit longer than it used to. Gradually, those occasions become more frequent. Then you become aware of other strange behavior. Video that used to play smoothly now stutters. Web pages seem to take forever to load. Opening applications and saving files is oddly time-consuming. That cursed spinning wait cursor (see the sidebar [The Spinning Pizza of Death](#)) may rear its ugly head from time to time. And you dread the thought of having to restart your Mac, because it takes an unbearably long time.

This sort of thing happens to just about everyone, although the severity and the rate at which these slowdowns occur vary from one situation to the next. Likewise, it’s not at all uncommon for a Mac to encounter spontaneous or intermittent performance problems rather than a slow degradation of speed. So you’re not alone, but that may be cold comfort; your Mac is still too slow! What to do?

Of course Apple would like you to hand them lots of money for a new Mac—and sooner or later that will indeed turn out to be necessary. But take heart: you *can* reverse the effects of time and return your Mac to its formerly zippy self. (And, if you have a newer Mac that’s still pretty fast, you can squeeze even more power out of it!)

But here’s the problem. There are hundreds, maybe thousands, of books, articles, blog posts, Web pages, and utilities that purport to speed up your Mac. I’ve spent countless hours researching these claims, and I’m sorry to say the vast majority of them are wrong. By “wrong” I mean incomplete at best, dangerous at worst, and nearly always based on guesses, anecdotes, or outdated information rather than, you know, *verifiable facts*.

Many of these claims have a bit of truth to them, so it's easy for even very smart people to be misled. For example, a friend told me her Mac had become terribly slow, and she'd done some research that led her to believe she needed a larger hard drive. Her disk was within a hair's breadth of being full, and it's true that a full disk can make your Mac very slow. So without any further experimentation I agreed with her analysis. She bought a new hard drive—a big expense in her case—and I installed it for her. But a week later my friend told me with great frustration that her Mac didn't feel any faster, even if her new disk did have plenty of breathing space. She was enormously disappointed, and although she didn't want to impose on me by asking me to do further troubleshooting, I later learned that her next computer was a PC.

I bear much of the blame for her dashed expectations. I jumped to a conclusion, and I should have known better. We did indeed solve *a* problem by installing a larger disk, but that didn't happen to be *the* major factor contributing to her Mac's poor performance.

Maybe you've had a similar experience. Perhaps you tried something, or a dozen things, that *should* have worked—or that did indeed work for other people. But your Mac is still slow.

So let's put all the conventional wisdom and guesswork behind us and turn to science. My aim in this book is to be systematic, factual, and *testable*. I explain the factors that affect a Mac's speed and how they interact. I tell you what to check, and what steps you can take to solve various speed problems. But crucially, I also show you how to verify numerically if or how much a certain change speeds things up. You don't have to take my word for it that some procedure may improve your performance—and you don't have to rely on informal perceptions either. You can measure your Mac's speed yourself, before and after making changes, and then you'll know for sure whether it's better. And if it's not, you'll have the tools and knowledge you need to try another technique, and another, until you've found and solved the problem.

I hope that little pep talk has inspired and encouraged you—you can and will make your Mac faster! At the same time, I want you to set your expectations correctly. You can make your Mac as fast as the day you bought it—and in many cases even push it well beyond that—without having to wipe your hard disk and start from scratch. But you're not going to make a ten-year-old G4 run as fast as a brand-new Intel-based Mac.

In particular, I want to be sure you understand the following:

- **The world changes.** Even if you returned your Mac to its exact physical state at the time you purchased it, you may find that some things are slower because of factors outside your control—for example, a Web site that used to be text-based and speedy may have switched to Flash and gotten slower. You feel the effect on your Mac, but it's not your Mac's fault.
- **You may have to accept trade-offs.** Say your Mac shipped with Mac OS X 10.4 Tiger, and you upgraded it so that it now runs 10.6 Snow Leopard. Newer versions of Mac OS X (and of third-party applications) may add terrific features that you've come to depend on, but also require greater system resources to run, which may tax older hardware. So it could be that you must decide between speed and features—or make some other unpleasant choice.
- **Returns diminish.** You'll do some easy things that speed up your Mac quite a bit, but as you progress through the book, you may find yourself spending more and more time for ever smaller speed gains. There comes a point at which it simply isn't worth any more bother.
- **It could cost you.** Many of the techniques in this book can be performed for free, but if you want to make your Mac as fast as possible, you may need to invest in software, hardware, or both.

When I wrote the first edition of *Take Control of Troubleshooting Your Mac*, I treated slow performance as a minor problem and devoted a mere three pages to it. Similarly, although *Take Control of Maintaining Your Mac* overlaps a bit with what I discuss here, it focuses on preventing problems rather than curing them. The advice I give in those other books is useful, of course, but I realized after considerable feedback from readers that it didn't even begin to scratch the surface of the speed issue. So my hope is that the book you're now reading will do far more than that—it should give you, by the time you're done with it, a much faster Mac with a new lease on life.

Most of the advice I give here should work regardless of which version of Mac OS X you're running, but it's mainly geared toward users with 10.4 Tiger or later. Although 10.7 Lion has not yet been released as I write this and developers with early access are bound by nondisclosure agreements, I've included a few Lion-specific details that had already been made public in one way or another.

# Speeding Up Your Mac

## Quick Start

Many factors can influence a Mac's speed, including some that may not be obvious. So I encourage you to read and follow all the steps in this book. Although I've tried to present tasks in a logical progression for the most part, the order in which you do things is not critical. But please be sure to read [Learn What Makes a Mac Fast \(or Slow\)](#) first to get important background information; follow the steps in [Try a Few Quick Fixes](#) regardless of the problems you're experiencing; and acquaint yourself with the test procedures in [Diagnose Common Speed Problems](#), since I refer to them again and again in the remaining chapters.

### ***Start on the Right Foot***

- Get a grip on the underlying issues; see [Learn What Makes a Mac Fast \(or Slow\)](#).
- Solve several common speed problems in minutes; see [Try a Few Quick Fixes](#).
- Learn about test procedures, benchmarking, and monitoring resource usage; see [Diagnose Common Speed Problems](#).
- Clean up gremlins on your disk that can have numerous cascading effects; see [Fix File and Directory Problems](#).

### ***Solve General Speed Problems***

- Make sure your CPU isn't burdened with unnecessary tasks; see [Lighten Your CPU Load](#).
- Prevent low-memory situations from slowing down your Mac; see [Increase Your Free RAM](#).
- Get data onto and off of your disk faster and more efficiently; see [Improve Your Disk Performance](#).

### ***Speed Up Specific Applications and Activities***

- Surf faster; see [Speed Up Your Browser](#).

- Avoid aggravating delays when using Mail, Entourage, or Outlook; see [Speed Up Your Email](#).
- Test and optimize all the links between your Mac and an outside server; see [Speed Up Your Network](#).
- Help your Mac get up and running faster; see [Speed Up Booting, Sleeping, and Waking](#).
- Save time with utilities and tricks to increase input efficiency; see [Speed Up Mouse and Keyboard Input](#).

### ***Address Hardware Issues***

- Replace or add hardware components for increased performance; see [Upgrade Your Hardware](#).
- Eliminate USB and FireWire bottlenecks; see [Speed Up Your Peripherals](#).

# Learn What Makes a Mac Fast (or Slow)

In this chapter I try to set the record straight about what does and does not influence your Mac's speed. Unfortunately, slowdowns are often treated as a sort of voodoo topic where users are urged to simply Perform the Magical Procedure but with no explanation of what it really does or why it should work. There are a lot of myths floating around; most of them *do* have an element of truth to them, but that truth is often more constrained or specific than you may have been led to believe. Hence, this overview of the positive factors involved, followed by a rogue's gallery of purported fixes for slow Macs that usually do very little good, if any.

---

## The Three Most Important Determiners of Mac Performance

---

As you'll see throughout this book, lots of factors contribute to your Mac's performance. If your Mac is too slow, it may be due to one specific cause (and perhaps not the most obvious one), or it could be a combination of things. But in my experience, three main factors—CPU power, RAM, and disk speed—exert a greater influence a Mac's overall performance than anything else. Because many of the steps I describe in this book are intended to address one or more of them, I want to be sure you understand why and how they affect your Mac's speed.

### CPU Power

Your Mac has one or more *central processing units* (CPUs)—the computer's "brains." The CPU is where all the calculations happen that enable your Mac to do everything from displaying a single dot on the screen to surfing the Web and editing video. Since calculations are what a computer is all about, it stands to reason that the more CPU power you have, the faster your computer will be. However, in this case "power" is a slippery notion, and direct comparisons between Macs with different sorts of CPUs get tricky. Several factors come into play.

## Number of CPUs

If one brain is good, two brains are better! Having more than one CPU means your Mac can process more tasks at the same time. There isn't a one-to-one correlation between number of CPUs and speed—a two-CPU Mac won't be exactly twice as fast as an otherwise identical single-CPU Mac—because other factors come into play. For example, if a certain operation depends heavily on disk access, the disk speed could become the bottleneck, regardless of how many CPUs are available. And software must be specially designed to take maximum advantage of multiple CPUs.

**Tip:** To find out how many CPUs and cores your Mac has, open System Profiler (in [/Applications/Utilities](#)), select Hardware in the list on the left, and look at the “Total Number of Processors” and “Total Number of Cores” lines, respectively.

## Number of Cores

Each CPU chip has one or more *cores*—the parts of the CPU that do the actual computations. Having more cores gives you more processing power, because your Mac can do more calculations at any given time.

The PowerPC CPUs used in older Macs have just one core each, but most Intel-based Mac models use multi-core CPUs. For a while, dual-core Intel CPUs were the big thing, then quad-core chips started appearing, and now hexacore (6-core) chips are becoming the new black. Meanwhile, Intel is already shipping CPUs with eight cores, which are bound to make their way into Macs before long—and chips with as many as 80 cores have been produced (though these are expensive chips used mainly in high-end scientific work).

As with independent CPUs, there isn't a linear relationship between the number of cores and a Mac's speed—a four-core CPU won't be exactly twice as fast as one with two cores. (By the way, depending on several variables, multiple cores yield performance that's sometimes a bit faster, and sometimes a bit slower, than an equivalent number of independent CPUs.) And, as with multiple CPUs, not all software can exploit multiple cores effectively, so performance may vary from one application to the next.

# Try a Few Quick Fixes

Lots of the procedures in this book require time, thought, and effort to understand and put into practice. I hope that you'll be systematic about testing speed before and after making changes (as I describe later in [Understand Diagnostic Principles](#)), because I think the results are worth it. But that testing might take hours, and meanwhile you'll still be struggling with a slow Mac.


Fortunately, in many cases you can make significant improvements to your Mac's performance in a few minutes, and with hardly any effort. What I describe in this chapter may not be a complete or permanent solution, but it's the best and easiest place to start.

In fact, even if you plan to work your way carefully through every single procedure in this book, you should start with the items in this chapter—they won't hurt, they might help, and if nothing else they give your further tests a better foundation.

---

## Restart Your Mac

---

If your Mac is running slower than usual, the very first thing you should do is restart it (choose Apple  > Restart). Merely restarting solves several kinds of problems:

- It forces all applications and background *processes* to quit, including any that may be chewing up CPU cycles or otherwise causing problems.

---

**Process this:** *The term process refers to a program that's currently running—not only an application you've launched yourself, but also any of numerous parts of Mac OS X and third-party programs that may be active at any given time, possibly without displaying any visible user interface.*

---


- It frees up RAM, giving Mac OS X and applications more room to work when your Mac starts up again.

- It deletes certain temporary files on your disk, including virtual memory swap files—this can increase speed when you’re critically short on disk space.

In many cases, restarting brings your Mac immediately back to its normal zippy state. It may not stay that way, of course; the very things that slowed down your Mac in the first place can—and probably will—happen again. (Don’t worry, we’ll get to those too.) But restarting is the easiest way to jolt your Mac back to life, at least temporarily.

### Using Safe Mode

Mac OS X includes an extremely useful diagnostic feature called Safe Mode (also known as Safe Boot, since it’s a way to boot your Mac) that disables a number of components that would otherwise load at startup or login; it also performs a few low-level cleanup tasks. For those of you who remember using Mac OS 9, this is the modern-day equivalent to booting with extensions off.

To use Safe Mode—that is, to perform a Safe Boot—first turn off your Mac. (Seriously: don’t just restart. Choose Apple  > Shut Down or press the power button, and click Shut Down in the dialog that appears.) Turn your Mac on again, holding down the Shift key until the Apple logo appears; then release the Shift key and let your Mac start up the rest of the way. Despite the fact that it disables software, a Safe Boot takes longer than a normal boot because of the aforementioned cleanup tasks, so be patient.

To learn more about Safe Mode, see Apple’s official description, located at <http://support.apple.com/kb/ht1564>.

Apple’s description doesn’t mention, however, that Safe Mode uses much *more* RAM than a normal boot, or that running your Mac in Safe Mode results in severely *decreased* performance (as measured, for example, by benchmarking tools). As a result, you can’t use Safe Mode to make meaningful judgments about the extent to which startup and login items slow down your Mac.

# Diagnose Common Speed Problems

Saying “My Mac is slow” is like going to the doctor and saying, “I feel yucky.” You won’t get anywhere with a cure—or even a diagnosis—unless you can be much more specific. So in this chapter I help you to figure out exactly which aspects of your Mac are too slow (so I can direct you to appropriate fixes), and actually measure *how* slow (so we can measure again afterward and determine how effective the fixes were).

We’ll work from general to specific. First, I explain the basic diagnostic principles you’ll use throughout the book. Next, I show you how to benchmark your Mac’s raw performance so you have a baseline against which to compare future results—something you should do regardless of what particular speed problem you’re trying to solve. Then I discuss tools that provide a real-time display of how various system resources are being used at any given moment, which helps you identify software that may be slowing you down. Finally, I provide links to tests described elsewhere in this book that help you narrow down several specific speed problems.

---

## Understand Diagnostic Principles

---

Something has gone wrong. Your car has stopped moving, or your foot hurts, or your Mac is too slow. You want to solve the problem, but you can’t do that without understanding the cause. Sometimes it’s obvious: your gas gauge is on empty, there’s a rock in your shoe, or you’re trying to rip a DVD while cloning your hard disk and playing a game. But when it’s not obvious, it helps to have general techniques to figure out the source of the problem so you can choose an appropriate solution.

One of the most powerful diagnostic techniques, which can be used to find problems with nearly any complex system, is to *change just one thing* and check whether the problem still exists. This technique isn’t foolproof; problems might have multiple causes, and sometimes several factors interact in ways that are difficult to pin down. But it’s

an excellent starting point. If you try changing three things and the problem goes away, you won't know whether one, two, or all three of those things caused the problem. So, I recommend that you internalize the following sequence of steps, which you'll follow many times:

1. To the extent possible, eliminate extraneous factors that could affect your test.

For example, if you're using your Web browser to test the speed of your Internet connection, quit other programs and background processes using your network, because they could skew your results.

2. Measure the speed of some activity—and make a note of it for future reference.
3. Change one thing that might affect that speed.
4. Measure the speed again.

Then, if the problem still exists—that is, the speed hasn't increased noticeably—repeat the steps, changing something different in Step 3. (Depending on the situation, you may choose to return the thing you changed in Step 3 to its original state before performing the next test, but in the absence of evidence to the contrary, your default assumption should be that if the tests in steps 2 and 4 showed the same result, then whatever you changed in Step 3 was irrelevant to the slowdown.)

Once you have this basic outline down, the only things that remain to learn are how to measure speed (which I discuss in the remainder of this chapter) and which items to try changing in Step 3 (which I discuss throughout the book).

Alert readers may recognize the procedure I've just described as a simplified version of the scientific method: form a hypothesis, conduct an experiment to test the hypothesis, analyze the results, and then if necessary start over with a revised hypothesis. In diagnosing Mac slowdowns, as in science generally, the best-designed experiments isolate and test just one variable.

# Fix File and Directory Problems

Although less common than many people imagine, it's possible for things like corrupted fonts, caches, and preference files to result, somewhat indirectly, in a slow Mac. Similarly, disk errors of various sorts, such as directory damage, can result in a slower Mac (not to mention causing other problems).

Fortunately, the majority of file and directory problems are easily solved—as long as you have the right tools and know how to use them. Because these sorts of problems can affect everything your Mac does, you should check for, and repair, file and directory issues before moving on to the more specific steps I cover in later chapters.

---

## Run Disk Utility

---

Disk Utility, included with every Mac, can repair a variety of disk errors. Most of these problems have nothing to do with speed as such, but some can lead, even if indirectly, to slow performance—and in any case, they'll cause you headaches of one kind or another. So, before you continue with other tasks in this book, I recommend, on general principle, using Disk Utility to check for and repair disk errors.

To repair your disk, follow these steps:

1. Start up your computer from media—*other than* your regular startup disk—that also contains Disk Utility. This could be, for example:
  - ▶ A bootable duplicate of your startup disk stored on an external FireWire (or, for Intel-based Macs, USB) hard drive, a second internal drive, or a second partition of your main disk
  - ▶ A Mac OS X installation DVD or CD
  - ▶ The USB Software Reinstall Drive included with certain Macs (such as the MacBook Air and the Mac mini server) that lack an optical drive

---

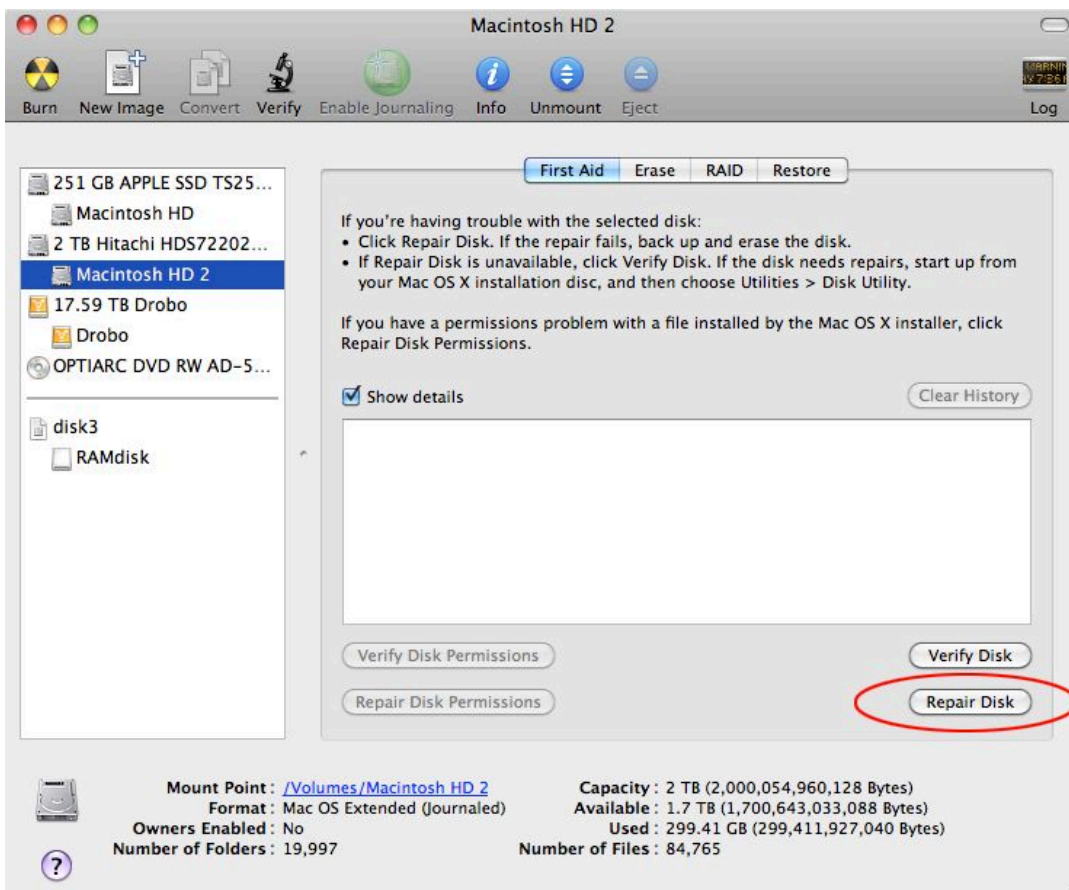
**Outside in:** You can't repair the disk from which Mac OS X is running (or the disk from which Disk Utility is running, if it's not the same one); that would be somewhat like trying to perform brain surgery on yourself.

---

2. Run Disk Utility:

- ▶ If you are running from a cloned hard disk, you can find Disk Utility in [/Applications/Utilities](#).
- ▶ If you're running from a Mac OS X installation disc, click through the installer's language selection screen—don't worry, this won't actually start to install Mac OS X—and then choose Utilities > Disk Utility.

3. In the list on the left side of the window, select your main startup volume (the one you want to test), as in **Figure 7**.



**Figure 7:** Select a volume (other than the startup volume) on the left, and then click Repair Disk.

4. On the First Aid pane, click Repair Disk.

# Lighten Your CPU Load

As I discussed in [CPU Power](#), your CPU is responsible for doing all the actual computations involved in making your Mac run. As a result, when your CPU is being pushed close to its limit, your Mac will slow down, and the way to speed it back up is to reduce some of the demands on your CPU so it can devote its power to the activities that are most important to you.

In this chapter I focus on steps you can take to reduce excess CPU usage. Because any process that uses CPU power also uses some RAM and, in most cases, accesses your disk, stopping or throttling that process can improve all three aspects of your Mac's performance. The items I discuss in this chapter are those for which, in my judgment, the improvements to CPU load tend to outweigh improvements in RAM usage and disk access.

---

## Cut Back on Startup and Background Items

---

Earlier in this book (see [Prune Login Items](#)), I suggested removing any extraneous applications from your Login Items list—partly because they can increase the delay between when you start your Mac and when you can get to work, and partly because they may use extra CPU cycles and RAM that you might wish to reserve for more important tasks. The same is true of startup items (which launch as Mac OS X starts, before any user logs in) and a variety of background items that load on startup but may not actually become active until later on (see the sidebar [Launchd and the Meaning of “Start”](#), just ahead).

Sometimes, these pieces of software can be tricky to find and remove, because a “startup item” can be any of numerous types of software, stored in several locations on your disk. But the fact that software loads at startup doesn't in any way mean it's bad; determining which startup items, if any, should be removed will depend on the particulars of your setup—whether the strain an item places on your system outweighs its usefulness to you.

## Launchd and the Meaning of “Start”

A Mac OS X component called `launchd` (“launch daemon”) is responsible for running many other processes in response to a particular condition—for example on startup or login, on a fixed schedule (such as once a day), or if a certain event (such as modifying a file) occurs. `Launchd` learns what it’s supposed to do by reading specially formatted files found in these locations:

- ◆ `/System/Library/LaunchAgents`
- ◆ `/System/Library/LaunchDaemons`
- ◆ `/Library/LaunchAgents`
- ◆ `/Library/LaunchDaemons`
- ◆ `~/Library/LaunchAgents`

I count `launchd` items as “startup items,” but I must qualify that. `Launchd` loads the *daemons* (which are system-wide processes) on startup, but it loads the *agents* (which are per-user processes) on login. A Safe Boot (see the sidebar [Using Safe Mode](#)) disables the `launchd` items in `/Library` and `~/Library`—though not those located in `/System/Library`—along with other startup items, but when you disable login items, all the per-user `launchd` agents still load, including those in `~/Library`.

In any case, depending on the instructions in the `launchd` item, *loading* (being added to the list of actions `launchd` initiates) doesn’t imply *running*; the process(es) referred to by the `launchd` item may not take action until later. For example, a `launchd` item associated with Time Machine tells it to run once an hour. Until then, the `backupd` (Time Machine) process uses no CPU power or RAM, but when it runs, the process can use quite a bit of both.

Because the effects of `launchd` items may or may not appear immediately after you restart, experiments that seem to either implicate or exonerate startup items may be misleading.

The following are the steps I recommend for finding and cutting back on startup items, as I’ve (broadly) defined them:

1. **Find your startup and background items.** Begin by making a list (in your favorite text editor, or even on paper) of your startup and background items. Here’s where to look for most of the items

# Increase Your Free RAM

As I described in detail in [RAM](#), free RAM correlates strongly with speed, and running out of free RAM—which in turn increases virtual memory usage—is a major reason for slowdowns. So in this chapter I explore ways to keep more of your RAM free.

The things that free up RAM often reduce CPU usage and disk access too, but here I'm looking here at cases where RAM is the primary consideration. (For example, a well-written application might use virtually no CPU cycles when it's idle, but still chew up RAM, so that puts it in this category.)

Of course, the best way to increase your free RAM is to add more (see [Add RAM](#)). But if your Mac won't hold any more, or if you can't afford to add physical RAM, the steps in this chapter should help.

---

## Reduce the Number of Open Applications, Windows, and Tabs

---

Look at your Dock right now. How many applications are open? (Open applications are signified by a dot beneath the icon, if your Dock is at the bottom of your screen, or next to the icon, if your Dock is on the side.) Of these, how many are you actively using? How many have you even touched in the last hour? I counseled you earlier to [Quit Inactive Applications](#), but here I want to provide a bit more detail and ask you to go even further—and to develop some new habits.

---

**Background information:** *This chapter refers to ordinary applications you open yourself; to learn about quitting background processes, see [Cut Back on Startup and Background Items](#).*

---

Each application you run uses at least a bit of RAM, and although its CPU usage may drop to virtually nothing when it's in the background, it continues to use RAM—sometimes a *lot* of RAM—until you quit it. Similarly, every new window or tab you open, whether in the Finder or in any other application, requires a chunk of RAM, and that's true even if the application is hidden or the window is minimized to your Dock.

So the fewer applications, windows, and tabs you have open, the lower your overall RAM usage will be.

---

**Put it on my tab:** *As far as your Mac's RAM is concerned, a tab is just another window—even though it may not look like one. Web browsers are the best-known examples of applications that use multiple tabs, but so do some word processors, email clients, development tools, and other applications.*

---

**Tip:** I discuss additional techniques for dealing with too many open windows and tabs in Web browsers later, in [Have Fewer Tabs and Windows Open](#).

Closing windows and quitting applications is pretty straightforward, but I do have a few specific tips:

- **Quit and (possibly) reopen:** When you quit an application, Mac OS X recovers the RAM the application was using. Even if you immediately reopen the application, its RAM usage will likely be less than it was before, because many applications use increasing amounts of RAM as they run but then don't properly give back what they no longer need (see [Watch Out for Memory Leaks](#), ahead).
- **Don't just close:** As I mentioned earlier, for many Mac applications—especially those that are document-based—merely closing the application's last open window doesn't necessarily quit the program. If there's still a glowing dot by its Dock icon or if its icon appears when you press Command-Tab, the application is still running, even without any visible windows. Right-click (or Control-click) on the Dock icon and choose Quit.
- **Watch the clock:** Mac OS X makes it easy to open lots of applications and keep them running. If you're low on RAM and you notice that you haven't used a given application in more than an hour, consider quitting it. It might take a bit longer to reopen it the next time, but you'll probably more than recover that time in increased performance due to the extra RAM. (If you want to speed up application opening dramatically, get an SSD—see [Add an SSD](#).)
- **Check your preferences:** A number of applications can optionally reopen at launch whatever windows, tabs, or documents were open the last time you used the application. (In 10.7 Lion, this

# Improve Your Disk Performance

Regardless of the raw speed of your (mechanical) hard disk, if lots of processes are trying to read/write at the same time, that's going to seriously dent your Mac's overall performance—even with a fast CPU and lots of RAM. In this chapter, I talk about what some of those disk-intensive activities are and how to minimize their impact. In addition, since your Mac can run slow if its startup disk becomes critically low on free space, I explore numerous ways to address that problem. And I discuss a few other ways (of varying degrees of utility) to increase a disk's performance.

---

## Tame Disk Access

---

Earlier, in [Disk Speed](#), I talked about the fact that your hard disk can do only one thing at a time. If you ask it to do two or more things at once—reading, writing, or searching files—it can accomplish this only by switching back and forth between the tasks rapidly, which slows all the tasks down. Even an SSD, which doesn't suffer from the physical constraints of mechanical hard disks, can only read or write data from one location at a time, so giving it too many things to do will reduce its performance.

Apart from ordinary file access, Mac OS X often uses your disk to store virtual memory swap files. If the software you're running makes demands for memory beyond the physical RAM you have installed, Mac OS X moves pages of memory onto and off of your disk as needed. As I detailed in [RAM](#), although a little of this may go unnoticed, the more heavily Mac OS X is forced to depend on virtual memory, the greater the amount of disk thrashing. That will slow down your Mac all by itself, but when you combine it with other disk-reading and -writing activities, it's bad news all around—your Mac could freeze up. (And the best remedy, of course, is to [Add RAM](#).)

How might you know if your disk is being overworked? If your Mac has a mechanical hard drive, you might hear it clicking and whirring away,

depending on where your Mac is located, the type of disk, and the ambient noise level. But you can get a better idea if you [Use Activity Monitor](#). Click Disk Activity at the bottom of the window, and you'll see a graph with reading activity shown in green and writing shown in red. In normal use, both of these spike from time to time, and if you're reading a large file (such as playing a movie in iTunes) or writing a large file (for example, saving an iMovie project), one or the other might stay high for a while. But if you're seeing sustained high reading and writing activity with no obvious cause, you'll need to dig deeper to discover why it's happening and what to do about it. I give some suggestions in the pages that follow.

---

***Where's the action?*** Unfortunately, Activity Monitor doesn't show you which specific process(es) are contributing to disk activity, though in general, high disk activity corresponds to high CPU activity, so as a first guess, consider the items using the most CPU power. To get all the gory details, open a Terminal window and type `sudo iotop -oD` followed by Return; enter your administrator's password when prompted. You'll see a display, updated every 5 seconds, showing the processes accessing your disk most heavily (higher numbers in the `DISKTIME` column mean more disk access by that process in the last 5 seconds). To stop `iotop`, press Control-C.

---

## Control Spotlight Indexing

Spotlight is Mac OS X's system-wide mechanism for indexing and rapidly searching files. It was introduced in Mac OS X 10.4 Tiger, improved considerably in 10.5 Leopard, and improved still further in 10.6 Snow Leopard. (As I write this, 10.7 Lion hasn't been released yet, so I can't say anything about how Spotlight functions there.)

Some people love Spotlight, and some hate it. I'm not going to ponder its many merits and faults in this book, nor do I intend this to be a general Spotlight troubleshooting guide. For our current purposes, I want to focus on just one aspect of Spotlight: the way it hammers on your disk when it's indexing your files—what that might mean for your Mac's performance, and what to do about it.

The first time Spotlight encounters a new local disk, it automatically reads and indexes the contents of every single file on that disk—a process that can take many hours, depending on the number of files and the speed of the disk. (By default, Spotlight doesn't index network

# Speed Up Your Browser

Apart from network issues (which I discuss later, in [Speed Up Your Network](#)), lots of things can affect the speed with which a browser downloads and displays pages (and does other things, too, including scrolling and playing videos). This chapter explores some of the things you can do to make Web browsing as fast as possible from the browser end.

---

## Quit and Reopen Your Browser

---

Is there an echo in here? Back in [Reduce the Number of Open Applications, Windows, and Tabs](#), I told you that you can increase the amount of free RAM on your Mac by quitting applications (even if you immediately reopen them). I hereby reiterate that advice, but when it comes to Web browsers, you may need a bit of additional information to help you cope effectively with this strategy.

If you're like me, you don't browse just one Web page at a time. Perhaps you do a search in Google and then Command-click a bunch of links to open them in background tabs so you can visit them later. Maybe you have a set of Web pages you like to visit every day, so you keep them open in tabs or in separate windows. Or maybe you frequently follow links in your email or Twitter client for sites you'd like to explore later, giving you lots of open tabs or windows you haven't explored. Whatever the case, it's extremely easy to have lots of Web pages loaded without even realizing it. Each of those pages uses a bit of RAM, and some of them—particularly those that use Flash, which I discuss ahead in [Manage or Disable Flash](#)—may continue using up CPU power when the window or tab, or even your entire browser, is in the background. The quickest way to free up all those system resources is to quit your browser.

But wait! Won't you lose all those open pages when you restart your browser? What if you haven't looked at them yet—or don't want to go to the bother of individually bookmarking them and reopening them?

Fear not; I can offer several suggestions:

- **Manually bookmark a group of tabs.** In Safari, you can choose Bookmarks > Add Bookmarks for These *X* Tabs to create a bookmark folder for all the tabs in the frontmost window. Later, you can reopen all those tabs at once by choosing Bookmarks > *bookmark folder name* > Open in Tabs. You can do the same thing in Firefox or Google Chrome by choosing Bookmarks > Bookmark All Tabs.
- **Restore tabs manually after restarting Safari.** If you quit and reopen Safari, you can choose History > Reopen All Windows from Last Session to return all your windows and tabs to their state when you last quit Safari—no bookmarking required.
- **Restore tabs automatically.** Most browsers offer a mechanism whereby you can ensure that if you quit the browser and reopen it, all your windows and tabs return to their previous states:

- **Firefox:** In Firefox, if you quit the browser while tabs or windows are open, a “Do you want Firefox to save your tabs for the next time you start?” alert appears. Click Save and Quit. The next time you open Firefox, it puts everything right back where you left it.

To make Firefox automatically save all your tabs and windows and reopen them when you next launch the browser (avoiding that alert every time), choose Firefox > Preferences, click General, and choose Show My Windows and Tabs from Last Time from the When Firefox Starts pop-up menu.

- **Google Chrome:** In Chrome, choose Chrome > Preferences, click Basics, and select Reopen the Pages that Were Open Last in the On Startup section.
- **Safari:** Safari doesn’t have a built-in feature to *automatically* restore tabs on relaunch, but you can get this capability by installing a free third-party extension such as Sessions by David Yoo (<http://dl.dropbox.com/u/8247646/sessions/index.html>).

Any of these techniques can make quitting and reopening your browser painless enough that you won’t mind doing so if the need arises. Be aware, though, that reloading all the pages could take some time, and if you’ve navigated deep within a database-driven site or entered data

# Speed Up Your Email

In this chapter I talk about some of the things that can make email much slower than it needs to be when using desktop clients such as Apple Mail and Microsoft Outlook, and how to address those issues. But be sure also to read the next chapter, [Speed Up Your Network](#), which covers general network issues that could also have an effect on your email.

---

## Adjust Checking Frequency

---

If you depend heavily on the timely receipt of email, you may have set your email client to check your IMAP or POP account as frequently as possible—say, once per minute. Paradoxically, such frequent checks can slow down your email client, in some cases *increasing* the amount of time it takes to receive new messages.

The reason is that each check takes time; the more accounts you have, and the more messages in each one, the greater that time is. If a single check takes longer than the interval you've designated between checks, the result is that your client is perpetually checking for messages. Depending on how your client is designed, this may mean that a series of checks are queued up such that checking your first account may have to wait until your client is finished checking several other, slower accounts; or it could mean that multiple checks are happening in parallel, which can slow down all of them.

In any case, my advice is simple: try a longer interval between checks—5, 10, or 15 minutes. See how that goes for a day or two; you can always adjust it again later. To change the frequency of email checks, do this:

- **Apple Mail:** Choose Mail > Preferences, click General on the toolbar, and choose a frequency from the Check for New Messages pop-up menu.
- **Microsoft Entourage or Outlook 2011:** Choose Tools > Run Schedule > Edit Schedules. Double-click the Send & Receive All schedule, enter a time in the “Repeating Schedule” row, and click OK. Repeat with any additional schedules you may have.

- **Thunderbird:** Choose Tools > Account Settings. Under any email account in the list on the left, select Server Settings. Change the number in Check for New Messages Every \_\_\_ Minutes and click OK. Repeat this for each of your accounts, if you have more than one.

---

## Consolidate Your Accounts

---

Your email client can check as many different accounts as you have—and many of us have quite a few! But checking more accounts takes longer, and you can speed up your email by consolidating your accounts so that your client has fewer servers to talk to (ideally only one). Of course, you may still need to receive mail from multiple addresses (say, a work address and a home address) and also send mail from multiple addresses (so that replies go to the right place). With a bit of effort, you can do all of this while still checking only one email account for incoming messages.

### Receiving Email

If you have multiple personal POP or IMAP accounts, you can choose one as your primary account—that's the one you'll actively check with your email client—and then redirect email from your other (secondary) accounts to this primary account.

There are two ways to do so:

- Set your secondary account(s) to forward all incoming mail to your primary account. Or...
- Set the primary account to fetch mail from the secondary account(s) using POP (a feature commonly offered by larger email providers) or IMAP (much less common).

Either way, one account ends up with all the incoming mail sent to multiple addresses.

Before deciding which account will be your primary account, research the capabilities of your mail server—for example, some email providers let you fetch mail from only a single external POP account. Gmail and MobileMe, however, can check multiple POP accounts, and can do so automatically and continuously, making them good choices to serve as primary accounts.

# Speed Up Your Network

What some perceive as a slow Mac has nothing to do with the Mac itself, but rather with one or more of the links in the network between the Mac and another computer (such as a Web server). In this chapter I look at several parts of that chain to help you identify and clear bottlenecks.

This discussion of network speed is deliberately shorter on details than most of this book, for two reasons:

- Because of the many variables involved in optimizing a wireless network, it would take an entire book to do that topic justice. Luckily, for those who use Apple's AirPort base stations or Time Capsule devices, just such a book exists: Glenn Fleishman's *Take Control of Your 802.11n AirPort Network*, which I heartily recommend to you. (In fact, you can learn a lot from that book even if you use other vendors' Wi-Fi products.)
- The last comment notwithstanding, a large percentage of network speed issues can be solved readily with a few simple tests and tips, which I'm happy to provide in the following pages.

---

## Understand Factors Influencing Network Speed

---

Suppose something involving a resource on the Internet seems slow—for example, maybe Web pages take a long time to load. This sort of thing can be tricky to diagnose, because there may be a great many links in the chain between your Mac and the server it's talking to, and any one of them could be the bottleneck. For example:

- Your Mac itself could have network configuration problems.
- Your browser, or a plug-in, might be at fault (as discussed earlier, in [Speed Up Your Browser](#)).
- A particular process (such as an online backup program) could be monopolizing your Internet bandwidth.

- You could have a bad Ethernet cable. (Seriously!)
- The Wi-Fi connection between your Mac and your AirPort base station or other wireless router might be too slow.
- The broadband link to your ISP could be inherently slow, or the ISP could be experiencing temporary congestion.
- The DNS servers that map domain names to IP addresses could be responding slowly, adding delays to each request you make.
- The server on the other end—or any of the intervening routers, switches, hubs, gateways, and other equipment—might be too slow.

### **When I Say “Slow...”**

Networking geeks are often quick to reprimand anyone who dares to use words like “slow,” “fast,” or “speed” when referring to a network, because signal speed per se—the movement of electrons through copper wire or photons through optical fiber—isn’t what most people are talking about. So what *are* we talking about?

On the one hand, you have *bandwidth*, which is itself a metaphorical usage, but now generally refers to the capacity, or maximum possible data transfer rate, of a network segment as expressed in (tera-/giga-/mega-/kilo-) bits per second. For example, your DSL connection may have a bandwidth of 8 Mbps (megabits per second), which means that, in theory, you could download a 1 MB file (1 megabyte = 8 megabits) in 1 second.

However, a more important concept is *throughput*, which you can think of as the real-world data transfer rate (amount of data received per unit of time)—invariably a good bit lower than the theoretical bandwidth. Your so-called 8 Mbps connection may have throughput of only, say, 6 Mbps—and that can vary from moment to moment.

Although technically neither bandwidth nor throughput is a measure of speed, higher bandwidth generally correlates to higher throughput, and higher throughput means shorter times for a given amount of data to be transferred. In everyday usage, “less time waiting” equals “faster,” and “more time waiting” equals “slower.” So there!

# Speed Up Booting, Sleeping, and Waking

In this chapter, I discuss a number of factors that can influence how long it takes a Mac to boot. In addition, I explore an issue that can significantly affect how long it takes for a notebook Mac to enter and exit sleep mode—as well as how much disk space is used.

---

## Understand What Influences Startup Speed

---

When you turn on or restart your Mac, it has to read thousands of files from your disk, copy a fair amount of data into RAM, and launch a number of programs, most of which run invisibly in the background. Beyond what Mac OS X itself needs to function, the process may include loading third-party software of various kinds, such as kernel extensions (which modify Mac OS X's behavior at a low level) and startup items (often helper applications that run in the background).

Once Mac OS X has started, the login process begins. Depending on your preferences (see [Cut Back on Startup and Background Items](#)), this may happen immediately and automatically, or you may have to supply a user name and password to log in. Either way, Mac OS X then loads still more files and runs still more programs, including any shown in the Login Items list in the Accounts pane of System Preferences (called Users & Groups pane in 10.7 Lion).

All of the above could take less than 30 seconds or more than 10 minutes—or anywhere in between. What could account for that tremendous difference in time? Here are some of the key factors:

- **Disk speed:** Because so many files must be read, the speed with which your disk can transfer data into RAM is key. In general, hard disks with lower rotational speeds are the slowest; disk with higher rotational speeds are faster; and SSDs are fastest.
- **Directory health:** *Directory* is the informal name for a set of special files on any disk that that keep track of where all the data is.

Because any given file may be stored in dozens or hundreds of smaller pieces scattered over the disk, the directory enables Mac OS X to find and reassemble all those pieces (among other functions). Any number of factors can result in a damaged or inefficiently structured directory, which in turn makes it more time-consuming to locate and read the files necessary to start Mac OS X.

---

**Geek tip:** See technical details of the HFS+ file system at <http://developer.apple.com/library/mac/#technotes/tn/tn1150.html>.

---

- **Caches:** Some of the components that Mac OS X must load at startup, including fonts and kernel extensions, are cached to provide faster access. Reading caches is faster than reading all the individual files—unless the caches are damaged. In situations where a cache is outdated or has been deleted, the startup process takes longer, both because Mac OS X must read all the individual files from scratch and because it must also rebuild and write the cache.
- **Startup and login items:** Although many startup and login items load almost instantly (especially `launchd` items that don't necessarily *run* programs when they load—see the sidebar [Launchd and the Meaning of “Start”](#)), some of these are full-blown applications that can take several seconds or more each to open.
- **Safe Boot factors:** As I explained in [Using Safe Mode](#), holding down the Shift key when you start your Mac disables a number of things, which sounds as though it should make your Mac boot faster. But because a Safe Boot bypasses the cache of kernel extensions and also runs a directory check, it typically takes longer than a regular boot. In addition, your first regular boot *after* a Safe Boot may take a bit longer as caches are rebuilt.

---

## Speed Up Startups

---

Although it may be obvious from the foregoing, you can often decrease the amount of time it takes to boot your Mac by doing the following:

- Upgrade to a faster hard disk or an SSD; see [Upgrade Your Hard Drive](#) and [Add an SSD](#).
- Make sure your directory is healthy; see [Run Disk Utility](#).

# Speed Up Mouse and Keyboard Input

People have written to tell me their Mac is too slow, and on further investigation I discovered that what they really meant was that their *mouse pointer* was too slow—an easily solvable problem, if you know what to do. This is just one of several cases where benchmarking and timed tests don't tell the whole story, because so many factors figure into one's subjective perception of speed.

In this brief chapter I tell what to do if your pointer seems slow; I also cover other ways to make your Mac *seem* faster because you can get more done with less mousing and fewer keystrokes, using a variety of utilities.

---

## Speed Up Your Pointer

---

You may have noticed that the average mouse pad is a lot smaller than the average display. Likewise, if you have a trackpad (either built into your Mac or external), you may have noticed that it's quite a bit smaller than your Mac's display. And yet, you can usually move the pointer from one corner of your display to the other in a single motion without running out of space! That's because pointing devices (of whatever sort) don't have a one-to-one correspondence between distance moved physically and the distance your pointer moves on screen. To save wrist movement and disk space, your pointing device can translate small physical movements into larger virtual distances.

However, it's not a fixed ratio (as in, 1 inch of mouse movement equals 3 inches of pointer movement on the screen). Sometimes you want to be able to move your pointer a tiny amount, and if the mapping were linear, it would be terribly difficult to control. So Mac OS X, like all operating systems, builds in an *acceleration curve*, a mathematical model that basically says, if your mouse is moving slower, the pointer should travel smaller distances, and if it's moving faster, it should travel larger distances. In practice, most of us instinctively move the mouse faster when we want the pointer to travel

large distances, and are never even conscious of the acceleration effect, but trust me: you'd miss it if it were gone!

Depending on such variables as the type of pointing device you use, the size of your hands, the size and resolution of your display, the type of work you're doing, and what you've become accustomed to, you may find the default mouse settings uncomfortable—the pointer movement may seem too slow, too fast, or too unpredictable. (Former Windows users who have recently moved to the Mac often fall into the “this mouse feels awful!” camp.)

Apple includes a slider that lets you adjust “tracking speed,” and that's an easy thing to try first, but it may or may not do the trick for you. That's because what Apple refers to as tracking speed amounts to a simplistic scaling of the acceleration curve (making pointer movements uniformly larger or smaller in proportion to distance moved), but not changing the basic *shape* of the curve—the rate and extent of change in the pointer's speed based on the mouse's speed. To do that, you'll need third-party software.

## Adjust Tracking Speed

To make basic adjustments to your pointer speed, all you need do is move the Tracking Speed slider left (slower) or right (faster). The trick is finding that slider! Here's where to look:

- **Mouse:** If you have a mouse, you configure it the Mouse pane of System Preferences (in Mac OS X 10.6 Snow Leopard or later) or the Mouse view of the Keyboard & Mouse pane (in 10.5 Leopard and earlier).
- **Trackpad (newer):** If you have a Mac notebook released in October 2008 or later featuring a glass multi-touch trackpad without a separate button, or an Apple Magic Trackpad, you configure the trackpad in the Trackpad pane of System Preferences.
- **Trackpad (older):** If you have a Mac notebook with the older-style trackpad, you configure the trackpad in the Trackpad view of the Trackpad pane (in Snow Leopard or later) or the Keyboard & Mouse pane (in Leopard and earlier).

If you have a third-party pointing device, see the sidebar [Preferences for Third-Party Input Devices](#), ahead page or two.

# Upgrade Your Hardware

Fiddling with the applications and files on your disk can solve many problems that *decrease* your Mac's performance, but if you want to actually make your Mac *faster* than the day you bought it, you may need to undertake some hardware modifications. These range from easy and inexpensive (yet incredibly effective) to expensive and scary (while not so effective). But if you're serious about speed, you'll almost certainly do at least some of these things.

---

## Add RAM

---

I've mentioned RAM many times in this book because the correlation between free RAM and speed is so strong. By now I hope I don't have to convince you how valuable it is, but you may still be wondering *how much* RAM to add, *where* to get it, and *how* to go about installing it. Allow me to address these questions briefly.

### How Much?

As of 2011, the lowest amount of RAM any Mac ships with is 2 GB. In my opinion, that's far too little for almost anyone. Mac OS X itself uses so much RAM that you'll be severely restricted in how many applications and files you can open before virtual memory begins paging memory to disk, thus slowing you down significantly. On the other hand, some of today's Macs hold a *maximum* of 4 GB; a few early Intel-based Macs held a maximum of 2 GB; and some PowerPC-based Macs still likely to be in service held a maximum of only 1 GB.

---

***A bit more or less:*** *You may have heard the term "64-bit" bandied about as being the latest thing in hardware and software. For our current purposes, all you need to know is that if your Mac is not 64-bit capable, its maximum RAM capacity can be no more than 4 GB. Apple began shipping Macs with 64-bit architecture in late 2006.*

---

At the other end of the spectrum, high-end Mac Pro models hold as much as 64 GB of RAM. Based on today's software, very few people can productively keep that much RAM busy, which is fortunate because very few people can *afford* that much RAM!

For most people and most common activities, I believe something in the range of 6 to 16 GB should be sufficient. At those quantities, RAM is fairly inexpensive compared to the price of a new Mac, and the incremental cost of an extra 1 or 2 GB is usually quite small. So it pays to add as much as you can, within reason.

---

**Pairing up:** *Intel-based Macs get a slight performance boost when RAM modules are installed in matched pairs—that is, pairs of the same size. If you have an odd number of modules, or modules of different sizes (say, a 2 GB module and a 4 GB module), performance will be a tiny bit slower, but the speed boost from having a greater quantity of RAM virtually always trumps what you get from matched pairs of a smaller quantity.*

---

All that said, here are my specific suggestions:

- If your Mac has a capacity of 8 GB of RAM or less, install the maximum it can hold.

---

**Out of thin Air:** *The MacBook Air is the only Mac model that lacks support for adding RAM after the fact; the only way to get more than the base amount is to request it as a build-to-order option.*

---

- If your Mac has a capacity of 16 GB and you can afford it, install 16 GB; otherwise, give it at least 8 GB.
- If your Mac has a capacity of 32 GB or more, install at least 16 GB. Go above that only if you learn from Activity Monitor or other tools that you're generating significant quantities of pageouts—and you can afford it! If you're doing massive scientific calculations or high-end, high-definition video editing, you may very well benefit from 64 GB of RAM. Most ordinary folks, however, will seldom max out more than 16 GB.
- If you buy a new Mac, check to see not only how much RAM it includes but how the modules are configured. If you plan to upgrade your RAM later, it helps to know whether you'll have to replace any of the existing modules to get to your desired total. (If you order your Mac from the online Apple Store, the configuration page shows you this information.) Sometimes Apple gives you the choice—for example, 8 GB in the form of four 2-GB modules or two 4-GB

# Speed Up Your Peripherals

USB and FireWire are the most commonly used interfaces for the sorts of external devices (such as hard drives) that can most significantly affect your Mac's speed. In this final chapter I get into some admittedly geeky territory, discussing somewhat obscure concepts such as bus bandwidth and hub power supplies. But it's all in the service of speeding up your Mac. By understanding what I explain here, you can make informed decisions about which devices to connect to your Mac and how to do so in a way that keeps overall performance as high as possible.

---

## Learn about Buses and Ports

---

If you look at your Mac, you'll see one or more USB *ports* (physical connectors where you can attach USB cables) and perhaps one or more FireWire ports. (There are others, too, such as ports for video and Thunderbolt, but for the purpose of this chapter I'm concerned only with USB and FireWire.)

It's fairly obvious that if you have three USB ports, you can plug in three USB devices. (And, if one of those devices is a *hub*, which increases the number of available ports, you can plug in still more devices.) All the ports of a given type look the same, but details about your Mac's internal configuration could determine *which* of those ports you might want to attach a device to.

To make sense of this, you must understand the concept of a *bus*, which is essentially a particular set of physical circuits that carry some sort of data. Your Mac has many different buses for communicating with a variety of internal and external devices, and ordinarily you need never concern yourself with any of them. However, there's a crucial fact about buses that can impact your Mac's performance: every bus has a fixed amount of *bandwidth*, which is to say that no matter how many devices connect to it, only a certain amount of data can travel through the bus at any given time. So, if a bus has just one device on it, that device can use the bus's full bandwidth. Connect two or more, and the devices must share that bandwidth. Of course, all the devices may

not actively be transferring data at any point in time, but to the extent that they do, the bus bandwidth can limit their effective speed.

Now here's the interesting part: The number of USB or FireWire buses your Mac has may be completely different from the number of *ports* it has! For example, your Mac may have only one USB port but two USB buses (the second of which is used for internal devices such as the trackpad and camera). Or it may have more USB ports than buses, meaning each bus shares multiple ports. Or it may have two FireWire ports (say, a FireWire 800 and a FireWire 400) connected to the same internal FireWire bus.

**Note:** Among the internal devices that may connect to a USB bus are your keyboard and trackpad (on a notebook Mac), iSight or FaceTime camera, Bluetooth controller, IR receiver, and SD card reader.

Why should you care about this? It's simple: knowing that each bus has a limited amount of bandwidth, you'll get the best performance if you spread out the load. For example, let's say you have two USB hard drives and two USB ports on your Mac, which you've discovered (as I explain in a moment) correspond to two different USB buses. You could connect one drive to each port, or you could connect a hub to one of the ports and connect both drives to the hub (leaving the other port free for additional devices). In this example, connecting one drive to each port is generally the better choice, because then they don't have to share the bandwidth of a single bus. If you need to attach more devices, you can still use a hub, plugging one of your drives (and the other devices) into it, but keeping that on a separate USB bus from the other drive will increase the performance of both.

So... how can you figure out how many buses your Mac has, and which ports go with which buses? Follow these steps:

1. Open System Profiler (in [/Applications/Utilities](#)).
2. In the list on the left, under Hardware, select USB (**Figure 15**).

# About This Book

Thank you for purchasing this Take Control book. We hope you find it both useful and enjoyable to read. We welcome your comments at [tc-comments@tidbits.com](mailto:tc-comments@tidbits.com).

---

## Ebook Extras

---

You can [access extras related to this ebook](#) on the Web. Once you're on the ebook's Take Control Extras page, you can:

- Download any available new version of the ebook for free, or buy a subsequent edition at a discount.
- Download various formats, including PDF, EPUB, and—usually—Mobipocket. (Learn about reading this ebook on handheld devices at <http://www.takecontrolbooks.com/device-advice>.)
- Read postings to the ebook's blog. These may include new information and tips, as well as links to author interviews. At the top of the blog, you can also see any update plans for the ebook.
- Get a discount when you order a print copy of the ebook.

---

## About the Author

---

Joe Kissell is Senior Editor of *TidBITS*, a Web site and email newsletter about Apple and the Internet, and the author of numerous print and electronic books about Macintosh software, including *Take Control of Mac OS X Backups* and *Take Control of Maintaining Your Mac*. He is also a Senior Contributor to *Macworld*, was the winner of a 2009 Neal award for Best How-to Article, and has appeared on the MacTech 25 list (the 25 people voted most influential in the Macintosh community) since 2007. Joe has worked in the Mac software industry since the early 1990s, including positions managing software development for Nisus Software and Kensington Technology Group.

In his increasingly imaginary spare time, Joe likes to travel, cook, walk, and practice t'ai chi. He lives in Paris with his wife, Morgen Jahnke, their son, Soren, and their cat, Zora.

To contact Joe about this book, send him email at [jwk@me.com](mailto:jwk@me.com) and include *Take Control of Speeding Up Your Mac* in the subject so his spam filters won't intercept it. Better yet, if appropriate, post your question publicly in our forums at <http://www.getsatisfaction.com/takecontrolbooks/>.



---

## Author's Acknowledgments

---

I'd like to extend special thanks to Dan Frakes, who reviewed the entire manuscript for technical accuracy and made many extremely helpful corrections and suggestions. In addition, Glenn Fleishman offered considerable input on the networking material, setting me straight on a number of confusing topics. Jeff Porten, David Shayer, and Kevin van Haaren also served as technical reviewers, and provided lots of good advice. All these folks have done a great deal to keep me out of trouble, and the book is immeasurably better for their efforts.

---

## Shameless Plug

---

Although I write about computers as my day job, I have a great many other interests, which I write about on several Web sites, including [Interesting Thing of the Day](#) and my personal blog. You can find links to all my sites, a complete list of my publications, and more personal details about me at [JoeKissell.com](http://JoeKissell.com). You can also follow me on Twitter ([@joekissell](#)).

---

## About the Publisher

---

Publishers Adam and Tonya Engst have been creating Apple-related content since they started the online newsletter *TidBITS*, in 1990. In *TidBITS*, you can find the latest Apple news, plus read reviews, opinions, and more (<http://www.tidbits.com/>).

Adam and Tonya are known in the Apple world as writers, editors, and speakers. They are also parents to Tristan, who thinks ebooks about clipper ships and castles would be cool.



### Production Credits:

- Take Control logo: Jeff Tolbert
- Cover design: Jon Hersh
- Copyeditor, Publisher: Adam Engst
- Technical Editor: Dan Frakes
- Editor in Chief: Tonya Engst
- Production Assistant: Michael E. Cohen

# Copyright and Fine Print

*Take Control of Speeding Up Your Mac*

ISBN: 978-1-61542-135-0

Copyright © 2011, Joe Kissell. All rights reserved.

TidBITS Publishing Inc.

50 Hickory Road

Ithaca, NY 14850 USA

<http://www.takecontrolbooks.com/>

Take Control electronic books help readers regain a measure of control in an oftentimes out-of-control universe. Take Control ebooks also streamline the publication process so that information about quickly changing technical topics can be published while it's still relevant and accurate.

This electronic book doesn't use copy protection because copy protection makes life harder for everyone. So we ask a favor of our readers. If you want to share your copy of this ebook with a friend, please do so as you would a physical book, meaning that if your friend uses it regularly, he or she should buy a copy. Your support makes it possible for future Take Control ebooks to hit the Internet long before you'd find the same information in a printed book. Plus, if you buy the ebook, you're entitled to any free updates that become available.

Although the author and TidBITS Publishing Inc. have made a reasonable effort to ensure the accuracy of the information herein, they assume no responsibility for errors or omissions. The information in this ebook is distributed "As Is," without warranty of any kind. Neither TidBITS Publishing Inc. nor the author shall be liable to any person or entity for any special, indirect, incidental, or consequential damages, including without limitation lost revenues or lost profits, that may result (or that are alleged to result) from the use of these materials. In other words, use this information at your own risk.

Many of the designations used to distinguish products and services are claimed as trademarks or service marks. Any trademarks, service marks, product names, or named features that appear in this title are assumed to be the property of their respective owners. All product names and services are used in an editorial fashion only, with no intention of infringement of the trademark. No such use, or the use of any trade name, is meant to convey endorsement or other affiliation with this title.

This title is an independent publication and has not been authorized, sponsored, or otherwise approved by Apple Inc. Because of the nature of this title, it uses terms that are trademarks or that are the registered trademarks of Apple Inc.; to view a complete list of the trademarks and of the registered trademarks of Apple Inc., you can visit <http://www.apple.com/legal/trademark/appletmlist.html>.

# Featured Titles

Click any book title below or [visit our Web catalog](#) to add more ebooks to your Take Control collection!

*[Take Control of Fonts in Snow Leopard](#)* (Sharon Zardetto): Install, organize, and use fonts with ease in Mac OS X 10.6 Snow Leopard (and 10.5 Leopard)!

*[Take Control of Mac OS X Backups](#)* (Joe Kissell): Set up a rock-solid backup strategy so that you can restore quickly and completely, no matter what catastrophe arises.

*[Take Control of Maintaining Your Mac](#)* (Joe Kissell): Find a commonsense approach to avoiding problems and ensuring that your Mac runs at peak performance.

*[Take Control of Safari 5](#)* (Sharon Zardetto): Make the most of Apple's Safari, a Mac Web browser with many hidden and under-appreciated talents!

*[Take Control of the Mac Command Line with Terminal](#)* (Joe Kissell): Learn the basics of the Unix command line that underlies Mac OS X, and get comfortable and confident when working in Terminal.

*[Take Control of Troubleshooting Your Mac](#)* (Joe Kissell): Learn basic troubleshooting procedures, solve common problems, and gain confidence in solving any Mac problem.

*[Take Control of Your 802.11n AirPort Network](#)* (Glenn Fleishman): Make your AirPort network fly—get help with buying the best gear, set up, security, and more.

*[Take Control of Your Paperless Office](#)* (Joe Kissell): With your Mac, scanner, and this ebook in hand, you'll finally clear the chaos of an office overflowing with paper.

*[Take Control of Upgrading to Lion](#)* (Joe Kissell): Find friendly advice that prepares you for a successful installation, plus learn how to best run the installer while avoiding problems.