

Mountain Lion Installation SUPERGUIDE



Everything You Need to Know to Install OS X 10.8

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Foreword

Before Lion (Mac OS X 10.7) debuted last year, installing a major version of the Mac operating system meant buying a disc and slipping it into your Mac's optical drive. But Lion changed all that by making OS X available via direct download. OS X 10.8—better known as Mountain Lion—inherits Lion's distribution method: It's available *only* as a download from Apple's Mac App Store. This method of upgrading your OS is easier and more convenient than having to buy and use a DVD or thumb drive, but it also raises a number of questions, and presents upgrade obstacles for some users.

As we did last year with Lion, we've installed Mountain Lion more times than we can count—on a variety of Mac models—in order to put together a guide that we hope will make the transition painless for you. We cover the requirements for running OS X 10.8; the things you should do to get your Mac ready; and the purchase and download processes. We walk you through the actual installation, recommend some post-install tasks, discuss some upgrade challenges, and help you decide if a “clean install” is right for you. We also offer instructions for creating a bootable Mountain Lion installer drive, tips for installing the new OS over Leopard (OS X 10.5)—provided you have the appropriate license to do so—and a hands-on look at recovery mode.

—Dan Frakes
San Francisco, July 2012

Mountain Lion Installation

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Get Ready for Mountain Lion



INSTALL THE CAT Ready to install Mountain Lion? Here's our guide.

Last year, Apple dramatically changed the way we get and install OS X. Instead of charging a princely sum for an installation DVD, the company let you download OS X 10.7 (Lion)—specifically, the OS installer—from the Mac App Store, and charged only \$30 for the privilege. This new process was a success for most users, and Apple is using it again for Mountain Lion (OS X 10.8), only this time around, it's even less expensive: just \$20. As simple as the process is, here are some tips for making it go as smoothly as possible.

It's prudent to note that Mountain Lion is brand new, so although it's possible it's bug free, chances are it isn't—we usually see the first update for new OS X versions within a few weeks of release. If downtime is not an option for you, you might consider holding off for the inevitable Mac OS X 10.8.1.

What You Need

Apple says Mountain Lion requires one of the following computers, already running OS X 10.6.8 or any version of OS X 10.7:

MacBook (Late 2008 aluminum, or Early 2009 or newer)

MacBook Pro (Mid to Late 2007 or newer)

MacBook Air (Late 2008 or newer)

iMac (Mid 2007 or newer)

Mac mini (Early 2009 or newer)

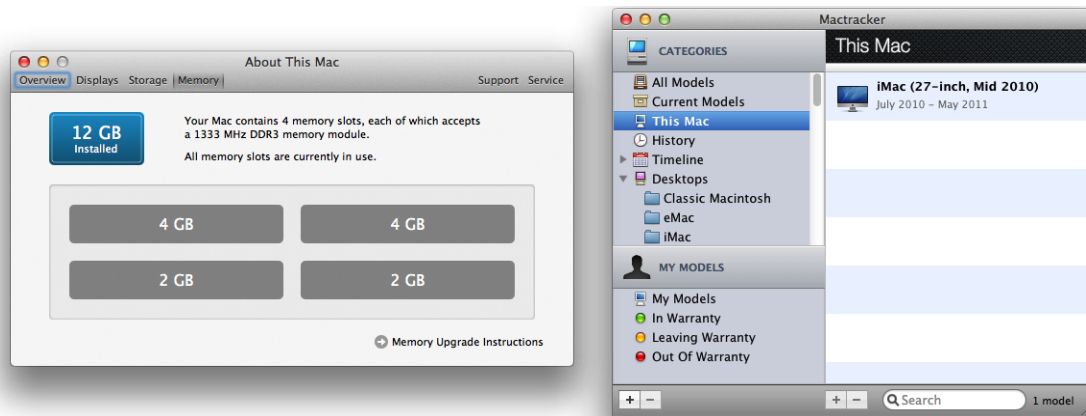
Mac Pro (Early 2008 or newer)

Xserve (Early 2009)

(Note that while the above computers can *install* Mountain Lion, some features, such as Power Nap, AirPlay mirroring, and AirDrop, [have stricter requirements](#).)

Apple also says you need 2GB of RAM (memory), although in our experience you'll enjoy better results with at least 4GB. If you have only 2GB installed, you might consider a hardware upgrade before installing OS X 10.8. A word of advice here: If you don't buy your RAM directly from Apple, be sure you get RAM that's specifically guaranteed for use in Macs. Some third-party RAM that's not up to Apple's specs will cause problems when you upgrade your OS. Most reputable vendors make it clear which RAM they offer is specifically compatible with Macs.

Similarly, Apple recommends having at least 8GB of free space on your Mac's drive, but play it safe by aiming for 15GB or more—the Mountain Lion installer itself is over 4GB, and you'll need some room for temporary files. You may also find, especially if you're upgrading from Snow Leopard, that some of Mountain Lion's features require more "everyday" free space, as is the case in Lion. If you need to free up space on your drive, you can use a utility such as [WhatSize](#) or [GrandPerspective](#) to help you find big files you can get rid of; we recently [provided some specific suggestions for freeing up drive space](#).



SUSS OUT YOUR SPECS In Lion, you can check your Mac's specs using the About This Mac window (left); Snow Leopard users can use MacTracker to identify their Mac model (right).

Not sure which Mac you own or how much RAM or free drive space it has? Choose About This Mac from the Apple Menu, and then click More Info. In Lion, the resulting window displays your computer model and year/version; click the Storage tab to view your drive's free space, and click Memory to check its RAM amount. In Snow Leopard, you get a System Profiler window—select Memory to check the RAM amount; select Serial-ATA, and then select your drive's name on the right, to see your free drive space.

Unfortunately, Snow Leopard's System Profiler window doesn't display your Mac's actual model year/version. However, the excellent [MacTracker](#) ([Mac App Store link](#)) makes it easy to find this information. Just launch MacTracker and select This Mac on the left, and your Mac's MacTracker entry—complete with its official model year/version—is displayed on the right.

The requirement that your Mac be running OS X 10.6.8 or any version of OS X 10.7 is also important. The main reason for this restriction is that, like Lion, Mountain Lion will only be available via the Mac App Store, which requires Mac OS X 10.6.6. And OS X 10.6.8 provides a number of enhancements that make upgrades to 10.7 or 10.8 go more smoothly. In addition, Apple recommends that you install the *very latest* updates to Snow Leopard or Lion before upgrading to Mountain Lion, so be sure to check Software Update for any available updates. (See [“Before You Install”](#) for more information.)

What if you have an otherwise compatible Mac that's still running Leopard (OS X 10.5)? The easiest way to get Snow Leopard is to call Apple Support (800/275-2273). You'll still be paying less than \$50 for a huge OS upgrade. If that isn't an option for you, for whatever reason, stay tuned—we'll explain how to install 10.8 over Leopard (see the [“Install Mountain Lion over Leopard”](#) chapter), assuming you have the right to do so, much as we [did with Lion last year](#). (If you've got one of the two Mac models that originally shipped with OS X 10.4 Tiger *and* that support Mountain Lion, and you're still running Tiger, you definitely want to go the Snow Leopard to Mountain Lion route—the alternative is very messy.)

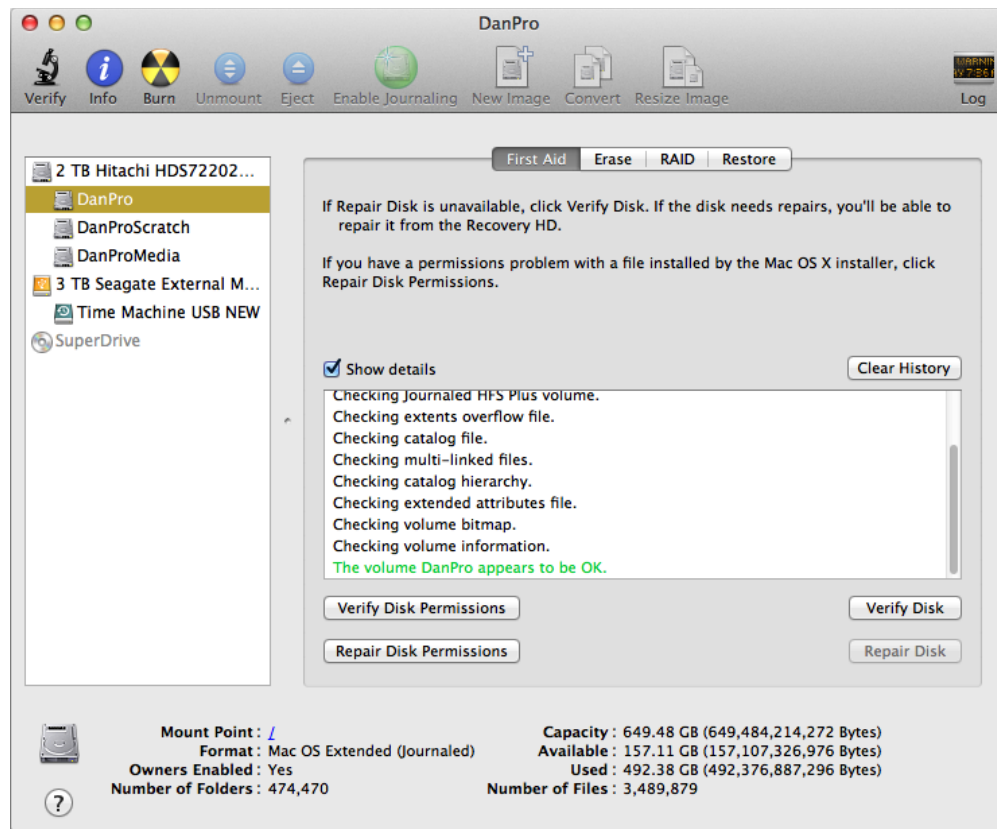
Finally, although it's not a requirement, if you have a desktop Mac, we highly recommend picking up Apple's [Magic Trackpad](#) if you don't already have one. The systemwide gestures introduced in Lion last year are only going to become more pervasive as OS X evolves, and you likely won't enjoy the full benefits of Mountain Lion without a trackpad. (MacBook users, of course, all have a trackpad already.) Even if you prefer to use a mouse or large trackball for general mousing, you may want to keep a Magic Trackpad within reach just to take advantage of OS X's gesture-based features.

Before You Install

While Apple [describes the process of upgrading to Mountain Lion](#) as a simple download and install, those of us who've been doing this for a while know that a major OS update is never that simple. Perform the following tasks *before* the upgrade and you'll have a much better chance of a pain-free upgrade experience.

Make Sure Your Mac's Drive Is in Good Health

To do so, open Disk Utility (in /Applications/Utilities), select your startup drive in the list on the left, click the First Aid tab to the right, and then click Verify. If Disk Utility finds problems, you'll need to boot from a different volume to perform the actual repairs using the Repair Disk button. If you're upgrading from Lion and your Mac can use [Lion Recovery](#), you can boot into recovery mode (by holding down Command-R at startup) and use Disk Utility from there; alternatively, if you created a [bootable Lion-installer drive for older Macs](#) or [for newer Macs, created a separate Lion Recovery drive](#), or created a bootable Mountain Lion-installer drive (using the instructions later in this book), you can boot from that drive and use Disk Utility. If you're upgrading from Snow Leopard, you can use Disk Utility when booted from either your Snow Leopard install DVD or the OS X install DVD or thumb drive that shipped with your Mac. If you're feeling especially cautious, you can also opt to [run Apple Hardware Test](#).



DISK CHECKUP Disk Utility can verify that your Mac's drive is healthy.

Back Up Your Mac, and Test That Backup

Let's repeat that mantra: Back up your Mac, and test that backup—*before* you install Mountain Lion. (See [our article on Mac backup plans](#) for more information on backing up your Mac.) We recommend creating a bootable-clone backup (using [SuperDuper](#) or [Carbon Copy Cloner](#) for the task), although a Time Machine backup will do as well. To test a clone or other bootable backup, use the Startup Disk pane of System Preferences to boot from the backup drive. To test a Time Machine or other nonbootable backup, try restoring several files—both older ones and newer ones—to make sure you can recover your data should disaster strike.

Snow Leopard Users Should Disable FileVault

If you're upgrading from Snow Leopard (OS X 10.6) and you're using FileVault, OS X's built-in account-encryption feature, on any of your Mac's accounts, you should disable FileVault before upgrading to Mountain Lion. That's because Mountain Lion, like Lion before it, uses a different (and much improved) approach to encryption, called FileVault 2. Apple says you can keep using the Snow Leopard implementation for previously encrypted user accounts, but FileVault 2 is the better way to go, and what better time to make the switch than now? (Also, it's best not to risk running into any incompatibilities between the two versions of FileVault.)

Disable Third-Party Disk Encryption

If you're using third-party disk-encryption software, you may want to temporarily disable it before upgrading your Mac's OS. Most of these products interact with your drive and the OS at a low level, and an incompatibility with Mountain Lion could leave you unable to boot your Mac or, worse, access your data at all. Once Mountain Lion is up and running and you've verified (with the developer) that your encryption software is compatible, you can reenable encryption. However, given that FileVault 2 also encrypts your entire drive, you might consider this a good opportunity to migrate to that option.

Run Software Update

To make sure you're running both the latest version of Mac OS X—[version 10.6.8](#), for example, includes Snow Leopard fixes required for upgrading to Mountain Lion—and the latest versions of any other Apple software that the upgrade might affect, you should run Software Update (from the Apple menu). You should also [check for updated firmware for your particular Mac model](#).

Check for Mountain Lion–Compatible Updates to Third-Party Software

As with any major upgrade to Mac OS X, you'll likely find you need to update your third-party software to work with Mountain Lion. If you take the time to check compatibility before installing OS X 10.8, you'll be in a position to get up and running immediately, rather than dealing with frustration when your favorite apps and add-ons don't work.

To check app compatibility, you can visit each developer's website, but we recommend first checking Roaring-Apps' [growing list of Mac software and Mountain Lion compatibility](#). (The list shows both Lion and Mountain Lion compatibility—make sure you're looking at the Mountain Lion column.)

If an app has an update available, download and install that update. For apps you've obtained via the Mac App Store, simply launch the App Store app, click the Updates button in the toolbar, click Update All, and provide your Apple ID and password when prompted—this downloads and installs *all* available updates at once. For non-Mac App Store apps, you'll need to install updates manually. Some apps provide a built-in update feature (often accessed by choosing Check For Updates from the application's main menu or Help menu); for those that don't, visit the developer's website.

The biggest offenders here—in terms of incompatibility with Mountain Lion—are programs and system add-ons that integrate with (or hack) OS X at a low level. Kernel extensions, for example, notoriously fail to work with major new versions of OS X, but you may also find that utilities that tweak the Finder, [add-ons that enhance Mail](#), and other plug-ins and enhancers won't work under Mountain Lion, even if they worked fine under Lion. (This will be a bigger issue for people upgrading from Snow Leopard.) So be sure to check vendor websites for OS X 10.8–compatible updates for your favorite software *before* upgrading. (Don't forget to check third-party System Preferences panes and Mail add-ons.) If it turns out that a particular bit of software is incompatible with Mountain Lion and doesn't have an update available, uninstall or disable it until the developer releases a compatible version.

TIP: WATCH OUT FOR ROSETTA APPLICATIONS

If you're upgrading from Snow Leopard, the biggest compatibility issues are likely to involve older Mac software that Apple hasn't updated recently—it may not work at all under Mountain Lion. Specifically, PowerPC-only programs—software Apple never updated to run natively on Macs with Intel processors—are incompatible with both Lion and Mountain Lion.

Under previous versions of Mac OS X, Apple provided software called Rosetta that allowed PowerPC code to run on Intel Macs. The Snow Leopard update no longer installed Rosetta by default, but the OS would offer to download and install it if you tried to run a PowerPC program.

However, Apple killed Rosetta completely with the release of Lion, and it remains unavailable in Mountain Lion. If you've got important PowerPC programs (for example, older versions of Quicken for Mac are still surprisingly popular), you'll want to update those programs to Intel-processor versions, if available, before upgrading to Mountain Lion. If such updates aren't available, look for acceptable alternatives. That could mean recent Mac versions or, if need be, Windows versions that you can run under Boot Camp or virtualization software such as Parallels or Fusion.

How can you tell which of your applications are PowerPC programs? The easiest way is to launch System Profiler (find it in /Applications/Utilities), select Applications (under Software in the sidebar), and then click the Kind column header, which sorts the list of applications by processor type. Any programs listed as *PowerPC* will not work under Lion or Mountain Lion. (If you've got any listed as *Classic*, well, that ship sailed long ago.)

Set Up iCloud

In Lion and Mountain Lion, [iCloud](#), Apple's cloud-syncing service, is integrated into many apps and system services. So you don't get hassled about iCloud syncing when you first log in to Mountain Lion, simply make sure that you've logged in to your iCloud account under Lion, and that you've enabled syncing for the various types of supported data, before upgrading. (If you're upgrading from Snow Leopard, you'll have to log in—or create an iCloud account if necessary—when you boot into Mountain Lion for the first time.) For more on this issue, check out *Macworld* senior contributor Joe Kissell's [Take Control of Upgrading to Mountain Lion](#).

Keep an Extra Drive Handy

While most people will simply install Mountain Lion over Lion or Snow Leopard, there are situations in which you might want to install onto an empty drive—for example, if you want to install Mountain Lion on a second drive to test the OS before upgrading your main drive, or if you want to erase your Mac's startup drive and start anew. (The latter might be a good idea if your Mac has been having issues, or if your drive is nearly full or in need of repair.) However, erasing your Mac's startup drive and starting fresh means you need to have a good, tested backup (see [above](#)), as well as a bootable Mountain Lion installer drive, so now's the time to start preparing.

Install Mountain Lion



BEGIN THE JOURNEY Install Mountain Lion so that you can start using Apple's newest OS.

Before Lion (OS X 10.7) debuted last year, installing the latest major version of Mac OS X meant buying a disc and slipping it into your Mac's optical drive. But Lion changed all that by making OS X available for direct download. OS X 10.8—better known as Mountain Lion—inherits Lion's distribution method. More specifically, it's available *only* as a download from Apple's Mac App Store. While it's easier and more convenient to upgrade your OS this way than via a DVD or thumb drive, this change also raises a number of questions and presents upgrade obstacles for some users.

Purchase and Download Mountain Lion

Assuming you [meet the requirements](#), getting Mountain Lion is easy—for most people (more on that below). You simply launch the Mac App Store application, open the Mountain Lion page (searching for **Mountain Lion** is an easy way to get to it), click the \$19.99 button at the top of the screen, and then click the Buy App button that appears.

(Note: If you purchased a Mac between June 11 and July 25, 2012, but it didn't come with Mountain Lion preinstalled, don't purchase it from the Mac App Store—you're entitled to a free copy of the new OS. Note that this promotion ends on August 24, 2012. Visit [this Apple webpage](#) for details.)

After you provide your Apple ID and password, Mountain Lion starts to download. Specifically, the 4.4GB installer application, called "Install OS X Mountain Lion.app," is saved to your main Applications folder (/Applications) and, if you're upgrading from Lion, added to Launchpad. The installer even automatically launches after it finishes downloading.

Note that unlike Lion, which uses the Software Update feature (found in the Apple Menu) to provide OS updates, Mountain Lion provides OS updates through the Mac App Store app. In fact, if you choose Software Update from the Apple Menu under Mountain Lion, the Mac App Store launches.

Installer Tips

If you only have one computer, you're set. But if you want to install Mountain Lion on multiple Macs, here are a few quick tips for getting another copy of the installer and making sure it's available.

TO DOWNLOAD THE INSTALLER ONTO OTHER MACS Once you've purchased Mountain Lion, you can download the installer onto any 10.8-capable Mac authorized to use your Mac App Store account—just as with applications purchased from the store, a single purchase of Mountain Lion lets you install it on all your personal Macs. To download the installer on a Mac other than the one on which you purchased it, just launch the Mac App Store application, click the Purchases button in the toolbar, and click the Download button next to OS X Mountain Lion in the list.

TO COPY THE MOUNTAIN LION INSTALLER ONTO OTHER MACS Alternatively, once you've downloaded the Mountain Lion installer onto one computer, you can copy it—over your local network or by using a flash drive, DVD, or external hard drive—to your other Macs. This is obviously a much faster approach than redownloading the 4.4GB installer onto each of your Macs. You won't even be prompted to authorize the installer on each Mac, as you are with other Mac App Store-distributed software—the Mountain Lion installer does not use digital rights management (DRM).

TO DOWNLOAD THE INSTALLER ONTO A MAC THAT'S ALREADY RUNNING MOUNTAIN LION If you already have Mountain Lion installed on a Mac, you may have problems downloading the installer onto that Mac, as the Mac App Store app may think that you've already got it and hence won't let you download it. If this happens to you, launch the Mac App Store app and Option-click the Purchases tab in the toolbar; that should show the Download button next to Mountain Lion in the Purchases list. If that doesn't work, Option-click Mountain Lion

in the list, and then Option-click the Installed button on the Mountain Lion page. One of these two methods should let you download the installer.

TO KEEP THE INSTALLER AROUND Before proceeding, here's an important tip: If you run the installer from its default location in the Applications folder, the installation process deletes the installer, presumably to free up the drive space it occupies. So if, as explained above, you plan to use the installer on other Macs, or if you just want to keep the installer on hand, before installing you should copy the installer to another drive—or at least move it out of the Applications folder.

Install Mountain Lion

Like Lion—and unlike earlier versions of OS X—Mountain Lion offers only a single installation option: where to install the new OS. In fact, you don't need to make any other decisions until it's time to set things up and start using your Mac. You don't even need to boot from a different disc or volume—the Mountain Lion installer runs as a standard application.



ALL THE OPTIONS This is what the Mountain Lion installer looks like if you've opted to show all disks.

SHOULD YOU DO A CLEAN INSTALL?

It used to be that installing a major new version of OS X over an existing one—for example, installing 10.3 over 10.2—entailed some risk, as your apps, add-ons, and support files could conflict with the new OS. That’s why many people performed a clean install, which meant wiping the hard drive entirely (after backing it up), installing the latest version of OS X, and then either using Setup Assistant (at startup) or Migration Assistant (anytime) to restore your apps and personal data, or manually copying over data and reinstalling apps. (OS X 10.2 [included an Archive And Install](#) option, which saved your original OS in a special folder while installing a fresh copy of 10.3. Snow Leopard OS X 10.6 eliminated this feature.)

But the download-and-install procedure that debuted last year in Lion (OS X 10.7) and continues in Mountain Lion (OS X 10.8) means that instead of using a bootable installation DVD, you download the latest installer to your Mac and install it from the same drive. So Mac users are asking two questions: Can you perform a clean install of Mountain Lion, and should you?

First, the technical question: Given that OS X 10.8 doesn’t include an official clean-install option, is it possible to perform such an installation? The simple answer is yes—the installer lets you install the new OS onto a blank drive. So if you first back up your existing Snow Leopard or Lion installation and all your files—we recommend creating a bootable *clone* using [SuperDuper](#) or [Carbon Copy Cloner](#)—you can then boot from a bootable installer disc or drive (see the “[Create a Bootable Installer Drive](#)” chapter), erase your Mac’s normal startup drive, and install Mountain Lion or Lion on it.

Once you’ve done this, you can use Setup Assistant at startup to restore data from your backup. For a truly clean start, however, you must manually copy your personal data from your backup to your new Mountain Lion installation, and then reinstall your apps and other software. (This is one case in which the more apps you’ve purchased through the Mac App Store, the better—you just launch the Mac App Store app and click a few buttons to reinstall everything you’ve bought.)

As for the second question: Prior to Snow Leopard, we recommended a clean install. But when Snow Leopard came along, its Setup Assistant and Migration Assistant features generally didn’t transfer incompatible software and plug-ins. Lion and Mountain Lion can even detect some incompatible programs and system add-ons the first time you log in.

What about stuff the installer and Setup Assistant don’t catch? We’ve installed 10.8 many times over a variety of Lion, Snow Leopard, and Leopard installations, and we’ve had little trouble that we could trace directly to incompatibilities with transferred code. Based on our experience, as long as you’ve properly prepared your Mac before installing Mountain Lion, you should be just fine installing directly over Lion or Snow Leopard. (In fact, because Mountain Lion and Lion share so much code, the upgrade from Lion to Mountain Lion entails even less risk than upgrading from Snow Leopard.)

There are, however, a couple situations in which you might consider a clean install. The first is if you’ve done some funky partitioning of your Mac’s startup drive that prevents the Mountain Lion installer from creating the special [Recovery HD partition](#). Given how useful recovery mode is in Mountain Lion, we recommend performing a clean install (with a complete backup) just so you can erase your Mac’s drive and restore it to a standard configuration that allows the installer to create the Recovery HD partition. (If you don’t want to reinstall everything manually afterward, use Setup or Migration Assistant to transfer your data, applications, and the like from your backup to the new installation, as described above.)

The other instance is if you’ve been using your Mac for a while, installing and deleting lots of apps and OS add-ons, and your hard drive is littered with unnecessary gunk: orphaned app-support files, abandoned preference panes, and the like. A major new OS X version is a great time for some spring cleaning. Of course, if you perform a clean install for this purpose, you don’t want to use Setup or Migration Assistant to bring everything over from your backup. Instead, you should manually copy your personal data, and then reinstall just those apps and add-ons you actually use. (*Macworld* senior contributor Joe Kissell talks extensively about such procedures in [Take Control of Upgrading to Mountain Lion](#).)

Once you've purchased and downloaded the Mountain Lion installer, here are the simple steps involved in installing the new OS:

1. Double-click the Install OS X Mountain Lion app; in the window that appears, click Continue, and then click Agree to agree to the software license agreement.
2. On the next screen, choose where to install the OS. By default, only your internal startup drive is listed; if you have other drives connected and want to install Mountain Lion on one of them, click the Show All Disks button, and then choose the desired drive. Note that the installer lets you choose any drive that has OS X 10.6.8 or later installed *or* any blank drive—the latter is what you would choose for a clean install that contains none of your data, applications, or settings from your current installation of Snow Leopard or Lion.

In either case, the destination drive must also be formatted as Mac OS Extended (Journaled) and must use a GUID partition table; the built-in drive on any Mac eligible to run Mountain Lion should meet these requirements.

3. Click Install, and then provide an admin-level username and password when prompted.

The installer will spend some time preparing for installation; over many test installations on several different Mac models, we found that the process rarely took more than a few minutes. A message in the installer window states that your computer will restart automatically; you can continue to work in other applications during this time, but once the preparation phase is finished, you get only a 30-second warning, and then your Mac will indeed restart on its own.

After your Mac restarts, the actual installation occurs. During our test installs, this process took roughly 15 to 25 minutes, depending on the Mac. (Note that if you're upgrading from Lion and you have FileVault 2 enabled, when the installer restarts your Mac, you need to provide an authorized username and password to bypass the FileVault lock screen at startup. Once you do, installation continues normally.)

That's it—unlike older OS X installers, Mountain Lion's installer doesn't make you decide what kind of installation you want to do, which language translations or printer drivers to install, or whether you'll ever use X11 or QuickTime 7. The installation procedure is easier and quicker than ever.

Set Up Mountain Lion

When the installation procedure finishes, what you see depends on whether you've installed Mountain Lion on a blank drive or on a drive containing Lion or Snow Leopard with existing accounts, settings, and data.

If You Upgraded from Lion

If you've upgraded from Lion (or installed 10.8 onto a blank drive and imported your Lion data and settings), the first thing you see when you log in to your account under Mountain Lion depends on whether you were already using iCloud under Lion. If you were, and if you had Location Services and Find My Mac enabled, there's a good chance you can get right to work with no further interruptions.

If you didn't already have iCloud configured under Lion, or if you did but hadn't enabled Location Services and Find My Mac, your initial experience will be much like the one we describe for Snow Leopard upgraders below.

If You Upgraded from Snow Leopard

If you've upgraded from Snow Leopard (or installed 10.8 onto a blank drive and imported your Snow Leopard data and settings), the first thing you see when you log in to your account under Mountain Lion is an Apple ID screen. Enter your Apple ID and password—you can create an Apple ID if you don't have one—and agree to the Apple ID Terms and Conditions, and you're prompted to set up iCloud. Assuming you want to do so, click Continue (twice). You're then prompted to enable Find My Mac using your iCloud account; if you choose to do so, you must also allow Location Services. Finally, you see a Thank You screen with a button that says Start Using Your Mac.

Note that if you want to use different Apple IDs for iCloud and iTunes, the Mountain Lion setup assistant lets you do so. On the first Apple ID screen, click the link that reads "Want to use different Apple IDs for iCloud and iTunes?" Follow the prompts to enter your credentials.

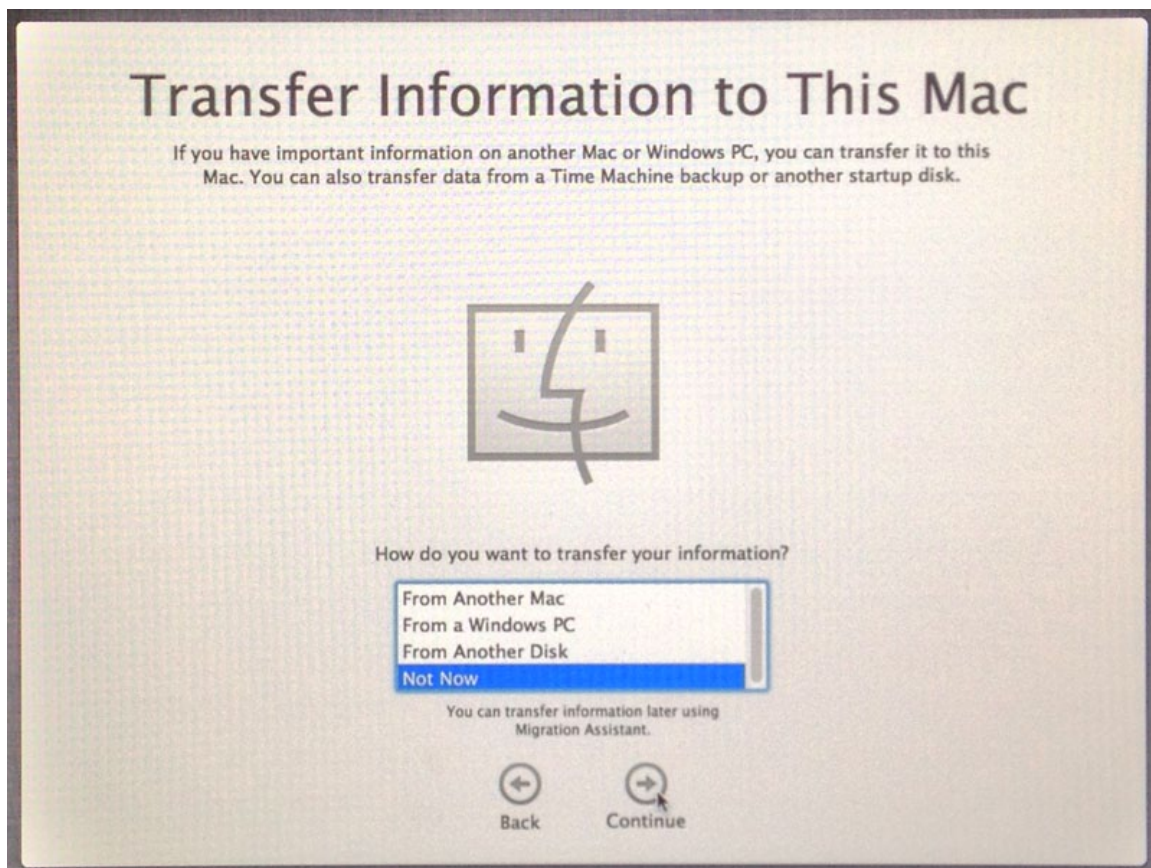
If You Installed on a Blank Drive

If you've installed Mountain Lion on a blank drive, the OS walks you through the new-system-setup procedure. First choose a system language and keyboard layout. Next choose a Wi-Fi network and provide the network password. (Click Other Network Options to use Ethernet instead.) The installer then asks if you want to transfer accounts and data from another Mac, a Windows PC, or another drive (which includes a Time Machine or clone backup). If you choose to do so, the installer gives you the option to choose what to transfer—unless you really want to start anew, you probably want to transfer everything.

TIP: LOOK OUT FOR INCOMPATIBLE SOFTWARE

If you upgraded a Snow Leopard or Lion Mac, the first time you boot into Mountain Lion, you may see a dialog box informing you that some of the existing software on your Mac is incompatible, and listing that software. (Apple provides more information about such software in [a support article](#).)

You'll usually see this message if you had kernel extensions—low-level software that patches the operating system itself—installed under Snow Leopard or Lion that Apple specifically knows won't work with Mountain Lion. It's also possible that you'll see this dialog box if you installed Mountain Lion onto a blank drive and then transferred data from another Mac or drive, but it's less likely—OS X's Migration Assistant generally doesn't import kernel extensions and similar software responsible for low-level processes. In either case, OS X automatically moves this incompatible software to a folder called Incompatible Software at the root level of your startup drive.



TRANSFER AWAY After installing Mountain Lion on a blank drive, you can transfer your data from another Mac, a Windows PC, another hard drive, or a Time Machine backup.

If you opt to transfer accounts and settings from a Snow Leopard or Lion Mac or drive, the setup procedure continues much as if you were upgrading from Snow Leopard or Lion, respectively. If you choose not to transfer—so you're essentially starting fresh—the installer asks you to enable Location Services, provide your Apple ID and password (and agree to the Apple ID terms and conditions), set up iCloud, and (assuming you enabled iCloud) enable Find My Mac and allow it to use your location. You then need to create a user account and password, as well as configure a few options for that account. After that, you set your time zone and, optionally, register your Mac. Finally, the aforementioned Thank You screen appears—click Start Using Your Mac to proceed.

Post-Install Tasks

Once you're up and running in Mountain Lion, you're almost done. You may find that, despite your preinstallation checks, some of your existing software needs updates. Similarly, if you've performed a clean install of Mountain Lion (onto a blank drive without transferring accounts and data), you need to spend a bit of time setting things up and reinstalling all your favorite apps. In either case, here are some things to check.

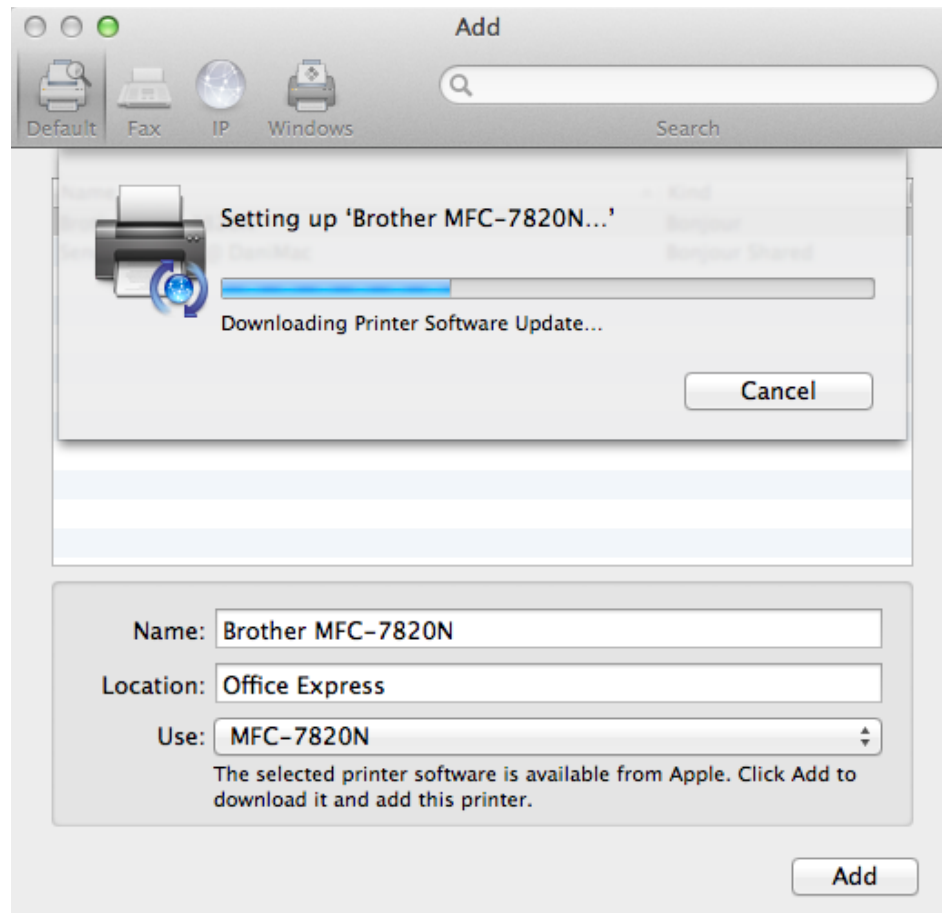
Check (Again) for Updates

The first thing to do is choose Software Update (from the Apple menu) to open the Mac App Store app and install any pending OS updates. If you've installed Mountain Lion in the first few days of availability, chances are you won't have any (especially if you checked for updates to Lion or Snow Leopard immediately before upgrading, so you already have the latest updates to other Apple software), but it can't hurt to make sure. And if you've waited several weeks or more to install Mountain Lion, there's a good chance Apple will have released a minor update—or will do so sometime soon.

Even if no updates to Mountain Lion itself are available, you may find that, after you install OS X 10.8, a firmware update is available for your Mac. For example, some Mac laptops require a firmware update to support Mountain Lion's new Power Nap feature.

Set Up Printers

If you didn't upgrade from an already-configured installation of Lion or Snow Leopard, you'll want to set up your printer(s). As with Snow Leopard and Lion, Mountain Lion doesn't include many printer drivers; rather, when you set up a printer, the OS determines which drivers you need and, if necessary, either downloads them automatically or helps you get them.



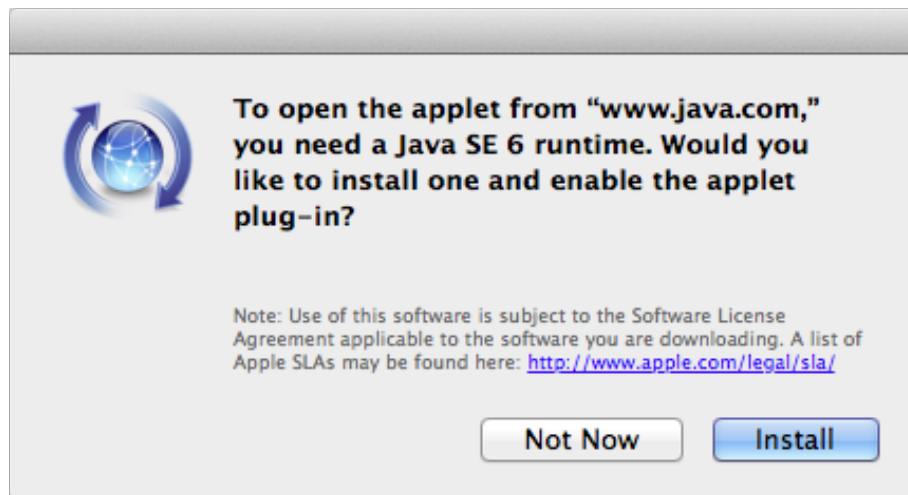
PRINTER PRELOAD Mountain Lion can automatically download the latest drivers for many recent printers.

Open the Print & Scan pane of System Preferences and click the plus-sign button (+) to add a printer, and a list of connected and nearby (Bonjour) printers pops up. Choose one, and OS X checks to see if drivers are available for that printer. If it finds any, the bottom of the Add window likely displays the message “The selected printer software is available from Apple. Click Add to download it and add this printer.” Click Add, and OS X proceeds to download the software and set up the printer.

Check for Incompatible Software and Install Apps

If you saw the aforementioned incompatible-software dialog box, now’s a good time to check the contents of the Incompatible Software folder at the root level of your startup drive, and then check each vendor’s website for updated versions of that software. Similarly, if you performed a clean install—installed Mountain Lion onto a blank drive and didn’t transfer accounts, applications, and data—it’s time to reinstall your apps. Just make sure you’ve got the latest versions, as well as any updates for software you install from CDs and DVDs.

One compatibility issue of note is that if you upgraded from Lion or Snow Leopard and you had Adobe's Flash Player 10.3 or later installed, it will work fine after upgrading; however, if you had a version prior to 10.3 installed, the installer will remove Flash and you'll be instructed to download the latest version.



THE WORLD OF JAVA If you need Java for an application, OS X will prompt you to download it.

Note that the first time you try to load a webpage or run an app that requires Java, Mountain Lion prompts you to download and install the Java runtime, even if you upgraded from Snow Leopard or Lion and you'd previously installed Java. This is normal—you shouldn't worry that you somehow lost any of your data or apps.

Enable FileVault

If you want to use [FileVault](#), OS X's disk-encryption feature, but it's not enabled, now's the time to turn it on, via the Security pane of System Preferences.

Configure Your Services

On several Macs—but not all—that we upgraded from Lion to Mountain Lion, the first time we logged in to the new OS, we were alerted that Location Services and Sharing had been disabled. You may not see these messages, but it's a good idea to take a quick look at the Sharing pane of System Preferences, as well as the Privacy tab of the Security pane. If any of these services have been disabled, and you want to use them, turn them on now.

Upgrade and Installation Challenges

For most people, Mountain Lion—like Lion before it—is easy enough to get and easy to install. But, also as with Lion, upgrading to OS X 10.8 presents challenges for a few specific situations.

Mountain Lion-Compatible Macs That Are Still Running Leopard (OS X 10.5)

A few Mac models that originally shipped with OS X 10.5 are compatible with Mountain Lion. Though probably not many Macs that are still running Leopard will be upgraded to Mountain Lion, there may be a few cases in which their owners want to make the jump directly. Similarly, if you have one of these Macs and you ever have to use your system-restore disc to reinstall the OS, you'll be running Leopard, without a simple way to get directly to Mountain Lion. If you really do need to upgrade from OS X 10.5 to 10.8, Apple's official policy is that you need acquire Snow Leopard (which you can get via Apple Support or a third-party online retailer) and install it before upgrading to Mountain Lion. And it's more than just policy: The Mountain Lion installer won't let you install Mountain Lion onto a drive, or from a Mac, that's running Leopard. But we've got a solution for you; see the "[Install Mountain Lion over Leopard](#)" chapter for more details. It's not a simple procedure, but it works.

If You Have a Slow or Limited-Bandwidth Internet Connection

If your Internet connection is slow, it will take a *long* time—perhaps days—to download the Mountain Lion installer. Even worse, if your ISP enforces caps on your Internet-data usage, you could end up paying a hefty price for the privilege.

If you've got a Mac laptop, you can instead tote it to your favorite Apple retailer, the library, a friend's house, or the office—anywhere with a fast Internet connection—and download the Mountain Lion installer there. In fact, when Lion was released, Apple's official policy was to invite you to your local Apple Store, where you could use the store's Internet connection to download Lion; store employees would even walk you through the purchase, download, and installation processes. That will likely be the case with Mountain Lion as well. (Last year, Apple made available a \$69 bootable flash drive containing the Lion installer; sadly, the company says it will not be doing the same thing for Mountain Lion.)

Of course, if your Mac doesn't happen to be portable, or if you live in an area where you can't borrow a fast, cheap Internet connection, you'll need to find another solution. If you've got an Apple Store nearby, you may be able to take a portable hard drive or an 8GB or larger thumb drive to the store and ask to purchase and download the installer on one of the store's Macs; similarly, you could borrow a friend's computer, or—if you're lucky enough to have a Mac at the office—use your work computer to download Mountain Lion.

Businesses, Schools, and Other Organizations and Institutions That Need to Install Mountain Lion on Many Different Computers

When Apple released Lion last year, we heard concerns from large installations—schools, businesses, and the like—about the Mac App Store–only distribution. These organizations often need to roll out new versions of OS X to many Macs, and forcing each individual user to download and install Lion presented significant technical, logistical, and support issues. OS X 10.8 presents the same challenges. Apple's solution is [a volume-purchase program](#): While organizations will use the same purchasing procedure as always to buy OS X, they'll receive a single Mountain Lion redemption code for a volume-purchase contract. After using the code to download the Mountain Lion installer from the Mac App Store, they can use that copy of the installer on any and all Macs covered by the contract. For example, IT personnel could copy the Mountain Lion installer to the /Applications folder on each Mac and then run the installer from there, or they could create a NetInstall or NetRestore image or use Apple Remote Desktop. They could also create one or more bootable Mountain Lion install discs or drives and then install the OS using those. (See the "[Create a Bootable Installer Drive](#)" chapter for more details.)

Purring Along

While researching this book, we installed literally dozens of copies of OS X 10.8 on a variety of Macs. As with Lion, our experience has been that for the typical Mac user with a broadband connection, the process of purchasing, obtaining, and installing Mountain Lion is easy and relatively pain-free. Still, heeding the advice above will reduce the chances of problems and make the upgrade go as smoothly as possible.

Create a Bootable Installer Drive



BE SAFE AND BACK UP Make a bootable copy of the Mountain Lion installer, and you'll be able to reinstall Mountain Lion easily if you need to.

Though Mountain Lion is available only as an installer app from the Mac App Store, there are a number of reasons you might want a bootable Mountain Lion installer on an external hard drive or a thumb drive (USB stick).

For example, if you want to install Mountain Lion on multiple Macs, a bootable installer drive can be more convenient than downloading or copying the entire Mountain Lion installer to each computer. Also, if your Mac is experiencing problems, a bootable installer drive makes a handy emergency disk. (Mountain Lion's recovery feature, also called OS X Recovery, is a big help here, but, as explained in the "[Hands-on with Recovery Mode](#)" chapter, some Macs don't get it—and if your Mac's drive is itself having trouble, recovery mode may not even be available. Also, if you need to reinstall Mountain Lion, recovery mode requires that you download the entire 4GB-plus installer again.) Finally, if you need to [install Mountain Lion over Leopard](#)—assuming you have the license to do so—a bootable installer drive makes it easier.

Thankfully, it's easy to create a bootable installer drive from the Mountain Lion installer that you download from the Mac App Store.

As an aside, though it's possible to make a Mountain Lion installer DVD, it's not the best option. More and more Macs ship without a built-in optical drive; booting and installing from a DVD is very slow; and you can buy an 8GB flash drive for \$10 or less—there's little reason to opt for a DVD anymore. In addition, you can easily update a USB stick or external hard drive each time Apple releases an update to Mac OS X, as explained below; with a DVD, you have to toss the disc in the trash and start over, which is both a hassle and bad for the environment.

Note: As explained in the “[Install Mountain Lion](#)” chapter, if you leave the Mountain Lion installer in its default location in the Applications folder when you install OS X 10.8, the installer will be deleted during the installation process. So if you plan to use that installer on other Macs, or, as in this case, to create a bootable drive, make sure you copy the installer to another drive, or at least move it out of the Applications folder, before you install. If you don't, you'll have to redownload the installer from the Mac App Store before you can create a bootable installer drive.

Get the Latest Mountain Lion Installer

Before you make a bootable installer drive, you should make sure you have the latest version of the Mountain Lion installer. When you download the installer from the Mac App Store, that copy of the installer installs whatever version of OS X was available at the time of download. For example, if you downloaded OS X 10.8 the day of Mountain Lion's release, you got the 10.8.0 installer. That also means a bootable installer drive created from that installer will install OS X 10.8.0.

But Apple regularly updates the Mountain Lion installer on the Mac App Store so that it installs the latest version of OS X 10.8. For example, when Apple releases the inevitable 10.8.1 update, a few days later the Mac App Store will provide an updated Mountain Lion installer that installs 10.8.1 right off the bat. Using an updated installer is convenient, because it means that if you ever need to reinstall Mountain Lion, you won't have to install 10.8.0 and then immediately install the latest big update.



CHECK THE STORE The Mac App Store displays details about the current version of the Mountain Lion installer.

This means you want to create your bootable installer drive using the latest version of the Mountain Lion installer. However, unlike with other Mac App Store–purchased software, the Mac App Store does not update the copy of the Mountain Lion installer app on your hard drive. If you’ve got an older version of the installer and you want the latest version, you must redownload Mountain Lion from the Mac App Store. (If the Mac App Store won’t let you redownload the installer, quit the Mac App Store app, relaunch it, and Option-click the Purchases tab in the toolbar; the Download button should then appear next to Mountain Lion in the Purchases list.)

Similarly, if you create an installer drive and later download an updated version of the Mountain Lion installer, you’ll have to update that installer drive by erasing it and repeating the procedure below.

How do you know which version of the Mountain Lion installer you have? A file inside the Mountain Lion installer contains this info, but getting to it and viewing it is messy. The easiest approach is to simply look at the Information box on the Mountain Lion page in the Mac App Store, and check the date next to Updated. Then locate your downloaded copy of the Mountain Lion installer in the Finder, choose File -> Get Info, and look at the date next to Modified. If the Mac App Store date is newer than the Modified date on your copy of the installer, you need to redownload the installer to get the latest version. (The version listed in the Mac App Store’s Information box is the version of OS X you’ll get if you download the installer.)

TIP: CHECK INSTALLER COMPATIBILITY

The initial Mac App Store version of Mountain Lion will boot only those Macs released prior to Mountain Lion's debut—Macs released after Mountain Lion's debut will ship with a newer version of Mountain Lion preinstalled. This means that if you make a bootable installer drive right when Mountain Lion debuts, and then later buy a new Mac, your installer drive won't boot that Mac. However, as explained above, Apple regularly updates the Mountain Lion installer on the Mac App Store so that it installs the latest version of OS X 10.8. If you create a new bootable installer using the next major update to Mountain Lion after your Mac's release date, it should be able to boot all your Macs.

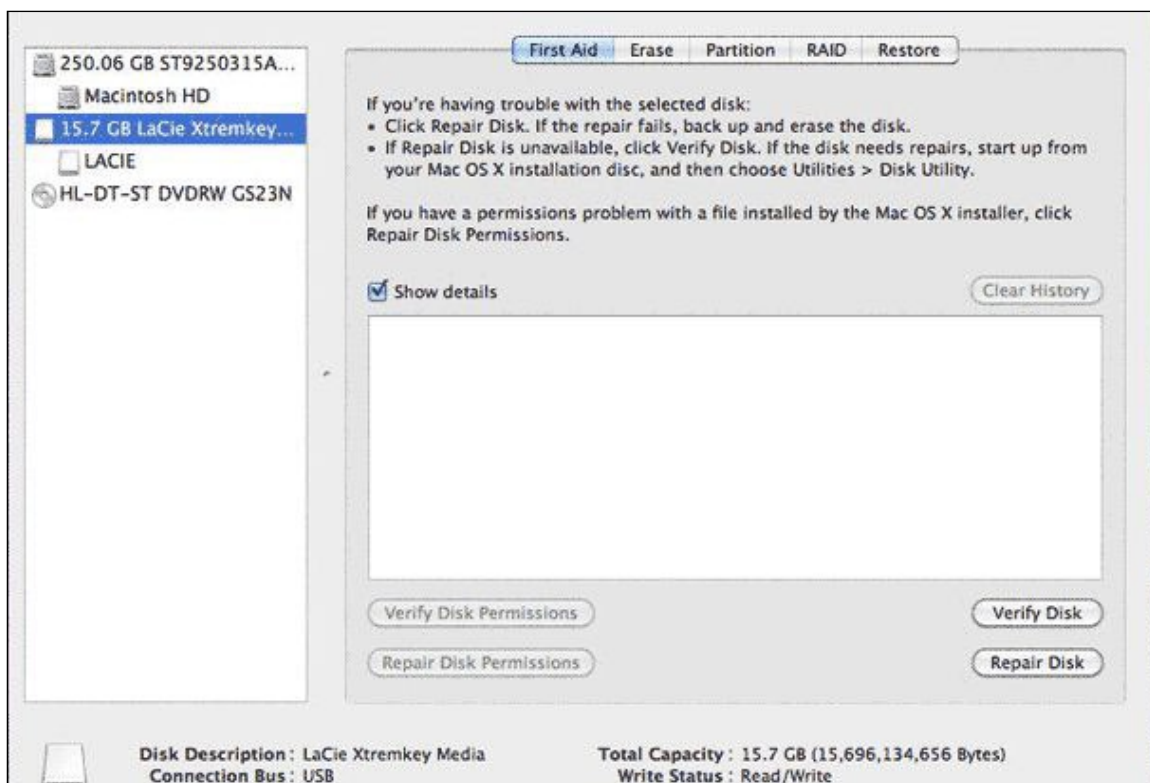
There's a catch, however: Recent Macs are designed to let you reinstall the OS using a feature called Internet Recovery (see the "[Hands-on with Recovery Mode](#)" chapter). So if you buy a new Mac post-Mountain Lion, and you haven't purchased Mountain Lion for another Mac, you can't download the Mountain Lion installer from the Mac App Store. We published an article for Lion [explaining how to create a bootable installer drive for newer Macs](#); once Apple starts shipping Macs with a Mountain Lion version of Internet Recovery, we'll update those instructions for Mountain Lion.

Create a Mountain Lion Installer Drive

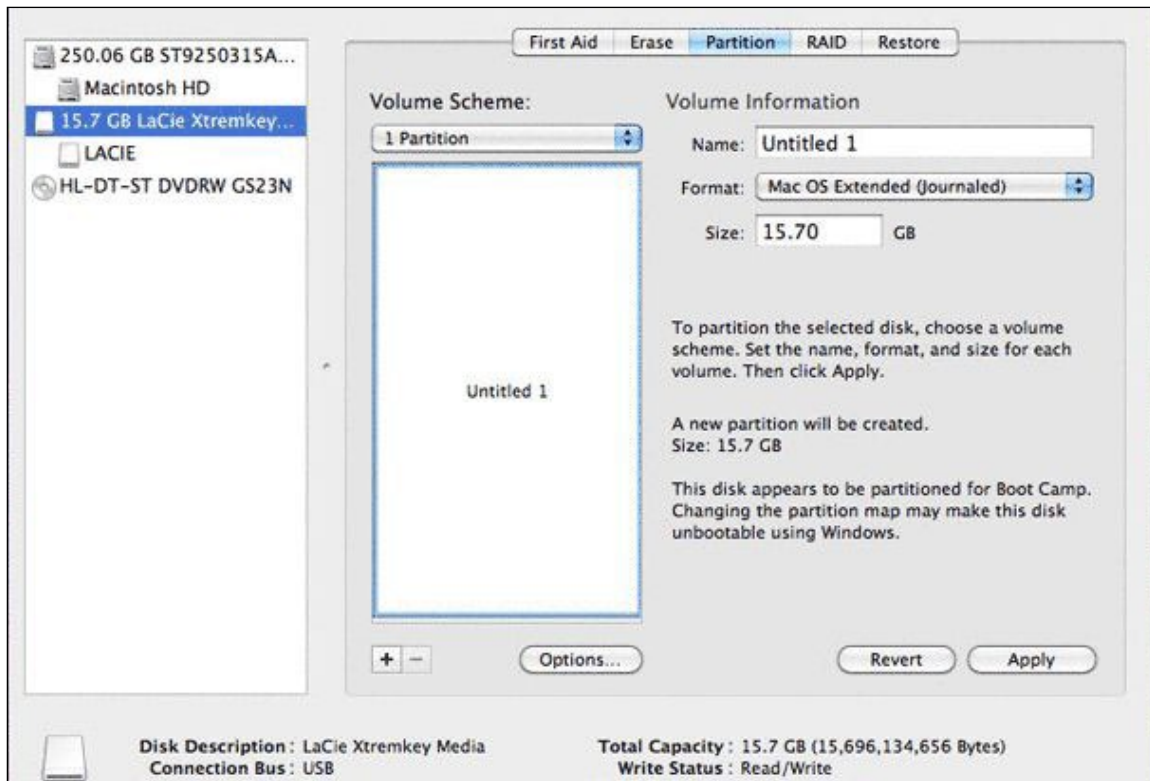
There are a couple ways you can create a bootable installer drive: using OS X's own Disk Utility or using the third-party app Carbon Copy Cloner. The latter is easier, but the former doesn't require you to download third-party software. (The developer of [Lion DiskMaker](#) has updated that utility to support Mountain Lion, giving you yet another option.)

Format Your Drive

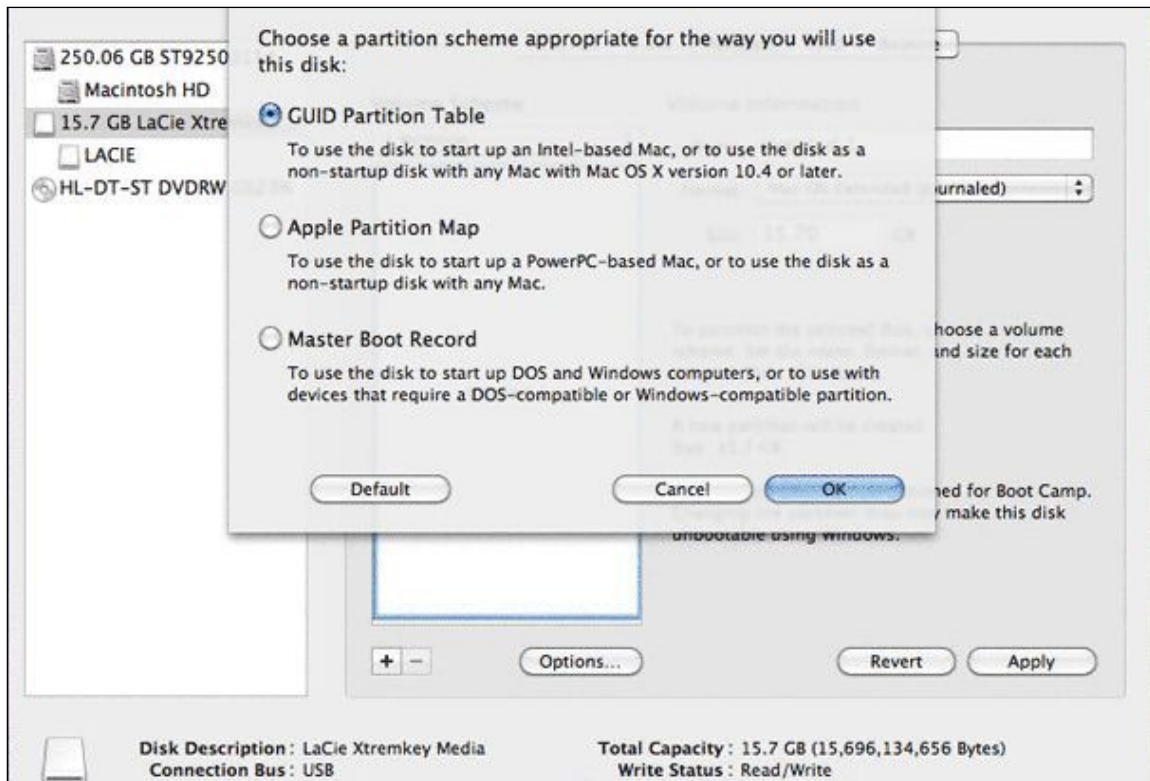
Whichever method you use, you need a hard drive or thumb drive (USB stick) at least 5GB in size (an 8GB flash drive works well), and it must be formatted with a GUID partition table. Here are the steps to format the drive properly:



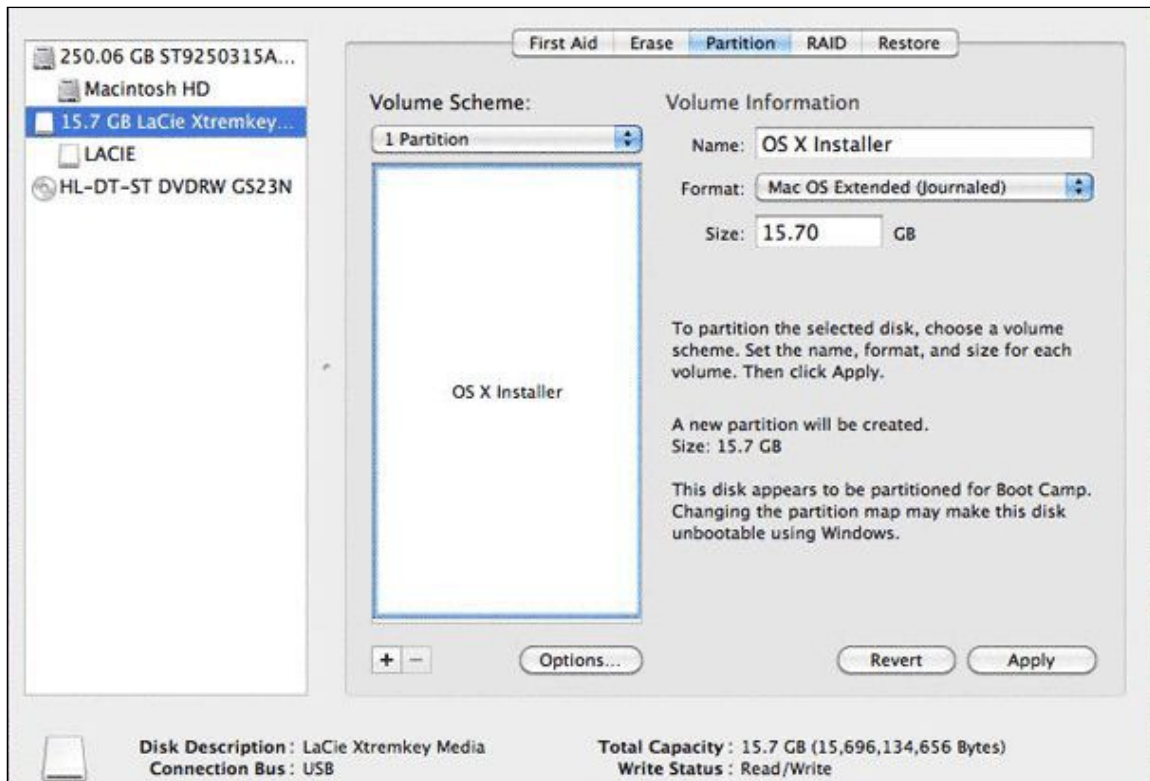
1. Plug in the drive and, once it has mounted, open Disk Utility (/Applications/Utilities). In Disk Utility, select the drive (not any of its partitions, which appear in an indented list beneath it), and then click the Partition tab on the right.



2. In the Partition Layout pop-up menu, choose 1 Partition; alternatively, if you have a drive with enough space, you can create multiple partitions—just make sure you create at least one partition that is 8GB or larger.



3. Once you've defined your partitions, click Options below the Partition Layout display. Select GUID Partition Table and click OK. (This ensures the drive will be able to boot your Mac.)

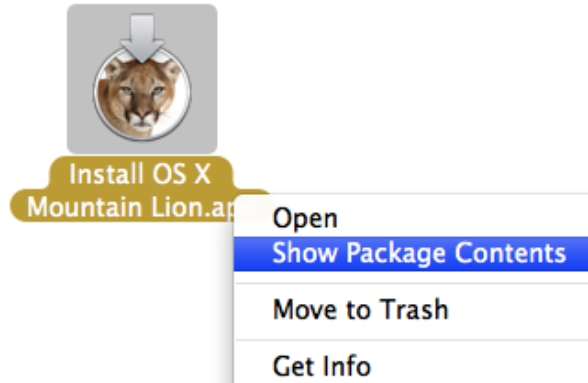


4. Back in the main window, under Volume Information, give your partition a new name, such as OS X Installer. From the Format pop-up menu, choose Mac OS X Extended (Journaled). Click Apply, click Partition in the dialog box that appears, and wait for the formatting process to finish.

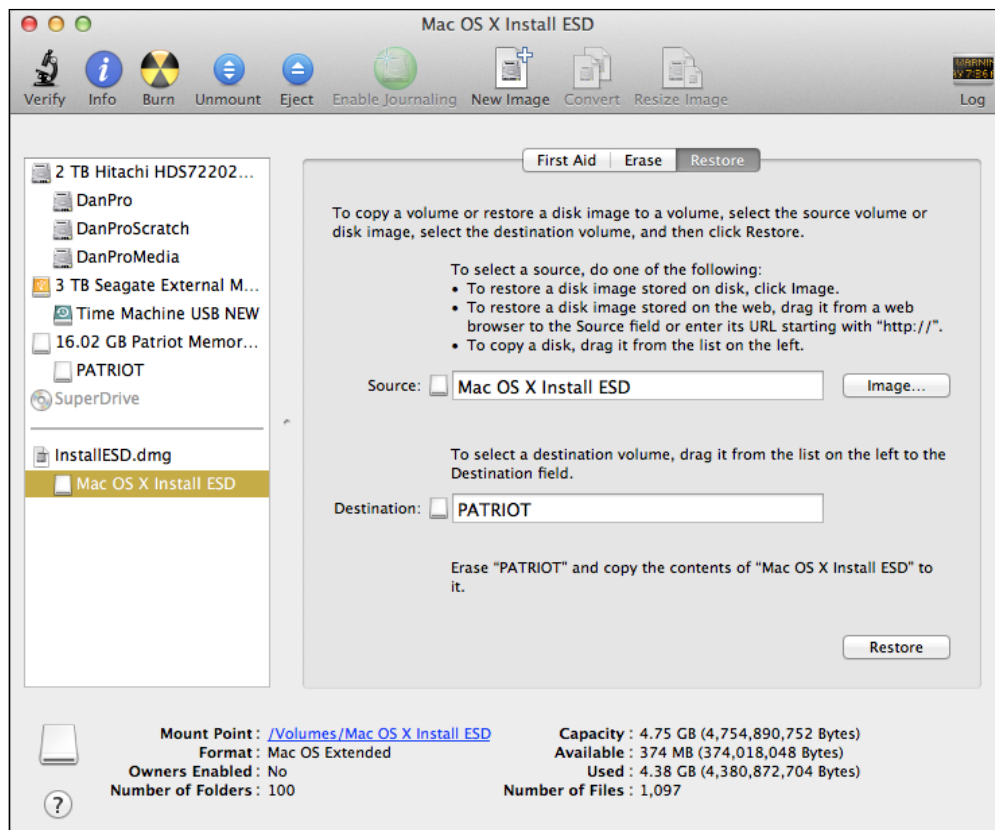
Use Disk Utility to Create a Bootable Drive

Here are the steps for using Disk Utility to create your installer drive:

1. Once you've purchased Mountain Lion, find the installer on your Mac. It's called Install OS X Mountain Lion.app, and the App Store should have downloaded it to your main Applications folder (/Applications).
2. Control-click (or right-click) the installer, and choose Show Package Contents from the resulting contextual menu.



3. In the folder that appears, open Contents, and then open Shared Support; you'll see a disk-image file called InstallESD.dmg.
4. Launch Disk Utility.
5. Drag the InstallESD.dmg disk image into the bottom (empty) area of Disk Utility's sidebar (on the left).
6. In Disk Utility, select InstallESD.dmg in the sidebar, and then click the Open button in the toolbar to mount the disk image's volume in the Finder. The mounted volume is called Mac OS X Install ESD, and it appears below InstallESD.dmg in Disk Utility.
7. Select Mac OS X Install ESD in Disk Utility's sidebar, and then click the Restore button in the main part of the window.
8. Drag the Mac OS X Install ESD icon into the Source field on the right (if it isn't already there).
9. Connect to your Mac the correctly formatted hard drive or flash drive you want to use for your bootable Mountain Lion installer. (If you haven't formatted your drive yet, see the "Format Your Drive" section above.)



10. In Disk Utility, find the destination drive in the left sidebar, and then drag it into the Destination field on the right. (If the destination drive has multiple partitions, just drag the partition you want to use as your bootable installer volume.) Warning: The next step erases the destination drive or partition, so make sure that volume doesn't contain any valuable data.

11. Click Restore, and then, in the dialog box that appears, click Erase; if prompted, enter an admin-level user-name and password.

The restore procedure takes roughly five to ten minutes, depending on your Mac and the speed of your drive(s).

Use Carbon Copy Cloner to Create a Bootable Drive

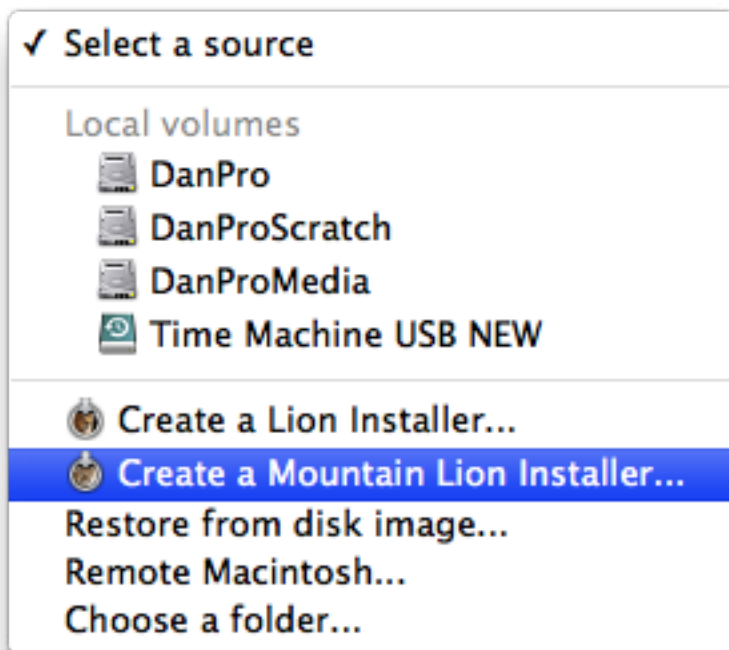
Version 3.5 or later of this excellent clone-backup utility includes a special feature for creating a bootable installer drive. (Carbon Copy Cloner is free to try; you can purchase a license for \$40.) Once you've [downloaded Carbon Copy Cloner from the developer's website](#)—or, if you already had it, once you've checked to make sure you've got the latest version—follow these steps:

1. Find the Mountain Lion installer on your Mac. It's called Install OS X Mountain Lion.app, and it should have been downloaded to your main Applications folder (/Applications). Note that Carbon Copy Cloner requires that

the installer be located in the Applications folder on your boot drive, which means that if you followed our advice to move the installer out of your Applications folder, you'll have to move it back, at least temporarily.

2. Connect to your Mac the properly formatted hard drive or flash drive you want to use for your bootable Mountain Lion installer.

3. Launch Carbon Copy Cloner.



4. In the Source pop-up menu (labeled Select A Source), choose Create A Mountain Lion Installer. (This mounts the InstallESD.dmg disk image, mentioned above, and selects it as the source volume.)

5. In the Destination pop-up menu (labeled Select A Destination), choose the drive you're using for your bootable installer.

6. In the Handling Of Data Already On The Destination pop-up menu, choose Delete Anything That Doesn't Exist On The Source. Warning: The next step effectively erases the destination drive or partition, so make sure it doesn't contain any valuable data.

7. Click Clone, and then click Continue in the warning dialog box that appears. When prompted, provide an administrator username and password.

As is the case when you create a bootable installer drive using Disk Utility, the process takes roughly five to ten minutes. One difference here: Whereas Disk Utility names your bootable drive Mac OS X Install ESD, Carbon Copy Cloner keeps the drive's original name.

Boot from the Installer Drive

You can now boot any Mountain Lion-compatible Mac from this drive: Just connect the drive to your Mac and either (if your Mac is already booted into OS X) choose your installer drive in the Startup Disk pane of System Preferences or (if your Mac is currently shut down) hold down the Option key at startup and choose the installer drive when OS X's Startup Manager appears.

When you boot your Mac from the installer drive, you can, of course, install the OS, but you can also use any of the Mountain Lion installer's special recovery and restore features—in fact, when you boot from this drive, you'll see the same OS X Utilities screen you get when you boot into OS X Recovery (recovery mode). However, unlike the Restore HD partition used by recovery mode, your bootable installer includes the entire Mountain Lion installer.

Install Mountain Lion over Leopard



NO-GO Installing Mountain Lion over Leopard isn't as easy as installing over Snow Leopard.

As we explained earlier in this book, one of the requirements for installing OS X 10.8 is that you already have at least Snow Leopard (Mac OS X 10.6) installed. (Specifically, Mountain Lion requires OS X 10.6.8 or later.) The main practical reason for this requirement is that Mountain Lion is available only via the Mac App Store, and

the Mac App Store debuted in Mac OS X 10.6. In other words, you need Snow Leopard or Lion just to be able to purchase and download Mountain Lion. (In addition, Apple made changes in OS X 10.6.8 specifically to avoid upgrade problems.)

But once you've got your copy of Mountain Lion, can you install it on a Mac or an external drive containing Leopard (Mac OS X 10.5)?

Understand the License Agreement

The software license you agree to when you install Mountain Lion states that you can “download, install, use and run for personal, non-commercial use, one (1) copy of the [OS X] directly on each Apple-branded computer running OS X Lion or OS X Snow Leopard . . . that you own or control.” In other words, if your Mac shipped with Lion or Snow Leopard, you can install Mountain Lion. If your Mac shipped with Leopard or Tiger (Mac OS X 10.4), but you later purchased and installed Snow Leopard, you can install Mountain Lion. If your Mac doesn't at least have Snow Leopard installed, you can't install Mountain Lion.

That seems pretty clear. But what if, for example, you've got a family-pack license for Snow Leopard, and you have a Mac that shipped with Leopard but has never been upgraded to Snow Leopard? The Mountain Lion license agreement says that even if that Mac is compatible, you can't upgrade to 10.8 until you first install Snow Leopard (or Lion, which itself requires the installation of Snow Leopard first).

This is just one scenario—there are a number of situations in which you might have Leopard on a Mac or an external drive, along with a valid license for Snow Leopard, and you'd rather not take the interim step of installing Snow Leopard just to upgrade to Mountain Lion. Having performed this two-step upgrade many times while researching Mountain Lion installation, we can tell you that it's a real hassle.

The Practical and Technical Questions

But let's take a step back. While the letter of the law says you need to install Snow Leopard before installing Mountain Lion, the spirit of the law seems to be that a particular Mac just needs a *license* for Snow Leopard before you can upgrade it. In other words, in our view, you should be well within your rights to install Mountain Lion on any of your computers for which you have a valid, current Snow Leopard license—even if you don't actually install Snow Leopard first. So then the question becomes whether there are any technical reasons you can't install Mountain Lion over Leopard.

In our testing with many Macs, the Mountain Lion installer refuses to install onto a drive containing Leopard; in fact, the installer refuses to install on any drive running a version of Mac OS X below 10.6.8—just as the official system requirements claim. The installer will, however, install onto a blank drive, so clearly Mountain Lion doesn't need any of Snow Leopard's files or settings.

You may be thinking, “If it will install onto a blank drive, I'll just copy the installer to my Leopard-equipped Mac, connect an empty drive, install the new OS there, and then migrate my files over to the drive.” Alas, while you can freely install the Mountain Lion installer onto a blank drive, you must still *run* the installer from within Snow Leopard, Lion, or Mountain Lion.

Three Ways to Install Mountain Lion over Leopard

So how *can* you install Mountain Lion over Leopard? There are three ways: the official way, the brute-force method, and the quick-but-technical way. Whichever method you choose, you should—as with any OS installation—be sure to have an up-to-date, well-tested backup of your drive before you begin.

Note that two Mountain Lion-compatible Macs—the Mid 2007 iMac and the Mid/Late 2007 MacBook Pro—shipped with Tiger (Mac OS X 10.4). If you’ve got one of these Macs, still running Tiger, and you’re determined to upgrade it to Mountain Lion, the first two methods below (official and brute force) will work; the third method (technical) will not.

The Official Way

As we explained above, Apple’s official policy is that if you want to install Mountain Lion over Leopard—assuming, of course, that the Mac in question meets the system requirements for Mountain Lion—you must first install Snow Leopard, and then install Mountain Lion. This approach works fine, it’s fairly easy to do (if a bit time-consuming), and it gets the Apple seal of approval.

Upgrade with Brute Force

What if you don’t want to install Snow Leopard first or don’t have your Snow Leopard disc handy? We’re not trying to be coy here—it’s quite possible you’ve misplaced the disc, or maybe you’re on the road and you’ve got your Mac’s original Leopard disc with you as an emergency boot disc, but you don’t have your Snow Leopard upgrade disc.

As we mentioned above, the Mountain Lion installer will let you install onto an empty drive as long as you’re running the installer itself under Snow Leopard, Lion, or Mountain Lion. This means as long as you have a good backup, a 5GB or larger thumb drive or external drive, and either an already-downloaded copy of the installer or access to a Mac running Snow Leopard, Lion, or Mountain Lion, you can perform a bit of installer razzle-dazzle.

Specifically, the procedure involves erasing your Mac’s drive, installing Mountain Lion onto it, and then importing all your data from your backup. (If this sounds a lot like a [clean install](#), that’s because it’s essentially the same process.) Here are the steps to take:

1. Make sure you have an up-to-date backup—either a Time Machine backup or a clone backup made using a utility such as [SuperDuper](#) or [Carbon Copy Cloner](#)—of your Leopard Mac’s drive. (For this purpose, we recommend a clone.) Be sure to test this backup to verify that it has your latest data: In the case of a Time Machine backup, try restoring some important recent data from the backup; in the case of a clone backup, boot from the clone to make sure that it boots and that it contains all your data.
2. Use the computer running Snow Leopard or later to download the OS installer from the Mac App Store. (If you’ve already got your copy of the Mountain Lion installer, skip this step.)

CHAPTER 4 Install Mountain Lion over Leopard

3. Create a bootable installer drive using the thumb drive or external drive and our instructions for creating a bootable Mountain Lion installer (see the [“Create a Bootable Installer Drive”](#) chapter).
4. Boot your Leopard Mac from that new installer drive. When you do so, you find yourself looking at a screen called OS X Utilities, with several options. This is the same screen you see if you boot your Mac into OS X Recovery.
5. Select Disk Utility and click Continue, then use Disk Utility to erase your Leopard Mac’s internal drive. To do so, select that drive on the left, click Erase on the right, choose Mac OS X Extended (Journaled) from the Format pop-up menu, and click Erase. *Warning: This step erases all the data on your Mac’s drive, which is why you need that backup.*
6. When the erase procedure is finished, quit Disk Utility to get back to the OS X Utilities screen.
7. Select Reinstall OS X and click Continue to launch the OS X installer and install Mountain Lion on your Mac’s internal drive.
8. After your Mac restarts, installation finishes, and you proceed through the setup process, watch for the Transfer Information To This Mac screen. Choose the third option, From Time Machine Or Another Disk, to transfer all your files from your backup to your new installation of Mountain Lion.

When the transfer process is finished, you can log in to the new version of OS X with all your accounts and data intact.

The Quick Version, for Tech Experts

If you’re comfortable diving into the OS and editing a .plist file, this is the fastest way to install Mountain Lion over Leopard, although, as with the previous method, you need to be able to boot from a Snow Leopard, Lion, or Mountain Lion drive to run the installer.

As we mentioned above, the Mountain Lion installer refuses to install over Leopard Mac. But how does the installer know your drive contains Leopard and not Snow Leopard or later? It turns out that the installer simply checks a particular file—`/System/Library/CoreServices/SystemVersion.plist`—on the destination disk to check the version of OS X currently installed on that disk.

This means that if your Mac is running Leopard, and you’re feeling adventurous, you can edit the `SystemVersion.plist` file so that it claims you’re running, say, 10.6.8. The Mountain Lion installer—which still needs to run on a Mac running Snow Leopard or later—will then install over Leopard without the slightest complaint. Here’s how to do that:

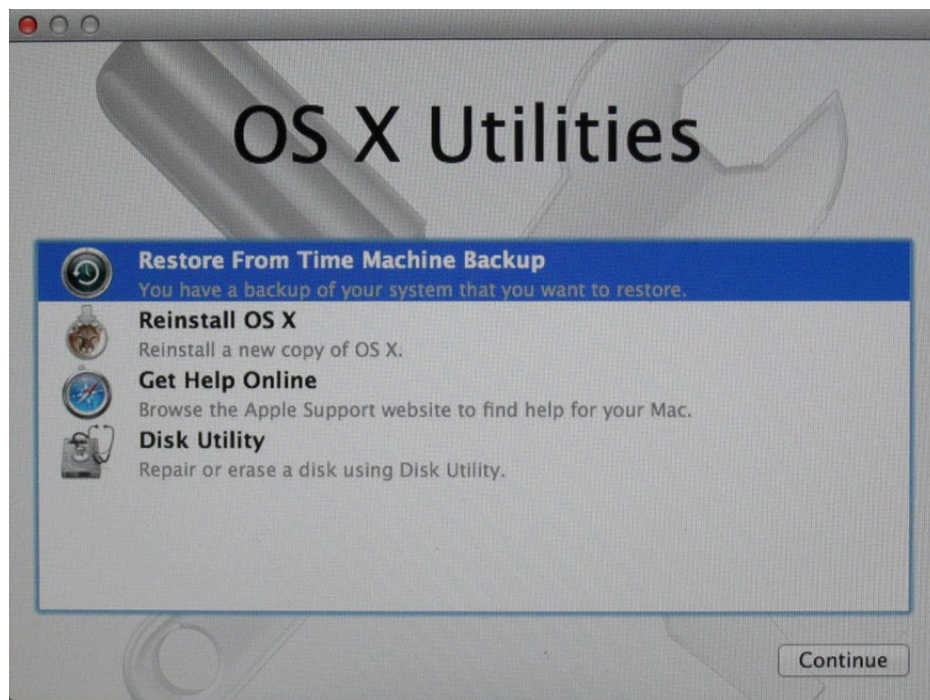
1. On your Leopard-equipped Mac, navigate to `/System/Library/CoreServices`.
2. Using a text editor that lets you enter an admin-user name and password to edit system-level files—such as the *non-Mac App Store* version of TextWrangler ([download link](#))—open the file called `SystemVersion.plist`.

CHAPTER 4 Install Mountain Lion over Leopard

- 3.** Locate the ProductVersion key (not the ProductUserVisibleVersion key). Just below that is a string of numbers indicating the OS version; for example, on a Mac running OS X 10.5.8, it will read 10.5.8.
- 4.** Change that number to **10.6.8**, save the file (providing your admin-level username and password when prompted), and then shut down your Mac.
- 5.** Boot your Mac from a drive running Snow Leopard or later that also contains the OS X installer. If you've created a bootable Mountain Lion installer drive, just boot your Mac from it. When the OS X Utilities screen appears, use the Reinstall OS X option to install onto your Leopard drive. You could instead boot your Leopard Mac from an external drive containing Snow Leopard or later, and then run the installer from there. Another option, if you've got two Macs with FireWire or Thunderbolt, is to boot the Leopard Mac into Target Disk Mode and connect it to your Snow Leopard or later Mac, and then run the installer.

Whichever approach you take, when you're done, you'll have Mountain Lion installed on your formerly Leopard Mac.

Hands-on with Recovery Mode



FIX AND FIDDLE Recovery mode allows you to restore a disk, reinstall OS X, search for solutions online, or repair your hard drive.

A major feature that debuted in Lion (OS X 10.7) and continues in Mountain Lion (OS X 10.8) is one we hope you'll never need to use: *recovery mode*, officially called OS X Recovery. (It was called Lion Recovery in Lion.) When you install Mountain Lion or Lion, the installer creates an invisible, bootable 650MB partition—a portion of a drive that the operating system treats as a separate volume—on your startup drive. Named Recovery HD, this partition includes a few essential utilities for fixing problems, restoring files, browsing the Web, and even reinstalling the operating system.

The idea behind recovery mode is that if you ever have problems with your Mac's startup volume, you can boot from Recovery HD and perform some basic troubleshooting procedures without the need for an OS X installa-

tion DVD or thumb drive, or a separate bootable drive. In fact, because Recovery HD is a separate partition—and one that's invisible even to Disk Utility—recovery mode would be available at startup even if you were to erase your Mac's startup drive.

Of course, because the Recovery HD partition is actually part of your Mac's internal drive or SSD, if that drive is having *hardware* problems or partition-map problems, the recovery partition itself may be inaccessible. In other words, recovery mode won't save you from every problem, and it's no substitute for having a reliable, regularly updated backup. Also, because the Recovery HD volume is read-only, you can't, say, copy your favorite third-party disk utility onto it to make that utility available in recovery mode.

Separate from—but closely related to—OS X Recovery is a feature called OS X *Internet* Recovery, which provides similar features even if you don't have a functioning Recovery HD partition, or if your Mac's drive is damaged or disconnected, or has been replaced with a drive that's missing the Recovery HD partition.

TIP: MISSING THE RECOVERY HD PARTITION?

When you install Mountain Lion on a drive, the installer automatically attempts to repartition that drive to create the invisible Recovery HD partition. (If the drive was previously running Lion and already has a Recovery HD partition, the Mountain Lion installer simply updates the partition's contents.) We say “attempts” because the installer is not always successful. For starters, as Apple [explains](#), the drive must be formatted with a [GUID partition scheme](#) and Mac OS Extended (Journaled) format, and it must be at least 13GB in size. In addition, if your drive has a [nonstandard partition scheme](#)—for example, if it's part of a RAID, or if you partitioned the drive using Boot Camp Assistant and then tweaked the drive's partitions later—the installer won't be able to create a Recovery HD partition. So not everyone will have access to this useful feature.

Unfortunately, if you didn't already have a Recovery HD partition from a previous Lion installation, and the Mountain Lion installer can't create the partition, you can't add it later. Your only option, according to Apple, is to back up your drive (including your Boot Camp partition, if you have one), erase it (repartitioning it as a single-partition, Mac OS Extended [Journaled] volume in the process), reinstall Mountain Lion or Lion, and then restore your data from your backup. If you were using Boot Camp, you'd then use Boot Camp Assistant to set up Boot Camp again, and restore your Boot Camp data.

Alternatively, you could install Mountain Lion or Lion on an external hard drive or thumb drive, which would create a Usable Recovery HD partition on that drive. If you ever needed recovery mode, you could boot into it using that external drive or thumb drive. Apple also offers a utility called [OS X Recovery Disk Assistant](#) that lets you create an OS X Recovery drive on an external drive.

Access Recovery Mode

You can access recovery mode only when your Mac starts up. There are two ways to do so: via a keyboard shortcut or using OS X's Startup Manager.

On most Macs, you can access recovery mode by simply restarting or starting up the Mac while holding down Command-R. Keep holding down these keys until you see a window with *OS X Utilities* in large text across the top.



START ME UP, SCOTTY The Startup Manager displays all possible boot disks along with any available Wi-Fi networks.

If this procedure doesn't work for you, restart or start up your Mac while holding down the Option key; keep holding down Option until the Startup Manager—a gray screen showing all connected bootable volumes—appears. One of the volumes will be called Recovery HD.

If you need to connect to your local network (for example, to access backups on a Time Capsule) or the Internet while in recovery mode (see [“Use Recovery Mode”](#) below), you can use the pop-up menu at the bottom of the screen to choose a local Wi-Fi network; provide the network’s password when prompted. However, you don’t have to perform this step now, as you can also choose a network once your Mac has booted into recovery mode.

Select Recovery HD and click the upward-pointing arrow below it to boot from Recovery HD. After a brief delay, you’ll see the new Utilities screen. (This is the same screen you see if you create a bootable Mountain Lion installer drive and boot your Mac from it.)

Regardless of which method you use to access recovery mode, the menu bar displays OS X’s Input, Wi-Fi, and (on laptops) battery menus. If you want to connect to your network or the Internet, and you haven’t already chosen a Wi-Fi network, you can do so using the Wi-Fi menu. Alternatively, if you’ve got a wired connection, make sure the Ethernet cable or USB-to-Ethernet adapter is connected to your Mac.

Access Internet Recovery

Macs released in mid-2011 or later, along with [some older Macs once you install a firmware update](#), include a new feature called OS X Internet Recovery. This feature works much like standard OS X Recovery but with one major difference: Internet Recovery works even if you don’t have a Recovery HD partition, if that partition isn’t working properly, or if your Mac’s drive is damaged or not connected.

How Does Internet Recovery Work?

Unlike standard recovery mode, which uses software on a partition of your Mac’s drive, Internet Recovery uses a combination of code stored in your Mac’s firmware and a net-boot image stored on Apple’s servers. Specifically, when you start Internet Recovery, your Mac contacts Apple’s Internet Recovery servers and requests the appropriate disk image to boot your Mac into recovery mode. Your Mac then downloads the necessary code over the Internet and boots. At that point, Internet Recovery works much like standard recovery mode, as described in the next section.

One other difference between standard recovery mode and Internet Recovery is that when you boot into Internet Recovery, the system tests your Mac’s RAM and its hard drive to see if either has any obvious hardware problems. (If so, you’ll see a message stating that a problem was found.) Also, because Internet Recovery requires an Internet connection just to boot, if your Mac is not connected to a working Ethernet network, you have to connect to a Wi-Fi network right from the start.

However, while Internet Recovery is a useful feature—it could save your bacon if your hard drive should die—it has one major drawback: It’s very, very slow compared to standard recovery mode, because it must first download the necessary software. In fact, if you boot into Internet Recovery, the first screen you see displays a slow-moving progress bar, along with a warning that booting will take a while.

How Do You Boot into Internet Recovery?

If you're really curious, you may be able to force your Mac to boot into Internet Recovery by holding down Command-Option-R at startup. However, in our testing, this didn't work on every Internet Recovery-capable Mac.

If that keyboard shortcut doesn't work for you, that's probably because you don't *need* to boot into Internet Recovery. As long as you have a valid Recovery HD partition, when you attempt to boot into Internet Recovery, your Mac will instead boot into standard recovery mode. Internet Recovery comes into play only if you have a compatible Mac with no working Recovery HD partition—in that case, your Mac automatically uses the Internet Recovery option. In fact, on one of our Macs, to even test Internet Recovery, we had to use a number of tricks to make the Recovery HD partition visible and then purposely erase and remove it. Only then, with a blank drive with no Recovery HD partition, were we able to boot into Internet Recovery by holding down Command-R at startup. (If you have an Internet Recovery-compatible Mac with an easily accessible hard drive, you could simply disconnect the hard drive, but that's not an option for most current Macs.)

Use Recovery Mode

When your Mac is booted into OS X Recovery or Internet Recovery, the tasks you can perform on it are limited. The four main options are listed in the OS X Utilities window; select one and click Continue to use it.

Restore from Time Machine Backup

If your Mac's problems are serious enough to require erasing your startup drive, or if you've installed a new drive in your Mac, this option lets you restore your entire system from a Time Machine backup, including the OS and all accounts, user data, and settings.

Note that to use this feature, your Time Machine backup must be a *complete* backup that includes all system files. So if you previously added the System folder, or any other OS-related files and folders, to Time Machine's exclusion list in the Time Machine pane of System Preferences, you won't be able to restore your system from that backup using this tool. Instead, you'll need to reinstall the OS (see "Reinstall OS X" below) and then use the Setup Assistant (at first startup) to transfer your data from that Time Machine backup.

Before proceeding, read the important information on the Restore Your System screen that appears when you choose this option. Specifically, you should note that the Restore From Time Machine Backup feature *erases* the destination drive—it's only for restoring an entire volume from a Time Machine backup to its original source (or to a replacement drive). To transfer files from a backup to a new Mac, you should use Migration Assistant or Setup Assistant; to restore individual files and folders, use Time Machine while booted into OS X.

If you're sure you want to use the Restore From Time Machine Backup feature, click Continue. On the next screen, select your Time Machine drive, choose the particular backup snapshot you want to restore from, and then choose the destination drive. You'll see a final warning that this procedure will erase the destination drive; click Continue, and the utility erases the drive and begins restoring your files from your Time Machine backup.

Once this process is finished—on a MacBook Air, it took about an hour and a half for approximately 65GB of data—your Mac restarts from the newly restored drive, and you can log in normally.

Reinstall OS X

Select this option and click Continue, and the OS X installer launches, letting you install OS X on any supported drive or volume, including the current Mac's internal drive. However, the recovery-mode version of the installer doesn't actually include all of the necessary files and data, so installing Mountain Lion from within recovery mode requires an Internet connection to download the actual OS.

When you click Continue on the initial installer screen, you get a dialog box stating, "To download and restore OS X, your computer's eligibility will be verified with Apple." Clicking Continue sends the necessary information to Apple, and then the installer proceeds just as if you were running the Mountain Lion installer normally, with one key exception: Once you select the drive onto which you want to install the OS, the installer must download the actual data—roughly 4GB of it—required to install OS X. (When we tested the feature, the estimated download time was five hours, although the actual download time was closer to 35 minutes over a cable-modem connection.)

Note that if your Mac didn't ship with the version of OS X you're installing—in other words, if you purchased that version of OS X from the Mac App Store—you'll be prompted to enter your Mac App Store Apple ID and password before the download begins.

Although it's nice to have the option to install OS X from within recovery mode, having to download the installer data is inconvenient—and if you have a metered Internet connection, it could be quite expensive as well. Because of this, we recommend using recovery mode to reinstall the OS only if you don't have a bootable Mountain Lion installer drive.

Get Help Online

Choosing this item and clicking Continue launches Safari (with its default settings and bookmarks) so you can browse Apple's support site, or any other website, to find answers to troubleshooting problems. You can also check and send messages if your email account provides Web access.

When Safari first launches in recovery mode, you see a page called Recovery Information that provides brief instructions on how to perform various tasks in recovery mode. Unfortunately, you won't be able to print these instructions from within recovery mode, although you can access them when booted from your standard startup drive, as described in "Recovery Mode under the Hood" below.

To get back to the main Mac OS X Utilities window, just quit Safari.

Disk Utility

Selecting this option and clicking Continue launches Disk Utility, which you can use to check, repair, erase, or partition connected drives, including your startup drive.

To erase your Mac's startup drive and reinstall OS X (after making sure you've backed up, of course), you'd start here, erase the drive, quit Disk Utility, and then use the Reinstall OS X option (see "Reinstall OS X" earlier in this chapter) to install a new copy of OS X. You can get back to the Utilities window at any time by quitting Disk Utility.

Other Options

In addition to the four main functions in the Utilities window, recovery mode offers a few options in its Utilities menu (displayed when viewing the main Utilities screen): Firmware Password Utility, Network Utility, and Terminal. These are the same utilities you can use when your Mac is booted normally into OS X; they let you configure a firmware password, monitor network connections and traffic, and use OS X's Unix shell, respectively.

What Version of OS X Does Recovery Mode Install?

You may be wondering what version of OS X you'll end up with if you use recovery mode to reinstall the operating system. When Lion Recovery debuted last year, the answer to this question was simply Lion. But now that two versions of OS X support recovery mode, the answer is a bit more complicated.

Standard (Non-Internet) OS X Recovery

Unless a problem occurred when you installed Lion or Mountain Lion, your Recovery HD partition should correspond to your hard drive's OS: Lion or Mountain Lion, respectively. (When you install Mountain Lion over Lion, Recovery Mode is updated to the Mountain Lion version.) In other words, if you're running Mountain Lion and you reinstall OS X from within recovery mode, you get Mountain Lion. If you're running Lion, you get Lion.

Internet Recovery

Unlike OS X Recovery, Internet Recovery relies on your Mac's firmware, which isn't updated when you install a newer version of the OS. This means if your Mac model came out prior to Mountain Lion's release, you have the Lion version of Internet Recovery, even if you upgrade your Mac's operating system to Mountain Lion. If you purchase a Mac model released after Mountain Lion's debut, Internet Recovery installs Mountain Lion. (It's possible that Apple will release firmware updates for older Macs to give them the Mountain Lion version of Internet Recovery, but that hasn't happened yet.)

What all this means is that as long as your hard drive doesn't have serious problems that prevent it from booting from the Recovery HD partition, holding down Command-R lets you reinstall the same version of OS X as is currently installed on your hard drive. If your drive is having problems, forcing your Mac to boot into Internet

Recovery, reinstalling OS X gives you whatever version of the OS your Mac originally shipped with. (On Macs that shipped with Snow Leopard but gained OS X Internet Recovery support via a firmware update, Internet Recovery installs Lion.)

Recovery Mode under the Hood

If you try to find the Recovery HD partition in the Finder, or even using Disk Utility, you'll come up empty. Apple has hidden this partition well, presumably to keep it safe from accidental (or intentional) modifications—after all, what good is an emergency disk if someone has accidentally deleted some of its vital contents?

However, if your curiosity won't be sated until you've been able to browse Recovery HD, here's how you can do it. Just remember: Look, but don't touch.

1. Open Terminal. Type `diskutil list` and press Return.
2. You'll get output similar to this (if you've enabled FileVault, you may see a second table starting with `/dev/disk1`):

```
/dev/disk0
#:
```

#:	TYPE	NAME	SIZE	IDENTIFIER
0:	GUID_partition_scheme		*121.3 GB	disk0
1:	EFI		209.7 MB	disk0s1
2:	Apple_HFS	DanBookAir	120.5 GB	disk0s2
3:	Apple_Boot	Recovery HD	650.0 MB	disk0s3

3. Locate the Recovery HD partition (under Name) and note its identifier—in this case, `disk0s3`.
4. Type `diskutil mount [identifier]`, where `[identifier]` is, of course, the identifier for the Recovery HD partition. This mounts the Recovery HD partition in the Finder. Inside you'll find a folder named `com.apple.recovery.boot`.
5. Open the `com.apple.recovery.boot` folder in the Finder, and you'll see several items. However, you aren't seeing everything—some of the folder's contents are invisible. If you want to see everything that's there, switch back to Terminal. Type (or copy and paste from here into Terminal) `ls -al /Volumes/Recovery\ HD/com.apple.recovery.boot/` and press Return. This displays the full list of the folder's contents:

```
total 906680
drwxr-xr-x  9 root  wheel      306  Jul 12 23:12  .
drwxrwxr-x 11 root  wheel      442  Jul 13 00:56  ..
-rw-r--r--@ 1 root  admin    1840  Jul  5 05:19  BaseSystem.chunklist
-rw-r--r--@ 1 root  admin  448702992 Jul  5 04:58  BaseSystem.dmg
-rw-r--r--  1 root  wheel    3418  Jun 20 12:53  PlatformSupport.plist
-r--r--r--  1 root  wheel     475  Jul  5 02:56  SystemVersion.plist
-rw-r--r--  1 root  wheel   986272  Jul  5 04:57  boot.efi
-rw-r--r--  1 root  wheel     361  Jul 12 23:12  com.apple.Boot.plist
-rw-r--r--  1 root  wheel  14510577 Jul  5 04:53  kernelcache
```

Of particular interest is BaseSystem.dmg, a disk image that contains the Recovery HD partition's bootable copy of OS X and all the recovery-mode utilities. You can mount this disk image in the Finder by typing `open /Volumes/Recovery\ HD/com.apple.recovery.boot/BaseSystem.dmg` and pressing Return. Once you've done that, you can view the Recovery Information page that you see when you launch Safari from within recovery mode; just type `open /Volumes/Mac\ OS\ X\ Base\ System/System/Installation/CDIS/OS\ X\ Utilities.app/Contents/Resources/English.lproj/` all on one line, and then press Return. You'll see the contents of the English.lproj folder; find the file RecoveryInformation.html and double-click it to open it in your default Web browser.

When you're done browsing, you can eject Mac OS X Base System as you would any removable volume. You can then unmount the Recovery HD volume by typing `diskutil unmount [identifier]`, where *[identifier]* is the same identifier you used above for the Recovery HD partition.

Thanks for Reading!

We hope you've managed to successfully install OS X Mountain Lion and are ready to start using Apple's newest Mac operating system. For more information on Mountain Lion, the Mac, iOS, and all things Apple, check out the other books in [our Superguide program](#).

And visit Macworld.com for the latest tips, tricks, how-tos, and news about the iPhone, iOS, and all of Apple's other products.