

Migrate to Mac

The Comprehensive Guide



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1 Back up your old computer

In this section, you will understand how to back up your old computer.

Apple provides a tool for certain versions of Windows to easily back up your user data to an external media.

For newer Macs, you can use the Migration Assistant or Time Machine function that is built-in in Mac OS X to back up all your data, applications, even settings.

For other versions of Windows, Mac, and other operating systems, this chapter will also attempt to guide you to back up your personal data.

After you have backed up desired user data, proceed to next section and determine if you need to format the hard drive of your new Macintosh.

Windows Migration Assistant

Note: This method will only work for Windows XP, Vista, 7, and 8. To determine your Windows Version, press [Win]+R, type in `winver` then press Enter key.

To back up supported versions of Windows, you need to download Apple's Windows Migration Assistant to your Windows PC. You can find the instructions here (<http://support.apple.com/kb/ht4796>). At the time of writing, the latest version (v1.0.5.6) can be found here (<http://support.apple.com/kb/DL1557>).

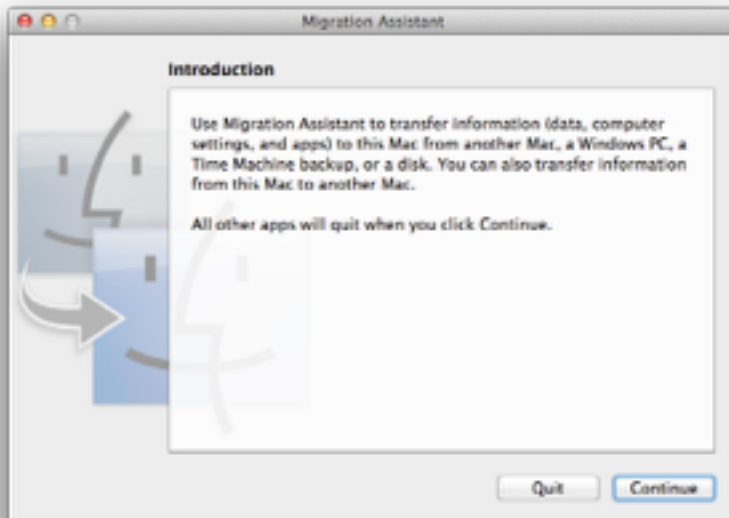
External media is not needed to complete the migration; however you do need to have both your Windows PC and your new Mac on the same network. To do this, you can connect your Windows PC to your Mac through a CAT-6 certified Ethernet cable (might require adaptor as some newer Macs does not have built-in Ethernet ports), connect your Windows PC and/or Mac through a CAT-6 certified Ethernet cable to your hub or switch. Alternatively, if your Windows PC has supports Wi-Fi and you have a wireless router, you can connect both your Windows PC and your Mac to the same wireless network.

Before running Migration Assistant, it is considered a good practise to scan your system to make sure it does not contain virus. Even though virus under Windows is highly unlikely to affect your new Mac, it might interfere with the migration process. For Windows XP, Vista and 7, Microsoft provides a free-to-use tool "Microsoft Security Essential" that can help you scan your computer for virus. For Windows 8, a virus scanner called "Windows Defender" is already built-in. Alternatively, you can purchase some third-party anti-virus software to do the job.

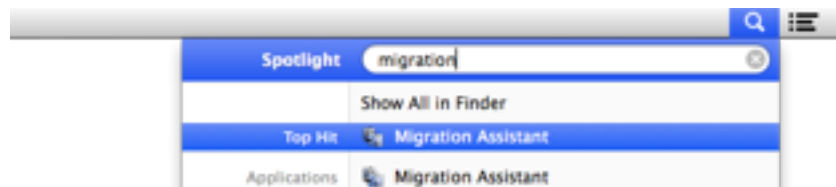
You can jump to the next section (p. 6) after choosing what you wish to migrate to the new Mac.

Mac OS X Migration Assistant

Note: This method will only work for Mac OS X 10.3 or newer version of OS X. To determine your Mac OS X version, click on the Apple logo (🍏) on the top-left side of the screen then choose "About This Mac".



To migrate supported versions of Mac OS X, you can use Migration Assistant that comes with your Mac. To initiate Migration Assistant, click on the magnifier icon on the top-right side of the screen to open Spotlight, start typing "Migration".



Alternatively, open Finder and navigate to Applications folder, you can locate Migration Assistant under Utilities folder. From there you can choose what you want in the new Mac.

You do not necessarily need a large enough external media to back up your data; rather, you can also choose to use network migration (wired ethernet cable), wireless migration, FireWire migration (wired), and if your Mac is fairly new, ThunderBolt migration (wired). The speed to migrate is subject to which option you choose.

Note: If you wish to initiate the migration through hard drive, ideally the external hard drive should be formatted as Mac OS Extended (also known as HFS+). Do not try to use a NTFS-formatted (a file system commonly found on modern Windows) external hard drive, as it is Mac OS X isn't able to write to it (but you can still view the files on that drive).

You can jump to the next section (p. 6) after choosing what you wish to migrate to the new Mac.

Time Machine

Note: This will only work for Mac OS X 10.5 or newer version of OS X. If you wish to use an external hard drive for the backup, the hard drive performs the best if is formatted as Mac OS Extended (also known as HFS+). Do not try to use a NTFS-formatted (a file system commonly found on modern Windows) external hard drive, as it is Mac OS X isn't able to write to it (but you can still view the files on that drive).



If you already have a number of Time Machine backups, you do not have to use the Migration Assistant.

To back up to Time Machine, attach an external hard drive or connect to a network hard drive, then select the Time Machine icon on the status bar (⌚) and choose “Open Time Machine Preferences...”. Alternatively, click on the magnifier icon on the top-right side of the screen to open Spotlight, start typing “Time Machine” and choose it under the “System Preferences” category. Enable Time Machine backup by flipping the switch from “OFF” to “ON”, then choose the drive you wish to back up to.

Depend on the type of external media and how much file you have on your Mac, it is not unusual that it will take a while to finish the first backup. Contrary to the Migration Assistant, Time Machine backup is a comprehensive backup. Addition to the user data and applications, it will also back up all the settings (including existing users). So, after fully restoring a Time Machine backup, everything on your old Mac should appear on your new Mac.

You can jump to the next section (p. 6) after you have at least completed one full Time Machine backup.

Manual Backup

If your operating system is not supported by the previously mentioned backup methods, or if you wish to back up your file manually, you can always skip the previous methods and perform a manual backup.

If you're using Windows...

Note: Windows applications cannot run natively on Mac OS X, hence these steps will only back up your documents, music, pictures and videos stored under your user profile.

To manually backup a Windows PC, you need to know the version of Windows. To do that, press [Win]+R combination key on your keyboard, type in:

`winver`

And press the Enter key. You should see a window with the version of Windows. Keep in mind of the version and dismiss the window.

If you have Windows NT, attach an external media, if necessary install the driver for it. Press [Win]+R on your keyboard, type in:

`%SystemDrive%\WINNT\Profiles\`

And press the Enter key. A Windows Explorer windows should show up. Copy everything in that folder to your external media. If necessary, copy other files you need.

If you have Windows 2000, ME (Millennium Edition), XP, or 2003, attach an external media, if necessary install the driver for it. Press [Win]+R on your keyboard, type in:

`%SystemDrive%\Documents and Settings\`

And press the Enter key. A Windows Explorer windows should show up. Copy everything in that folder to your external media. If necessary, copy other files you need.

If you have Windows Vista, 2008, 7, 8, or 2012, attach an external media, if necessary install the driver for it. Press [Win]+R on your keyboard, type in:

%SystemDrive%\Users\

And press the Enter key. A Windows Explorer window should show up. Copy everything in that folder to your external media. If necessary, copy other files you need.

Proceed to next section (p. 6) if finished.

If you're using Mac OS X...

To back up your user profile, including your document, music, pictures and video, attach an external media, open Finder, press ⌘G (shift-command-G) and type in:

/Users/

And press the return key. Copy everything in that folder to your external media. If necessary, copy other files you need.

It is not recommended to copy the applications directly from the Applications folder to an external media, as some software store data in other locations as well. You can always reinstall the application back on your new Mac.



If your old Mac uses PowerPC processor, not all the applications are supported under OS X Mavericks. If you have an old software and can find the "Universal Binary" icon (left) on the product description, then it is safe to run under Mavericks. Most of the applications made or updated after 2007 are either Universal Binary or Intel

Macs only. If you are still not sure, contact vendors for compatibility. PowerPC Macs are usually manufactured before 2006. And you can find out by clicking the Apple icon (🍏) on the top-left side of the screen and select "About This Mac".

If Mac OS X does not boot (stay at grey screen when power button is pressed, or showing a flashing folder icon with question marks on it, or grey screen with other icons), you might be able to use Target Disk

Mode to retrieve your file, although there is no guarantee that you will be able to get it. Skip this step and move on, as it will be explained later. If there is something wrong with the hard drive and you wish to retrieve the data, you might need to contact AppleCare to set up an appointment.

Proceed to next section (p. 6) if finished.

If you're using Mac OS 7.6 - 9...

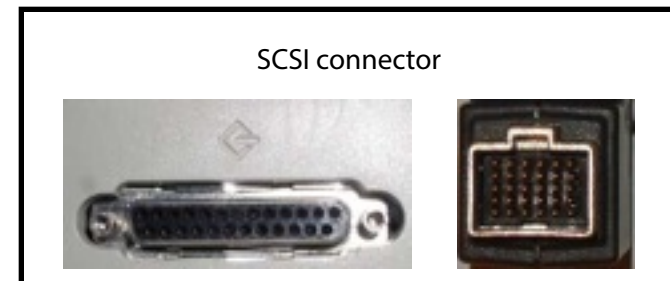
There are several ways to back up your Mac:

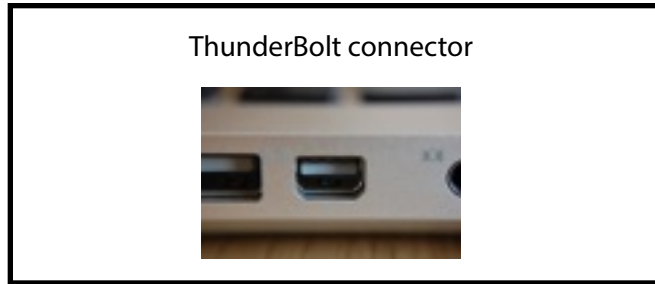
If the device has a FireWire port, try to back up your personal data to an external media through FireWire.

If the device has a USB port, try to back up your personal data to an external media through USB.

If the device has a SuperDrive, try to back up your personal data through an optical disk.

Alternatively, if the device has one of these:





You might be able to use Target Disk Mode to manually back up your files. Skip this step and move on, as it will be explained later.

Proceed to next section (p. 6) if finished.

If you're using Linux, Unix, or BSD...

Note: Some of the distributions provide a very user-friendly approach to help the user with a desktop environment or a window manager. However the desktop environments and window managers do vary in style and functionality; consult your system administrator or various forums for help on a specific desktop environment or window manager. Here is the generic approach by using terminal. To mount the external media to your computer on a Linux, Unix, or BSD computer, you will need root privilege (#). You can either log in as a root user, use `su` to substitute to a root user, or if installed and configured, use `sudo` before each command to execute it in root privilege.

Attach a large enough external media to your computer. Enter:

```
# frisk -l
```

And press Enter. You might be prompted to enter password. A list of connected disk (with their storage capacity) will be shown. Find out yours and keep that in mind. Here, we will use `/dev/sdb1` as an example here. With that in mind, type in:

```
# mkdir /media/extdev
```

And press Enter. This will create a folder. Then, you need to mount the drive to that folder by:

```
# mount /dev/sdb1 /media/extdev
```

And press Enter. Once it is done, you can copy everything under your home folder by executing:

```
# cp -r ~ /media/extdev
```

Copy other files if necessary.

Note: OS X does not natively recognise ext3/ext4 file system, hence it would be easier to use a FAT32 formatted external media, although limitations do exist, such as you cannot copy file larger than 4 GiB. Alternatively there are some commercial software that help OS X recognise ext3/ext4 partitions.

Proceed to next section (p. 6) if finished.

2 (Optional) Erase and install

This section should be skipped if you have a brand-new Mac: You can proceed to Section 3: *Configure your Mac* (p. 10) instead.

If you got a second-hand Mac, it is recommended to format the hard drive before installing OS X.

Before formatting the hard drive, you might need to install a firmware update to enable Internet Recovery, which is needed for the next section.

Also, it is recommended to disable Firmware Password before formatting the hard drive.

Check for Firmware Updates

Some Macs did not come with Internet Recovery. This can be fixed by installing the latest firmware update. Navigate to <http://support.apple.com/kb/HT1237> and install appropriate EFI and/or SMC firmware updates, if necessary.

Disable Firmware Password

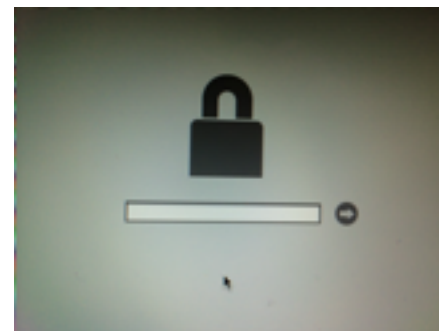
OS X uses firmware password to prevent unauthorised major changes to the Mac, namely, erasing built-in hard drive.

It is strongly not recommended to purchase a Mac with Firmware Password locked down, as if you do not know the Firmware Password, you will have to bring your Mac as well as the invoice from original purchase to an Apple Authorised Service Provider or an Apple Retail Store.

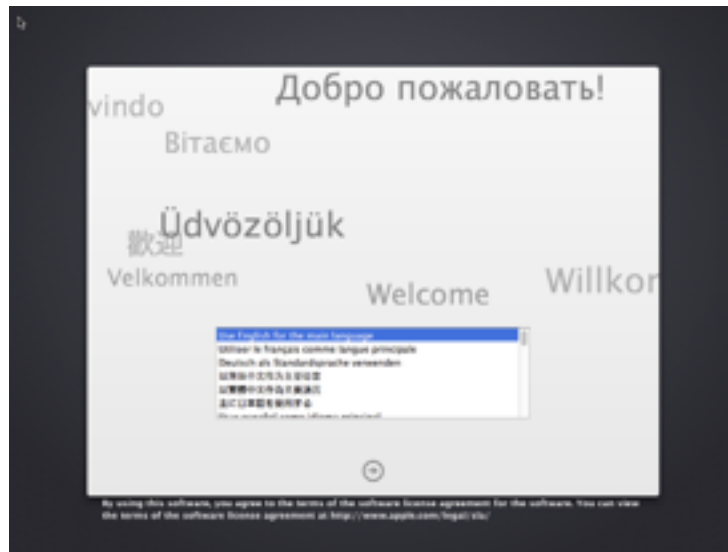
If the Firmware Password is engaged and you know the password, you should disable it before formatting the hard drive.

To disable Firmware Password, shut down your Mac. After it is completely shut down, hold down ⌘R (command-R) and press the power button. Keep pressing ⌘R until you see a lock icon.

Note: If you did not see a lock, that means Firmware Password is not engaged. You can skip to next step to erase the hard drive.



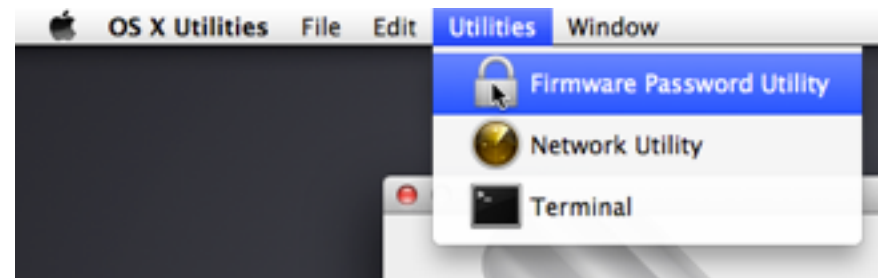
Key in your Firmware Password then press return. Wait until System Recovery loads. When it is finished, it will ask you to choose a language.



With a preferred language chosen, OS X Utilities interface will be shown.



Choose "Utilities > Firmware Password Utility". Disable Firmware password in the following Windows and close the utility.



Erase Hard Drive

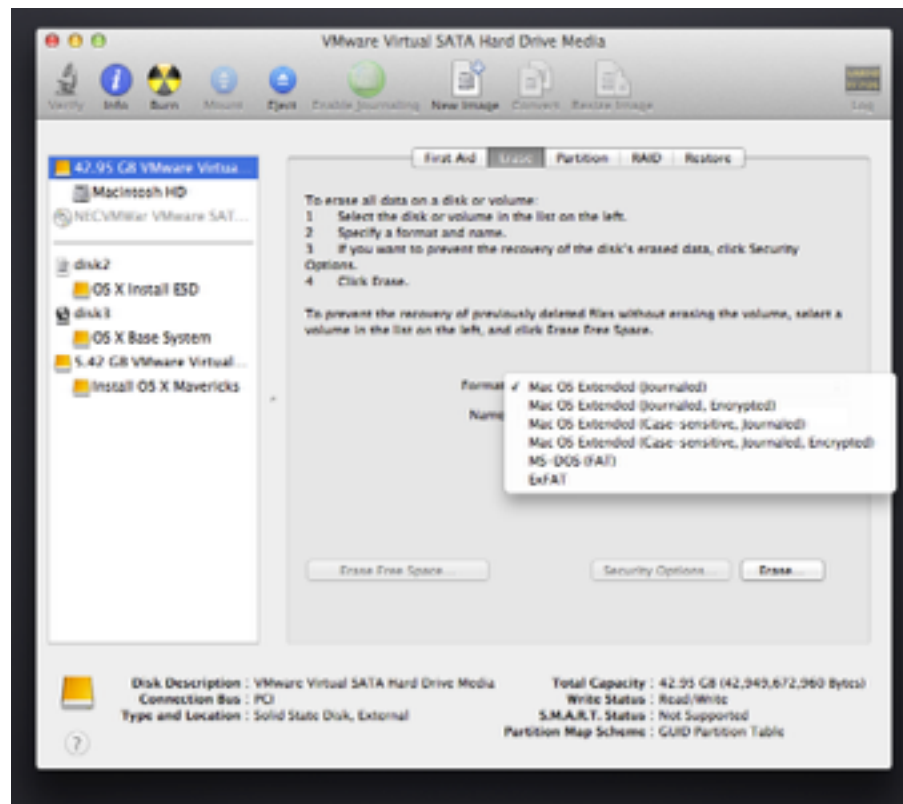
Caution! Always make sure you have everything backed up before formatting the hard drive.

Under OS X Utilities, choose Disk Utility and click Continue.



In Disk Utility, click on the built-in hard drive (by default, it is named "Macintosh HD"). Under the Erase tab, make use you choose one of the "Mac OS Extended" format. You can rename the hard drive in the "Name" section. If you are ready, click "Erase". (If you choose one of the Encrypted format, you will be prompted to enter a password. Keep the password in a safe place.)

Caution! Always make sure you have everything you need backed up before formatting the hard drive. Restoring data from a formatted hard drive might require specialised external application, and there is no guarantee that the data will be restored, especially if you use the "Security Options" to zero out the data.



It might take a while to format the hard drive. When it is done, click "Disk Utility > Quit" on the top-left corner, or by pressing ⌘Q (command-Q).

Installation

Note: Before installing OS X, make sure you have plugged in to a reliable power outlet.

To install OS X, choose "Install OS X" and click "Continue" in OS X Utilities.





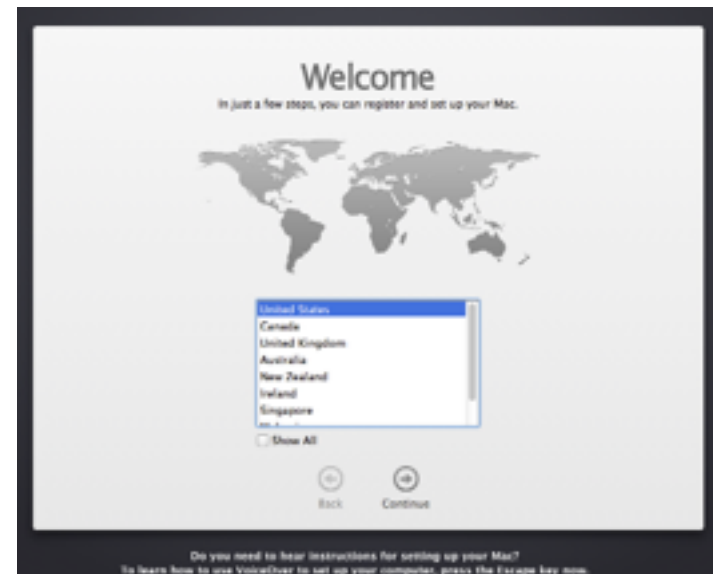
After agreeing to the license agreement and choosing the hard drive, installation will start.



If you see the Welcome screen, it means the installation has completed. Proceed to next section to set up your Mac.



A restart will occur to continue installation. It is normal for the screen to turn black during the installation.



3 Set up your Mac

In this section, you will be able to configure your Mac and migrate your data to it.

Setting up your Mac is easy. With a few clicks, you will be able to go through the setup guide, and restore your backup onto your new Mac.

If you decided to back up manually previously, you can always restore the backup after the setup. If your older Mac supports Target Disk Mode, you can also give it a try.

General Setup

You need to choose your location and keyboard layout.



Migrate to Your New Mac

If set up the Migration Assistant in Section 1, you might wish to choose appropriate options.

If you wish to run Windows Migration Assistant, choose "From a Windows PC".

If you wish to run Mac OS X Migration Assistant or Time Machine restore, choose "From a Mac, Time Machine backup, or a startup disk". Other backup options should choose "Don't transfer any information now".

Migration, depending on the method and size of the transfer, can take a long time. You might want to do it overnight, if possible.



Apple ID Sign in

You can sign in your Mac with your Apple ID. This can help you to set up iCloud, iTunes purchase, Apple Store purchase as well as iMessage. Built-in email client will also be configured with your iCloud email. It's not mandatory to sign in with your Apple ID at this moment, and you can always do that later. However, if you do it now, you can set up all the previously mentioned account at once, and you get an option to enable Find My Mac, an iCloud function that can help you locate your Mac in case it got lost.



Create an Account

After agreeing to the license agreement, you will be asked to create an account.

Note: If you use the migration assistant, you might not be prompted for this step; instead you will be able to sign in to your Mac with your previous account.

The account you create here will be granted administrative rights. Keep the password in a safe place.

After an account has been created, you will be prompted to register your Mac with Apple.

Basic setup has finished. If you used alternative ways to back up your old computer, please keep reading the rest of the document.



Restore a Manual Backup

To restore a manual backup, connect your external media and copy your file to your Mac.

Target Disk Mode

To use Target Disk Mode, both Macs should have a SCSI (rare, can be found on older, PowerPC Macs), FireWire, or ThunderBolt Connector. You might need to purchase additional cables and/or adaptors to use this function.

For example, if you own a Late-2011 MacBook Pro and wish to transfer your data to a Late-2013 MacBook Pro with Retina Display, you will need a ThunderBolt-to-ThunderBolt cable, because both of them features a ThunderBolt connector. If you wish to transfer your Mid-2010 MacBook Pro and wish to transfer data to the same Late-2013 MacBook Pro with Retina Display, you need a FireWire 800 to FireWire 800 Cable; in addition, you also need a FireWire-to-

ThunderBolt adapter, as the Mid-2010 MacBook Pro doesn't feature a ThunderBolt connector (it does feature a Mini DisplayPort connector, which shares the same form as a ThunderBolt connector. However it does not transfer data), and the Late-2013 MacBook Pro does not feature a FireWire 800 connector.

Make sure that both computers are fully shut down and unplug all cables except for the power adaptor. Connect both computer with necessary cables and/or adaptors. Then, on your older Mac (target), press and hold the "T" key and then press the power button. Keep pressing the "T" key until one of the logo has shown up:



Turn on the newer Mac (host). After login, you should be able to see the target as a hard drive on either your desktop or in the Finder.

After it is finished, drag the hard drive icon from desktop to Trash on Dock, or right click on the hard drive and choose "Eject".

Revision History:

3 March 2014: Rough draft finished.

5 March 2014: Full document finished.

6 March 2014: Minor changes to improve eloquence.

15 March 2014: Minor changes in format.

17 March 2014: Major changes:

(+) Benefit by restructuring, in-article images in Section 2 and Section 3 has been enlarged.

(-) Merged Section 3 ("Install OS X") to Section 2 ("Erase hard drive"). New Section 2 aptly named "Erase and Install". Table of Contents and in-article reference updated.

(x) Structural and typographical fixes to various places, including Table of Contents and Section 3.

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"Finder" icon found on the cover: Extracted from

/System/Library/CoreServices/CoreTypes.bundle in OS X. SCSI, FireWire, and ThunderBolt photo: Found on Wikimedia. Used under CC BY-SA 3.0 license.

SCSI, FireWire, ThunderBolt, and Universal Binary logo: Found on Wikimedia.

Screenshots: Taken by Tianyu Ge.

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Glossary

CAT-6 certified Ethernet cable — An Ethernet cable that is certified to provide gigabit Ethernet (1,000,000,000 bits per second) to connected devices. Formally referred as Category 6 cable, it can be easily identified by its 8 position 8 contact (8P8C) connector module, so that you can tell it from the cable that connects your telephone to landline (6 position 6 connector, or 6P6C).

FAT32 — A proprietary file system that is predominantly used on legacy Windows, succeeds the old FAT16 file system. It has limited support for modern file systems features, most notoriously it does not support files larger than $2^{32} - 1$ bytes (4 GiB - 1 byte). Although it is patented by Microsoft, it is still well-supported by various operating systems. OS X can natively read and write to a FAT32 partition (It is called “MS-DOS” under Disk Utility).

Firmware Password — A security feature found on many Macs to secure them in low level. If Firmware Password is turned on, you cannot modify the EFI (Extensible Firmware Interface) settings without entering the right password, which will stop unauthorised drive erase or reinstallation. It is provided both on legacy Macs that runs Open Firmware and newer Macs with EFI.

Mac OS Extended — A proprietary file system that is used predominantly on Macs, formally known as HFS+. It supports modern features such as Unicode support in file names, however it is not well-used outside the Mac environment. OS X reads and writes Mac OS Extended file system natively, and OS X can only be installed on this kind of file system.

NTFS — A proprietary file system that is used predominantly on modern Windows, succeeds the old FAT32 file system. It provides better support in partition size and file size, however it is patented and rarely used in other operating systems. OS X can read NTFS partitions natively, however it cannot write to it, rendering it readonly.

Time Machine — A system software introduced in Mac OS X 10.5 (“Leopard”) that can help the user incrementally back up their system. It can back up user data as well as settings to an external media such as AirPort Time Capsule (a device made and sold by Apple that combines a wireless router and a hard drive), external hard drive, or a network drive. User can restore the full system or certain file(s) to a certain historical backup point.

Universal Binary — An application bundle introduced by Apple when they decided to switch to Intel processors from PowerPC. It combines both PowerPC code and Intel code in a single package so it can be used on both platforms. For developers, it is very easy to create such a bundle, as they don’t have to modify their code; instead, in their development environment (Xcode), Universal Binary can be generated by choosing one checkbox. This approach helped Apple to successfully switch to Intel processors on computers in only one year.