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# TIME MACHINE

What it is, how it works, how to set it up and use it.  
A “New to Leopard” Presentation  
to MacFundamentals on Wednesday, Feb. 13, 2008  
made by Lee Maxwell, facilitator  
*(Thanks to Ars Technica for the screen shots.)*



# The 2 Cardinal Rules of Computing

## \* Save, Save, Save...

Every time you make a significant change to a document, use the save command (File>Save..., Apple/S) to save the change to the copy of the document permanently stored on the hard drive.

## \* Backup, Backup, Backup...

Data that cannot be easily recreated or placed must be regularly and frequently copied onto another hard drive, so that when the primary HD fails, you haven't lost your stuff.

# Reminder: How a computer works...

- \* There are four essential parts of a computer: The processor, which does the work of computing; the hard drive, where all data on the computer is stored when it's not in use; random-access memory, or memory or RAM, where data is stored temporarily if the processor needs it, and the motherboard (Apple: logicboard) that connects these things together.
- \* Information gets copied from the hard drive to RAM when the computer needs it. That info in RAM can be changed by the processor, and that changed info must be saved from RAM back to the hard drive, if it is to be saved permanently.
- \* The hard drive, being one of the few mechanically moving parts in a computer, is bound to fail at some point, and often with little or no advanced warning. You should prepare for this to happen.

# Backup System: Minimum Requirements

- \* A good backup system requires, at a minimum, a computer with a reliable operating system (Mac OS X) and...
- \* Another hard drive, outside the computer, with at least as much storage capacity as the hard drive used for everyday work, and...
- \* A reliable and well-constructed backup software, which should allow you to choose what files are backed up to where, and at what times and how often, and to verify the backup and keep a log of anything that goes wrong.

# Backup Hard Drives

- \* In general, a backup hard drive should have at least the same storage capacity as the primary drive.
- \* It should be an external drive that is not dependent on the internal power supply of the computer (usually, the main drive is inside the computer and thus dependent on it to work).
- \* It should connect to the main computer through a fast and reliable connection method. FireWire, pioneered by Apple, is one excellent connection method; USB 2.0 is OK, as is a network storage drive accessible via Ethernet or WiFi.

# Backup Software

- \* Like many classes of utility software, the candidates run the gamut, as do opinions of users and reviewers of these applications.
- \* There is the original Apple solution, Backup, which is software obtainable through a .Mac subscription and backs up files to the iDisk you get with .Mac.
- \* Retrospect is the one everyone has heard of and probably thinks of first, though many users (including me) consider it to be feature-bloated, overpriced and difficult to configure.
- \* Shareware or freeware alternatives include well-regarded stalwarts Carbon Copy Cloner and SuperDuper, and lots of others.

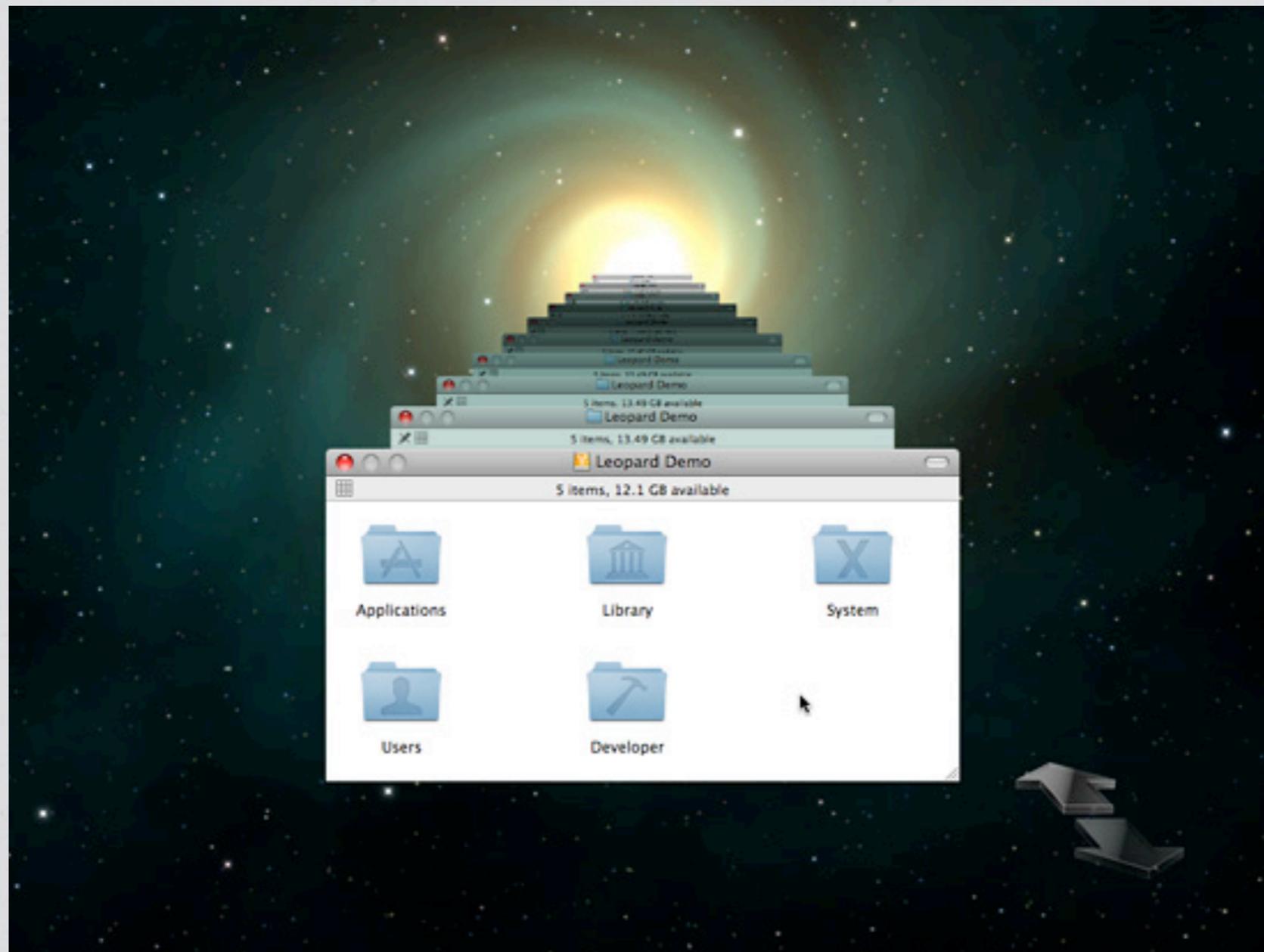
# And then came Leopard...

- \* As we all know, Mac OS X 10.5 (codenamed Leopard) was one of the best-received upgrades to X Apple has ever released.
- \* One of the most-acclaimed of Leopard's 300 new or improved features was Time Machine, its new backup software system.
- \* Time Machine was designed to be simple to understand, easy to use, graphically pleasing, and full of features such as incremental file backup and easy restoration.
- \* It has been compared favorably to the backup software in Windows Vista.

# Time Machine Features

- \* Time Machine is designed to back up the entire hard drive, a selection of files, or even a single file
- \* It works within iWork, iLife, and several other compatible programs, making it possible to restore files without leaving the application.
- \* In restoration mode, Time Machine uses a graphical user interface of windows receding into space to display backed-up data from various backup points, and the user can select from what point they want to back up data.
- \* See the next screen shot...

# Time Machine Restoration Mode



# What you need for TM to work

- \* Mac OS X Leopard installed on your Mac.
- \* An external hard drive, connecting either via FireWire (400 or 800) or USB 2.0 (so Time Machine probably will not work on older Macs which lack USB 2.0 ports. (Note: Doesn't seem to work with other connection methods, like eSATA.)
- \* The external hard drive **MUST** be formatted to Mac HFS+ with journalling enable. You can do this by connecting the drive and then using Apple' Disk Utility to reformat the drive. Warning: This will delete all data on the external drive.

# Setting up Time Machine...

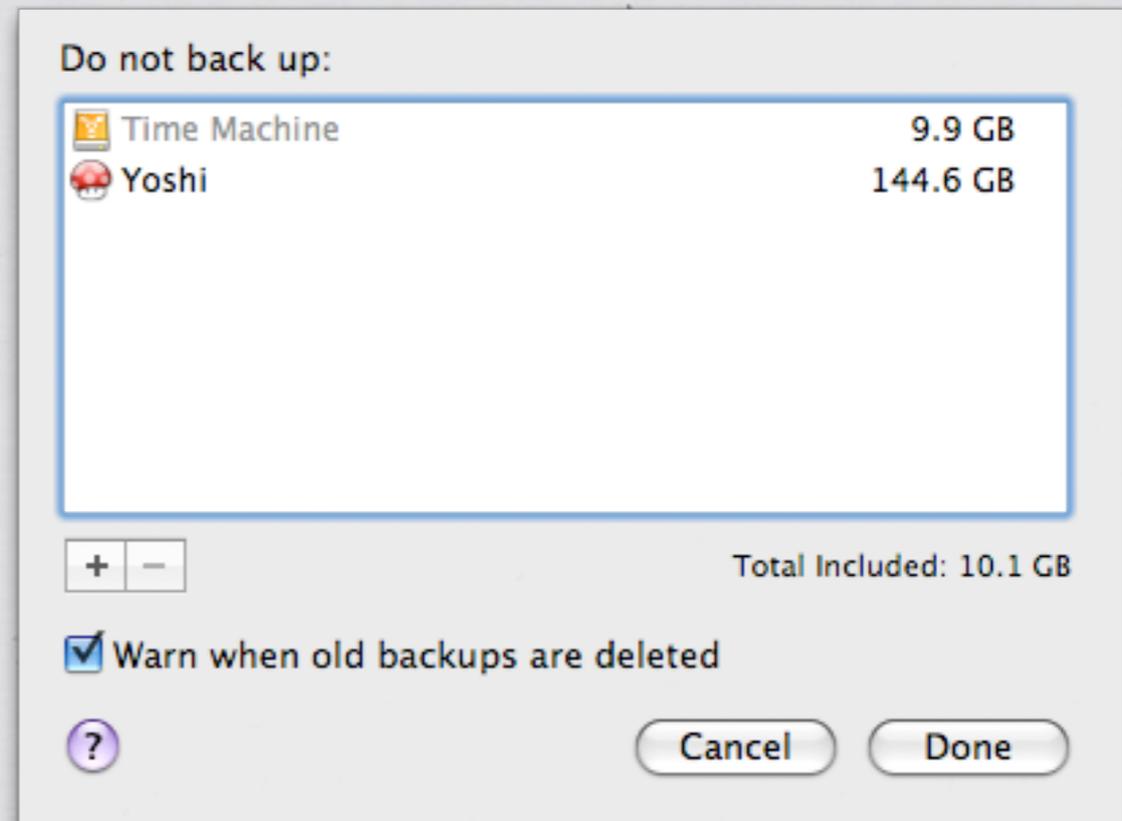
- \* ...is very easy.
- \* To do this, go to the Apple Menu on the menubar and go to System Preferences, or click on the System Preferences icon on the Dock (looks like a bunch of gears in a gunmetal gray rectangle).
- \* The Time Machine Preference Pane opens. Screenshot follows.

# Time Machine Preference Pane



# Time Machine options

- \* Just like the Preference Pane, Time Machine options are very simple, allowing you only to exclude certain files from backup.
- \* You may also see this dialog box appear when first setting up Time Machine, if you have multiple external hard drives from which to choose your backup disk



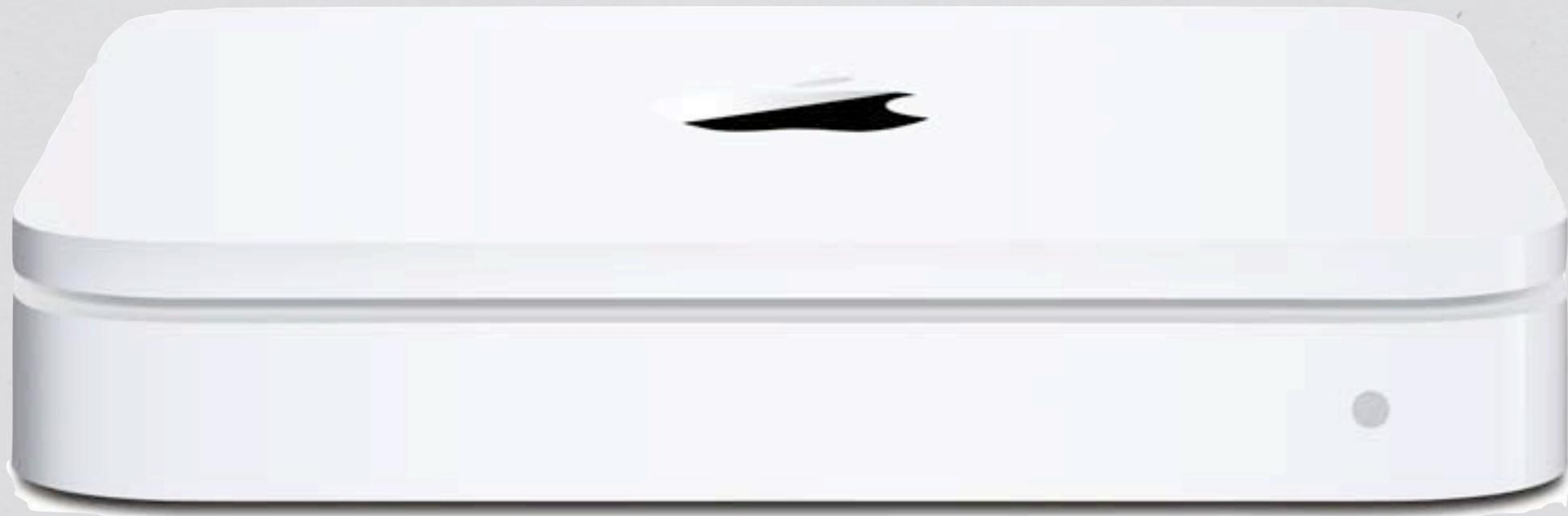
# Notice what you can't control

- \* How often Time Machine does backups: It backs up every hour for 24 hours, then every day for six days, then every week until the backup disk is filled with data. (I assume it automatically starts deleting the oldest backups to make room for newer ones.)
- \* When Time Machine does backups: see above.
- \* What is backed up: It pretty much does everything, unless you go in and exclude a lot. You can't just pick the stuff you want to back up other than the process already mentioned.

# Network Backups

- \* Despite heavy interest and hopes, Time Machine does not support backups over networks, unless the backup drive is attached to another Mac running either Mac OS X Leopard or Leopard Server.
- \* This includes backing up to a hard drive attached via USB 2.0 to an Airport Extreme base station.
- \* There are both free softwares and Unix hacks available to enable network backups, but these are not reliable and difficult to implement.
- \* The reason why this is not available? Could it be...

# Apple Time Capsule



# Time Capsule Facts

- \* Combines an Airport Extreme Base Station, Apple's entry in the wireless router market that supports the latest in wireless networking protocols, 802.11n, and includes three gigabit Ethernet ports, with a very large network attached hard drive.
- \* Comes in two sizes (as far as hard drive capacity): 500 Gigabyte for \$300, and 1 Terabyte (1 thousand gigabytes) for \$500.
- \* Designed to work wirelessly with Time Machine to back up all Macs running Leopard on the local network.
- \* Drool.

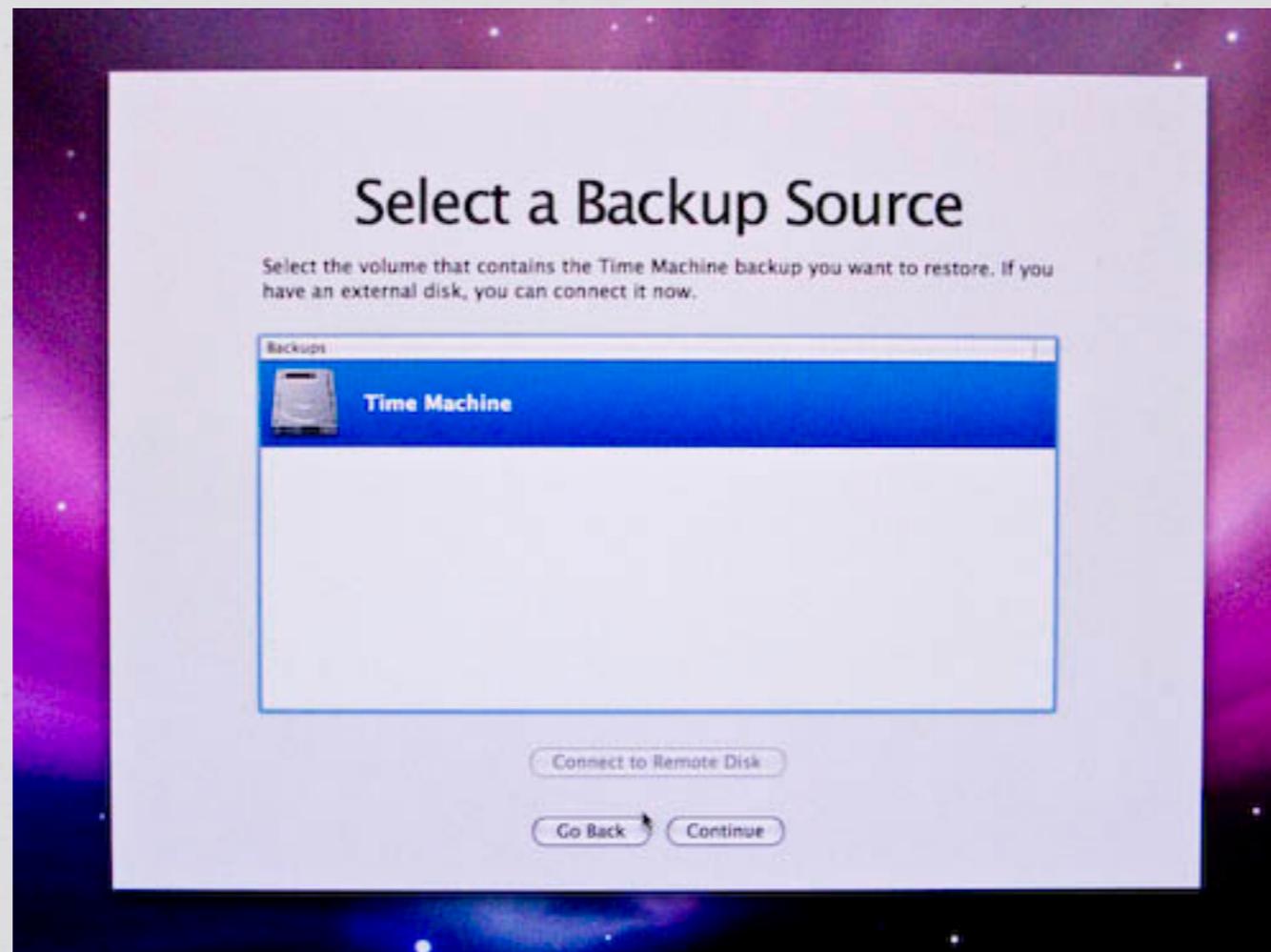
# Restoring a disk totally

\* Besides using Time Machine on one Mac to do incremental backups and restorations, Time Machine on a Leopard installation disk can be used to restore a backup onto a new disk.

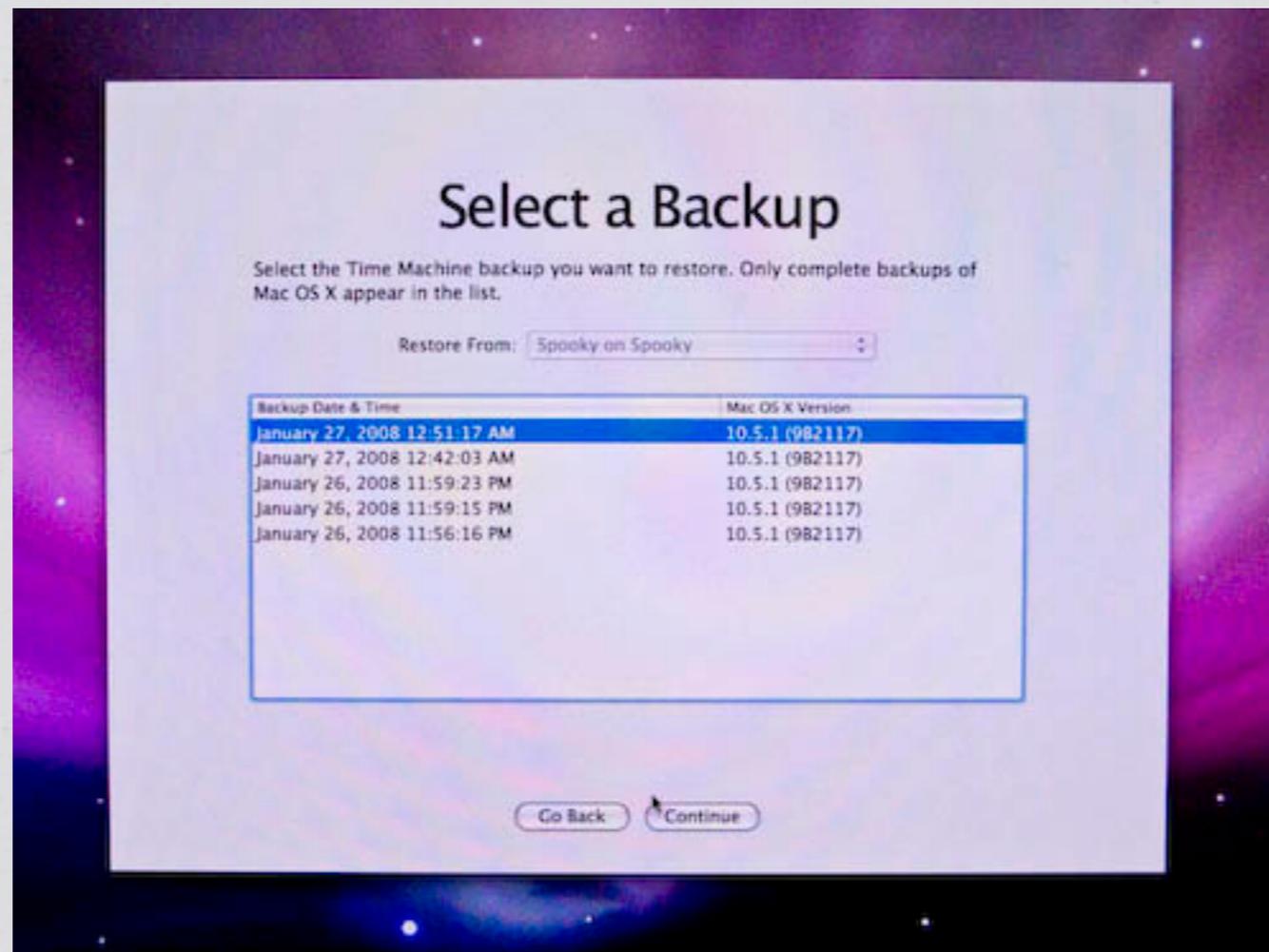


\* The following slides show this process. Thanks to James Duncan Davidson for the account and screenshots from his blog at: [http://duncandavidson.com/blog/restoring\\_from\\_time\\_machine/](http://duncandavidson.com/blog/restoring_from_time_machine/) He used Time machine to copy all of his software and file from his old drive to a new one.

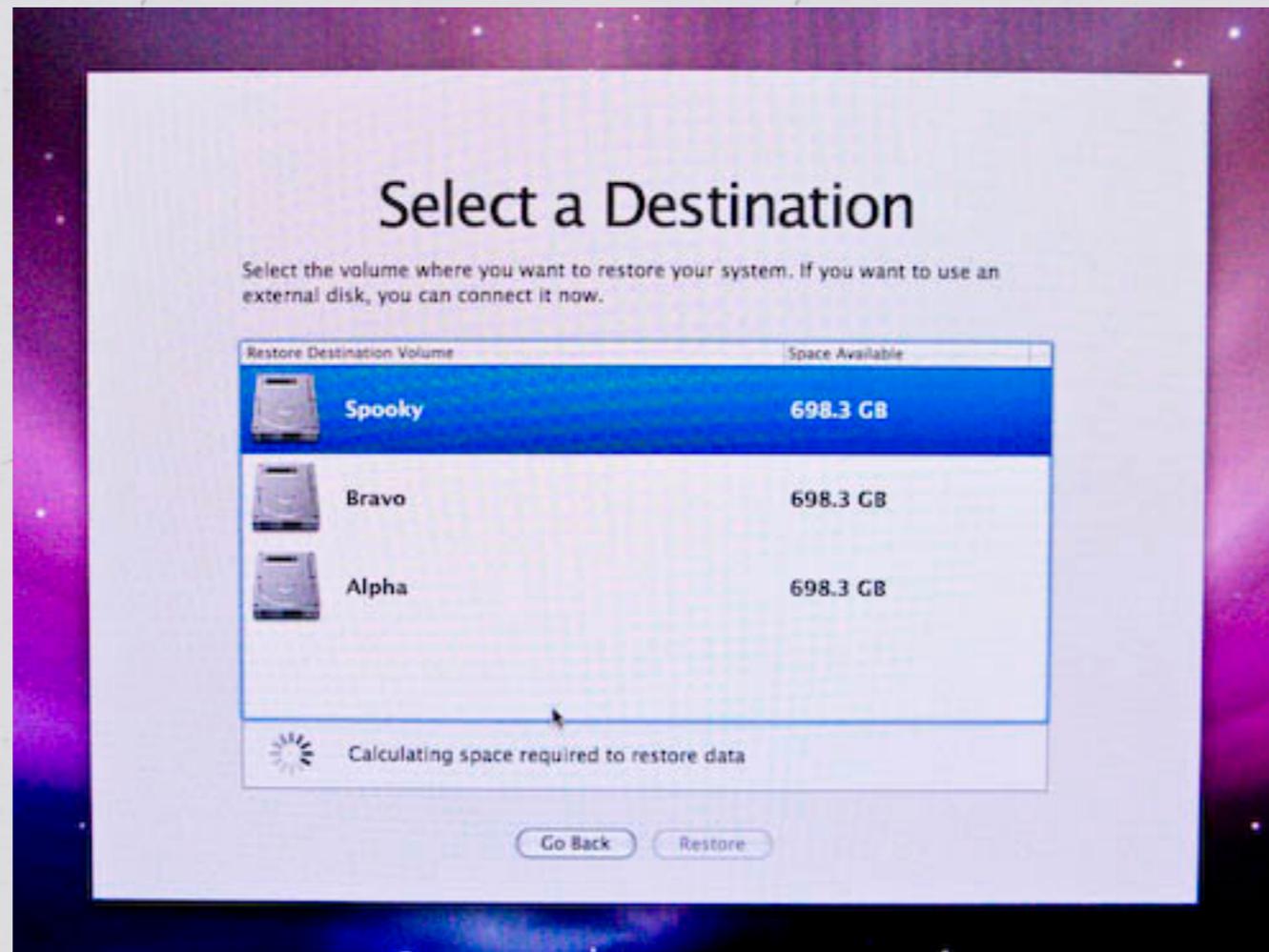
# Selecting the source for restoration



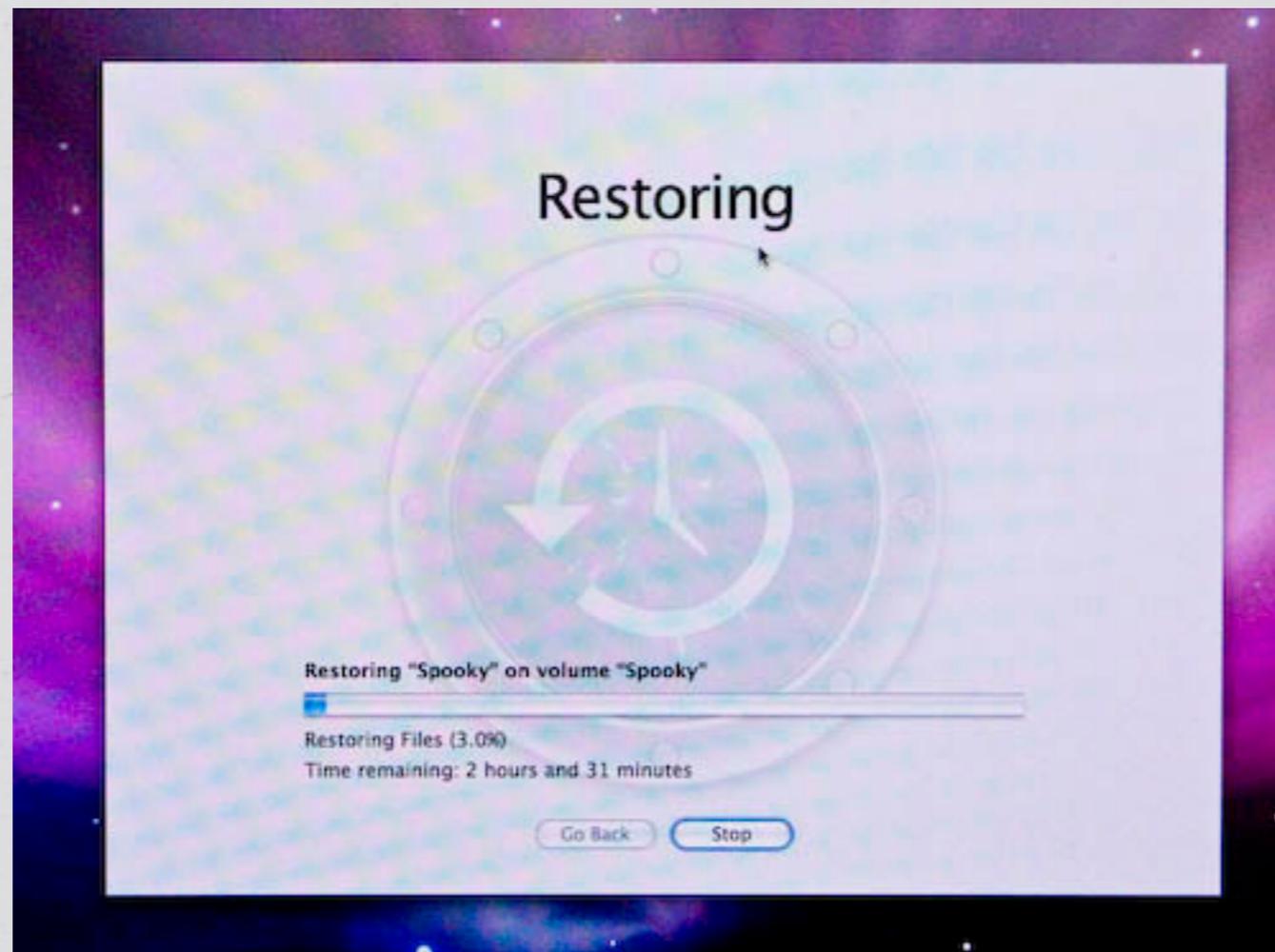
# Selecting the backup session to restore



# Selecting the destination disk to which to restore the backup



# Wait for the restoration to complete



# Restoration Complete

- \* Davidson reported being very satisfied with the whole process. All of his software was copied onto the new drive almost flawlessly.
- \* However, problems arose with Time Machine not copying back certain behind-the-scenes files like system cache files (meaning Spotlight must rebuild its database), or imperfectly copying some files, particularly address-book files, which led to him spending some time manually restoring some settings.
- \* He also noted that Time Machine is quite slow, even on the fastest Macs. If you want a quick recovery, it might be better to have a duplicate drive already backed up and ready to run.

# The End

\* Thanks for your attention to this presentation.