

Cloning A MacOS X (10.2.2 or higher) System

Part 1: Creating A Master (Original) Image

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In order to clone a system from one machine to another you must of course create your master original template. In MacOS 9 and earlier this was easy. Setup a machine the way you wanted, connect to a server (or another drive) and copy the files/folders you wanted to keep from the original machine to a folder. To download to a new machine just boot from a CD (or another partition), erase the drive, and copy down the files/folders.

In MacOS X however this a little more complicated because of file/folder permissions (something you usually didn't need to worry about in MacOS 9) and special UNIX files/folders. To get around this Apple and third parties have supplied various free tools to help you out.

For this document it is assumed that you will be using MacOS X version 10.2.2 or higher (earlier version do not include some features/utilities that will be covered here).

Prep Work

To copy a master drive/partition you *should* boot into MacOS X from either another partition/drive or an external drive (such as a FireWire drive). So before you start make sure to either partition your drive into two partitions, a 'master' partition (you don't have to name it that though) and an 'administration' partition or have an external drive available. Note: This second partition or external drive should have enough *free* space to hold all of the files/folder from the 'master' partition plus *at least* 60% more (2x the size of the data on the 'master' partition is recommended).

Note: You can also use a special boot CD that has MacOS X (10.2.2 or higher) and Disk Copy on it if you really don't want to partition your drive.

Setting Up A Master (Original) Image

On your 'master' partition, reformat (optional, but will save lots of space) and install MacOS X with all updates (Apple Menu->System Preferences->Software Update. Keep running until no updates are listed), add any programs you want (MS Office, Photoshop, etc.) and set any settings you need.

Some Recommended Areas To Check:

System Preferences->

Displays, Energy Saver, Network, Sharing, Accounts, Classic, Date & Time

Applications/Utilities/Print Center

Applications/Utilities/Directory Access (if connection to a NetInfo/MacOS X Domain)

Note #1: The file “/Library/Preferences/com.apple.dockfixup.plist” contains items that the OS will re-add (once) to the user’s Dock even if you use Workgroup Manager to customize. Removing (or customizing) this file will then start the user with the Dock items *you* specify..

Note #2: If you are *not* using home directories on a network you can optionally edit the folders/files in “/System/Library/User\ Template/English.lproj” (this is the ‘template’ for new user’s home directories on the local machine).

Saving Master Image To A File

If you have not already done so, install MacOS X 10.2.2 (or higher) on the ‘administration’ partition (or external drive). Note: You only have MacOS X 10.2 Install CDs, install and run the Software Updates to update to version 10.2.6 (current at this time of writing, but as long as it is version 10.2.2 or higher it shouldn’t matter).

Boot from this ‘administration’ partition (Apple Menu->System Preferences->Startup Disk).

The ‘master’ partition will have some files on it that simply aren’t needed or desired (the virtual memory swap file, cache, etc). Using the terminal (/Applications/Utilities/Terminal) type the following:

```
sudo rm "/Volumes/<MASTER-NAME>/private/var/vm/swapfile*"
sudo rm "/Volumes/<MASTER-NAME>/private/var/db/volinfo.database"
sudo rm "/Volumes/<MASTER-NAME>/private/var/db/BootCache.playlist"
sudo rm "/Volumes/<MASTER-NAME>/Library/Caches/com.apple.LaunchServices.LocalCache.csstore"
sudo rm "/Volumes/<MASTER-NAME>/System/Library/Extensions.kextcache"
sudo rm -R "/Volumes/<MASTER-NAME>/Trash"
sudo rm -R "/Volumes/<MASTER-NAME>/Volumes"
sudo rm -R "/Volumes/<MASTER-NAME>/Trash"
sudo rm -R "/Volumes/<MASTER-NAME>/Trashes"
sudo rm -R "/Volumes/<MASTER-NAME>/Library/Caches"
sudo rm -R "/Volumes/<MASTER-NAME>/private/tmp/*"
```

Note #1: Make sure to replace “<MASTER-NAME>” with the name of the volume/partition of your master image and not to include the line break caused by wrapping in the 4th command.

Note #2: None of these file are actually required to be deleted but I would recommend them (especially the 1st one, though I sorted them in order of importance).

Open Disk Copy (/Applications/Utilities/).

Choose ‘File->New->Image From Folder or Volume’ on the menubar.

Select the source volume (your ‘master’ partition)

Save your image format (compressed format).

The copying of your image (and compressing) will take a while, *much* longer than the download so don’t worry about how long it takes.

When done open Terminal (/Applications/Utilities/) and type the following:

```
asr -imagescan <path to your Disk Copy image file>
```

Example:

```
asr -imagescan “/Volumes/ServerVolume/Images/MacOSXimage/dmg”
```

‘asr -imagescan’ will prepare the image file for later restore by asr (see part 2 of this document). This step isn’t required but it will speed up the restore/download process.

Final Tips

#1

If you do not have an external hard drive (such as a FireWire drive) and do not wish to partition your master computer you can either 1) you *can* use Disk Copy to copy the boot volume/partition while booted on the ‘master’ partition (it will work, but some of the caches and other files will be copied too), or 2) connect two Macs that have built-in FireWire together via a FireWire cable. Just power on your ‘master’ computer while holding down the ‘T’ key (this will make the computer act as an external FireWire drive to the other computer).

#2

Another method that is simpler but slower is using a bootable CD I have recently created with MacOS X and Disk Copy on it. When booted from this CD you can run Disk Copy and save your disk image directly to a server or another partition. If you want a copy of this CD please contact me.

Part 2: Downloading An Image To A Client Machine

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For this document it is assumed that you will be using MacOS X version 10.2.2 or higher (earlier version do not include some features/utilities that will be covered here) and have already read (or have available) Cloning A MacOS X System Part 1.

Before Downloading

To download a Disk Copy image containing your 'master image' of MacOS X to a client workstation you must boot the workstation into MacOS X (10.2.2 or higher), but you can not boot from the partition that you wish to overwrite. To get around this you have multiple options:

- 1) Boot from MacOS X Server CD (note: you can get away with versions as old as 10.2.0)
- 2) Boot from the network using NetInstall
- 3) Boot from a custom made bootCD
- 4) Boot from a second partition on the computer
- 5) Boot from an external hard drive (FireWire hard drive, iPod, etc.)

Downloading

Once booted you need to access the command line. If you used option 3, 4, or 5, you can access the command line using the Terminal program found in the Utilities folder which is in the Applications folder). For options 1 or 2, you will be booted to the 'MacOS X Server Installer'. Do NOT actually run the Installer, instead, access the command line by choosing 'Terminal' from the 'Installer' menu.

The command line tool I like to use to download the image is 'asr' (you can type 'asr' and press <return> to find out more).

The basics of asr are:

```
asr -target <the directory path to the partition to dump your image to> -source <the path  
to your Disk Copy image file> -erase
```

Here are some examples:

```
asr -target "/Volumes/Macintosh HD" -source http://10.0.0.3/TechDept/OSXimage.dmg -erase
```

In the above example we are dumping the image to the local hard drive called "Macintosh HD" (note: All volumes, except the boot volume will likely appear under "/Volumes/"). The source (the Disk Copy image file) in this case is actually located on a web server (in a directory called 'TechDept'. (note: I had a lot of luck with this working on using the web server Apache (which is included in MacOS X), I've had some luck with WebStar for a web server, but I have not tried any others).

```
asr -target "/Volumes/MacOSX" -source "/Volumes/ServerVolume/Images/OSXimage.dmg" -erase
```

In the above example we are dumping the image to the volume called 'MacOSX' and we are getting the image from a mounted server (in the Finder we used the 'Go->Connect To Server...' menu to connect to the server).

```
asr -target "/Volumes/MacOSX" -source "/Images/OSXimage.dmg" -erase
```

In the above example we are dumping the image to the volume called 'MacOSX' and we are getting the image from a folder called 'Images' on the boot partition (presumably we are not booted from a CD).

Tips

If you use the boot options 3, 4, or 5, you will have the option of using the regular MacOS X desktop (the Finder) and should be able to access your network file servers just as you usually would (Go->Connect To Server...' menu).

The '-erase' part of asr was optional (it erases the partition right before downloading the image) but if used it will assure your drive is cleaned of any files *and* will actually *speed up* the asr processing time.

To make a bootable MacOS X CD-ROM I used the free tool 'bootCD' from <http://www.charlessoft.com>. If you wish to make your own, be sure to read the directions *and* add 'Terminal' as one of the additional programs. If you want a copy of *my* MacOS X boot cd feel to contact me.

NetInstall is an option where newer Macs (iMacs, G4s, etc.) can boot up and use an OS from a MacOS X Server machine instead of the local hard drive. This is a great option, it doesn't require FireWire drives or CDs to download to a client and you can do many machines at the same time. For the sake of keeping this document short I won't cover how to setup a NetInstall option on your server, but if you are interested in this option please let me know and I can tell you how I did it.

In Terminal you can save yourself the trouble of typing some of these file paths by dragging files/folders/volumes to the Terminal window. Example: Type: "asr -source " (without quotes) and then drag the local hard drive icon onto the Terminal window. Terminal will then insert the full path that volume (such as: asr -source /Volumes/Macintosh\ HD).

In Terminal you don't actually *have to* use quotes around folder/file names that have spaces in them (but I prefer too, it looks neater), you can use the "\ " character (see the above tip) to tell Terminal that the next character (a space in our case) is not a separator.

Robert C. Best III

rbest@potdam.k12.ny.us

Computer Coordinator for Potsdam Central Schools

(315) 265-2000 x266