

## WHAT IS INSTALLED

### 1. The Package

The MacTeX-2009 install package contains six subpackages:

- TeXLive-2009
- GUI-Applications
- Ghostscript-8.70
- ImageMagick-Convert-6.5.2
- Latin-Modern-Fonts
- TeX-Gyre-Fonts

In the default installation, all except the two font packages are installed. Using the “Custom Install” option, you can select which packages to install.

### 2. TeX Live

The most important package is TeXLive-2009, which installs the full TeX Live 2009 distribution in `/usr/local/texlive/2009`. TeX Live is the reference TeX distribution produced by TeX user groups across the world; it runs on almost all computer architectures including OS X, Windows, GNU/Linux, and other Unix systems. The distribution is the same on all of these platforms; nothing has been added or removed to customize it for OS X.

You can find a complete list of files and install locations by double clicking on the MacTeX-2009 package and then choosing the menu item “Show Files”. The important fact is that everything in TeX Live is put in the “2009” folder.

When you want to add files to TeX Live which are visible for all users on your machine, the files should be installed in `/usr/local/texlive/texmf-local`. This tree is not inside the 2009 folder so it can be used with future versions of TeX Live as well. If the `texmf-local` directory exists when MacTeX-2009 is installed, then it is not touched by the installer. But if there is no such tree, then MacTeX-2009 installs an empty tree waiting to be used. This is exactly what would happen if you installed TeX Live using its native install script.

Incidentally, if you want to add files to  $\text{\TeX}$  Live for one particular user, install them in a similar tree `~/Library/texmf` where `~/Library` is the Library folder in that user's home directory. The folder `texmf` and other folders for the tree will have to be created. For instance,  $\text{\TeX}$  will find any file in `~/Library/texmf/tex` or a subfolder of this location,  $\text{\LaTeX}$  will find any file in `~/Library/texmf/tex/latex` or a subfolder of this location, and  $\text{\BibTeX}$  will find any `.bib` file in `~/Library/texmf/bibtex/bib` or a subfolder of this location, and any `.bst` file in `~/Library/texmf/bibtex/bst` or a subfolder of this location. It is not necessary to use `texhash` when adding files to this local tree.

In addition,  $\text{\MacTeX}$  installs a few items customized for OS X and not available from the  $\text{\TeX}$  Live install script. These items are not in the `2009` folder or the `texmf-local` folder; they are support items which can be used or ignored. The support items make it possible to add GUI front ends and utilities to  $\text{\TeX}$  without any configuration whatever; these applications are automatically configured for your current  $\text{\TeX}$  distribution. The support items also allow you to have more than one  $\text{\TeX}$  distribution on your machine and trivially switch between them. For example, if you already installed  $\text{\TeX}$  Live 2008 last year, that distribution remains after you install  $\text{\TeX}$  Live 2009; if you are in the middle of an important project and find that something in  $\text{\TeX}$  Live 2009 doesn't work correctly, you can switch back to  $\text{\TeX}$  Live 2008 with a single button push.

All of this is made possible by the  $\text{\TeX}$  Distribution Data Structure designed by Jérôme Laurens and Gerben Wierda. The structure contains a small folder of symbolic links for each  $\text{\TeX}$  distribution installed on your machine. The structure is in `/Library/TeX` and contains four subfolders: `.scripts`, `Documentation`, `Distributions`, and `Root`. The data structure is very small, only about 332 KB.

A user can ignore `/Library/TeX` entirely because the data is controlled from a “ $\text{\TeX}$  Distribution” preference pane installed in `/Library/PreferencePanes`. To use it, open Apple's System Preferences and find the  $\text{\TeX}$  Distribution pane at the bottom. Open it to see a list of  $\text{\TeX}$  distributions installed on your machine. The active distribution will be indicated by a radio button. Push a different button to change distributions; automatically all of your GUI front ends and utilities will reference the new distribution, and `PATH` and `MANPATH` will point to the new distribution in Terminal.

Currently everything in the folder `TeX` inside `/Library` was installed by  $\text{\MacTeX}$ , but in the future developers may install other things in this location. It isn't necessary to discuss the full contents of `TeX`, but two items will be of interest.

`Root` is just a symbolic link to the active distribution, and so in our case to `/usr/local/texlive/2009`. It is visible in the Finder, so to inspect  $\text{\TeX}$  Live 2009 without using tricks, click on `Root` and navigate to any portion of the  $\text{\TeX}$  Live 2009 tree you'd like to study.

Distributions contains one “.texdist” folder for each distribution on your machine. Four such folders are installed by MacTeX: Fink-texTeX, MacPorts-texTeX, gwTeX-2003-2005, and TeX Live-2009, but you may have others if you installed earlier distributions like gwTeX or TeX Live-2008. The Fink and MacPorts structures are provided because these distributions do not install such structures themselves; the gwTeX-2003-2005 structure refers to Gerben Wierda’s original texTeX based distribution of several years ago, and is provided because that distribution was invented before this structure existed. Note that “.texdist” folders may exist for distributions you don’t have; this causes no trouble because the TeX Distribution preference pane is intelligent and checks to make sure the .texdist folder points to active data. So if you later remove TeX Live 2009, it is not necessary to modify /Library/TeX.

Our package also installs two symbolic links: /usr/texbin is a link pointing to the executables directory of the active distribution, and /usr/local/bin/texdist is a symbolic link to a script in /Library/TeX which can manipulate the TeX Distribution Data Structure. Most GUI front ends and utilities use /usr/texbin as the location of the TeX executables, although this can be changed in their preferences. For that reason, such applications require no configuration for new TeX distributions.

Finally, our package modifies your PATH and MANPATH so command line utilities also work automatically with the active distribution. This modification is particularly straightforward if you are running a new installation of Leopard. On Leopard, the directory /etc/paths.d contains a file for each addition of a new location to the default PATH on the system. As shipped by Apple, this folder has only one file: x11. Our install package adds a second file, TeX, which contains the single line /usr/texbin. Similarly the directory /etc/manpaths.d contains a file for each addition of a new location to the default MANPATH. As shipped by Apple, it contains only one file: x11. We add a second file: TeX.

On older systems, and on Leopard if you upgraded from an earlier system and you modified /etc/profile or /etc/csh.login, another technique is required. In either of these cases we modify /etc/profile, /etc/csh.login, and either /etc/manpath.config or /usr/share/misc/man.conf. We use exactly the modification introduced by Gerben Wierda in his distributions of texTeX and TeX Live; indeed we use his scripts to make the modification. Gerben’s modifications are enclosed in easily visible comments, so they can be directly inspected and removed if desired.

On Snow Leopard, the man command uses heuristics starting with PATH to find man pages. This technique works for TeX Live 2009 because the TeX Live 2009 bin directory contains a link named “man” which points to the related TeX Live man pages.

### 3. Latin Modern Fonts and TeX Gyre Fonts

As you probably know, TeX fonts are separate from standard system fonts and reside inside the TeX Live tree. TeX and L<sup>A</sup>T<sub>E</sub>X use these TeX fonts rather than ordinary system fonts. The program X<sub>Y</sub>TeX is an exception and can use any ordinary system font.

TeX Live contains a vast array of fonts. See <http://tug.org/fonts> to begin exploring the possibilities. The most commonly used are the Computer Modern Fonts of Donald Knuth, and extended versions of these called the Latin Modern Fonts which add European accented characters and additional characters to Knuth's classics. The TeX Gyre Fonts give TeX versions of standard Adobe Fonts.

One difficulty is that Macintosh programs like Adobe Illustrator do not have access to the TeX fonts. MacTeX has a custom installation mode which installs the Latin Modern and TeX Gyre Fonts in system font libraries, so these fonts can also be used in Adobe Illustrator and other standard programs.

The two packages are not installed by default; “custom install” must be used to obtain them. The first package installs a folder named LatinModern to /Library/Fonts; this folder contains 72 fonts. The second package installs a folder named TeXGyre to /Library/Fonts; this folder contains 33 fonts. To uninstall, simply drag the two folders out of /Library/Fonts, assuming you have proper permission.

### 4. GUI Applications

This package installs BibDesk, LaTeXiT, TeXShop, TeXworks, TeX Live Utility, and Excalibur in /Applications/TeX. Note that many other editors, front ends, and utilities are available for TeX on the Internet; you may want to experiment with a variety of such programs. The package also installs one README file and the “What Is Installed” document which you are currently reading. All of these items can be removed by dragging them to the trash.

The package installs Gerben Wierda's i-Installer to /Applications/Utilities. This utility can install several independent packages over the internet which are useful in conjunction with TeX, including a full version of ImageMagick, FontForge, a L<sup>A</sup>T<sub>E</sub>X to RTF Converter, XFig, and various other utilities. Wierda's program is not used to maintain TeX Live.

TeXShop and TeXworks is front ends for TeX. Each contains an editor and previewer for TeX. If you are new to TeX, you can begin learning it by running TeXShop or TeXworks and following the instructions in the README file in /Applications/TeX. Experienced users may want to switch to their own favorite editor.

TeX Live Utility is a program which can update TeX Live 2009 packages over the network, and can configure paper size in TeX. The program is self explanatory. When it starts, TeX Live Utility lists packages in TeX Live 2009 for which updates are available. Push the “Update All” button to update these packages. TeX Live Utility calls a command line utility named `tlmgr` in TeX Live 2009 to perform the updates; it is possible to directly run `tlmgr` in Terminal.

Unfortunately, TeX Live Utility requires system Leopard (system 10.5 or higher). If you are running an earlier operating system, you can upgrade TeX Live 2009 using the command line utility `tlmgr` from Apple’s Terminal program. Read the file `TeX Live Manager.pdf` in `/Applications/TeX` for details.

## 5. Ghostscript 8.70

The Macintosh comes with a distiller which converts postscript to pdf: `/usr/bin/pstopdf`. For this reason, it is not essential to install Ghostscript when installing TeX. However some TeX style files assume the existence of Ghostscript and many people prefer to distill using it. Any Ghostscript installation will do, and some users have the Fink or MacPorts distributions, or the distribution from i-Installer, which all work well with TeX. For others we provide the latest version of Ghostscript in this package.

You can find a complete list of files installed by double clicking on the MacTeX-2009 package and then choosing the menu item “Show Files”.

Ghostscript executables are placed in `/usr/local/bin`, support files are placed in `/usr/local/share/ghostscript/8.70`, man pages are in `/usr/local/share/man`, and fonts are installed in `/usr/local/share/ghostscript/fonts`. Most Ghostscript executables are just shell scripts. There are only two binaries containing code, `gs-X11` and `gs-noX11`; the first is compiled with X11 support and the second without X11 support. The symbolic link `gs` points to one of the two versions depending on whether the installer found X11 on your system at install time. Both are universal binaries with code for both Intel and PPC.

## 6. Convert from ImageMagick 6.5.2

ImageMagick is a program used to process image files; it comes with a large number of support utilities. The “convert” utility in ImageMagick is used by a small number of programs in TeX Live to convert between graphic formats. In particular, the `TeX4ht` package in TeX Live typesets a TeX source file to an HTML file for the web, and requires “convert”. Also, “convert” is useful in other contexts; it understands pdf, ps, png, jpeg, tiff, and many other formats. For example, to convert a tiff file to png, issue the command

```
convert myfile.tiff myfile.png
```

The full ImageMagick can be obtained in several ways: via Fink, MacPorts, or i-Installer. We provide a very small package which contains only “convert”, compiled with static libraries so no unexpected library is installed on the system. (Indeed, nothing in MacTeX-2009 installs library files on the system). The package installs “convert” in `/usr/local/bin`, nine xml initialization files in `/usr/local/lib/ImageMagick-6.5.2/config`, and one man page in `/usr/local/share/man/man1`.