

TUG-BINARY

RICHARD KOCH

1. TeX LIVE BINARIES

Starting in 2017, we support versions of macOS which are still receiving security updates from Apple. Thus in 2019 we support the latest three systems, Sierra, High Sierra, and Mojave. Shortly after TeX Live is released, Apple holds the developer conference, WWDC, and releases a first beta of the next system. This system is usually released in September. So for most of the year, we support four versions of macOS.

This is the portion of the TUG documentation which deals with making the TeX Live binaries. Building is a two stage process. First TeX Live and asymptote are compiled on the oldest supported system, currently Sierra. Then the resulting binaries are processed here, forming the binaries sent to TUG for inclusion in TeX Live. (We sometimes build TeX Live on the latest operating system, currently Mojave, to check that users who compile themselves will be happy.)

A clean package file will contain

- the folder AsymptoteBuild containing information for building asymptote.
- the folder BuildStatusDocs, containing technical details for building TeX Live and lisp
- the script "liposcript"
- the empty folder "RawCode"
- "TUG" folder with this document

The main MacTeX folder containing the Binary Folder must contain "xz", the binary which compresses packages, since the scripts in the Binary directory call it.

2. COMPILING THE BINARIES

The "BuildStatusDocs" folder contains a crucial document named

BuildStatus-2019

Date: January 5, 2019.

This document contains the precise shell commands needed to obtain and build the TeX Live binaries. The document is an ordinary TextEdit plain text file so it can be easily edited if changes in the process are required. I find it convenient to put a copy of the document on the desktop of the build machine, merging editing changes back into the master document from time to time.

Building xindy requires obtaining and compiling CLISP. A separate document in the Build-StatusDocs folder explains how to do that.

Building asymptote requires obtaining, compiling, and installing three libraries. Complete instructions are included in the AsymptoteBuild folder, in the document

AsymptoteBuild-2019

The end result of these processes will be a folder of binaries and an isolated binary for asy. Place these items in the RawCode folder on this machine. Then run Terminal, change to the Binary directory, and run the command

```
sudo sh liposcript
```

This will create a folder named x86_64-darwin and a file named x86_64-darwin.tar.xz. Send the second xz file to Karl Berry.

3. SPECIAL CONSIDERATIONS FOR XINDY IN 2019

We began compiling Xindy in 2010. In 2011, these binaries no longer worked. The author of Xindy pointed out that two lisp files did not change: xindy.mem and xindy.run. So from 2011 on, we compiled xindy using clisp, but replaced these two files with the 2010 versions.

In 2017, we adopted the modern approach of supporting only the three latest versions of macOS. That year's lisp files xindy.mem and xindy.run worked, so we used them rather than the 2010 versions. But last year, the 2018 versions of these files did not work, so at first we returned to the 2010 versions.

Herbert Schult pointed out to me that the 2010 version of xindy.run contains 32 bit binaries, but the 2017 version contains 64 bit binaries. Starting last year, Apple began phasing out 32 bit code on the Macintosh. So instead of using the 2010 version of the lisp files, in 2018 and 2019 we will use the 2017 versions of xindy.mem and xindy.run. The liposcript which converts the binaries to x86_64-darwin automatically makes this substitution.

4. SPECIAL CONSIDERATIONS FOR LUA_{TEX} IN 2017 AND 2019

In 2017, it was discovered that lua_{TeX} could not call lua modules on the Macintosh. Ultimately this behavior was traced to the strip code. When TeX Live is built, part of the process calls "strip" to shrink the size of binaries by removing debugging code.

The Macintosh strip code has special flags which reduce the code size, but preserve lua_{TeX}'s ability to call lua modules. The required call, with flags, is "strip -u -r". Use of this call is

somewhat controversial in the TeX Live community, but it turns out that the flags barely change code size over using the full “strip”. So the code to build TeX Live 2019 is

```
cd
cd texlive2019dev/source
extern STRIP="strip -u -r"
./Build --enable-xindy CLISP=/Users/koch/clisp/clisp-build/clisp
```

The Binary directory contains a folder named LuaNew with a small test of luaTeX to make sure that this fix works.