fpTEX : teTEX for Win32

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Abstract
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Free TeX for Windows

- emTeX
  - Targeted at MS-Dos and OS/2
  - Compiled thanks to GCC, but with dos-extender
  - No source code available
  - Moved recently to the TDS (recursive search in a directory tree)
- MiKTeX
  - Dedicated to Windows
  - Quite the same as fpTeX

  Later, we will establish a comparison between both fpTeX and MiKTeX. The most noticable point is that C. Schenk has developped a completely new system from scratch.
- fpTeX
  - teTeX based and teTeX compatible
  - Same source code as the Unix version (Windows specifics have been integrated)

A bit of history

- The source code of TEX has been written by D.E. Knuth in the `web` language. From the `web` files are extracted both the Pascal program and its documentation in TEX format.
- But Pascal was not so portable, so a first translator from `web` to C has been devised.
- Any standard installation needed a bunch of tools and drivers, each of them having their own set of configuration variables, and that was hard to manage
- Karl Berry gathered all commonly used packages around TEX and build its kpathsea library. This library allows quick access to the files, and shares configuration parameters between all programs through a few configuration files.
- The Web2C distribution is used by teTEX and the TEX-Live CD-ROM.
- It is now maintained by Olaf Weber.

Why using a Web2C based TEX?

- Compatibility :
  - it is available for the most common platforms
  - you can *share* support files and configuration files across the network
- Up to date : most of the developments are happening on Web2C, so you are assured to use the latest tools,
- Safety :
  - Web2C is widely used, and as such, well debugged
  - the source code is portable and free, so should last a long time
-

What's in fpTeX ?

Most of the teTeX tools plus some bonus :

Programme	Description
TeX 3.14159	the TeX compiler
METAFONT **2.7182**	the fonts compiler
MetaPost 0.641	a graphical programming language along the lines of METAFONT, produces Postscript files
METAFONT**ware**	support tools for METAFONT
TeXware	support tools for TeX
e-TeX 2.1	the e-TeX extension of TeX
Omega 1.8	a TeX extension towards Unicode (and much more !)
pdfTeX 0.13c	a TeX compiler which produces PDF files
mktex* 2.0	support programs for generating missing font files
fmtutil 0.2	help at format files generation

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Programme	Description
dtl	translates DVI files into human readable format and vice-versa
dvi2tty	text mode previewer for DVI files
dvidvi	helpful with pagination problems
dviljk 2.6	driver for printing DVI files on *LaserJet* printers
dvipdfm 0.10.4	converts DVI into PDF format
dvipsk 5.85	converts DVI into Postscript format
gsftopk 1.16	rasterizes Type 1 fonts into PK fonts
lacheck 1.26	cheks your LaTeX files without actually compiling them
ltx2rtf 3.5	converts LaTeX files into RTF files
makeindexk 2.13	processes index files
musixflx 0.83	helps at typesetting music scores
odvipsk 5.85	converts Ω extended DVI files into Postscript files
owindvi 0.62	previewer for Ω extended DVI files
ps2pkm	another rasterizer for Type 1 files

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Programme	Description
psutils 1.7	a toolbox to manipulate Postscript files
seetexk	a toolbox to manipulate DVI files
t1utils 1.9	assembling and disassembling Type 1 fonts
tex4htk	converts TEX or LATEX files to HTML files
texinfo	the GNU technical documentation package relying on TEX
tth 2.0	another converter from LATEX to HTML
windvi 0.62	DVI file previewer

And at least as important as the programs :

A huge `texmf` tree maintained by Thomas Esser

How does one install and use fpTEX ?

General ideas

- InstallShield based installation program (with many bugs !)
- automatic default configuration
- uses as less parameters as possible

Options

- Asks about root of the installation, detects an old one,
- Global or personal installation under NT
- Several `texmf` trees :
  - the main tree pointed by `$TEXMFMAIN`
  - a local *mandatory* tree pointed by `$TEXMFLOCAL`
  - an optional tree pointed by `$TEXMFEXTRA`
  - a personal tree under NT pointed by `$TEXMFHOME`
- Choice among several installation types :
  - *Basic*,
  - *Recommended*,
  - *Full*,
  - *Customized*
- Supplementary tools :
  - Ghostview (to be removed ?)
  - ImageMagick
  - WinEdt
  - texshell

Everyday use

- even under Windows, TEX *is and will stay* a command line tool
- TEXing is essentially a *compilation* process
- an “intelligent” editor is needed to drive TEX
  - WinEdt and texshell are proposed with fpTEX installation
  - people used to it can also retrieve either GNU Emacs or XEmacs

Configuration files

The following files are copied in the local texmf tree and updated :

- `web2c/texmf.cnf`, main configuration file for kpathsea
- `web2c/mktex.cnf`, configuration file for font naming
- `web2c/fmtutil.cnf`, contient la définition des formats
- `tex/generic/config/language.dat`, holds the description of supported languages
- `dvips/config/config.ps`, default configuration for the `dvips` driver, *not updated*
- `pdftex/config/pdftex.cfg`, default configuration for the `pdftex` engine, *not updated*

Modified system variables

- The rule is : as less as possible, as simpler as possible
- The default `PATH` for the user is changed
- `TEXMFCNF` points to the `$TEXMFLOCAL/web2c` directory
- Some variables needed for Ghostview and ImageMagick
- No use of the registry

What's kpathsea?

- Centralized configuration
  - Programs call it to retrieve variables
  - Programs call it to retrieve files
- Supports multiple texmf trees
- `ls-R` database files
- font generation
- Debugging features
  - toggled by environment variable or command line option
  - `kpsewhich` tool

Some features of Web2C

- All the engines share a common set of command line options
- `ini` and `vir` forms have been merged
- Internal arrays are sizable at `ini` time
- Linking an engine on a format name will allow to load the format by calling the link. Done using `.dll` files under Windows
- The command line needed to process a document can be stored as the first line of the document
- `.tcx` files

Some new interesting tools

- a viewer for `.dvi` files
- a converter from `.dvi` file format to `.pdf` file format
- a converter from LaTeX to HTML

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The Windvi viewer

- Source code based on `xdvi`
- Antialiasing
- easy navigation through the dvi file
  - page by page,
  - with different increments (by 5 or 10 pages at a time)
  - goto home, end, or any page within the document,
- different shrink factors to zoom page in and out,
- magnifying glass to show the page at the pixel level,
- compatible with XDvi keystrokes
- use of `.vf` fonts
- display `.pk` and `.gf` font files
- automatic generation of missing `.pk` files even for Type 1 fonts,
- tracking `.dvi` file changes, and automatic reopening,
- understanding of Ω extended `.dvi` files,
- drag-and-drop file from the Windows shell explorer,
- colour support (a-la `dvips`),

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- real-time logging of background font generation, and other warning or error messages,
- visualization of Postscript inclusions.,
- support of HyperTEX specials,
- printing (not finished).

DVI to PDF converter by Marck A. Wicks

- really simple to use :

```
dvipdfm [options] dvifile
```

- Understands :
  - hyperlinks
  - geometrical transformations
  - inclusion of JPEG images
  - colourful text
  - partial font inclusion and compression
  - beware : uses its own `\special` !
- High quality result, just have a look at the documentation

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TeX4HT
by Eitan M. Gurari

- Two passes converter :
  1. LaTeXprocesses the document using a specific package :

```
\documentclass{article}
   \usepackage{tex4ht}
\begin{document}
   ..................
\end{document}
```

  2. Next TeX4ht processes the document too and generates HTML :

```
c:>tex4ht foo
```

- An optional third pass is needed to build some images from material that cannot be used directly,
- Highly configurable and can also target MathML, XML ...
- Uses `.css` style files
- Many features to investigate !

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MiKTEX and fpTEX side by side

- Same `C` compiler, same platform, same performances
- Source code dedicated to Windows for MiKTEX, portable code for fpTEX.
- Porting is rewarding : for quite a long time, MiKTEX did not have the same features that `web 2c` had, for example :
  - `ls-R` file for optimizing file search,
  - use of configuration files instead of Windows registry,
  - visualization of Postscript inclusions in the viewer,
  - more elaborated font generation,
  - many tools and TEX extensions were available with `web 2c` (pdfTEX, e-TEX, Ω, etc ...)
- on MiKTEX advantage :
  - installation program available from the beginning,
  - the viewer can print files.

The future

- Split the distribution in smaller parts
- Allow to download and install components from the Web
- Enhance Windvi
- A tool for configuration : `texconfig.exe`
- Printing administration