Special and common aspects of pdf generators

Ernst Reissner (rei3ner@arcor.de)

Contents

List of Tables

1 Introduction

This document is created with `lualatex` or that like with output format PDF. The package `tex4ht` is not loaded.

This document is about features the three generators on latex, `pdflatex`, `lualatex` and `xelatex` have in common and discusses also aspects under which they are specific. These programs are just underlying tex engines preloading the the LaTeX format. The names of the underlying engines just drop the inner sylable "'la"' For PdfTeX there is a user manual [THHB23], for LuaTeX there is a reference manual [HHHS23] and for XeTeX a reference guide [RHB23]. Note that in fact we use a variant of luatex, called LuaHBTeX.

This document is valid for versions of the underlying tex engine as given in Table reftab:versions.

converter	version
`pdflatex`	pdfTeX 3.141592653-2.6-1.40.24
`xelatex`	XeTeX 3.141592653-2.6-0.999994
`lualatex`	LuaHBTeX, Version 1.15.0

Table 1: Converters and the version this document refers to

The first aspect we cover are the options (among those to display the version).

2 The options

We start with a synopsis of the options. Table 2 shows options common to all, or all but one of the converters under consideration. Note that in contrast to the other converters, `lualatex` defines options starting with `--` but it can also process the options if given with a single dash also. This is to allow giving options valid for all given converters.

option	excluded	explanation
`(-)-cnf-line=STRING`	—	parse STRING as a configuration file line
`(-)-draftmode`	`xelatex`	switch on draft mode (generates no output PDF)
`(-)-[no-]file-line-error`	—	disable/enable file:line:error style messages
`-fmt=FMTNAME`	—	use FMTNAME instead of program name or a %& line[1]
`(-)-ini`	—	for dumping formats
`(-)-halt-on-error`	—	stop processing at the first error
`(-)-help`	—	display this help and exit
`(-)-version`	—	output version information and exit
`-8bit`	`lualatex`	make all characters printable by default[2]
`(-)-interaction=STRING`	—	set interaction mode (`STRING=batchmode/nonstopmode/scrollmode/errorstopmode`)
`(-)-jobname=STRING`	—	set the job name to STRING
`(-)-kpathsea-debug=NUMBER`	—	set path searching debugging flags according to the bits of NUMBER
`(-)-[no-]mktex=FMT`	—	disable/enable mktexFMT generation[3]
`-mltex`	`lualatex`	enable MLTeX extensions such as `\charsubdef`
`(-)-output-comment=STRING`	—	use STRING for DVI file comment instead of date (no effect for PDF)[4]
`(-)-output-directory=DIR`	—	use existing DIR as the directory to write files in
`-output-format=FORMAT`	`xelatex`	use FORMAT for job output; FORMAT is 'dvi' or 'pdf'[5]
`[-no]-parse-first-line`	`lualatex`	disable/enable parsing of first line of input file
`(-)-progname=STRING`	—	set program (and fmt) name to STRING[6]
`(-)-recorder`	—	enable filename recorder
`(-)-[no-]shell-escape`	—	disable/enable `\write18SHELL COMMAND`[7]
`(-)-shell-restricted`	—	enable restricted `\write18`[8]
`-src-specials`	`lualatex`	insert source specials into the DVI file
`-src-specials=WHERE`	`lualatex`	insert source specials in certain places of the DVI/XDV[9] file.
`(-)-synctex=NUMBER`	—	generate SyncTeX data for previewers[10]

Table 2: Common options, with up to one exception

To ensure that a configuration works for all of these converters, the options must be restricted to those listed in Table 2 and not assigned a restriction.

If one really needs functionality special for a certain converter, one has further options at disposal. Table 3 presents options specific to `pdflatex`, Table 4 Options specific to `lualatex` and Table 5 Options specific to `xelatex`.

pdflatex:

```
Usage: pdftex [OPTION]... [TEXNAME[.tex]] [COMMANDS]
```

[1] in fact for `lualatex` the explanation deviates a bit: `--fmt=FORMAT: load the format file FORMAT`
[2] for `xelatex`: don't use ^^X sequences
[3] `(FMT=tex/tfm/pk)` for `pdflatex`; else `(FMT=tex/tfm)`
[4] For `xelatex` it is XDV instead of DVI and the remark `(no effect for PDF)` is missing
[5] `xelatex` offers option `-no-pdf` instead.
[6] `lualatex` does not mention `(and fmt)`
[7] For `lualatex` the explanation is `disable/enable system commands`
[8] For `lualatex` the explanation is `restrict system commands to a list of commands given in texmf.cnf`
[9] DVI for `pdflatex`; XDV for `xelatex`
[10] Explanation differs for `lualatex`

```
 or: pdftex [OPTION]... \FIRST-LINE
 or: pdftex [OPTION]... &FMT ARGS
Run pdfTeX on TEXNAME, usually creating TEXNAME.pdf.
Any remaining COMMANDS are processed as pdfTeX input, after TEXNAME is read.
If the first line of TEXNAME is %&FMT, and FMT is an existing .fmt file,
use it.  Else use `NAME.fmt', where NAME is the program invocation name,
most commonly `pdftex'.

Alternatively, if the first non-option argument begins with a backslash,
interpret all non-option arguments as a line of pdfTeX input.

Alternatively, if the first non-option argument begins with a &, the
next word is taken as the FMT to read, overriding all else.  Any
remaining arguments are processed as above.

If no arguments or options are specified, prompt for input.
```

option	explanation
`-enc`	nable encTeX extensions such as `\mubyte`
`-etex`	enable e-TeX extensions
`-ipc`	send DVI output to a socket as well as the usual output file
`-ipc-start`	as `-ipc`, and also start the server at the other end
`-translate-file=TCXNAME`	use the TCX file `TCXNAME`

Table 3: Options specific to `pdflatex`

option	explanation
`--credits`	display credits and exit
`--debug-format`	enable format debugging
`--[no-]file-line-error-style`	aliases of –[no-]file-line-error
`--lua=FILE`	load and execute a lua initialization script
`--nosocket`	disable the lua socket library
`--safer`	disable easily exploitable lua commands
`--utc`	init time to UTC
`--luaonly`	run a lua file, then exit
`--luaconly`	byte-compile a lua file, then exit
`--luahashchars`	the bits used by current Lua interpreter for strings hashing

Table 4: Options specific to `lualatex`

option	explanation
`-etex`	enable e-TeX extensions
`-output-driver=CMD`	use CMD as the XDV-to-PDF driver instead of xdvipdfmx
`-no-pdf`	generate XDV (extended DVI) output rather than PDF
`-papersize=STRING`	set PDF media size to STRING

Table 5: Options specific to `xelatex`

3 References

[HHHS23] H. Hagen, H. Henkel, T. Hoekwater, and L. Scarso. *LuaTEX Reference Manual*, 2. 2023. A copy is within the documentation of this software.

[RHB23] W. Robertson, K. Hosny, and K. Berry. *The XeTeX reference guide*, 2. 2023. A copy is within the documentation of this software.

[THHB23] Hàn Thế Thành, H. Hagen, H. Henkel, and K. Berry. *The pdfTEX user manual*, 2. 2023. A copy is within the documentation of this software.