

An overview of T_EX, its children and their friends ...

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October 17, 2010

[Link for the impatient.](#)

In the world of T_EX, there are many developments and ambiguous names. This paper tries to give an overview of the development of T_EX and related programs. Contributions are welcome!¹

1. Introduction

The base frame and main idea of this document was taken from the article A brief history of T_EX, volume II by Arthur Reutenauer in the proceedings of EuroBachTeX2007 and his talk there (see references). Additional information is taken from original documentations (see references on page 30) and some review articles. For old, historic information, the historic archive maintained by Ulrik Vieth and hosted on ftp.tug.org (see refs) was very useful. Many thanks for that great archive!

All information is up to the date of this generated pdf. Everything here is without guarantee – this is just to get an overview. Consult the references for further (and/or correct) information!

In the tree views (page 10), every node has a tooltip that shows up when you hover the mouse over it. If your pdf viewer does not support this, go to the end of the document, where every tooltip is written in normal text (page 17).

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¹The current source of this document is available at <http://github.com/alt/tex-overview>. Please feel free to patch there or mail me any suggestions and comments. I'll be happy to extend and correct this document!

I tried to make the graphs more readable by using colors. All decisions reflect my personal opinion, not that of the community, of the authors or someone else.

normal That is, not very important in my opinion, no huge user group, but still maybe important for special needs. Was in use at least some time back, but is not of great impact nowadays.

important Engines or formats that had or have a great impact on (everyday) typesetting for a large community.

experimental Developments that might still be under construction or were never used by a large community. Nevertheless, these might be very important to the development of other engines or for use of special typesetting.

package L^AT_EX-packages that seemed worth mentioning. There won't be many of this. Not-included packages are not necessarily unimportant!

distribution Software bundles that bring T_EX and friends to the normal user.

program Programs that are not directly connected to T_EX (but interesting in the context of using T_EX) or are separate helper programs.

Furthermore, there are two versions of some graphs: A short version mentioning only the most important things and a full one with everything I could find.

In most cases I did not mention the authors of the programs/packages. This is not to diminish their effort but only for clarity (long names make things harder to read). I did not write any of the below-mentioned programs or packages. The authors are given in the documents linked in the references.

2. How to contribute

I hope one day this document would become the standard reference for questions like "What program do I need for ...?", "What's the difference between ...T_EX and ...T_EX?", "Why is it called ...?" etc.

To get to this point, I need some help of people having read more documentation or even developed some of the programs mentioned here themselves. Special help is needed for:

- font technologies
- METAFONT and sucesors
- BibT_EX and successors/alternatives

It is up to you to contribute texts, references, links, descriptions, hints etc. I'll be happy about anything I can add here. Also, if you have suggestions about the layout, let me know.

3. Problems with pdf viewers

As this document makes heavy use of pdf-features, some pdf viewers are not able to show everything correct and as intended. My experiences with viewers are as follows:

evince Shows the document correct and complete. Tested using Linux.

Acrobat Reader will show all the information but might hide some text of very long tooltips (at least that's the case on my machine). Also, it draws annoying green boxes around the tooltips which do not belong there.

TeXworks The built-in pdf viewer of the TeXworks editor does not break lines of tooltips, therefore long annotations are not shown completely.

okular also does not break the lines.

xpdf shows only very short tooltips. Most of the information is not visible in the graphs.

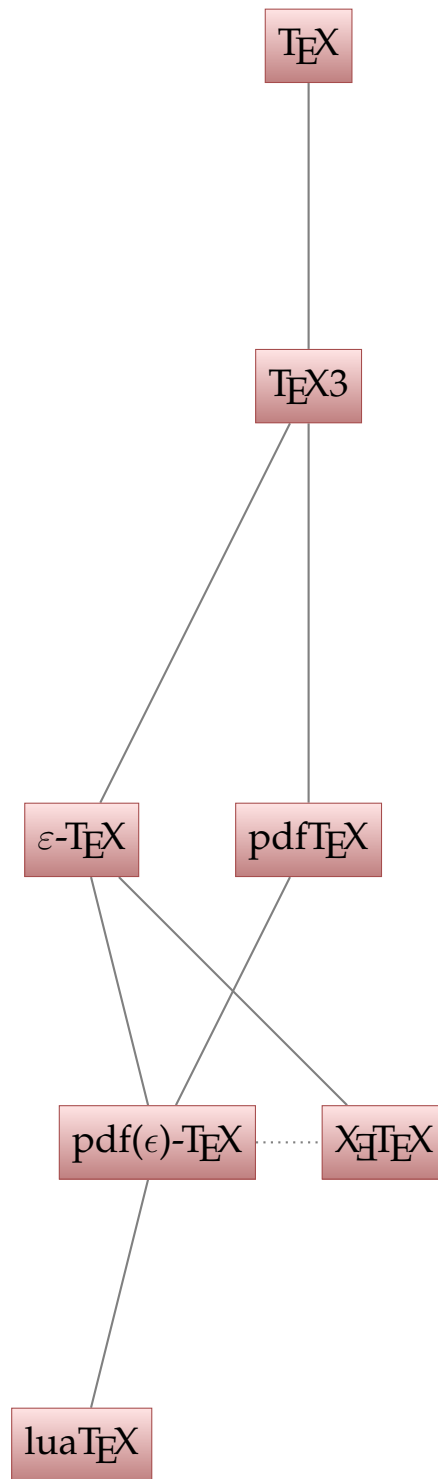
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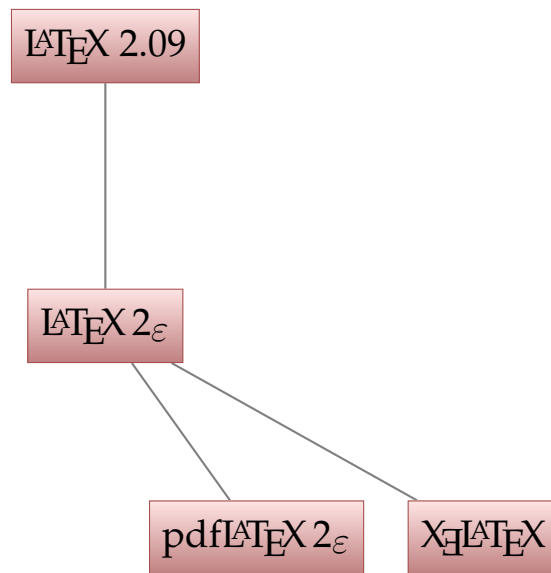
Part I.

Tree Views

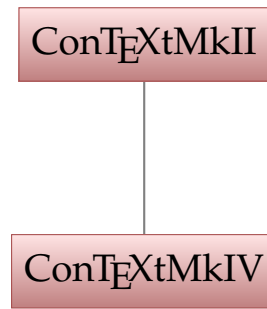
4. $\text{T}_{\text{E}}\text{X}$ – the program



5. \LaTeX (Lamport's \TeX format)



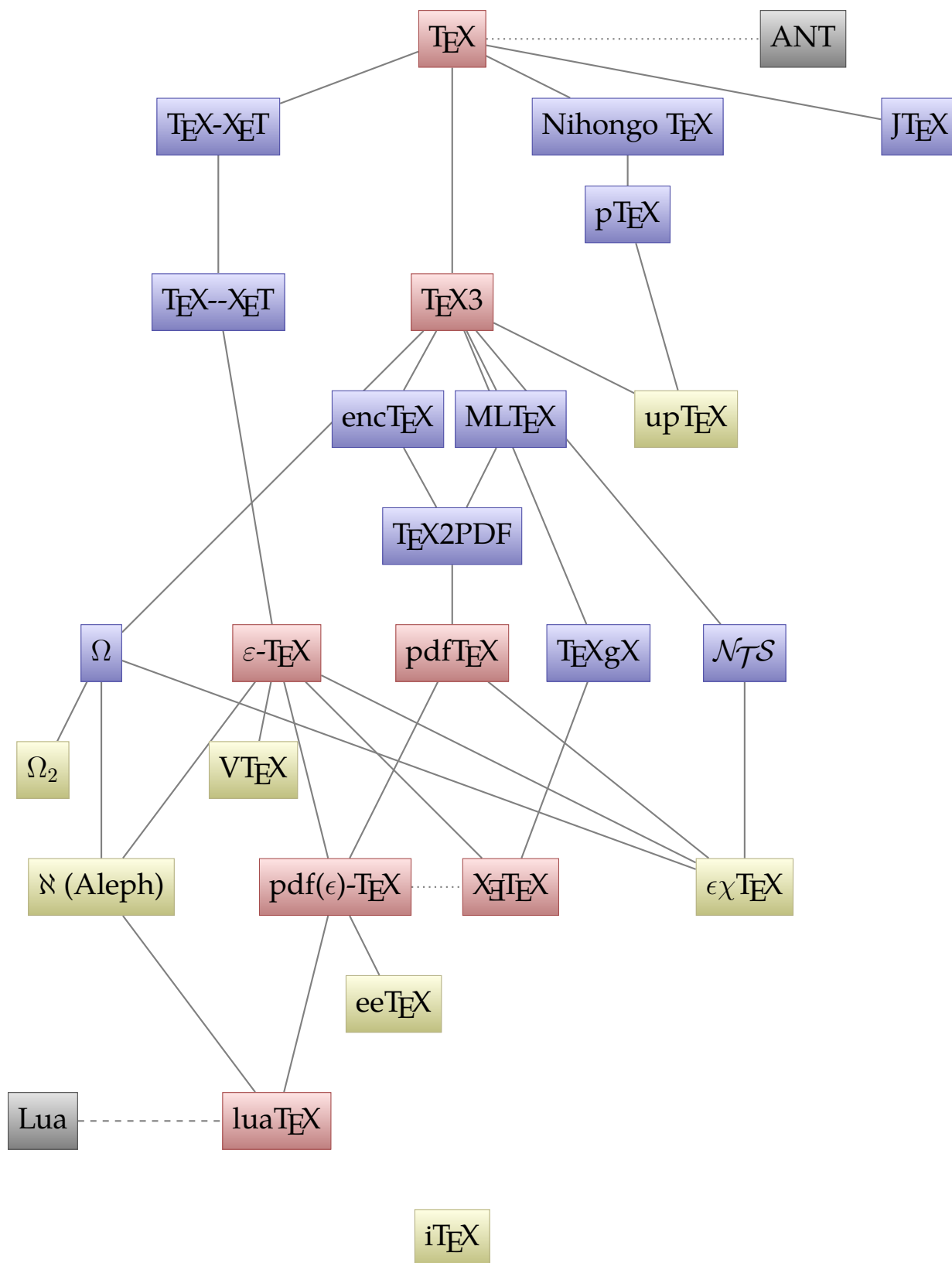
6. ConT_EXt (Context = con tex t – text with tex; formerly pragmatex)



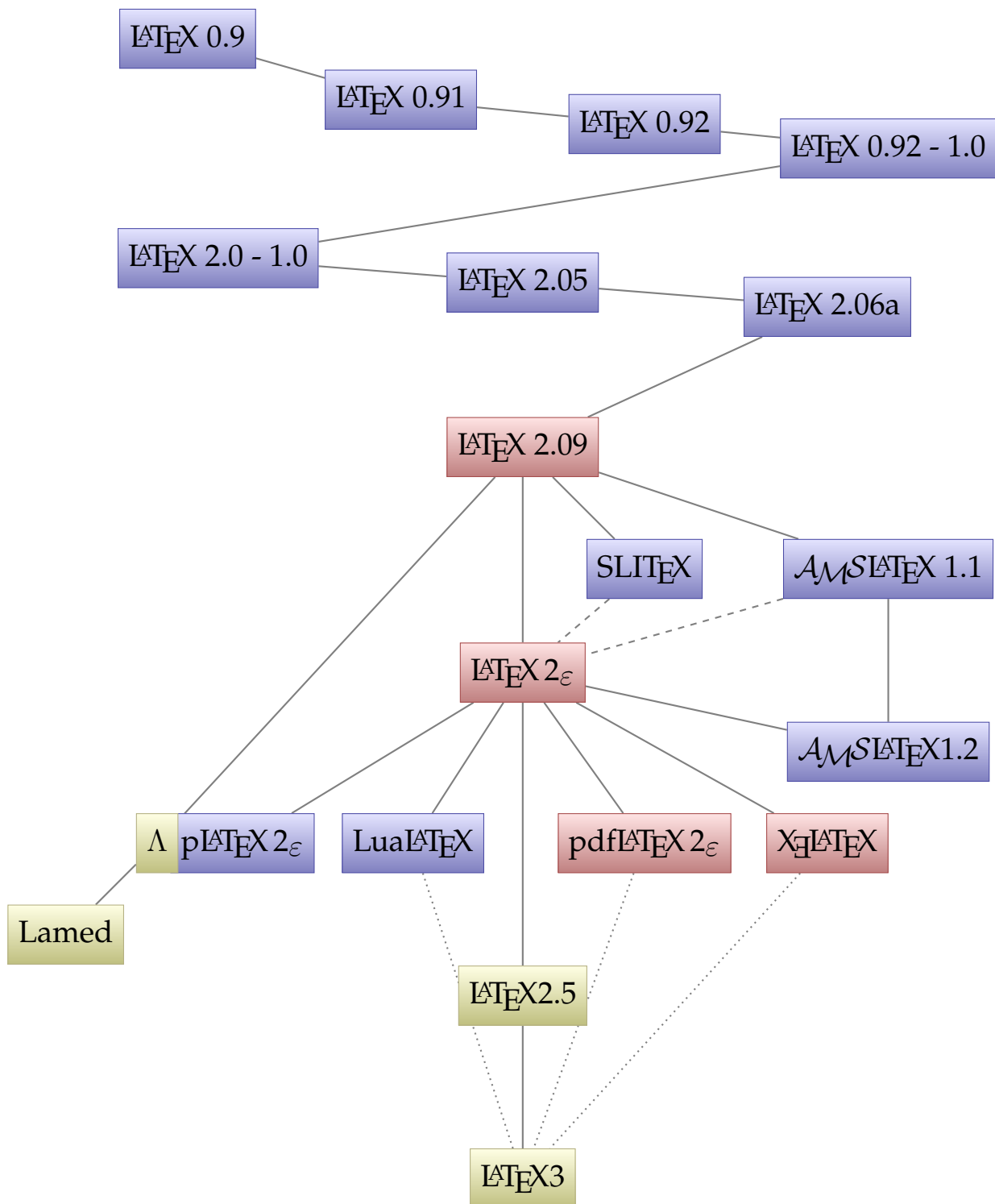
Part II.

Tree Views

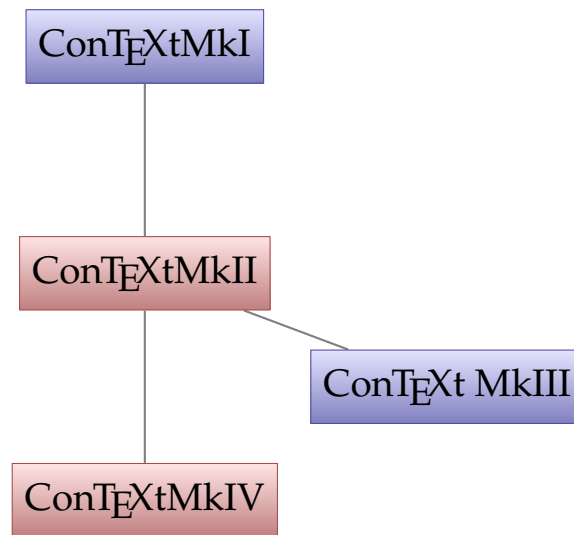
7. T_EX – the program



8. L^AT_EX (Lamport's T_EX format)



9. ConT_EXt (Context = con tex t – text with tex; formerly pragmatex)

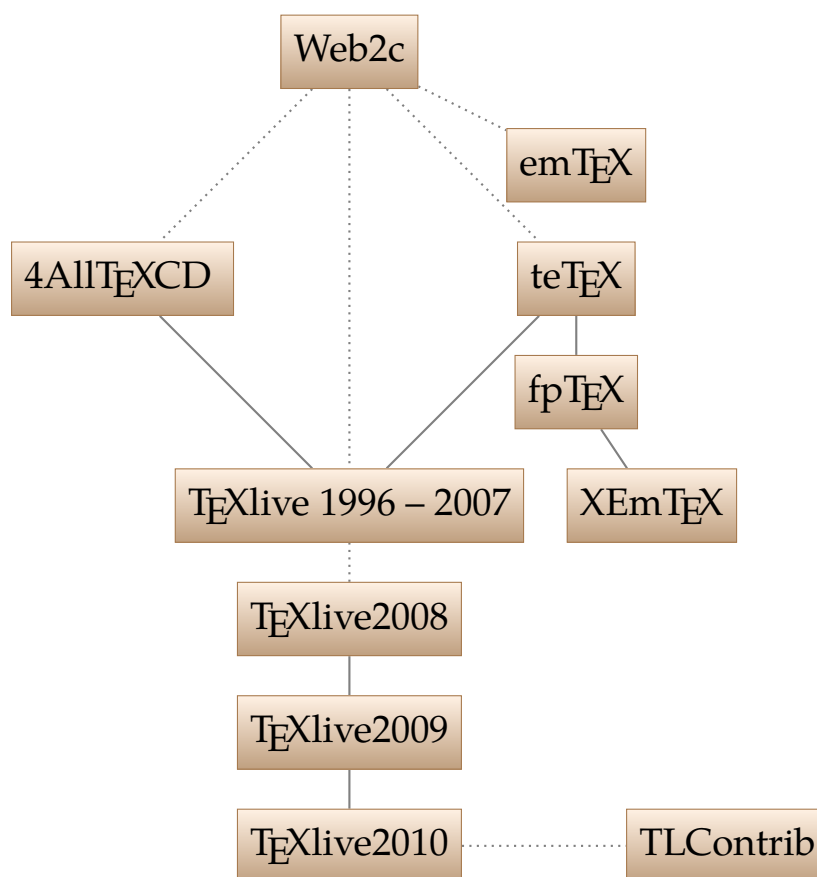


Part III.
Others

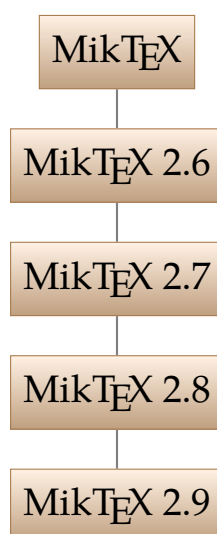
10. Distributions

This section will feature the main distributions of $\text{T}_{\text{E}}\text{X}$ and related programs. Of course, not every Linux Distribution's $\text{T}_{\text{E}}\text{X}$ package can be listed here, but only official upstream distributions. So far, only $\text{T}_{\text{E}}\text{Xlive}$ and $\text{MikT}_{\text{E}}\text{X}$ are listed, but I'll add others if they are/were important.

10.1. $\text{T}_{\text{E}}\text{Xlive}$



10.2. $\text{MikT}_{\text{E}}\text{X}$



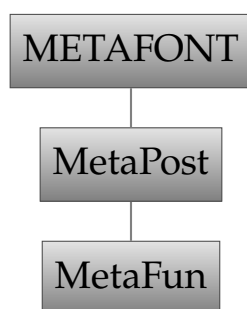
10.3. $\text{W32T}_{\text{E}}\text{X}$



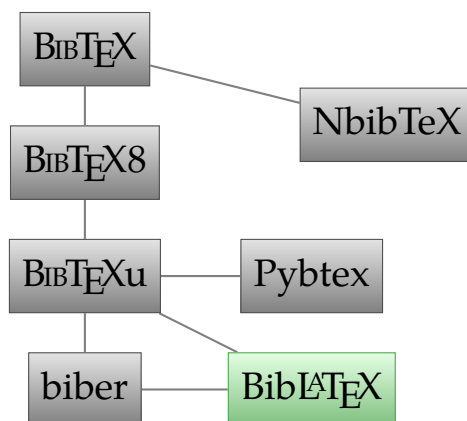
11. Pandora's Box

The following pages will be a hodge-podge of many things that are related to $\text{T}_{\text{E}}\text{X}$ and used in the process of generating documents in different file formats, i. e. conversion tools, bibliography tools etc. Feel free to contribute, I'll choose case-by-case if I'll add something or won't include it. Text editors or viewers will *not* be included!

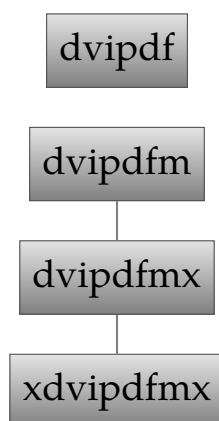
11.1. META*



11.2. Bib $\text{T}_{\text{E}}\text{X}$



11.3. (x)dvipdf(m)(x)

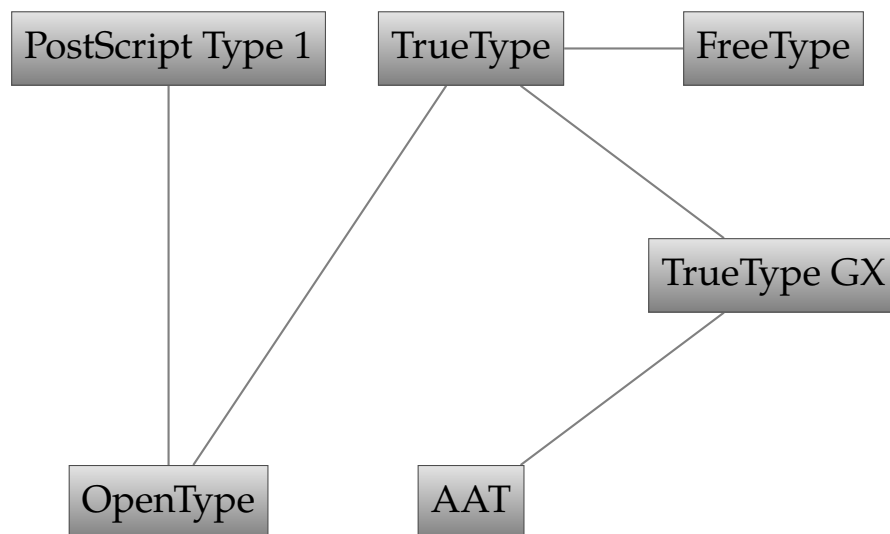


11.4. Font Techonolgies

This section tries to cover the development of font technologies – the most important thing for a typesetting system is it's font mechanism ...

Bitmap fonts

metafont



Part IV.

Text Views

12. T_EX – the program

T_EX

Born in 1978 by Donald Erwin Knuth.

ANT

Ant is Not TeX. A typesetting system inspired by TeX. Only **inspired**, so it has nothing to do with TeX in terms of common code.

T_EX-~~X~~E_T

The first extension to TeX, 1987. It was able to typeset in two directions, but only with a mark in the dvi to change the direction.

Nihongo T_EX

A true multibyte extension of TeX. Could handle all Japanese characters in one font.

JT_EX

An extension of TeX for typesetting Japanese. (1987, Yasuki Saito)

pT_EX

Extension of Nihongo TeX to enable vertical typesetting. ("p" for "publishing") Distributed as WEB change files.

T_EX--~~X~~E_T

TeX--XeT was able to really put the glyphs on the right place in the dvi.

TeX3

Ability to handle 8-bit input. 1989. TeX development was frozen in 1991 and only bugfixes were made. Now in version 3.1415926, it gets closer to pi with every bugfix ...

encTeX

A small extension to TeX, started 1997. Adds 10 new primitives relating input re-encoding

MLTeX

Extension (started 1990) to TeX that allows hyphenation of words with accented letters. (Therefore the name: MultiLingual TeX.) Distributed as a change file to the original WEB sources of TeX.

upTeX

Unicode-aware version of pTeX ("unicode-publishing"-TeX) also modernized from TeX3.

TeX2PDF

Early name for pdfTeX. Don't confuse with converters like dvi2pdf.

Ω

Support for 16bit-unicode-input. Still constrained on the output.

ε-TeX

An extension to TeX, provided by the NTS team as an intermediate project until NTS would be ready. eTeX is a full TeX and backward compatible. The number of TeX's registers is increased and various new primitives useful to programmers are added.

pdfTeX

A new engine to directly produce pdf-files from TeX, without the need of dvi-ps-pdf. This allows to use microtypographic extensions and many other features of the pdf format like page transitions etc.

TeXgX

GX stands for Graphic eXtension, a font technology. TeXGX was able to handle these fonts. Only on Mac OS.

NTS

A project to completely reimplement TeX in Java. Now NTS is officially declared dead.

Ω_2

A short-time try to pick up the development of Omega again in 2006. Seemed more like a good plan and is now regarded as obsolete. LuaTeX is kind of a successor.

VT_EX

VT_EX (VisualTeX) can produce pdf, html, svg, dvi or ps output directly from input. In contrast to pdfTeX, it includes a full PostScript interpreter, thus capable to include EPS figures, PStricks etc. First official version I found: February 15, 1999: VT_EX 6.3; last official version seems to be from Oct 1, 2005: VT_EX 8.61. Commercial product.

⌘ (Aleph)

Originally named epsilon-Omega, an attempt to stabilize Omega while merging epsilon extensions. Authors: John Plaice and Yannis Haralambous, now maintained for severe bugfixes by Taco Hoekwater.

[XeTeX](#)

This extension enables full multilingual support for left-to-right typesetting, right-to-left and almost any other possible direction. Unicode encoding is fully supported (utf8 as native encoding). XeTeX also features support for OpenType and AAT-fonts. In newest versions, character protrusion is possible -- hence the connection to pdfTeX.

[εXTeX](#)

Planned implementation of a high-quality typesetting system, written in Java. Based on experiences in NTS, eTeX, pdfTeX and Omega. Started in 2003, current version in repository is 0.0. (i. e. not very far ...)

[pdf\(ε\)-TeX](#)

Merging the pdfTeX engine with the eTeX-extensions. This engine can produce dvi (with or without the eTeX-extensions) as well as pdf (again, with or without extensions).

[eeTeX](#)

Experimental extension to pdfTeX by Taco Hoekwater, created 2000. Distributed as change file. Now dead due to his development of luaTeX.

[Lua](#)

Script language; has nothing to do with TeX!

[luaTeX](#)

LuaTeX supports utf8, OpenType and totally everything. TeXlive 2010 ships version 0.60.2. luaTeX features an embedded scripting language, lua, making it easy to extend, so most of the programming can be done in lua instead of TeX-hackery.

[iTeX](#)

iTeX is the official successor of TeX3, announced by Don Knuth at the TUG conference 2010.

13. \LaTeX (Lamport's \TeX format)

[\$\LaTeX\$ 0.9](#)

First version still on web (historic archive, see refs) is 0.9, for use with TeX 0.95. No installation help found. Apparently one needs the files lplain.tex and latex.tex to create the format.

[\$\LaTeX\$ 0.91](#)

Version 0.91 for use with TeX 0.97 (C) 1983 by Leslie Lamport. Most changes to previous version are in the file lplain.tex.

[\$\LaTeX\$ 0.92](#)

First version with the @ as letter for internal names. Seemingly first version with a manual. For use with TeX Version 0.999999. (no joke, that's the version number given in the latex.tex file!) (C) 1983 by Leslie Lamport, conversion to 0.92 from 0.91 by Arthur Keller.

[\$\LaTeX\$ 0.92 - 1.0](#)

Adaption of 0.92 for TeX version 1.0. (C) 1983 by Leslie Lamport, conversion to 0.92 from 0.91 by Arthur Keller.

[\$\LaTeX\$ 2.0 - 1.0](#)

Seemingly heavy changes compared to 0.92. Version for TeX 1.0. Release of 11 Dec 1983. There were never public versions 1.x

[\$\LaTeX\$ 2.05](#)

No sure information found so far.

[L^AT_EX 2.06a](#)

Release of version 2.06a of the LaTeX macros. September 1984.

[L^AT_EX 2.09](#)

The first official version by Leslie Lamport, 1985.

[SLI_TE_X](#)

A variation of LaTeX2.09 to provide an easy way for producing presentations. In LaTeX2e absorbed as a documentclass (slides).

[A_MS^IL^AT_EX 1.1](#)

A port of Spivak's AMS-TeX to LaTeX 2.09, released 1990

[L^AT_EX 2_ε](#)

June 1994: New release of LaTeX to avoid incompatible dialects of LaTeX 2.09. Introduced by the LaTeX3-Team.

[A_MS^IL^AT_EX 1.2](#)

A port of version 1.1 to LaTeX 2e by Downes and Jones.

[pdfL^AT_EX 2_ε](#)

The standard LaTeX. If anyone talks about "LaTeX" it is nearly shure to be this package. pdfLaTeX2e produces pdf or dvi output.

[X_εL^AT_EX](#)

Using the XeTeX engine. There are some special packages that provide easy access to the modern features of XeTeX.

[Lua \$\LaTeX\$](#)

LaTeX based on LuaTeX with pdf (standard) or dvi (dviLuaLaTeX) output. LaTeX support for luaTeX is under heavy development to make this machine usable with the format. Work in progress, but already well useable!

[p \$\LaTeX\$ 2 \$\epsilon\$](#)

A LaTeX-bundle for the pTeX engine.

[\$\Lambda\$](#)

A LaTeX-package for the omega-engine.

[Lamed](#)

A LaTeX-package for the aleph-engine.

[\$\LaTeX\$ 2.5](#)

Will Robertson suggested in an interview (see refs) an interim unstable version on the way to LaTeX3 with version number 2.5 that should bring package authors towards using LaTeX3 syntax. This version should be backwards incompatible to LaTeX2e. (This version does not exist in any official plannings, but I liked the idea, so it is mentioned here ;))

[\$\LaTeX\$ 3](#)

The long-time successor of LaTeX2e. It is planned to implement a very elaborate low-level programming language. (Almost done by now.) The expl3-package provides an implementation that can be used on top of LaTeX2e. Several LaTeX packages already make heavy use of expl3. (As does this document.)

14. ConT_EXt (Context = con tex t – text with tex; formerly pragmatex)

ConT_EXtMkI

Original ConT_EXt with Dutch low level interface.

ConT_EXtMkII

ConT_EXt with English low level interface. Works with any T_EX-engine, like L^AT_EX: T_EX, e-T_EX, pdfT_EX, Aleph, XeT_EX, ...

ConT_EXt MkIII

Reserved for future use for files supporting XeT_EX. Was "skipped" for "practical reasons" (Hans Hagen)

ConT_EXtMkIV

Specially designed for LuaT_EX.

15. Distributions

15.1. T_EXlive

Web2c

An Implementation and Distribution of T_EX which translates the original WEB sources to a C code.

emT_EX

Eberhard Mattes T_EX Distribution for MS-DOS and OS2.

teT_EX

Maintained by Thomas Esser (hence the te in teT_EX) from 1994 to May 2006.

[4AllT_EXCD](#)

The (vague) past ... (?)

[fpT_EX](#)

A free TeX distribution for Win32 based on teTeX, by Fabrice Popineau. Still active, provides up-to-date binaries for Windows. Special support for Japanese Typesetting.

[XEmT_EX](#)

A TeX distribution for Windows, based on fpTeX with XEmacs, AucTeX as IDE for (La)TeX. XemTeX was sponsored by the French government.

[T_EXlive 1996 – 2007](#)

First version 1996 (UNIX only, later also Windows binaries), and then a long story of ongoing work -- see the detailed documentation for a detailed history.

[T_EXlive2008](#)

A new package manager and network installer are available. So installation via the net is possible as well as package updates. Missing packages are not installed on-the-fly. The last of the modern machines is added: luaTeX

[T_EXlive2009](#)

Dropped Omega and Lambda. Aleph and Lamed are kept.

[T_EXlive2010](#)

Up to now, latest release of TeXlive.

[TLContrib](#)

An extension of TeXlive that contains packages that TeXlive cannot hold because: not free, binary update, not on CTAN or intermediate release. Useable via the TeXlive manager.

15.2. MikTeX

[MikTeX](#)

MikTeX is a TeX distribution originally for Windows only. Copyright by Christian Schenk goes back to 2001

[MikTeX 2.6](#)

Windows only. featuring pdftex 1.40.4, mpost 1.000

[MikTeX 2.7](#)

Windows only. featuring xetex 0.999.6, pdftex 1.40.9, mpost 1.005

[MikTeX 2.8](#)

Windows only. featuring xetex 0.9995.1, pdftex 1.40.10, mpost 1.005

[MikTeX 2.9](#)

Windows only (stable version). Beta version for GNU/Linux available. featuring xetex 0.9997.4, pdftex 1.40.11, LuaTeX 0.60.2, mpost 1.211

15.3. W32TeX

[W32TeX](#)

A distributon to provide binaries for windows, with special support for Japanese. First version (up to the changelog): 2009/08/02. Still highly up-to-date.

16. Pandora's Box

16.1. META*

[METAFONT](#)

The program for creating the fonts originally used by TeX.

[MetaPost](#)

A graphic generating program inspired by METAFONT. MetaPost can produce PostScript graphics as well as SVG.

[MetaFun](#)

"MetaFun is Hans Hagen's extension to (or module for) the MetaPost language."

16.2. BibTeX

[BibTeX](#)

A helper program to generate a bibliography list.

[Nbibtex](#)

"Nbibtex helps authors take better advantage of BibTeX data" says the homepage.

[BibTeX8](#)

The documentation says: "An 8-bit Implementation of BibTeX 0.99 with a Very Large Capacity"

[BibTeXu](#)

A unicode-aware version of BibTeX

[Pybtex](#)

A python implementation of BibTeX.

biber

A cooler version of unicode-aware BibTeX, designed for (?) use with BibLaTeX

Bib~~La~~TeX

A LaTeX package as frontend for biber.

16.3. (x)dvipdf(m)(x)

dvipdf

Converts dvi files to pdf files.

dvipdfm

Converts dvi files to pdf files. Does not build on dvipdf, but is an independent implementation.

dvipdfmx

Extended version of dvipdfm. Support for multi-byte encodings and more pdfTeX features. Still active. Combined work of dvipdfm-jpn and dvipdfm-kor.

xdvipdfmx

Converts xdvi files produced by XeTeX to pdf files. Normally always executed after a XeTeX run, so the user won't notice that an xdvi document was created in between.

16.4. Font Technologies

Bitmap fonts

Bitmap fonts contain the shape of the letters as a number of dots. If you zoom in, a bitmap letter will show pixels.

metafont

Fonts based on the METAFONT program.

PostScript Type 1

Outline font. The shape of a letter is described as mathematical curves so the letter can be made arbitrarily large without getting pixelated.

TrueType

FreeType

TrueType implementation for Unix.

TrueType GX

Only available for Mac OS.

OpenType

Extension of TrueType font format, adding support for PostScript font data. Developed by Microsoft and Adobe.

AAT

Only available for Mac OS.

Part V.

Appendix

A. References

The references are in order of occurrence in the above document. I. e. if you want information about LuaTeX, it will be below e. g. ϵ TeX.

Books

D.E. Knuth, D. Bibby, and I. Makai. The TeXbook
Addison-Wesley Reading, MA, 1986.

F. Mittelbach, M. Goossens, J. Braams, D. Carlisle, C. Rowley, C. Detig, and
J. Schrod. The L^ATeX companion.
Addison-Wesley, 2004.

Overview Articles

Arthur Reutenauer. A Brief History of TeX. Talk at EuroBachTeX 2007.
[http://www.gust.org.pl/bachotex/EuroBachTeX2007/presentations/bhot.pdf/
view](http://www.gust.org.pl/bachotex/EuroBachTeX2007/presentations/bhot.pdf/view)

A Brief History of L^ATeX
<http://www.xent.com/FoRK-archive/feb98/0307.html>

Short Article About Omega And Aleph
<http://www.tex.ac.uk/cgi-bin/texfaq2html?label=omegaleph>

Interviews with Will Robertson, Hans Hagen et. al.
<http://www.tug.org/interviews>

Web Archives

CTAN – Comprehensive TeX Archive Network:
<http://www.ctan.org>

Historic Archive of TeX Distributions:
<ftp://ftp.tug.org/historic>

Engines (Web sources)

ANT project page

<http://ant.berlios.de>

Yasuki S AITO. Report on JTEX: A Japanese TEX. TUGboat 8 (1987), no. 2, 103–116.

<http://www.tug.org/TUGboat/Articles/tb08-2/tb18saito.pdf>

pT_EXsources and documentation

<http://dante.ctan.org/tex-archive/help/Catalogue/entries/ptex.html>

MLT_EX source (CH file)

<http://www.tex.ac.uk/tex-archive/systems/generic/mltex/mltex.ch>

encT_EX page

<http://www.olsak.net/enctex.html>

N_TS project page

<http://nts.tug.org>

VT_EX – official homepage of micropress-inc

<http://www.micropress-inc.com/>

ε_XT_EX project page

<http://www.extex.org>

eeT_EX project page

<http://tex.aanhet.net/eetex>

LuaT_EX project page

<http://www.luatex.org>

iT_EX announcement by Don Knuth at the TUG 2010

<http://river-valley.tv/tug-2010/an-earthshaking-announcement>

Formats (Web sources)

ConT_EXt wiki

<http://wiki.contextgarden.net>

L^AT_EX project page

<http://www.latex-project.org>

L^AT_EX3 project

<http://www.latex-project.org/latex3.html>

Distributions (Web sources)

fpT_EX: Announcement at TUG 1999

<http://www.tug.org/tug99/program/node39.html>

T_EXlive development history

<http://tug.org/texlive/doc/texlive-en/texlive-en.html>

TLContrib project page

<http://tlcontrib.metatex.org/>

MikTeX project page

<http://miktex.org/>

Win32 project page

<http://w32tex.org/>

Fonts (Web sources)

Type1 Fonts specifications

http://partners.adobe.com/public/developer/en/font/T1_SPEC.PDF

The FreeType project

<http://freetype.org/index2.html>

OpenType specifications

<http://www.microsoft.com/typography/otspec/default.htm>

Original Documentation – Everything Else

dvipdfmx project page

<http://project.ktug.or.kr/dvipdfmx/>

B. List of Contributors

I have to thank some people for helping me to improve this document. Of course I thank all the people providing the above-mentioned references.

- Paul Isambert, for usefull discussions and testing
- Heiko Oberdiek, for solving a bug that broke the document with Acrobat Reader