The `hyphen.cfg` file for LuaTEX

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Abstract

This is a modified version of the file `hyphen.cfg` distributed with the babel package, with a supporting Lua module, aimed at adapting babel's hyphenation patterns loading mechanism to LuaTEX's dynamic pattern loading capabilities.

1 Documentation

Hyphenation patterns should be loaded at runtime with LuaTEX: if they appear in the format, they will be rehashed when the format is loaded anyway, which makes the format quite long to load (many seconds even on modern machines) and provides for bad user experience. Hence, it is desirable to load as few patterns as possible in the format, and load on-demand the needed patterns at runtime.

For backward compatibility, Knuth's original patterns for US English are still loaded in the format, as `\language0`.

This package provides a modified version of hyphen.cfg adapted to LuaTEX, as well as a supporting Lua module. Since a lot of things, especially the catcodes, are not as predictable at runtime than at format creation time, we don't `\input` the usual pattern files, but rather load the patterns using the Lua interface, using a special plain text version of the pattern files kindly provided by the texhypen project.

The modifications applied in this files are highlighted in the code documentation below, but here is a summary:

- not loading patterns in the format except for english
- loading patterns at runtime, except for english
- modified banner

This file checks for the engine, and should continue to work with any engine without any modified behaviour. However, it is recommended to install it in such a way that the original `hyphen.cfg` from babel is found first by any engine other than LuaTeX.

2 Package code

2.1 luatex-hyphen.lua

```

luatexhyphen = {}

luatexhyphen.version = "1.3beta"

local dbname = "language.dat.lua"

local function warn (msg, ...)
    texio.write_nl('luatex-hypen: '..string.format(msg, ...))
end

luatexhyphen.language_dat = {}
local dbfile = kpse.find_file(dbname)
if not dbfile then
    warn("file not found: "..dbname)
else
    luatexhyphen.language_dat = dofile(dbfile)
end

local function lookupname(l)
    if luatexhyphen.language_dat[l] then
        return luatexhyphen.language_dat[l], l
    else
        for orig,lt in pairs(luatexhyphen.language_dat) do
            for _,syn in ipairs(lt.synonyms) do
                if syn == l then
                    return lt, orig
                end
            end
        end
    end
    return nil
end

function luatexhyphen.loadpatterns(l, id)
    local lt, orig = lookupname(l)
    if not lt or not lt.code then
        warn("no entry in %s for this language: %s", dbname, l)
        return
    end
    local n = 'hyph-'..lt.code..'.pat.txt'
    local f = kpse.find_file(n)
    if not f then
        warn("file not found: %s", n)
        return
    end
    f = io.open(f, 'r')
    local data = f:read('*a')
    f:close()
    if not data then
        warn("file not readable: %s", f)
        return
    end
    local lobj = lang.new(id)
    warn("loading patterns for: %s", orig)
    lang.patterns(lobj, data)
end

function luatexhyphen.loadexceptions(l, id)
    local lt, orig = lookupname(l)
    if not lt or not lt.code then
        warn("no entry in %s for this language: %s", dbname, l)
        return
    end
    local n = 'hyph-'..lt.code..'.hyp.txt'
    local f = kpse.find_file(n)
    if not f then
        warn("file not found: %s", n)
        return
    end
    f = io.open(f, 'r')
    local data = f:read('*a')
    f:close()
    if not data then
        warn("file not readable: %s", f)
        return
    end
    local lobj = lang.new(id)
    warn("loading exceptions for: %s", orig)
    lang.hyphenation(lobj, data)
end

```

2.2 hyphen.cfg

```
\ifx\ProvidesFile\@undefined
  \def\ProvidesFile#1[#2 #3 #4]{%
    \wlog{File: #1 #4 #3 <#2>}%
```

Use a modified banner for LuaTEX.

```
    \ifx\directlua\@undefined
      \toks8{Babel <#3> and hyphenation patterns for }%
    \else
```

```
      \toks8{LuaTeX adaptation of babel <#3>
        and hyphenation patterns for }%
    \fi
    \let\ProvidesFile\@undefined
    }
  \def\ProvidesLanguage#1[#2 #3 #4]{%
    \wlog{Language: #1 #4 #3 <#2>}%
    }
\else
 \let\bbl@tempa\ProvidesFile
 \def\ProvidesFile#1[#2 #3 #4]{%
```

Same here.

```
    \ifx\directlua\@undefined
      \toks8{Babel <#3> and hyphenation patterns for }%
    \else
      \toks8{LuaTeX adaptation of babel <#3>
        and hyphenation patterns for }%
    \fi
    \bbl@tempa#1[#2 #3 #4]%
    \let\ProvidesFile\bbl@tempa}
  \def\ProvidesLanguage#1{%
    \begingroup
      \catcode`\ 10 %
      \@makeother\/%
      \@ifnextchar[%]
        {\@provideslanguage{#1}}{\@provideslanguage{#1}[]}}
  \def\@provideslanguage#1[#2]{%
    \wlog{Language: #1 #2}%
    \expandafter\xdef\csname ver@#1.ldf\endcsname{#2}%
    \endgroup}
\fi

```

File identification is modified again.

```
\ProvidesFile{hyphen.cfg}
                [2010/04/26 v3.8l-luatex-1.3beta %
      Language switching mechanism for LuaTeX, adapted from babel v3.8l]
\ifx\AtBeginDocument\@undefined
 \input plain.def\relax
\fi
\ifx\language\@undefined
 \csname newcount\endcsname\language
\fi
\ifx\newlanguage\@undefined
 \csname newcount\endcsname\last@language
\else
 \countdef\last@language=19
\fi
\ifx\newlanguage\@undefined
```

```
  \def\addlanguage#1{%
    \global\advance\last@language \@ne
    \ifnum\last@language<\@cclvi
    \else
        \errmessage{No room for a new \string\language!}%
    \fi
    \global\chardef#1\last@language
    \wlog{\string#1 = \string\language\the\last@language}}
\else
  \def\addlanguage{\alloc@9\language\chardef\@cclvi}
\fi
\def\adddialect#1#2{%
    \global\chardef#1#2\relax
    \wlog{\string#1 = a dialect from \string\language#2}}
\def\iflanguage#1{%
  \expandafter\ifx\csname l@#1\endcsname\relax
    \@nolanerr{#1}%
  \else
    \bbl@afterfi{\ifnum\csname l@#1\endcsname=\language
      \expandafter\@firstoftwo
    \else
      \expandafter\@secondoftwo
    \fi}%
  \fi}
\edef\selectlanguage{%
  \noexpand\protect
  \expandafter\noexpand\csname selectlanguage \endcsname
  }
\ifx\@undefined\protect\let\protect\relax\fi
\ifx\documentclass\@undefined
  \def\xstring{\string\string\string}
\else
  \let\xstring\string
\fi
\xdef\bbl@language@stack{}
\def\bbl@push@language{%
  \xdef\bbl@language@stack{\languagename+\bbl@language@stack}%
  }
\def\bbl@pop@lang#1+#2-#3{%
  \def\languagename{#1}\xdef#3{#2}%
  }
\def\bbl@pop@language{%
  \expandafter\bbl@pop@lang\bbl@language@stack-\bbl@language@stack
  \expandafter\bbl@set@language\expandafter{\languagename}%
  }
\expandafter\def\csname selectlanguage \endcsname#1{%
  \bbl@push@language
  \aftergroup\bbl@pop@language
  \bbl@set@language{#1}}
\def\bbl@set@language#1{%
```

```
  \edef\languagename{%
    \ifnum\escapechar=\expandafter`\string#1\@empty
    \else \string#1\@empty\fi}%
  \select@language{\languagename}%
  \if@filesw
    \protected@write\@auxout{}{\string\select@language{\languagename}}%
    \addtocontents{toc}{\xstring\select@language{\languagename}}%
    \addtocontents{lof}{\xstring\select@language{\languagename}}%
    \addtocontents{lot}{\xstring\select@language{\languagename}}%
  \fi}
\def\select@language#1{%
  \expandafter\ifx\csname l@#1\endcsname\relax
    \@nolanerr{#1}%
  \else
    \expandafter\ifx\csname date#1\endcsname\relax
      \@noopterr{#1}%
    \else
      \bbl@patterns{\languagename}%
      \originalTeX
      \expandafter\def\expandafter\originalTeX
          \expandafter{\csname noextras#1\endcsname
                      \let\originalTeX\@empty}%
      \languageshorthands{none}%
      \babel@beginsave
      \csname captions#1\endcsname
      \csname date#1\endcsname
      \csname extras#1\endcsname\relax
      \babel@savevariable\lefthyphenmin
      \babel@savevariable\righthyphenmin
      \expandafter\ifx\csname #1hyphenmins\endcsname\relax
        \set@hyphenmins\tw@\thr@@\relax
      \else
        \expandafter\expandafter\expandafter\set@hyphenmins
          \csname #1hyphenmins\endcsname\relax
      \fi
    \fi
  \fi}
\long\def\otherlanguage#1{%
  \csname selectlanguage \endcsname{#1}%
  \ignorespaces
  }
\long\def\endotherlanguage{%
  \originalTeX
  \global\@ignoretrue\ignorespaces
  }
\expandafter\def\csname otherlanguage*\endcsname#1{%
  \foreign@language{#1}%
  }
\expandafter\def\csname endotherlanguage*\endcsname{%
  \csname noextras\languagename\endcsname
  }
\def\foreignlanguage{\protect\csname foreignlanguage \endcsname}
\expandafter\def\csname foreignlanguage \endcsname#1#2{%
  \begingroup
    \originalTeX
    \foreign@language{#1}%
    #2%
    \csname noextras#1\endcsname
  \endgroup
  }
\def\foreign@language#1{%
  \def\languagename{#1}%
  \expandafter\ifx\csname l@#1\endcsname\relax
    \@nolanerr{#1}%
  \else
    \bbl@patterns{\languagename}%
    \languageshorthands{none}%
    \csname extras#1\endcsname
    \expandafter\ifx\csname #1hyphenmins\endcsname\relax
      \set@hyphenmins\tw@\thr@@\relax
    \else
      \expandafter\expandafter\expandafter\set@hyphenmins
        \csname #1hyphenmins\endcsname\relax
    \fi
  \fi
  }
\def\bbl@patterns#1{%
```

With LuaTEX, load patterns and exceptions at runtime using functions from the supporting Lua module.

Remember which patterns have been loaded to avoid reloading patterns and exceptions every time the language is activated. This is done in TEX rather than in Lua so that the information about which patterns are loaded in the format is correctly remembered at runtime.[1]

```
  \ifx\directlua\@undefined\else
    \unless\ifcsname bbl@luatex@#1@loaded\endcsname
       \expandafter\gdef\csname bbl@luatex@#1@loaded\endcsname{}%
       \directlua{
         if not luatexhyphen then
           dofile(kpse.find_file("luatex-hyphen.lua"))
         end
         luatexhyphen.loadpatterns("\luatexluaescapestring{#1}",
           \number\csname l@#1\endcsname)
         luatexhyphen.loadexceptions("\luatexluaescapestring{#1}",
           \number\csname l@#1\endcsname)
         }%
```

[1]It is theoretically possible to do so in Lua too, saving things in a bytecode register and restoring if via `\everyjob`, but there is currently no standard mechanism for this, and the TEX works well anyway.

```
    \fi
  \fi
  \language=\expandafter\ifx\csname l@#1:\f@encoding\endcsname\relax
    \csname l@#1\endcsname
  \else
    \csname l@#1:\f@encoding\endcsname
  \fi\relax
}
\def\hyphenrules#1{%
  \expandafter\ifx\csname l@#1\endcsname\@undefined
    \@nolanerr{#1}%
  \else
    \bbl@patterns{#1}%
    \languageshorthands{none}%
       \expandafter\ifx\csname #1hyphenmins\endcsname\relax
         \set@hyphenmins\tw@\thr@@\relax
       \else
         \expandafter\expandafter\expandafter\set@hyphenmins
         \csname #1hyphenmins\endcsname\relax
       \fi
  \fi
  }
\def\endhyphenrules{}
\def\providehyphenmins#1#2{%
  \expandafter\ifx\csname #1hyphenmins\endcsname\relax
    \@namedef{#1hyphenmins}{#2}%
  \fi}
\def\set@hyphenmins#1#2{\lefthyphenmin#1\righthyphenmin#2}
\def\LdfInit{%
  \chardef\atcatcode=\catcode`\@
  \catcode`\@=11\relax
  \input babel.def\relax
  \catcode`\@=\atcatcode \let\atcatcode\relax
  \LdfInit}
\ifx\originalTeX\@undefined\let\originalTeX\@empty\fi
\ifx\babel@beginsave\@undefined\let\babel@beginsave\relax\fi
\ifx\PackageError\@undefined
  \def\@nolanerr#1{%
    \errhelp{Your command will be ignored, type <return> to proceed}%
    \errmessage{You haven't defined the language #1\space yet}}
  \def\@nopatterns#1{%
    \message{No hyphenation patterns were loaded for}%
    \message{the language `#1'}%
    \message{I will use the patterns loaded for \string\language=0
          instead}}
  \def\@noopterr#1{%
    \errmessage{The option #1 was not specified in \string\usepackage}
    \errhelp{You may continue, but expect unexpected results}}
  \def\@activated#1{%
```

```
    \wlog{Package babel Info: Making #1 an active character}}
\else
  \newcommand*{\@nolanerr}[1]{%
    \PackageError{babel}%
                 {You haven’t defined the language #1\space yet}%
        {Your command will be ignored, type <return> to proceed}}
  \newcommand*{\@nopatterns}[1]{%
    \PackageWarningNoLine{babel}%
        {No hyphenation patterns were loaded for\MessageBreak
          the language ‘#1’\MessageBreak
          I will use the patterns loaded for \string\language=0
          instead}}
  \newcommand*{\@noopterr}[1]{%
    \PackageError{babel}%
                 {You haven’t loaded the option #1\space yet}%
             {You may proceed, but expect unexpected results}}
  \newcommand*{\@activated}[1]{%
    \PackageInfo{babel}{%
      Making #1 an active character}}
\fi
\def\process@line#1#2 #3/{%
  \ifx=#1
    \process@synonym#2 /
  \else
    \process@language#1#2 #3/%
  \fi
  }
\toks@{}
\def\process@synonym#1 /{%
  \ifnum\last@language=\m@ne
    \expandafter\chardef\csname l@#1\endcsname0\relax
    \wlog{\string\l@#1=\string\language0}
    \toks@\expandafter{\the\toks@
      \expandafter\let\csname #1hyphenmins\expandafter\endcsname
      \csname\languagename hyphenmins\endcsname}%
  \else
    \expandafter\chardef\csname l@#1\endcsname\last@language
    \wlog{\string\l@#1=\string\language\the\last@language}
    \expandafter\let\csname #1hyphenmins\expandafter\endcsname
    \csname\languagename hyphenmins\endcsname
  \fi
  }
\def\process@language#1 #2 #3/{%
  \expandafter\addlanguage\csname l@#1\endcsname
  \expandafter\language\csname l@#1\endcsname
  \def\languagename{#1}%
```

Yet another banner modification. See below why the test makes sense.

```
  \ifx\directlua\@undefined
    \global\toks8\expandafter{\the\toks8#1, }%
```

```
\else
  \unless\ifcsname bbl@luatex@english@loaded\endcsname
    \global\toks8\expandafter{\the\toks8#1 }%
  \fi
\fi
```

```
\begingroup
  \bbl@get@enc#1:\@@@
  \ifx\bbl@hyph@enc\@empty
  \else
    \fontencoding{\bbl@hyph@enc}\selectfont
  \fi
  \lefthyphenmin\m@ne
```

Assume the first (that is, zeroth) language in `language.dat` is English. This assumption is very reasonnable, since otherwise it would break compatibility with frozen TEXby not providing Knuth's orginal patterns as `\language0`, so we're pretty sure about this point.

We do load this first language, since we want Knuth's patterns to be active as soon as the format is loaded. But once it is done, we don't want to load any other language.

```
  \ifx\directlua\@undefined
    \input #2\relax
  \else
    \unless\ifcsname bbl@luatex@english@loaded\endcsname
      \gdef\bbl@luatex@english@loaded{1}%
      \input #2\relax
    \fi
  \fi
```

```
  \ifnum\lefthyphenmin=\m@ne
  \else
    \expandafter\xdef\csname #1hyphenmins\endcsname{%
      \the\lefthyphenmin\the\righthyphenmin}%
  \fi
\endgroup
\ifnum\the\language=\z@
  \expandafter\ifx\csname #1hyphenmins\endcsname\relax
    \set@hyphenmins\tw@\thr@@\relax
  \else
    \expandafter\expandafter\expandafter\set@hyphenmins
      \csname #1hyphenmins\endcsname
  \fi
  \the\toks@
\fi
\toks@{}%
\def\bbl@tempa{#3}%
\ifx\bbl@tempa\@empty
\else
  \ifx\bbl@tempa\space
  \else
```

Likewise, don't load hyphenation exceptions now, but rather when we load the patterns. (Anyway, in practice, the third field of `language.dat` is never used since exceptions are defined in the same file as patterns, so it doesn't really matter.)

There are no hyphenation exceptions for english, and since it is frozen, we can rely on this, so no need for a special case for english here.

```
      \ifx\directlua\@undefined
        \input #3\relax
      \fi
    \fi
  \fi
  }
\def\bbl@get@enc#1:#2\@@@{%
  \def\bbl@tempa{#1}%
  \def\bbl@tempb{#2}%
  \ifx\bbl@tempb\@empty
    \let\bbl@hyph@enc\@empty
  \else
    \bbl@get@enc#2\@@@
    \edef\bbl@hyph@enc{\bbl@tempa}%
  \fi}
\openin1 = language.dat
\ifeof1
  \message{I couldn't find the file language.dat,\space
           I will try the file hyphen.tex}
  \input hyphen.tex\relax
\else
  \last@language\m@ne
  \loop
    \endlinechar\m@ne
    \read1 to \bbl@line
    \endlinechar`\^^M
    \ifx\bbl@line\@empty
    \else
      \edef\bbl@line{\bbl@line\space/}%
      \expandafter\process@line\bbl@line
    \fi
    \iftrue \csname fi\endcsname
    \csname if\ifeof1 false\else true\fi\endcsname
  \repeat
  \language=0
\fi
\closein1
\let\process@language\@undefined
\let\process@synonym\@undefined
\let\process@line\@undefined
\let\bbl@tempa\@undefined
\let\bbl@tempb\@undefined
\let\bbl@eq@\@undefined
\let\bbl@line\@undefined
```

```
\let\bbl@get@enc\@undefined
\ifx\addto@hook\@undefined
\else
  \expandafter\addto@hook\expandafter\everyjob\expandafter{%
    \expandafter\typeout\expandafter{\the\toks8 loaded.}}
\fi
```