The **latex-lab-toc-kernel-changes** package
Changes and additions to the kernel related to tagging and links in toc entries

LaTeX Project[*]

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Abstract

1 Introduction

The followings contains various changes to kernel commands needed for the tagging of table of contents and similar lists.

2 General kernel and class changes

Some of the changes can probably could go into the kernel. This are marked with [kernel?], the other are marked with [latex-lab]. A few changes must be done in the classes. They are marked as [class]. They are inserted with hooks here: this will break if a non-standard class is used.

2.1 Package declaration

```
1 ⟨*kernelchange⟩
2 \ProvidesPackage{latex-lab-kernel-changes}
3        [\ltlabkerneldate\space v\ltlabkernelversion\space
4         General kernel and class changes]
```

2.2 Providing the counter representation \theHxx generally

[kernel?]

The \theHxx representation allows to create a unique representation of a counter that is for example used to create destination names. It will also be needed to add /Ref keys to various tagging structures. It makes therefore sense to provide it by default as soon as a counter is created. The \@addtoreset change (taken also from hyperref) tries to ensure the counter stays unique if it is reset.

At first we suppress the patches from hyperref:

```
5 \def\hyper@nopatch@counter{}
```

---

[*]Initial implementation done by Ulrike Fischer

```
 6  \def\@definecounter#1{\expandafter\newcount\csname c@#1\endcsname
 7      \setcounter{#1}\z@
 8      \global\expandafter\let\csname cl@#1\endcsname\@empty
 9      \@addtoreset{#1}{@ckpt}%
10      \global\expandafter\let\csname p@#1\endcsname\@empty
11      \expandafter\gdef\csname theH#1\endcsname{\the\value{#1}}%new
12      \expandafter
13      \gdef\csname the#1\expandafter\endcsname\expandafter
14          {\expandafter\@arabic\csname c@#1\endcsname}}
15  \def\@addtoreset#1#2{\expandafter\@cons\csname cl@#2\endcsname {{#1}}%
16    \expandafter\gdef\csname theH#1\endcsname{\csname theH#2\endcsname.\the\value{#1}}%
17  }
```

The following counters are defined in the kernel

```
18  \gdef\theHenumi{\the\value{enumi}}
19  \gdef\theHenumii{\the\value{enumii}}
20  \gdef\theHenumiii{\the\value{enumiii}}
21  \gdef\theHenumiv{\the\value{enumiv}}
22  \gdef\theHequation{\the\value{equation}}
23  \gdef\theHfootnote{\the\value{footnote}}
24  \gdef\theHmpfootnote{\the\value{mpfootnote}}
```

2.3   Providing and updating \@currentHref

[kernel?]

\@currentHref contains the current unique representation of a counter. It is useful also without hyperref as it allows to connect with a /Ref key a toc entry with the heading it refers too. So \refstepcounter is extended to update the command. This is done at the begin so that the hyperref code can still adapt it later (using the cmd/refstepcounter/after hook would be too late, and could also break with cleverref.)

We also provide a kernel version that hyperref doesn't touch and so will never set a target.

```
25  \def\@currentHref{}
26  \def\refstepcounter#1{\stepcounter{#1}%
27      \edef\@currentcounter{#1}%
28      \xdef\@currentHref {#1.\csname theH#1\endcsname}%
29      \protected@edef\@currentlabel
30          {\csname p@#1\expandafter\endcsname\csname the#1\endcsname}%
31  }
32  \let\@kernel@refstepcounter\refstepcounter
```

2.4   Assigning the headings level numbers

[kernel?]

The code for the toc must be able to compare the level of subsection against section. So some numbers are needed. It uses for now the commands used by hyperref for the bookmark levels. While headings are more a class thing, it could make sense to provide a standard set already in the kernel. The numbers are a bit different to the one in hyperref, but imho sensible.

Note for the future: once that heading stuff is turned into template instances the template should set that number.

```
33  \def\toclevel@document{-10}
```

```
34  \def\toclevel@part{-1}
35  \def\toclevel@chapter{0}
36  \def\toclevel@section{1}
37  \def\toclevel@subsection{2}
38  \def\toclevel@subsubsection{3}
39  \def\toclevel@paragraph{4}
40  \def\toclevel@subparagraph{5}
41  \def\toclevel@figure{1}
42  \def\toclevel@table{1}
```

2.5 Storing the relation between target names and structure numbers

To be able to add a /Ref key to structures the tagging makes use of target names and stores the relationship in a property. We add a hook to `\MakeLinkTarget` to catch as much as possible, see also tagging issue #20. This should work also without hyperref. The property is defined in tagpdf-base, so the code would work also without tagging but we add a test anyway, this is probably faster.

```
43  \ExplSyntaxOn
44  \AddToHookWithArguments{cmd/MakeLinkTarget/after}
45    {
46      \tag_if_active:T
47        {
48          \tl_if_blank:VF \@currentHref
49            {
50              \prop_gput:Nee \g__tag_struct_dest_num_prop {\@currentHref}{\tag_get:n{struct_num
51            }
52        }
53    }
54  \ExplSyntaxOff
55  ⟨/kernelchange⟩
```

2.6 load kernel changes

```
56  ⟨*package⟩
57  \RequirePackage{latex-lab-kernel-changes}
```

2.7 \contentsline extension

[latex-lab] The tagging code must add code at the begin and end of `\contentsline`. This code must have access to the arguments. We set it up as config point for now.

```
58  \def\@contentsline@cfgpoint@before#1#2#3#4{}
59  \def\@contentsline@cfgpoint@after#1#2#3#4{}
```

for the hooks we need that the `\l@XX` pass also the destination and that `\l@XX` takes three arguments. TODO: test that, if there are two many problems we should pass the destination through a command name ...

```
60  \def\contentsline#1#2#3#4%
61    {%
62      \@contentsline@cfgpoint@before{#1}{#2}{#3}{#4}%
63      \gdef\@contentsline@destination{#4}%
64      \csname l@#1\endcsname{#2}{#3}%
65      \@contentsline@cfgpoint@after{#1}{#2}{#3}{#4}%
66    }
```

2.8 \addcontentsline changes

[latex-lab]

\addcontentsline should always write the unique counter representation \@currentHref so that we can create the /Ref key. At the same time we need a hook, so that hyperref can add its bookmarks code, the generic hook with arguments is ok.

```
67 \def\addcontentsline#1#2#3{% #1=toc extension, #2= heading type, tag
68     \addtocontents{#1}{%
69         \protect\contentsline{#2}{#3}{\thepage}{\@currentHref}\protected@file@percent
70     }}
```

2.9 \@starttoc

[kernel?]

We add a configuration point before and after reading the file for the tagging.

```
71 \def\@starttoc@cfgpoint@before#1{}
72 \def\@starttoc@cfgpoint@after#1{}
73 \def\@starttoc#1{%
74   \begingroup
75     \makeatletter
76     \@starttoc@cfgpoint@before{#1}%
77     \@input{\jobname.#1}%
78     \@starttoc@cfgpoint@after{#1}
79     \if@filesw
80       \expandafter\newwrite\csname tf@#1\endcsname
81       \immediate\openout \csname tf@#1\endcsname \jobname.#1\relax
82     \fi
83     \@nobreakfalse
84   \endgroup}
```

2.10 Formatting of the toc entries

2.10.1 Kernel commands

[latex-lab] or [kernel?]?

We need hooks before and after the content and before and after the page number. The number needs some thing so that it can be tagged as label. The text and the page hooks are used in manual \l@xx commands and in \l@xx defined by \@dottedtocline or by other means. The arguments of the following hooks are:

#1 level as a *number* (integer expression), see above for the standard numbering. The standard first argument of \contentsline is not used, as \@dottedtocline knows only a number.

#2 content (the second argument of a \contentsline

#3 page (the third argument of a \contentsline

#3 target (the fourth argument of a \contentsline

```
85 \NewMirroredHookPairWithArguments{contentsline/number/before}{contentsline/number/after}{1}%
86 \NewMirroredHookPairWithArguments{contentsline/text/before}{contentsline/text/after}{4}%
87 \NewMirroredHookPairWithArguments{contentsline/page/before}{contentsline/page/after}{4}%
```

The dot in the leader must be set as artifact. But luatex requires that the mc are set outside the leaders. So we need a config point.

`\@dottedtocline` needs hooks and formatting commands. We add a sixth argument so that it can grab the destination too.

```
88 \def\@dottedtocline@cfgpoint@leaders#1{#1}
89
90 \def\@dottedtocline#1#2#3#4#5{%
91   \ifnum #1>\c@tocdepth \else
92     \vskip \z@ \@plus.2\p@
93     {\leftskip #2\relax \rightskip \@tocrmarg \parfillskip -\rightskip
94      \parindent #2\relax\@afterindenttrue
95      \interlinepenalty\@M
96      \leavevmode
97      \@tempdima #3\relax
98      \advance\leftskip \@tempdima \null\nobreak\hskip -\leftskip
99      \UseHookWithArguments{contentsline/text/before}{4}{#1}{#4}{#5}{\@contentsline@destinatio
100     \csname contentsline@text@#1@format\endcsname{#4}%
101     \UseHookWithArguments{contentsline/text/after}{4}{#1}{#4}{#5}{\@contentsline@destination
102     \nobreak
103     \@dottedtocline@cfgpoint@leaders{%
104       \leaders\hbox{$\m@th
105         \mkern \@dotsep mu\hbox{.}\mkern \@dotsep
106         mu$}\hfill}%
107     \nobreak
108     \hb@xt@\@pnumwidth{\hfil\normalfont \normalcolor
109     \UseHookWithArguments{contentsline/page/before}{4}{#1}{#4}{#5}{\@contentsline@destinatio
110     #5%
111     \UseHookWithArguments{contentsline/page/after}{4}{#1}{#4}{#5}{\@contentsline@destination
112                       \kern-\p@\kern\p@}%
113     \par}%
114   \fi}
```

2.10.2 `\numberline`

[kernel?] Inside or outside the box?

```
115 \def\numberline#1{\hb@xt@\@tempdima{%
116   \UseHookWithArguments{contentsline/number/before}{1}{#1}%
117   #1\hfil
118   \UseHookWithArguments{contentsline/number/after}{1}{#1}%
119   }}
```

2.10.3 `\l@xx` in the classes

Depending on the class we have to redefine also more commands For other classes it should be documented what is needed. Let the commands grab also the third arguments. If a class redefines them again it will break tagging anyway.

```
120 \AddToHook{class/article/after}
121 {
122 \renewcommand*\l@part[2]{% as in contentsline: content, page
123 \ifnum \c@tocdepth >-2\relax
124   \addpenalty\@secpenalty
125   \addvspace{2.25em \@plus\p@}%
126   \setlength\@tempdima{3em}%
```

```latex
127    \begingroup
128      \parindent \z@ \rightskip \@pnumwidth
129      \parfillskip -\@pnumwidth
130      {\leavevmode
131       \large \bfseries
132       \UseHookWithArguments{contentsline/text/before}{4}
133        {\toclevel@part}{#1}{#2}{\@contentsline@destination}%
134       \csname contentsline@text@-1@format\endcsname{#1}%
135       \UseHookWithArguments{contentsline/text/after}{4}
136        {\toclevel@part}{#1}{#2}{\@contentsline@destination}%
137       \hfil
138       \hb@xt@\@pnumwidth{\hss
139       \UseHookWithArguments{contentsline/page/before}{4}
140        {\toclevel@part}{#1}{#2}{\@contentsline@destination}%
141       #2%
142       \UseHookWithArguments{contentsline/page/after}{4}
143        {\toclevel@part}{#1}{#2}{\@contentsline@destination}%
144                        \kern-\p@\kern\p@}}\par
145       \nobreak
146     \endgroup
147   \fi}
148 \renewcommand*\l@section[2]{%
149   \ifnum \c@tocdepth >\z@
150     \addpenalty\@secpenalty
151     \addvspace{1.0em \@plus\p@}%
152     \setlength\@tempdima{1.5em}%
153     \begingroup
154       \parindent \z@ \rightskip \@pnumwidth
155       \parfillskip -\@pnumwidth
156       \leavevmode \bfseries
157       \advance\leftskip\@tempdima
158       \hskip -\leftskip
159        \UseHookWithArguments{contentsline/text/before}{4}
160         {\toclevel@section}{#1}{#2}{\@contentsline@destination}%
161        \csname contentsline@text@1@format\endcsname{#1}%
162       \UseHookWithArguments{contentsline/text/after}{4}
163        {\toclevel@section}{#1}{#2}{\@contentsline@destination}%
164        \nobreak\hfil
165       \nobreak\hb@xt@\@pnumwidth{\hss
166       \UseHookWithArguments{contentsline/page/before}{4}
167        {\toclevel@section}{#1}{#2}{\@contentsline@destination}%
168        #2%
169       \UseHookWithArguments{contentsline/page/after}{4}
170        {\toclevel@section}{#1}{#2}{\@contentsline@destination}%
171       \kern-\p@\kern\p@}\par
172     \endgroup
173   \fi}
174 }
175 \AddToHook{class/report/after}
176 {
177     \renewcommand*\l@part[2]{%
178      \ifnum \c@tocdepth >-2\relax
179        \addpenalty{-\@highpenalty}%
180        \addvspace{2.25em \@plus\p@}%
```

```
181        \setlength\@tempdima{3em}%
182        \begingroup
183          \parindent \z@ \rightskip \@pnumwidth
184          \parfillskip -\@pnumwidth
185          {\leavevmode
186           \large \bfseries
187           \UseHookWithArguments{contentsline/text/before}{4}
188             {\toclevel@part}{#1}{#2}{\@contentsline@destination}%
189           \csname contentsline@text@-1@format\endcsname{#1}%
190           \UseHookWithArguments{contentsline/text/after}{4}
191             {\toclevel@part}{#1}{#2}{\@contentsline@destination}%
192           \hfil
193           \hb@xt@\@pnumwidth{\hss
194           \UseHookWithArguments{contentsline/page/before}{4}
195             {\toclevel@part}{#1}{#2}{\@contentsline@destination}%
196           #2%
197           \UseHookWithArguments{contentsline/page/after}{4}
198             {\toclevel@part}{#1}{#2}{\@contentsline@destination}%
199                              \kern-\p@\kern\p@}}\par
200          \nobreak
201        \endgroup
202      \fi}
203    \renewcommand*\l@chapter[2]{%
204      \ifnum \c@tocdepth >\m@ne
205        \addpenalty{-\@highpenalty}%
206        \vskip 1.0em \@plus\p@
207        \setlength\@tempdima{1.5em}%
208        \begingroup
209          \parindent \z@ \rightskip \@pnumwidth
210          \parfillskip -\@pnumwidth
211          \leavevmode \bfseries
212          \advance\leftskip\@tempdima
213          \hskip -\leftskip
214          \UseHookWithArguments{contentsline/text/before}{4}
215            {\toclevel@chapter}{#1}{#2}{\@contentsline@destination}%
216          \csname contentsline@text@0@format\endcsname
217            {#1}%
218          \UseHookWithArguments{contentsline/text/after}{4}
219            {\toclevel@chapter}{#1}{#2}{\@contentsline@destination}%
220          \nobreak\hfil
221          \nobreak\hb@xt@\@pnumwidth{\hss
222          \UseHookWithArguments{contentsline/page/before}{4}
223            {\toclevel@chapter}{#1}{#2}{\@contentsline@destination}%%
224          #2%
225          \UseHookWithArguments{contentsline/page/after}{4}
226            {\toclevel@chapter}{#1}{#2}{\@contentsline@destination}%%
227                              \kern-\p@\kern\p@}\par
228          \penalty\@highpenalty
229        \endgroup
230      \fi}
231  }
232  \AddToHook{class/book/after}
233  {
234      \renewcommand*\l@part[2]{%
```

```latex
235      \ifnum \c@tocdepth >-2\relax
236        \addpenalty{-\@highpenalty}%
237        \addvspace{2.25em \@plus\p@}%
238        \setlength\@tempdima{3em}%
239        \begingroup
240          \parindent \z@ \rightskip \@pnumwidth
241          \parfillskip -\@pnumwidth
242          {\leavevmode
243           \large \bfseries
244           \UseHookWithArguments{contentsline/text/before}{4}
245             {\toclevel@part}{#1}{#2}{\@contentsline@destination}%%
246           \csname contentsline@text@-1@format\endcsname{#1}%
247           \UseHookWithArguments{contentsline/text/after}{4}
248             {\toclevel@part}{#1}{#2}{\@contentsline@destination}%%
249           \hfil
250           \hb@xt@\@pnumwidth{\hss
251           \UseHookWithArguments{contentsline/page/before}{4}
252             {\toclevel@part}{#1}{#2}{\@contentsline@destination}%%
253           #2%
254           \UseHookWithArguments{contentsline/page/after}{4}
255             {\toclevel@part}{#1}{#2}{\@contentsline@destination}%%
256                           \kern-\p@\kern\p@}}\par
257          \nobreak
258        \endgroup
259      \fi}
260    \renewcommand*\l@chapter[2]{%
261      \ifnum \c@tocdepth >\m@ne
262        \addpenalty{-\@highpenalty}%
263        \vskip 1.0em \@plus\p@
264        \setlength\@tempdima{1.5em}%
265        \begingroup
266          \parindent \z@ \rightskip \@pnumwidth
267          \parfillskip -\@pnumwidth
268          \leavevmode \bfseries
269          \advance\leftskip\@tempdima
270          \hskip -\leftskip
271          \UseHookWithArguments{contentsline/text/before}{4}
272            {\toclevel@chapter}{#1}{#2}{\@contentsline@destination}%
273          \csname contentsline@text@0@format\endcsname
274            {#1}%
275          \UseHookWithArguments{contentsline/text/after}{4}
276            {\toclevel@chapter}{#1}{#2}{\@contentsline@destination}%
277          \nobreak\hfil
278          \nobreak\hb@xt@\@pnumwidth{\hss
279          \UseHookWithArguments{contentsline/page/before}{4}
280            {\toclevel@chapter}{#1}{#2}{\@contentsline@destination}%
281          #2%
282          \UseHookWithArguments{contentsline/page/after}{4}
283            {\toclevel@chapter}{#1}{#2}{\@contentsline@destination}%
284                             \kern-\p@\kern\p@}\par
285          \penalty\@highpenalty
286        \endgroup
287      \fi}
288  }
```

⟨/package⟩