

The l3backend-testphase package Additional backend PDF features L^AT_EX PDF management testphase bundle

The L^AT_EX Project*

Version 0.96j, released 2024-08-17

1 l3backend-testphase Implementation

```
1 <drivers>\ProvidesExplFile
2 <*dvipdfmx>
3   {l3backend-testphase-dvipdfmx.def}{2024-08-17}{}
4   {LaTeX-PDF-management-testphase-bundle-backend-support: dvipdfmx}
5 </dvipdfmx>
6 <*dvips>
7   {l3backend-testphase-dvips.def}{2024-08-17}{}
8   {LaTeX-PDF-management-testphase-bundle-backend-support: dvips}
9 </dvips>
10 <*dvisvgm>
11   {l3backend-testphase-dvisvgm.def}{2024-08-17}{}
12   {LaTeX-PDF-management-testphase-bundle-backend-support: dvisvgm}
13 </dvisvgm>
14 <*luatex>
15   {l3backend-testphase-luatex.def}{2024-08-17}{}
16   {LaTeX-PDF-management-testphase-bundle-backend-support: PDF output (LuaTeX)}
17 </luatex>
18 <*pdftex>
19   {l3backend-testphase-pdftex.def}{2024-08-17}{}
20   {LaTeX-PDF-management-testphase-bundle-backend-support: PDF output (pdfTeX)}
21 </pdftex>
22 <*xdvipdfmx>
23   {l3backend-testphase-xetex.def}{2024-08-17}{}
24   {LaTeX-PDF-management-testphase-bundle-backend-support: XeTeX}
25 </xdvipdfmx>
```

1.1 Variants

We need to generate temporarily a few e-types variants of kernel backend commands. These can be removed once the kernel provides them.

```
26 <@@=pdf>
27 <*luatex | pdftex>
28 \cs_generate_variant:Nn \_kernel_backend_literal_page:n { e }
```

*E-mail: latex-team@latex-project.org

```

29 </luatex | pdftex>
30 < *dvipdfmx | xdvipdfmx>
31 \cs_generate_variant:Nn \_kernel_backend_literal:n { e }
32 \cs_generate_variant:Nn \_pdf_backend:n { e }
33 </dvipdfmx | xdvipdfmx>
34 < *dvips>
35 \cs_generate_variant:Nn \_kernel_backend_postscript:n { e }
36 \cs_generate_variant:Nn \_pdf_backend_pdfmark:n { e }
37 </dvips>

```

1.2 Support for delayed literal and special

Starting with TeXlive 2023 the engines support a `shipout` keyword for `\pdfliteral` and `\special`. When used the argument is not expanded when the command is used but only when the page is shipped out. This allows for example the tagging code to delay the page-wise numbering of MC-chunks until the page is actually built. For now we test the engine support. The boolean is setup in `pdfmanagement-testphase.dtx`.

```
38 < *drivers>
```

The following commands provide the needed kernel backend support. This are basically copies of similar commands of `l3backend-basics`.

`_kernel_backend_shipout_literal:e` The one shared function for all backends is access to the basic `\special` primitive.

```

39 \bool_if:NT \l_pdfmanagement_delayed_shipout_bool
40 {
41   \cs_new_protected:Npn \_kernel_backend_shipout_literal:e #1
42     { \tex_special:D~shipout { #1 } }
43 </drivers>

```

(End of definition for _kernel_backend_shipout_literal:e.)

```
44 < *luatex | pdftex>
```

`_kernel_backend_shipout_literal_pdf:e` This is equivalent to `\special{pdf:}` but the engine can track it. Without the `direct` keyword everything is kept in sync: the transformation matrix is set to the current point automatically. Note that this is still inside the text (BT ...ET block).

```

45 \cs_new_protected:Npn \_kernel_backend_shipout_literal_pdf:e #1
46   {
47 < *luatex>
48   \tex_pdfextension:D ~ literal ~ shipout ~
49 </luatex>
50 < *pdftex>
51   \tex_pdfliteral:D ~ shipout ~
52 </pdftex>
53   { #1 }
54   }

```

(End of definition for _kernel_backend_shipout_literal_pdf:e.)

`_kernel_backend_shipout_literal_page:e` Page literals are pretty simple.

```

55 \cs_new_protected:Npn \_kernel_backend_shipout_literal_page:e #1
56   {
57 < *luatex>
58   \tex_pdfextension:D ~ literal ~ shipout ~
59 </luatex>

```

```

60 <*pdfTeX>
61     \tex_pdfliteral:D ~ shipout ~
62 </pdfTeX>
63     page { #1 }
64 }
65 </luatex | pdfTeX>
66 <drivers> }

```

(End of definition for _kernel_backend_shipout_literal_page:e.)

1.3 Crossreferences

Commands to get a reference for the absolute page counter.

```

67 <*drivers>
68 \cs_new_protected:Npn \_pdf_backend_record_abspage:n #1
69 {
70     \@bsphack
71     \property_record:nn{#1}{abspage}
72     \@esphack
73 }
74 \cs_new:Npn \_pdf_backend_ref_abspage:n #1
75 {
76     \property_ref:nn{#1}{abspage}
77 }
78
79 \cs_generate_variant:Nn \_pdf_backend_record_abspage:n {e}
80 \cs_generate_variant:Nn \_pdf_backend_ref_abspage:n {e}
81 </drivers>

```

avoid that destinations names are optimized with xelatex/dvipdfmx see <https://tug.org/pipermail/dvipdfmx/200002.html>

```

82 <*dvipdfmx | xdvipdfmx>
83     \_kernel_backend_literal:n { dvipdfmx:config~C~ 0x0010 }
84 </dvipdfmx | xdvipdfmx>

```

```

\_pdf_backend_resourceid_int
\_pdf_backend_name_int
\_pdf_backend_page_int

```

Some scratch variables

```

85 <*drivers>
86 \prop_new:N \_pdf_backend_resourceid_int
87 \tl_new:N \_pdf_backend_name_int
88 \box_new:N \_pdf_backend_tmpa_box
89 \box_new:N \_pdf_backend_tmpb_box
90 </drivers>

```

(End of definition for _pdf_backend_resourceid_int, _pdf_backend_name_int, and _pdf_backend_tmpa_box.)

```

\_pdf_backend_resourceid_int
\_pdf_backend_name_int
\_pdf_backend_page_int

```

a counter to create labels for the resources, a counter to number properties in bdc marks, a counter for the \pdfpageref implementation.

```

91 <*drivers>
92 \int_new:N \_pdf_backend_resourceid_int
93 \int_new:N \_pdf_backend_name_int
94 \int_new:N \_pdf_backend_page_int
95 </drivers>

```

(End of definition for _pdf_backend_resourceid_int, _pdf_backend_name_int, and _pdf_backend_page_int.)

1.4 luacode

Load the lua code.

```
96 <*luatex>
97   \directlua { require("l3backend-testphase.lua") }
98 </luatex>
```

1.5 Converting unicode strings to a pdfname

dvips needs a special function here, so we add this as backend function.

```
99 <*pdftex | luatex | dvipdfmx | xdvipdfmx | dvisvgm>
100 \cs_new:Npn \__kernel_pdf_name_from_unicode_e:n #1
101   {
102     / \str_convert_pdfname:e { \text_expand:n { #1 } }
103   }
104 </pdftex | luatex | dvipdfmx | xdvipdfmx | dvisvgm>
105 <*dvips>
106 \cs_new:Npn \__kernel_pdf_name_from_unicode_e:n #1
107   {
108     ~ ( \text_expand:n { #1 } ) ~ cvn
109   }
110 </dvips>
```

1.6 Hooks

1.6.1 Add the “end run” hooks

Here we add the end run hook to suitable end hooks.

```
111 <*pdftex | luatex>
112 % put in \@kernel@after@enddocument@afterlastpage
113 \tl_gput_right:Nn \@kernel@after@enddocument@afterlastpage
114   {
115     \g__kernel_pdfmanagement_end_run_code_tl
116   }
117 </pdftex | luatex>
118 <*dvipdfmx | xdvipdfmx>
119 % put in \@kernel@after@shipout@lastpage
120 \tl_gput_right:Nn \@kernel@after@shipout@lastpage
121   {
122     \g__kernel_pdfmanagement_end_run_code_tl
123   }
124 </dvipdfmx | xdvipdfmx>
125 <*dvips>
126 % put in \@kernel@after@shipout@lastpage
127 \tl_gput_right:Nn \@kernel@after@shipout@lastpage
128   {
129     \g__kernel_pdfmanagement_end_run_code_tl
130   }
131 </dvips>
```

1.6.2 Add the “shipout” hooks

Now we add to the shipout hooks the relevant token lists. We also push the page resources in shipout/firstpage (AtBeginDvi) as the backend code sets color stack there. The xetex driver needs a rule here. If it clashes on the first page, we will need a test ...

```
132 <*drivers>
133 \tl_if_exist:NTF \@kernel@after@shipout@background
134 {
135   \g@addto@macro \@kernel@before@shipout@background{\relax}
136   \g@addto@macro \@kernel@after@shipout@background
137   {
138     \g__kernel_pdfmanagement_thispage_shipout_code_tl
139   }
140 }
141 {
142   \hook_gput_code:nnn{shipout/background}{pdf}
143   {
144     \g__kernel_pdfmanagement_thispage_shipout_code_tl
145   }
146 }
147
148 </drivers>
```

1.7 The /Pages dictionary (pdfpagesattr)

_pdf_backend_Pages_primitive:n

This is the primitive command to add something to the /Pages dictionary. It works differently for the backends: pdftex and luatex overwrite existing content, dvips and dviPDFM are additive. luatex sets it in lua. The higher level code has to take this into account.

```
149 <*pdftex>
150 \cs_new_protected:Npn \_pdf_backend_Pages_primitive:n #1
151 {
152   \tex_global:D \tex_pdfpagesattr:D { #1 }
153 }
154 </pdftex>
155 <*luatex>
156 %luatex: does it in lua
157 \sys_if_engine_luatex:T
158 {
159   \cs_new_protected:Npn \_pdf_backend_Pages_primitive:n #1
160   {
161     \tex_directlua:D
162     {
163       pdf.setpagesattributes( \_pdf_backend_luastring:n { #1 } )
164     }
165   }
166 }
167 </luatex>
168 <*dvips>
169 \cs_new_protected:Npx \_pdf_backend_Pages_primitive:n #1
170 {
171   \tex_special:D{ps:~[#1~/PAGES-pdfmark] %}
172 }
```

```

173 </dvips>
174 <*dvipdfmx | xdvipdfmx>
175 \cs_new_protected:Npn \__pdf_backend_Pages_primitive:n #1
176 {
177   \__pdf_backend:n{put~@pages~<<#1>>}
178 }
179 </dvipdfmx | xdvipdfmx>
180 <*dvisvgm>
181 \cs_new_protected:Npn \__pdf_backend_Pages_primitive:n #1
182 {}
183 </dvisvgm>

```

(End of definition for __pdf_backend_Pages_primitive:n.)

1.8 “Page” and “ThisPage” attributes (pdfpageattr)

<pre> __pdf_backend_Page_primitive:n __pdf_backend_Page_gput:nn __pdf_backend_Page_gremove:n __pdf_backend_ThisPage_gput:nn __pdf_backend_ThisPage_gpush:n </pre>	<p>__pdf_backend_Page_primitive:n is the primitive command to add something to the /Page dictionary. It works differently for the backends: pdftex and luatex overwrite existing content, dvips and dvipdfmx are additive. luatex sets it in lua. The higher level code has to take this into account. __pdf_backend_Page_gput:nn stores default values. __pdf_backend_Page_gremove:n allows to remove a value. __pdf_backend_ThisPage_gput:nn adds a value to the current page. __pdf_backend_ThisPage_gpush:n merges the default and the current page values and add them to the dictionary of the current page in \g__pdf_backend_thispage_shipout_tl.</p>
--	--

```

184 % backend commands
185 <*pdftex>
186 %the primitive
187 \cs_new_protected:Npn \__pdf_backend_Page_primitive:n #1
188 {
189   \tex_global:D \tex_pdfpageattr:D { #1 }
190 }
191 % the command to store default values.
192 % Uses a prop with pdflatex + dvi,
193 % sets a lua table with luatex
194 \cs_new_protected:Npn \__pdf_backend_Page_gput:nn #1 #2 %key,value
195 {
196   \pdfdict_gput:nnn {g__pdf_Core/Page}{ #1 }{ #2 }
197 }
198 % the command to remove a default value.
199 % Uses a prop with pdflatex + dvi,
200 % changes a lua table with luatex
201 \cs_new_protected:Npn \__pdf_backend_Page_gremove:n #1
202 {
203   \pdfdict_gremove:nn {g__pdf_Core/Page}{ #1 }
204 }
205 % the command used in the document.
206 % direct call of the primitive special with dvips/dvipdfmx
207 % \latelua: fill a page related table with luatex, merge it with the page
208 % table and push it directly
209 % write to aux and store in prop with pdflatex
210 \cs_new_protected:Npn \__pdf_backend_ThisPage_gput:nn #1 #2
211 {
212   %we need to know the page the resource should be added too.

```

```

213 \int_gincr:N\g__pdf_backend_resourceid_int
214 \__pdf_backend_record_abspage:e { l3pdf\int_use:N\g__pdf_backend_resourceid_int }
215 \tl_set:Ne \l__pdf_tmpa_tl
216 {
217   \__pdf_backend_ref_abspage:e {l3pdf\int_use:N\g__pdf_backend_resourceid_int}
218 }
219 \pdfdict_if_exist:nF { g__pdf_Core/backend_Page\l__pdf_tmpa_tl}
220 {
221   \pdfdict_new:n { g__pdf_Core/backend_Page\l__pdf_tmpa_tl}
222 }
223 %backend_Page has no handler.
224 \pdfdict_gput:nnn {g__pdf_Core/backend_Page\l__pdf_tmpa_tl}{ #1 }{ #2 }
225 }
226 %the code to push the values, used in shipout
227 %merges the two props and then fills the register in pdflatex
228 %merges the two tables and then fills (in lua) in luatex
229 %issues the values stored in the global prop with dvi
230 \cs_new_protected:Npn \__pdf_backend_ThisPage_gpush:n #1
231 {
232   \prop_gset_eq:Nc \g__pdf_tmpa_prop { \__kernel_pdfdict_name:n { g__pdf_Core/Page } }
233   \prop_if_exist:cT { \__kernel_pdfdict_name:n { g__pdf_Core/backend_Page#1 } }
234   {
235     \prop_map_inline:cn { \__kernel_pdfdict_name:n { g__pdf_Core/backend_Page#1 } }
236     {
237       \prop_gput:Nnn \g__pdf_tmpa_prop { ##1 }{ ##2 }
238     }
239   }
240   \__pdf_backend_Page_primitive:e
241   {
242     \prop_map_function:NN \g__pdf_tmpa_prop \pdfdict_item:ne
243   }
244 }
245 </pdfTeX>
246 <*luatex>
247 % do we need to use some escaping for the values?????
248 \cs_new:Npn \__pdf_backend_luastring:n #1
249 {
250   "\tex_luaescapestring:D { \tex_unexpanded:D { #1 } }"
251 }
252 %not used, only there for consistency
253 \cs_new_protected:Npn \__pdf_backend_Page_primitive:n #1
254 {
255   \tex_latelua:D
256   {
257     pdf.setpageattributes(\__pdf_backend_luastring:n { #1 })
258   }
259 }
260 % the command to store default values.
261 % Uses a prop with pdflatex + dvi,
262 % sets a lua table with luatex
263 \cs_new_protected:Npn \__pdf_backend_Page_gput:nn #1 #2
264 {
265   \tex_directlua:D
266   {

```

```

267     ltx.__pdf.backend_Page_gput
268     (
269         \__pdf_backend_luastring:n { #1 },
270         \__pdf_backend_luastring:n { #2 }
271     )
272 }
273 }
274 % the command to remove a default value.
275 % Uses a prop with pdflatex + dvi,
276 % changes a lua table with luatex
277 \cs_new_protected:Npn \__pdf_backend_Page_gremove:n #1
278 {
279     \tex_directlua:D
280     {
281         ltx.__pdf.backend_Page_gremove (\__pdf_backend_luastring:n { #1 })
282     }
283 }
284 % the command used in the document.
285 % direct call of the primitive special with dvips/dvipdfmx
286 % \latelua: fill a page related table with luatex, merge it with the page
287 % table and push it directly
288 % write to aux and store in prop with pdflatex
289 \cs_new_protected:Npn \__pdf_backend_ThisPage_gput:nn #1 #2
290 {
291     \tex_latelua:D
292     {
293         ltx.__pdf.backend_ThisPage_gput
294         (
295             tex.count["g_shipout_readonly_int"],
296             \__pdf_backend_luastring:n { #1 },
297             \__pdf_backend_luastring:n { #2 }
298         )
299         ltx.__pdf.backend_ThisPage_gpush (tex.count["g_shipout_readonly_int"])
300     }
301 }
302 %the code to push the values, used in shipout
303 %merges the two props and then fills the register in pdflatex
304 %merges the two tables (the one is probably still empty) and then fills (in lua) in luatex
305 %issues the values stored in the global prop with dvi
306 \cs_new_protected:Npn \__pdf_backend_ThisPage_gpush:n #1
307 {
308     \tex_latelua:D
309     {
310         ltx.__pdf.backend_ThisPage_gpush (tex.count["g_shipout_readonly_int"])
311     }
312 }
313
314 </luatex>
315 <*dvipdfmx | xdvipdfmx>
316 %the primitive
317 \cs_new_protected:Npn \__pdf_backend_Page_primitive:n #1
318 {
319     \tex_special:D{pdf:-put~@thispage-<<#1>>}
320 }

```



```

321 % the command to store default values.
322 % Uses a prop with pdflatex + dvi,
323 % sets a lua table with luatex
324 \cs_new_protected:Npn \__pdf_backend_Page_gput:nn #1 #2
325 {
326   \pdfdict_gput:nnn {g__pdf_Core/Page}{ #1 }{ #2 }
327 }
328 % the command to remove a default value.
329 % Uses a prop with pdflatex + dvi,
330 % changes a lua table with luatex
331 \cs_new_protected:Npn \__pdf_backend_Page_gremove:n #1
332 {
333   \pdfdict_gremove:nn {g__pdf_Core/Page}{ #1 }
334 }
335 % the command used in the document.
336 % direct call of the primitive special with dvips/dvipdfmx
337 % \lattelua: fill a page related table with luatex, merge it with the page
338 % table and push it directly
339 % write to aux and store in prop with pdflatex
340 \cs_new_protected:Npn \__pdf_backend_ThisPage_gput:nn #1 #2
341 {
342   \__pdf_backend_Page_primitive:n { /#1~#2 }
343 }
344 %the code to push the values, used in shipout
345 %merges the two props and then fills the register in pdflatex
346 %merges the two tables (the one is probably still empty)
347 % and then fills (in lua) in luatex
348 %issues the values stored in the global prop with dvi
349 \cs_new_protected:Npn \__pdf_backend_ThisPage_gpush:n #1
350 {
351   \__pdf_backend_Page_primitive:e
352   { \pdfdict_use:n { g__pdf_Core/Page} }
353 }
354 </dvipdfmx | xdvipdfmx>
355 <*dvips>
356 \cs_new_protected:Npn \__pdf_backend_Page_primitive:n #1
357 {
358   \tex_special:D{ps:-[ThisPage]<<#1>>~/PUT~pdfmark} %]
359 }
360 % the command to store default values.
361 % Uses a prop with pdflatex + dvi,
362 % sets a lua table with luatex
363 \cs_new_protected:Npn \__pdf_backend_Page_gput:nn #1 #2
364 {
365   \pdfdict_gput:nnn {g__pdf_Core/Page}{ #1 }{ #2 }
366 }
367 % the command to remove a default value.
368 % Uses a prop with pdflatex + dvi,
369 % changes a lua table with luatex
370 \cs_new_protected:Npn \__pdf_backend_Page_gremove:n #1
371 {
372   \pdfdict_gremove:nn {g__pdf_Core/Page}{ #1 }
373 }
374 % the command used in the document.

```

```

375 % direct call of the primitive special with dvips/dvipdfmx
376 % \latalua: fill a page related table with luatex, merge it with the page
377 % table and push it directly
378 % write to aux and store in prop with pdflatex
379 \cs_new_protected:Npn \__pdf_backend_ThisPage_gput:nn #1 #2
380 {
381   \__pdf_backend_Page_primitive:n { /#1~#2 }
382 }
383 %the code to push the values, used in shipout
384 %merges the two props and then fills the register in pdflatex
385 %merges the two tables (the one is probably still empty)
386 %and then fills (in lua) in luatex
387 %issues the values stored in the global prop with dvi
388 \cs_new_protected:Npn \__pdf_backend_ThisPage_gpush:n #1
389 {
390   \__pdf_backend_Page_primitive:e
391     { \pdfdict_use:n { g__pdf_Core/Page} }
392 }
393 </dvips>
394 <*dvisvgm>
395 % mostly only dummies ...
396 \cs_new_protected:Npn \__pdf_backend_Page_primitive:n #1
397   {}
398 % Uses a prop with pdflatex + dvi,
399 \cs_new_protected:Npn \__pdf_backend_Page_gput:nn #1 #2
400   {
401     \pdfdict_gput:nnn {g__pdf_Core/Page}{ #1 }{ #2 }
402   }
403 % the command to remove a default value.
404 % Uses a prop with pdflatex + dvi,
405 \cs_new_protected:Npn \__pdf_backend_Page_gremove:n #1
406   {
407     \pdfdict_gremove:nn {g__pdf_Core/Page}{ #1 }
408   }
409 % the command used in the document.
410 \cs_new_protected:Npn \__pdf_backend_ThisPage_gput:nn #1 #2
411   {}
412 %the code to push the values, used in shipout
413 \cs_new_protected:Npn \__pdf_backend_ThisPage_gpush:n #1
414   {}
415 </dvisvgm>
416 <*drivers>
417 \cs_generate_variant:Nn \__pdf_backend_Page_primitive:n { e }
418 </drivers>

```

(End of definition for __pdf_backend_Page_primitive:n and others.)

1.9 “Page/Resources”: ExtGState, ColorSpace, Shading, Pattern

Path: Page/Resources/ExtGState etc. The actual output of the resources is handled together with the bdc/Properties. Here is only special code.

`\c_pdf_backend_PageResources_clist` The names are quite often needed a similar list is now in l3pdfmanagement. Perhaps it should be merged.

```

419 <*drivers>
420 \clist_const:Nn \c_pdf_backend_PageResources_clist
421 {
422   ExtGState,
423   ColorSpace,
424   Pattern,
425   Shading,
426 }
427 </drivers>

```

(End of definition for `\c_pdf_backend_PageResources_clist`.)

Now the backend commands the command to fill the register and to push the values.

`\c_pdf_backend_PageResources_gput:nnn` stores values for the page resources.

#1 : name of the resource (ExtGState, ColorSpace, Shading, Pattern)

#2 : a pdf name without slash

#3 : value

This pushes out the objects. It should be a no-op with xdvipdfmx and dvips as it currently issued in the end-of-run hook! create the backend objects:

`\c_pdf_backend_PageResources_obj_gpush:`

```

428 <*pdftex | luatex>
429 \clist_map_inline:Nn \c_pdf_backend_PageResources_clist
430 {
431   \pdf_object_new:n {__pdf/Page/Resources/#1}
432   \cs_if_exist:NT \tex_directlua:D
433     {
434       \tex_directlua:D
435         {
436           ltx.__pdf.object["__pdf/Page/Resources/#1"]
437           =
438           "\pdf_object_ref:n{__pdf/Page/Resources/#1}"
439         }
440     }
441 }
442 </pdftex | luatex>

```

values are only stored in a prop and will be output at end document. luatex must also trigger the lua side

```

443 <*luatex>
444 \cs_new_protected:Npn \c_pdf_backend_PageResources_gput:nnn #1 #2 #3
445 {
446   \pdfdict_gput:nnn {g__pdf_Core/Page/Resources/#1} { #2 }{ #3 }
447   \tex_latelua:D{ltx.__pdf.Page.Resources.#1=true}
448   \tex_latelua:D
449     {
450       ltx.pdf.Page.Resources_gpush(tex.count["g_shipout_readonly_int"])
451     }
452 }
453 </luatex>
454 <*pdftex>
455 \cs_new_protected:Npn \c_pdf_backend_PageResources_gput:nnn #1 #2 #3
456 {

```

```

457     \pdfdict_gput:nnn {g__pdf_Core/Page/Resources/#1} { #2 }{ #3 }
458   }
459 </pdfTeX>

```

code for end of document code

```

460 <*pdfTeX | luatex>
461 \cs_new_protected:Npn \__pdf_backend_PageResources_obj_gpush:
462 {
463   \clist_map_inline:Nn \c__pdf_backend_PageResources_clist
464   {
465     \prop_if_empty:cF
466     { \__kernel_pdfdict_name:n { g__pdf_Core/Page/Resources/##1} }
467     {
468       \pdf_object_write:mne
469       { __pdf/Page/Resources/##1 } { dict }
470       { \pdfdict_use:n { g__pdf_Core/Page/Resources/##1} }
471     }
472   }
473 }
474 </pdfTeX | luatex>

```

xdvipdfmx doesn't work correctly with object names ... <https://tug.org/pipermail/dvipdfmx/2019-August/000021.html>, so we use this must be issued on every page! objects should not only be created but also initialized initialization should be done before anyone tries to write so we add rules for the backend. The push command should not be used as it is in the wrong end document hook. If needed a new command must be added.

```

475 <*dvipdfmx | xdvipdfmx>
476 <xdvipdfmx> \hook_gset_rule:nnnn{shipout/firstpage}{l3backend-xetex}{after}{pdf}
477 <dvipdfmx> \hook_gset_rule:nnnn{shipout/firstpage}{l3backend-dvipdfmx}{after}{pdf}
478 %
479 \clist_map_inline:Nn \c__pdf_backend_PageResources_clist
480 {
481   \pdf_object_new:n { __pdf/Page/Resources/#1 }
482   \hook_gput_code:nnn
483   {shipout/firstpage}
484   {pdf}
485   {\pdf_object_write:nnn { __pdf/Page/Resources/#1 } { dict } {}}
486 }
487 \cs_new_protected:Npn \__pdf_backend_PageResources:n #1
488 {
489   \__pdf_backend:n {put~@resources~<<#1>>}
490 }
491 \cs_new_protected:Npn \__pdf_backend_PageResources_gput:nnn #1 #2 #3
492 {
493   % this is not used for output, but there is a test if the resource is empty
494   \prop_gput:cne { \__kernel_pdfdict_name:n { g__pdf_Core/Page/Resources/#1} }
495   { \str_convert_pdfname:n {#2} }{ #3 }
496   %objects are not filled with \pdf_object_write as this is not additive!
497   \__pdf_backend:e
498   {
499     put~\pdf_object_ref:n {__pdf/Page/Resources/#1}<</#2~#3>>
500   }
501 }
502
503 \cs_new_protected:Npn \__pdf_backend_PageResources_obj_gpush: {}

```

```
504 </dvipdfmx | xdvipdfmx>
```

dvips unneeded, or no-op. The push command should not be used as it is in the wrong end document hook. If needed a new command must be added.

```
505 <*dvips>
506 \cs_new_protected:Npn \__pdf_backend_PageResources:n #1 {}
507 \cs_new_protected:Npn \__pdf_backend_PageResources_gput:nnn #1 #2 #3
508 { %only for the show command TEST!!
509   \pdfdict_gput:nnn {g__pdf_Core/Page/Resources/#1} { #2 }{ #3 }
510 }
511 \cs_new_protected:Npn \__pdf_backend_PageResources_obj_gpush: {}
512 </dvips>
```

dvipsvgm unneeded, or no-op

```
513 <*dvisvgm>
514 \cs_new_protected:Npn \__pdf_backend_PageResources:n #1 {}
515 \cs_new_protected:Npn \__pdf_backend_PageResources_gput:nnn #1 #2 #3
516 { %only for the show command TEST!!
517   \pdfdict_gput:nnn {g__pdf_Core/Page/Resources/#1} { #2 }{ #3 }
518 }
519 \cs_new_protected:Npn \__pdf_backend_PageResources_obj_gpush: {}
520 </dvisvgm>
```

(End of definition for __pdf_backend_PageResources_gput:nnn and __pdf_backend_PageResources_obj_gpush:.)

1.9.1 Page resources /Properties + BDC operators

```
\__pdf_backend_bdc:nn \__pdf_backend_bdc:nn, \__pdf_backend_shipout_bdc:ee, \__pdf_backend_bdcobject:nn,
  \__pdf_backend_shipout_bdc:ee \__pdf_backend_bdcobject:n, \__pdf_backend_bmc:n and \__pdf_backend_emc: are
\__pdf_backend_bdcobject:nn the backend command that create the bdc/emc marker and store the properties.
\__pdf_backend_bdcobject:n \__pdf_backend_PageResources_gpush:n outputs the /Properties and/or the other re-
  \__pdf_backend_bmc:n sources for the current page.
  \__pdf_backend_emc:
\__pdf_backend_PageResources_gpush:n
521 % pdftex and luatex (and perhaps dvips ...) need to know if there are in a
522 % xform stream ...
523 <*drivers>
524 \bool_new:N \l__pdf_backend_xform_bool
525 </drivers>
526 <*dvips>
527 % dvips is easy: create an object, and reference it in the bdc
528 % ghostscript will then automatically replace it by a name
529 % and add the name to the /Properties dict
530 % special variant von accsupp
531 % https://chat.stackexchange.com/transcript/message/50831812#50831812
532 %
533 \cs_set_protected:Npn \__pdf_backend_bdc:nn #1 #2 % #1 eg. Span, #2: dict_content
534 {
535   \__pdf_backend_pdfmark:n{/#1-<<#2>>~/BDC}
536 }
537
538 \bool_if:NT\l__pdfmanagement_delayed_shipout_bool
539 {
540   \cs_new_protected:Npn \__pdf_backend_bdc_shipout:ee #1 #2 % #1 eg. Span, #2: dict_content
541   {
542     \__kernel_backend_shipout_literal:e
```

```

543         {ps: SDict ~ begin ~ mark /#1~<<#2>>~/BDC ~ pdfmark ~ end }
544     }
545 }
546
547 \cs_set_protected:Npn \__pdf_backend_bdcobject:nn #1 #2 % #1 eg. Span, #2: object name
548 {
549     \__pdf_backend_pdfmark:e{/#1~\pdf_object_ref:n{#2}~/BDC}
550 }
551 \cs_set_protected:Npn \__pdf_backend_bdcobject:n #1 % #1 eg. Span,
552 {
553     \__pdf_backend_pdfmark:e{/#1~\__pdf_backend_object_last:~/BDC}
554 }
555 \cs_set_protected:Npn \__pdf_backend_emc:
556 {
557     \__pdf_backend_pdfmark:n{/EMC} %
558 }
559 \cs_set_protected:Npn \__pdf_backend_bmc:n #1
560 {
561     \__pdf_backend_pdfmark:n{/#1~/BMC} %
562 }
563 \cs_new_protected:Npn \__pdf_backend_PageResources_gpush:n #1 {}
564
565 </dvips>
566 <*dvisvgm>
567 % dvisvgm should do nothing
568 %
569 \cs_set_protected:Npn \__pdf_backend_bdc:nn #1 #2 % #1 eg. Span, #2: dict_content
570 {}
571 \bool_if:NT\l__pdfmanagement_delayed_shipout_bool
572 {
573     \cs_set_protected:Npn \__pdf_backend_shipout_bdc:ee #1 #2 % #1 eg. Span, #2: dict_content
574     {}
575 }
576 \cs_set_protected:Npn \__pdf_backend_bdcobject:nn #1 #2 % #1 eg. Span, #2: object name
577 {}
578 \cs_set_protected:Npn \__pdf_backend_bdcobject:n #1 % #1 eg. Span,
579 {}
580 \cs_set_protected:Npn \__pdf_backend_emc:
581 {}
582 \cs_set_protected:Npn \__pdf_backend_bmc:n #1
583 {}
584 \cs_new_protected:Npn \__pdf_backend_PageResources_gpush:n #1 {}
585
586 </dvisvgm>
587
588 % xetex has to create the entries in the /Properties manually
589 % (like the other backends)
590 % use pdfbase special
591 % https://chat.stackexchange.com/transcript/message/50832016#50832016
592 % the property is added to xform resources automatically,
593 % no need to worry about it.
594 <*dviPDFmx|xdviPDFmx>
595 \cs_set_protected:Npn \__pdf_backend_bdcobject:nn #1 #2 % #1 eg. Span, #2: object name
596 {

```

```

597 \int_gincr:N \g__pdf_backend_name_int
598 \__kernel_backend_literal:e
599 {
600 pdf:code~/#1/l3pdf\int_use:N\g__pdf_backend_name_int\c_space_tl BDC
601 }
602 \__kernel_backend_literal:e
603 {
604 pdf:put~@resources~
605 <<
606 /Properties~
607 <<
608 /l3pdf\int_use:N\g__pdf_backend_name_int\c_space_tl
609 \pdf_object_ref:n { #2 }
610 >>
611 >>
612 }
613 }
614 \cs_set_protected:Npn \__pdf_backend_bdcobject:n #1 % #1 eg. Span
615 {
616 \int_gincr:N \g__pdf_backend_name_int
617 \__kernel_backend_literal:e
618 {
619 pdf:code~/\exp_not:n{#1}/l3pdf\int_use:N\g__pdf_backend_name_int\c_space_tl BDC
620 }
621 \__kernel_backend_literal:e
622 {
623 pdf:put~@resources~
624 <<
625 /Properties~
626 <<
627 /l3pdf\int_use:N\g__pdf_backend_name_int\c_space_tl
628 \__pdf_backend_object_last:
629 >>
630 >>
631 }
632 }
633 \cs_set_protected:Npn \__pdf_backend_bmc:n #1
634 {
635 \__kernel_backend_literal:n {pdf:code~/#1~BMC} %pdfbase
636 }
637
638 %this require management
639 \cs_set_protected:Npn \__pdf_backend_bdc_contobj:nn #1 #2
640 {
641 \pdf_object_unnamed_write:nn { dict }{ #2 }
642 \__pdf_backend_bdcobject:n { #1 }
643 }
644
645 \cs_set_protected:Npn \__pdf_backend_bdc_contstream:nn #1 #2
646 {
647 \__kernel_backend_literal:n {pdf:code~/#1~<<#2>>~BDC }
648 }
649
650 \cs_set_protected:Npn \__pdf_backend_bdc:nn #1 #2

```

```

651 {
652   \bool_if:NTF \g__pdfmanagement_active_bool
653     {\cs_gset_eq:NN \__pdf_backend_bdc:nn \__pdf_backend_bdc_contobj:nn}
654     {\cs_gset_eq:NN \__pdf_backend_bdc:nn \__pdf_backend_bdc_contstream:nn}
655     \__pdf_backend_bdc:nn {#1}{#2}
656 }
657
658 \bool_if:NT\l__pdfmanagement_delayed_shipout_bool
659 {
660   \cs_set_protected:Npn \__pdf_backend_bdc_shipout_contstream:ee #1 #2
661     {
662       \__kernel_backend_shipout_literal:e {pdf:code~ /#1~<<#2>>~BDC }
663     }
664   \cs_set_eq:NN \__pdf_backend_bdc_shipout:ee \__pdf_backend_bdc_shipout_contstream:ee
665 }
666 \cs_set_protected:Npn \__pdf_backend_emc:
667 {
668   \__kernel_backend_literal:n {pdf:code~EMC} %pdfbase
669 }
670 % properties are handled automatically, but the other resources should be added
671 % at shipout
672 \cs_new_protected:Npn \__pdf_backend_PageResources_gpush:n #1
673 {
674   \clist_map_inline:Nn \c__pdf_backend_PageResources_clist
675     {
676       \prop_if_empty:cF { \__kernel_pdfdict_name:n { g__pdf_Core/Page/Resources/##1} }
677       {
678         \__kernel_backend_literal:e
679         {
680           pdf:put~@resources~
681             <</##1~\pdf_object_ref:n {__pdf/Page/Resources/##1}>>
682         }
683       }
684     }
685 }
686 </dvipdfmx | xdvipdfmx>
687 % luatex + pdftex
688 <*luatex>
689 \cs_set_protected:Npn \__pdf_backend_bdcobject:nn #1 #2 % #1 eg. Span, #2: object name
690 {
691   \int_gincr:N \g__pdf_backend_name_int
692   \__kernel_backend_literal_page:e
693     { /#1 ~ /l3pdf\int_use:N\g__pdf_backend_name_int\c_space_tl BDC }
694   \bool_if:NTF \l__pdf_backend_xform_bool
695     {
696     \pdfdict_gput:nee
697       { g__pdf_Core/Xform/Resources/Properties }
698       { l3pdf\int_use:N\g__pdf_backend_name_int }
699       { \pdf_object_ref:n { #2 } }
700     }
701     {
702     \exp_args:Ne \tex_latelua:D
703     {
704       ltx.pdf.Page_Resources_Properties_gput

```



```

705         (
706             tex.count["g_shipout_readonly_int"],
707             "l3pdf\int_use:N\g__pdf_backend_name_int",
708             "\pdf_object_ref:n { #2 }"
709         )
710     }
711 }
712 }
713 \cs_set_protected:Npn \__pdf_backend_bdcobject:n #1% #1 eg. Span
714 {
715     \int_gincr:N \g__pdf_backend_name_int
716     \__kernel_backend_literal_page:e
717     { /\exp_not:n{#1} ~ /l3pdf\int_use:N\g__pdf_backend_name_int\c_space_tl BDC }
718     \bool_if:NTF \l__pdf_backend_xform_bool
719     {
720         \pdfdict_gput:nee %no handler needed
721         { g__pdf_Core/Xform/Resources/Properties }
722         { l3pdf\int_use:N\g__pdf_backend_name_int }
723         { \__pdf_backend_object_last: }
724     }
725     {
726         \exp_args:Ne \tex_latelua:D
727         {
728             ltx.pdf.Page_Resources_Properties_gput
729             (
730                 tex.count["g_shipout_readonly_int"],
731                 "l3pdf\int_use:N\g__pdf_backend_name_int",
732                 "\__pdf_backend_object_last:"
733             )
734         }
735     }
736 }
737 \cs_set_protected:Npn \__pdf_backend_bmc:n #1
738 {
739     \__kernel_backend_literal_page:n { /#1~BMC }
740 }
741 \cs_set_protected:Npn \__pdf_backend_bdc_contobj:nn #1 #2
742 {
743     \pdf_object_unnamed_write:nn { dict } { #2 }
744     \__pdf_backend_bdcobject:n { #1 }
745 }
746 \cs_set_protected:Npn \__pdf_backend_bdc_contstream:nn #1 #2
747 {
748     \__kernel_backend_literal_page:n { /#1-<<#2>>~BDC }
749 }
750
751 \cs_set_protected:Npn \__pdf_backend_bdc:nn #1 #2
752 {
753     \bool_if:NTF \g__pdfmanagement_active_bool
754     {\cs_gset_eq:NN \__pdf_backend_bdc:nn \__pdf_backend_bdc_contobj:nn}
755     {\cs_gset_eq:NN \__pdf_backend_bdc:nn \__pdf_backend_bdc_contstream:nn}
756     \__pdf_backend_bdc:nn {#1}{#2}
757 }
758

```

```

759 \bool_if:NT\l__pdfmanagement_delayed_shipout_bool
760 {
761   \cs_set_protected:Npn \__pdf_backend_bdc_shipout_contstream:ee #1 #2
762   {
763     \__kernel_backend_shipout_literal_page:e { /#1~<<#2>>-BDC }
764   }
765   \cs_set_eq:NN \__pdf_backend_bdc_shipout:ee \__pdf_backend_bdc_shipout_contstream:ee
766 }
767
768 \cs_set_protected:Npn \__pdf_backend_emc:
769 {
770   \__kernel_backend_literal_page:n { EMC }
771 }
772
773 \cs_new_protected:Npn \__pdf_backend_PageResources_gpush:n #1 {}
774 </luatex>
775 <*pdfTeX>
776 % pdfLaTeX is the most complicated as it has to go through the aux ...
777 % the push command is extended to take other resources too
778 \cs_set_protected:Npn \__pdf_backend_bdcobject:nn #1 #2 % #1 eg. Span, #2: object name
779 {
780   \int_gincr:N \g__pdf_backend_name_int
781   \__kernel_backend_literal_page:e
782   { /#1 ~ /l3pdf\int_use:N\g__pdf_backend_name_int\c_space_tl BDC }
783   % code to set the property ....
784   \int_gincr:N\g__pdf_backend_resourceid_int
785   \bool_if:NTF \l__pdf_backend_xform_bool
786   {
787     \pdfdict_gput:nee %no handler needed
788     { g__pdf_Core/Xform/Resources/Properties }
789     { l3pdf\int_use:N\g__pdf_backend_resourceid_int }
790     { \pdf_object_ref:n { #2 } }
791   }
792   {
793     \__pdf_backend_record_abspage:e {l3pdf\int_use:N\g__pdf_backend_resourceid_int}
794     \tl_set:Ne \l__pdf_tmpa_tl
795     {
796       \__pdf_backend_ref_abspage:e{l3pdf\int_use:N\g__pdf_backend_resourceid_int}
797     }
798     \pdfdict_if_exist:nF { g__pdf_Core/backend_Page\l__pdf_tmpa_tl/Resources/Properties }
799     {
800       \pdfdict_new:n { g__pdf_Core/backend_Page\l__pdf_tmpa_tl/Resources/Properties }
801     }
802     \pdfdict_gput:nee
803     { g__pdf_Core/backend_Page\l__pdf_tmpa_tl/Resources/Properties }
804     { l3pdf\int_use:N\g__pdf_backend_resourceid_int }
805     { \pdf_object_ref:n{#2} }
806   }
807 }
808 \cs_set_protected:Npn \__pdf_backend_bdcobject:n #1% #1 eg. Span
809 {
810   \int_gincr:N \g__pdf_backend_name_int
811   \__kernel_backend_literal_page:e
812   { /\exp_not:n{#1} ~ /l3pdf\int_use:N\g__pdf_backend_name_int\c_space_tl BDC }

```

```

813 % code to set the property ....
814 \int_gincr:N\g__pdf_backend_resourceid_int
815 \bool_if:NTF \l__pdf_backend_xform_bool
816 {
817   \pdfdict_gput:nee
818   { g__pdf_Core/Xform/Resources/Properties }
819   { l3pdf\int_use:N\g__pdf_backend_resourceid_int }
820   { \__pdf_backend_object_last: }
821 }
822 {
823   \__pdf_backend_record_abspage:e{l3pdf\int_use:N\g__pdf_backend_resourceid_int}
824   \tl_set:Ne \l__pdf_tmpa_tl
825   {
826     \__pdf_backend_ref_abspage:e{l3pdf\int_use:N\g__pdf_backend_resourceid_int}
827   }
828   \pdfdict_if_exist:NF { g__pdf_Core/backend_Page\l__pdf_tmpa_tl/Resources/Properties
829   {
830     \pdfdict_new:n { g__pdf_Core/backend_Page\l__pdf_tmpa_tl/Resources/Properties }
831   }
832   \pdfdict_gput:nee
833   { g__pdf_Core/backend_Page\l__pdf_tmpa_tl/Resources/Properties }
834   { l3pdf\int_use:N\g__pdf_backend_resourceid_int }
835   { \__pdf_backend_object_last: }
836   %\pdfdict_show:n { g__pdf_Core/backend_Page\l__pdf_tmpa_tl/Resources/Properties }
837 }
838 }
839 \cs_set_protected:Npn \__pdf_backend_bmc:n #1
840 {
841   \__kernel_backend_literal_page:n { /#1-BMC }
842 }
843 \cs_set_protected:Npn \__pdf_backend_bdc_contobj:nn #1 #2
844 {
845   \pdf_object_unnamed_write:nn { dict } { #2 }
846   \__pdf_backend_bdcobject:n { #1 }
847 }
848 \cs_set_protected:Npn \__pdf_backend_bdc_contstream:nn #1 #2
849 {
850   \__kernel_backend_literal_page:n { /#1~<<#2>>~BDC }
851 }
852
853 \cs_set_protected:Npn \__pdf_backend_bdc:nn #1 #2
854 {
855   \bool_if:NTF \g__pdfmanagement_active_bool
856   {\cs_gset_eq:NN \__pdf_backend_bdc:nn \__pdf_backend_bdc_contobj:nn}
857   {\cs_gset_eq:NN \__pdf_backend_bdc:nn \__pdf_backend_bdc_contstream:nn}
858   \__pdf_backend_bdc:nn {#1}{#2}
859 }
860 \bool_if:NT\l__pdfmanagement_delayed_shipout_bool
861 {
862   \cs_set_protected:Npn \__pdf_backend_bdc_shipout_contstream:ee #1 #2
863   {
864     \__kernel_backend_literal_page:e { /#1~<<#2>>~BDC }
865   }
866   \cs_set_eq:NN \__pdf_backend_bdc_shipout:ee \__pdf_backend_bdc_shipout_contstream:ee

```

```

867 }
868
869 \cs_set_protected:Npn \__pdf_backend_emc:
870 {
871   \__kernel_backend_literal_page:n { EMC }
872 }
873
874 \cs_new:Npn \__pdf_backend_PageResources_gpush_aux:n #1 %#1 ExtGState etc
875 {
876   \prop_if_empty:cF
877   { \__kernel_pdfdict_name:n { g__pdf_Core/Page/Resources/#1} }
878   {
879     \pdfdict_item:ne { #1 }{ \pdf_object_ref:n {__pdf/Page/Resources/#1}}
880   }
881 }
882
883 \cs_new_protected:Npn \__pdf_backend_PageResources_gpush:n #1
884 {
885   \exp_args:NNe \tex_global:D \tex_pdfpageresources:D
886   {
887     \prop_if_exist:cT
888     { \__kernel_pdfdict_name:n { g__pdf_Core/backend_Page#1/Resources/Properties } }
889     {
890       /Properties~
891       <<
892       \prop_map_function:cN
893       { \__kernel_pdfdict_name:n { g__pdf_Core/backend_Page#1/Resources/Propert
894       \pdfdict_item:ne
895       >>
896     }
897     %% add ExtGState etc
898     \clist_map_function:NN
899     \c__pdf_backend_PageResources_clist
900     \__pdf_backend_PageResources_gpush_aux:n
901   }
902 }
903
904 </pdftex>

```

(End of definition for __pdf_backend_bdc:nn and others.)

1.10 “Catalog” & subdirectories (pdfcatalog)

The backend command is already in the driver: __pdf_backend_catalog_gput:nn

1.10.1 Special case: the /Names/EmbeddedFiles dictionary

Entries to /Names are handled differently, in part (/Desc) it is automatic, for other special commands like \pdfnames must be used. For EmbeddedFiles dvips wants code for every file and then creates the Name tree automatically. Other name trees are ignored. TODO: Currently the code for EmbeddedFiles is still a bit different but this should be merged, all name trees should be handled with the same code.

```

905 % pdflatex
906 <*pdftex>

```

```

907 \cs_new_protected:Npn \__pdf_backend_Names_gpush:nn #1 #2 %#1 name of name tree, #2 array co
908 {
909     \pdf_object_unnamed_write:nn {dict} {/Names [#2] }
910     \tex_pdfnames:D {/#1~\pdf_object_ref_last:}
911 }
912 </pdftex>
913 <*luatex>
914 \cs_new_protected:Npn \__pdf_backend_Names_gpush:nn #1 #2 %#1 name of name tree, #2 array co
915 {
916     \pdf_object_unnamed_write:nn {dict} {/Names [#2] }
917     \tex_pdfextension:D~names~ {/#1~\pdf_object_ref_last:}
918 }
919 </luatex>
920 <*dviPDFmx | xdvipdfmx>
921 \cs_new_protected:Npn \__pdf_backend_Names_gpush:nn #1 #2 %#1 name of name tree, #2 array co
922 {
923     \pdf_object_unnamed_write:nn {dict} {/Names [#2] }
924     \__pdf_backend:e {put~@names~<</#1~\pdf_object_ref_last: >>}
925 }
926 </dviPDFmx | xdvipdfmx>
927
928 %dvips: noop
929 <*dvips>
930 \cs_new_protected:Npn \__pdf_backend_Names_gpush:nn #1 #2 {}
931 </dvips>
932 %dvisvgm: noop
933 <*dvisvgm>
934 \cs_new_protected:Npn \__pdf_backend_Names_gpush:nn #1 #2 {}
935 </dvisvgm>

```

EmbeddedFiles is a bit special. For once we need backend commands for dvips. But we want also an option to create the name on the fly.

__pdf_backend_NamesEmbeddedFiles_add:nn dvips need special backend code to create the name tree. With the other engines it does nothing.

```

936 <*pdftex | luatex | dviPDFmx | xdvipdfmx>
937 \cs_new_protected:Npn \__pdf_backend_NamesEmbeddedFiles_add:nn #1 #2 {}
938 </pdftex | luatex | dviPDFmx | xdvipdfmx>
939 <*dvips>
940 \cs_new_protected:Npn \__pdf_backend_NamesEmbeddedFiles_add:nn #1 #2
941 {
942     \__pdf_backend_pdfmark:e
943     {
944         /Name~#1~
945         /FS~#2~
946         /EMBED
947     }
948 }
949 </dvips>
950 <*dvisvgm>
951 %no op. Or is there any sensible use for it?
952 \cs_new_protected:Npn \__pdf_backend_NamesEmbeddedFiles_add:nn #1 #2
953 {}
954
955 </dvisvgm>

```

(End of definition for `_pdf_backend_NamesEmbeddedFiles_add:nn`.)

1.10.2 Additional annotation commands

Starting with texlive 2021 pdftex and luatex offer commands to interrupt a link. That can for example be used to exclude the header and footer from the link. We add here backend support for this.

```
956 <*drivers>
957 \cs_new_protected:Npn \_pdf_backend_link_off: {}
958 \cs_new_protected:Npn \_pdf_backend_link_on: {}
959 </drivers>
960 <*pdftex>
961 \cs_if_exist:NT \pdfrunninglinkoff
962 {
963   \cs_set_protected:Npn \_pdf_backend_link_off:
964   {
965     \pdfrunninglinkoff
966   }
967   \cs_set_protected:Npn \_pdf_backend_link_on:
968   {
969     \pdfrunninglinkon
970   }
971 }
972 </pdftex>
973 <*luatex>
974 \int_compare:nNtT {\tex_luatexversion:D } > {112}
975 {
976   \cs_set_protected:Npn \_pdf_backend_link_off:
977   {
978     \pdfextension linkstate 1
979   }
980   \cs_set_protected:Npn \_pdf_backend_link_on:
981   {
982     \pdfextension linkstate 0
983   }
984 }
985 </luatex>
986 <*dvipdfmx | xdvipdfmx>
987 \cs_set_protected:Npn \_pdf_backend_link_off:
988 {
989   \_pdf_backend:n { nolink }
990 }
991 \cs_set_protected:Npn \_pdf_backend_link_on:
992 {
993   \_pdf_backend:n { link }
994 }
995 </dvipdfmx | xdvipdfmx>
```

1.10.3 Form XObject / backend

```
\_pdf_backend_xform_new:nnnn #1 : name
                              #2 : attributes
                              #3 : resources needed?? or are all resources autogenerated?
```

#4 : content, this doesn't need to be a box!

```
\__pdf_backend_xform_use:n 996 <*pdfTeX>
\__pdf_backend_xform_ref:n 997 \cs_new_protected:Npn \__pdf_backend_xform_new:n n n n #1 #2 #3 #4
998 % #1 name
999 % #2 attributes
1000 % #3 resources
1001 % #4 content, not necessarily a box!
1002 {
1003   \hbox_set:Nn \l__pdf_backend_tmpa_box
1004   {
1005     \bool_set_true:N \l__pdf_backend_xform_bool
1006     \prop_gc_clear:c { \__kernel_pdfdict_name:n { g__pdf_Core/Xform/Resources/Properties } }
1007     #4
1008   }
1009   %store the dimensions
1010   \tl_const:ce
1011   { c__pdf_backend_xform_wd_ \tl_to_str:n {#1} _tl }
1012   { \tex_the:D \box_wd:N \l__pdf_backend_tmpa_box }
1013   \tl_const:ce
1014   { c__pdf_backend_xform_ht_ \tl_to_str:n {#1} _tl }
1015   { \tex_the:D \box_ht:N \l__pdf_backend_tmpa_box }
1016   \tl_const:ce
1017   { c__pdf_backend_xform_dp_ \tl_to_str:n {#1} _tl }
1018   { \tex_the:D \box_dp:N \l__pdf_backend_tmpa_box }
1019   %% do we need to test if #2 and #3 are empty??
1020   \tex_immediate:D \tex_pdfxform:D
1021   ~ attr ~ { #2 }
1022   %% which other resources should be default? Is an argument actually needed?
1023   ~ resources ~
1024   {
1025     #3
1026     \int_compare:nNnT
1027     { \prop_count:c { \__kernel_pdfdict_name:n { g__pdf_Core/Xform/Resources/Properties } }
1028     >
1029     { 0 }
1030     {
1031       /Properties~
1032       <<
1033       \pdfdict_use:n { g__pdf_Core/Xform/Resources/Properties }
1034       >>
1035     }
1036   }
1037   \prop_if_empty:cF
1038   { \__kernel_pdfdict_name:n { g__pdf_Core/Page/Resources/ExtGState } }
1039   {
1040     /ExtGState~ \pdf_object_ref:n { __pdf/Page/Resources/ExtGState }
1041   }
1042   \prop_if_empty:cF
1043   { \__kernel_pdfdict_name:n { g__pdf_Core/Page/Resources/Pattern } }
1044   {
1045     /Pattern~ \pdf_object_ref:n { __pdf/Page/Resources/Pattern }
1046   }
```

```

1047     \prop_if_empty:cF
1048     { \__kernel_pdfdict_name:n { g__pdf_Core/Page/Resources/Shading } }
1049     {
1050         /Shading~ \pdf_object_ref:n { __pdf/Page/Resources/Shading }
1051     }
1052     \prop_if_empty:cF
1053     { \__kernel_pdfdict_name:n { g__pdf_Core/Page/Resources/ColorSpace } }
1054     {
1055         /ColorSpace~ \pdf_object_ref:n { __pdf/Page/Resources/ColorSpace }
1056     }
1057 }
1058 \l__pdf_backend_tmpa_box
1059 \int_const:cn
1060 { c__pdf_backend_xform_ \tl_to_str:n {#1} _int }
1061 { \tex_pdflastxform:D }
1062 }
1063
1064 \cs_new_protected:Npn \__pdf_backend_xform_use:n #1
1065 {
1066     \tex_pdfrefxform:D
1067     \int_use:c { c__pdf_backend_xform_ \tl_to_str:n {#1} _int }
1068     \scan_stop:
1069 }
1070
1071 \cs_new:Npn \__pdf_backend_xform_ref:n #1
1072 {
1073     \int_use:c { c__pdf_backend_xform_ \tl_to_str:n {#1} _int } ~ 0 ~ R
1074 }
1075 </pdftex>
1076 <*luatex>
1077 %luatex
1078 %nearly identical but not completely ...
1079 \cs_new_protected:Npn \__pdf_backend_xform_new:n #1 #2 #3 #4
1080 % #1 name
1081 % #2 attributes
1082 % #3 resources
1083 % #4 content, not necessarily a box!
1084 {
1085     \hbox_set:Nn \l__pdf_backend_tmpa_box
1086     {
1087         \bool_set_true:N \l__pdf_backend_xform_bool
1088         \prop_gc_clear:c { \__kernel_pdfdict_name:n { g__pdf_Core/Xform/Resources/Properties }
1089         #4
1090     }
1091     \tl_const:ce
1092     { c__pdf_backend_xform_wd_ \tl_to_str:n {#1} _tl }
1093     { \tex_the:D \box_wd:N \l__pdf_backend_tmpa_box }
1094     \tl_const:ce
1095     { c__pdf_backend_xform_ht_ \tl_to_str:n {#1} _tl }
1096     { \tex_the:D \box_ht:N \l__pdf_backend_tmpa_box }
1097     \tl_const:ce
1098     { c__pdf_backend_xform_dp_ \tl_to_str:n {#1} _tl }
1099     { \tex_the:D \box_dp:N \l__pdf_backend_tmpa_box }
1100     %% do we need to test if #2 and #3 are empty??

```



```

1101 \tex_immediate:D \tex_pdfxform:D
1102 ~ attr ~ { #2 }
1103 %% which resources should be default? Is an argument actually needed?
1104 ~ resources ~
1105 {
1106 #3
1107 \int_compare:nNnT
1108 {\prop_count:c { \__kernel_pdfdict_name:n { g__pdf_Core/Xform/Resources/Properties
1109 >
1110 { 0 }
1111 {
1112 /Properties~
1113 <<
1114 \pdfdict_use:n { g__pdf_Core/Xform/Resources/Properties }
1115 >>
1116 }
1117 \prop_if_empty:cF
1118 { \__kernel_pdfdict_name:n { g__pdf_Core/Page/Resources/ExtGState } }
1119 {
1120 /ExtGState~ \pdf_object_ref:n { __pdf/Page/Resources/ExtGState }
1121 }
1122 \prop_if_empty:cF
1123 { \__kernel_pdfdict_name:n { g__pdf_Core/Page/Resources/Pattern } }
1124 {
1125 /Pattern~ \pdf_object_ref:n { __pdf/Page/Resources/Pattern }
1126 }
1127 \prop_if_empty:cF
1128 { \__kernel_pdfdict_name:n { g__pdf_Core/Page/Resources/Shading } }
1129 {
1130 /Shading~ \pdf_object_ref:n { __pdf/Page/Resources/Shading }
1131 }
1132 \prop_if_empty:cF
1133 { \__kernel_pdfdict_name:n { g__pdf_Core/Page/Resources/ColorSpace } }
1134 {
1135 /ColorSpace~ \pdf_object_ref:n { __pdf/Page/Resources/ColorSpace }
1136 }
1137 }
1138 \l__pdf_backend_tmpa_box
1139 \int_const:cn
1140 { c__pdf_backend_xform_ \tl_to_str:n {#1} _int }
1141 { \tex_pdflastxform:D }
1142 }
1143
1144 \cs_new_protected:Npn \__pdf_backend_xform_use:n #1 %protected as with xelatex
1145 {
1146 \tex_pdfrefxform:D \int_use:c
1147 {
1148 c__pdf_backend_xform_ \tl_to_str:n {#1} _int
1149 }
1150 \scan_stop:
1151 }
1152
1153 \cs_new:Npn \__pdf_backend_xform_ref:n #1
1154 { \int_use:c { c__pdf_backend_xform_ \tl_to_str:n {#1} _int } ~ 0 ~ R }

```

```

1155
1156 </luatex>
1157 <{*dvi.pdfmx | xdvipdfmx}>
1158 % xetex
1159 % it needs a bit testing if it really works to set the box to 0 before the special ...
1160 % does it disturb viewing the xobject?
1161 % what happens with the resources (bdc)? (should work as they are specials too)
1162 % xetex requires that the special is in horizontal mode. This means it affects
1163 % typesetting. But we can no delay the whole form code to shipout
1164 % as the object reference and the size is often wanted on the current page.
1165 % so we need to allocate a box - but probably they won't be thousands xform
1166 % in a document so it shouldn't matter.
1167 \cs_new_protected:Npn \__pdf_backend_xform_new:nnnn #1 #2 #3 #4
1168 % #1 name
1169 % #2 attributes
1170 % #3 resources
1171 % #4 content, not necessarily a box!
1172 {
1173   \int_gincr:N \g__pdf_backend_object_int
1174   \int_const:cn
1175     { c__pdf_backend_xform_ \tl_to_str:n {#1} _int }
1176   { \g__pdf_backend_object_int }
1177   \box_new:c { g__pdf_backend_xform_#1_box }
1178   \hbox_gset:cn { g__pdf_backend_xform_#1_box }
1179     {
1180       \bool_set_true:N \l__pdf_backend_xform_bool
1181       #4
1182     }
1183   \tl_const:ce
1184     { c__pdf_backend_xform_wd_ \tl_to_str:n {#1} _tl }
1185     { \tex_the:D \box_wd:c { g__pdf_backend_xform_#1_box } }
1186   \tl_const:ce
1187     { c__pdf_backend_xform_ht_ \tl_to_str:n {#1} _tl }
1188     { \tex_the:D \box_ht:c { g__pdf_backend_xform_#1_box } }
1189   \tl_const:ce
1190     { c__pdf_backend_xform_dp_ \tl_to_str:n {#1} _tl }
1191     { \tex_the:D \box_dp:c { g__pdf_backend_xform_#1_box } }
1192   \box_set_dp:cn { g__pdf_backend_xform_#1_box } { \c_zero_dim }
1193   \box_set_ht:cn { g__pdf_backend_xform_#1_box } { \c_zero_dim }
1194   \box_set_wd:cn { g__pdf_backend_xform_#1_box } { \c_zero_dim }
1195   \hook_gput_next_code:nm {shipout/background}
1196   {
1197     \mode_leave_vertical: %needed, the xform disappears without it.
1198     \__pdf_backend:e
1199     {
1200       bobj ~ \__pdf_backend_xform_ref:n { #1 }
1201       \c_space_tl width ~ \pdfxform_wd:n { #1 }
1202       \c_space_tl height ~ \pdfxform_ht:n { #1 }
1203       \c_space_tl depth ~ \pdfxform_dp:n { #1 }
1204     }
1205     \box_use_drop:c { g__pdf_backend_xform_#1_box }
1206     \__pdf_backend:e {put ~ @resources ~<<#3>> }
1207     \__pdf_backend:e
1208     {

```

```

1209         put~ @resources ~
1210         <<
1211         /ExtGState~ \pdf_object_ref:n { __pdf/Page/Resources/ExtGState }
1212         >>
1213     }
1214     \__pdf_backend:e
1215     {
1216         put~ @resources ~
1217         <<
1218         /Pattern~ \pdf_object_ref:n { __pdf/Page/Resources/Pattern }
1219         >>
1220     }
1221     \__pdf_backend:e
1222     {
1223         put~ @resources ~
1224         <<
1225         /Shading~ \pdf_object_ref:n { __pdf/Page/Resources/Shading }
1226         >>
1227     }
1228     \__pdf_backend:e
1229     {
1230         put~ @resources ~
1231         <<
1232         /ColorSpace~
1233         \pdf_object_ref:n { __pdf/Page/Resources/ColorSpace }
1234         >>
1235     }
1236     \__pdf_backend:e {exobj ~<<#2>>}
1237 }
1238 }
1239
1240
1241
1242 \cs_new:Npn \__pdf_backend_xform_ref:n #1
1243 {
1244     @pdf.xform \int_use:c { c__pdf_backend_xform_ \tl_to_str:n {#1} _int }
1245 }
1246
1247 \cs_new_protected:Npn \__pdf_backend_xform_use:n #1
1248 {
1249     \hbox_set:Nn \l__pdf_backend_tmpa_box
1250     {
1251         \__pdf_backend:e
1252         {
1253             uxobj~ \__pdf_backend_xform_ref:n { #1 }
1254         }
1255     }
1256     \box_set_wd:Nn \l__pdf_backend_tmpa_box { \pdfxform_wd:n { #1 } }
1257     \box_set_ht:Nn \l__pdf_backend_tmpa_box { \pdfxform_ht:n { #1 } }
1258     \box_set_dp:Nn \l__pdf_backend_tmpa_box { \pdfxform_dp:n { #1 } }
1259     \box_use_drop:N \l__pdf_backend_tmpa_box
1260 }
1261 </dviptfm | xdvipdfmx>
1262 <*dvisvgm>

```

```

1263 % unclear what it should do!!
1264 \cs_new_protected:Npn \__pdf_backend_xform_new:nnnn #1 #2 #3 #4 {}
1265 \cs_new_protected:Npn \__pdf_backend_xform_use:n #1 {}
1266 \cs_new:Npn \__pdf_backend_xform_ref:n {}
1267 </divisvgn>

```

The xform code for dvips is based on code from the attachfile2 package (in atfi-dvips), along with some ideas from pdfbase and has been corrected with the help of Alexander Grahn. Details like clipping and landscape will probably be corrected in the future. We need some temporary variables to store dimensions

```

1268 <*dvips>
1269 \tl_new:N \l__pdf_backend_xform_tmpwd_tl
1270 \tl_new:N \l__pdf_backend_xform_tmpdp_tl
1271 \tl_new:N \l__pdf_backend_xform_tmph_tl

1272 \cs_new_protected:Npn \__pdf_backend_xform_new:nnnn #1 #2 #3 #4 % #1 name, #2 attribute, #4
1273 {
1274   \int_gincr:N \g__pdf_backend_object_int
1275   \int_const:cn
1276     { c__pdf_backend_xform_ \tl_to_str:n {#1} _int }
1277     { \g__pdf_backend_object_int }
1278
1279   \hbox_set:Nn \l__pdf_backend_tmpa_box
1280     {
1281       \bool_set_true:N \l__pdf_backend_xform_bool
1282       \prop_gc clear:c { \__kernel_pdfdict_name:n { g__pdf_Core/Xform/Resources/Properties } }
1283       #4
1284     }
1285   %store the dimensions
1286   \tl_const:ce
1287     { c__pdf_backend_xform_wd_ \tl_to_str:n {#1} _tl }
1288     { \tex_the:D \box_wd:N \l__pdf_backend_tmpa_box }
1289   \tl_const:ce
1290     { c__pdf_backend_xform_ht_ \tl_to_str:n {#1} _tl }
1291     { \tex_the:D \box_ht:N \l__pdf_backend_tmpa_box }
1292   \tl_const:ce
1293     { c__pdf_backend_xform_dp_ \tl_to_str:n {#1} _tl }
1294     { \tex_the:D \box_dp:N \l__pdf_backend_tmpa_box }
1295   %store content dimensions in DPI units (Dots) (code from issue 25)
1296   \tl_set:Nc \l__pdf_backend_xform_tmpwd_tl
1297     {
1298       \dim_to_decimal_in_sp:n { \box_wd:N \l__pdf_backend_tmpa_box } ~
1299       65536~div~72.27~div~DVImag~mul~Resolution~mul~
1300     }
1301   \tl_set:Nc \l__pdf_backend_xform_tmph_tl
1302     {
1303       \dim_to_decimal_in_sp:n { \box_ht:N \l__pdf_backend_tmpa_box } ~
1304       65536~div~72.27~div~DVImag~mul~VResolution~mul~
1305     }
1306   \tl_set:Nc \l__pdf_backend_xform_tmpdp_tl
1307     {
1308       \dim_to_decimal_in_sp:n { \box_dp:N \l__pdf_backend_tmpa_box } ~
1309       65536~div~72.27~div~DVImag~mul~VResolution~mul~
1310     }
1311   % mirror the box

```

```

1312 %\box_scale:Nnn \l__pdf_backend_tmpa_box {1} {-1}
1313 \hbox_set:Nn\l__pdf_backend_tmpb_box
1314 {
1315   \__kernel_backend_postscript:e
1316   {
1317     gsave~currentpoint~
1318     initclip~ % restore default clipping path (page device/whole page)
1319     clippath~pathbbox~newpath~pop~pop~
1320     \tl_use:N\l__pdf_backend_xform_tmpdp_tl~add~translate~
1321     mark~
1322     /_objdef~{ pdf.obj \int_use:N\g__pdf_backend_object_int }\c_space_tl~
1323     /BBox[
1324       0~
1325       \tl_use:N\l__pdf_backend_xform_tmpht_tl~
1326       \tl_use:N\l__pdf_backend_xform_tmpwd_tl~
1327       \tl_use:N\l__pdf_backend_xform_tmpdp_tl~
1328       neg
1329     ]
1330     \str_if_eq:eeF{#1}{}
1331     {
1332       product~(Distiller)~search~{pop~pop~pop~#2}{pop}ifelse~
1333     }
1334     /BP~pdfmark~1~-1~scale~neg~exch~neg~exch~translate
1335   }
1336   \box_use_drop:N\l__pdf_backend_tmpa_box
1337   \__kernel_backend_postscript:n
1338   {
1339     mark ~ /EP~pdfmark ~ grestore
1340   }
1341   \str_if_eq:eeF{#1}{}
1342   {
1343     \__kernel_backend_postscript:e
1344     {
1345       product~(Ghostscript)~search~
1346       {
1347         pop~pop~pop~
1348         mark~
1349         { pdf.obj \int_use:c{c__pdf_backend_xform_ \tl_to_str:n {#1} _int} }
1350         ~<<#2>>~/PUT~pdfmark
1351       }{pop}ifelse
1352     }
1353   }
1354 }
1355 \box_set_dp:Nn \l__pdf_backend_tmpb_box { \c_zero_dim }
1356 \box_set_ht:Nn \l__pdf_backend_tmpb_box { \c_zero_dim }
1357 \box_set_wd:Nn \l__pdf_backend_tmpb_box { \c_zero_dim }
1358 \hook_gput_code:nnn {begindocument/end}{pdfxform}
1359 {
1360   \mode_leave_vertical:
1361   \box_use:N\l__pdf_backend_tmpb_box
1362 }
1363 }
1364
1365

```

```

1366 \cs_new_protected:Npn \__pdf_backend_xform_use:n #1
1367 {
1368   \hbox_set:Nn \l__pdf_backend_tmpa_box
1369   {
1370     \__kernel_backend_postscript:e
1371     {
1372       gsave~currentpoint~translate~1~-1~scale~
1373       mark~{ pdf.obj \int_use:c{c__pdf_backend_xform_ \tl_to_str:n {#1} _int }}~
1374       /SP~pdfmark ~ grestore
1375     }
1376   }
1377   \box_set_wd:Nn \l__pdf_backend_tmpa_box { \pdfxform_wd:n { #1 } }
1378   \box_set_ht:Nn \l__pdf_backend_tmpa_box { \pdfxform_ht:n { #1 } }
1379   \box_set_dp:Nn \l__pdf_backend_tmpa_box { \pdfxform_dp:n { #1 } }
1380   \box_use_drop:N \l__pdf_backend_tmpa_box
1381 }
1382 \cs_new:Npn \__pdf_backend_xform_ref:n #1
1383 {
1384   { pdf.obj \int_use:c{c__pdf_backend_xform_ \tl_to_str:n {#1} _int} }
1385 }
1386
1387 </dvips>
1388 <*drivers>
1389 %% all
1390 \prg_new_conditional:Npnn \__pdf_backend_xform_if_exist:n #1 { p , T , F , TF }
1391 {
1392   \int_if_exist:cTF { c__pdf_backend_xform_ \tl_to_str:n {#1} _int }
1393   { \prg_return_true: }
1394   { \prg_return_false:}
1395 }
1396 \prg_new_eq_conditional:NMn \pdfxform_if_exist:n\__pdf_backend_xform_if_exist:n
1397 { TF , T , F , p }
1398 </drivers>

```

(End of definition for __pdf_backend_xform_new:nnnn, __pdf_backend_xform_use:n, and __pdf_backend_xform_ref:n.)

1.11 Structure Destinations

Standard destinations consist of a reference to a page in the pdf and instructions how to display it—typically they will put a specific location in the left top corner of the viewer and so give the impression that a link jumped to the word in this place. But in reality they are not connected to the content.

Starting with pdf 2.0 destinations can in a tagged PDF also point to a structure, to a /StructElem object. GoTo links can then additionally to the /D key pointing to a page destination also point to such a structure destination with an /SD key. Programs that e.g. convert such a PDF to html can then create better links. (According to the reference, PDF-viewer should prefer the structure destination over the page destination, but as far as it is known this isn't done yet.)

Currently structure destinations and GoTo links making use of it could natively only be created with the dvipdfmx backend. With pdftex and luatex it was only possible to create a restricted type which used only the “Fit” mode. Starting with T_EXlive 2022

(earlier in miktex) both engine will know new keywords which allow to create structure destination easily.

The following backend code prepares the use of structure destinations. The general idea is that if structure destinations are used, they should be used always. So we define alternative commands which can be activated by mapping them to the standard backend commands.

The needed code differ depending on if structure objects use standard or indexed object names. At the end we will probably always use indexed objects, but for now we offer both options.

`\l_pdf_current_structure_destination_tl` This command holds the name of the structure object to use in the following commands which creates a destination. The code which activates structure destinations must also ensure that it has a sensible, expandable content. `tagpdf` for example will define it as

```
\tl_set:Nn \l_pdf_current_structure_destination_tl { __tag/struct/\g__tag_struct_stack
```

or if indexed structure object names are used

```
\tl_set:Nn \l_pdf_current_structure_destination_tl { {__tag/struct}{\g__tag_struct_sta
```

```
1399 <*drivers>
1400 \tl_new:N \l_pdf_current_structure_destination_tl
1401 </drivers>
```

(End of definition for `\l_pdf_current_structure_destination_tl`. This function is documented on page ??.)

We will define alternatives for three backend commands:

```
\__pdf_backend_destination:nn      -> \__pdf_backend_structure_destination:nn
\__pdf_backend_destination:nmmm -> \__pdf_backend_structure_destination:nmmm
\__pdf_backend_link_begin_goto:nmw -> \__pdf_backend_link_begin_structure_goto:nmw
\__pdf_backend_destination:nn      -> \__pdf_backend_indexed_structure_destination:nn
\__pdf_backend_destination:nmmm -> \__pdf_backend_indexed_structure_destination:nmmm
\__pdf_backend_link_begin_goto:nmw -> \__pdf_backend_indexed_link_begin_structure_goto:nmw
```

Activating means mapping them onto the original commands. Be aware that not all engines and compilation routes support structure destinations, for them the command will be a no-op.

```
\pdf_activate_structure_destination:
pdf_activate_indexed_structure_destination:
1402 <*drivers>
1403 \cs_new_protected:Npn \pdf_activate_structure_destination:
1404 {
1405   \cs_gset_eq:NN \__pdf_backend_destination:nn      \__pdf_backend_structure_destination:nn
1406   \cs_gset_eq:NN \__pdf_backend_destination:nmmm    \__pdf_backend_structure_destination:nmmm
1407   \cs_gset_eq:NN \__pdf_backend_link_begin_goto:nmw \__pdf_backend_link_begin_structure_goto:nmw
1408 }
1409 \cs_new_protected:Npn \pdf_activate_indexed_structure_destination:
1410 {
1411   \cs_gset_eq:NN \__pdf_backend_destination:nn      \__pdf_backend_indexed_structure_destination:nn
1412   \cs_gset_eq:NN \__pdf_backend_destination:nmmm    \__pdf_backend_indexed_structure_destination:nmmm
1413   \cs_gset_eq:NN \__pdf_backend_link_begin_goto:nmw \__pdf_backend_indexed_link_begin_structure_goto:nmw
1414 }
1415 </drivers>
```

(End of definition for `\pdf_activate_structure_destination:` and `\pdf_activate_indexed_structure_destination:`. These functions are documented on page ??.)

Now the driver dependent parts. By default the new commands are simply copies of the original commands. We adapt them then for the engines and engine version which provide support for structure destinations.

```

1416 <*drivers>
1417 \cs_set_eq:NN \__pdf_backend_structure_destination:nn \__pdf_backend_destination:nn
1418 \cs_set_eq:NN \__pdf_backend_structure_destination:nmmn \__pdf_backend_destination:nmmn
1419 \cs_set_eq:NN \__pdf_backend_link_begin_structure_goto:nmw \__pdf_backend_link_begin_goto:nmw
1420 \cs_set_eq:NN \__pdf_backend_indexed_structure_destination:nn \__pdf_backend_destination:nn
1421 \cs_set_eq:NN \__pdf_backend_indexed_structure_destination:nmmn \__pdf_backend_destination:nmmn
1422 </drivers>

```

These commands are the backend commands to create a destination, which create also a structure destination. At first xetex/dvipdfmx. The structure destination is an array, so we use obj for it so that we can reference it:

```

1423 <*xdvipdfmx | dvipdfmx>
1424 \cs_set_protected:Npn \__pdf_backend_structure_destination:nn #1#2
1425 {
1426   \__pdf_backend:e
1427   {
1428     dest ~ ( \exp_not:n {#1} )
1429     [
1430       @thispage
1431       \str_case:nnF {#2}
1432       {
1433         { xyz } { /XYZ ~ @xpos ~ @ypos ~ null }
1434         { fit } { /Fit }
1435         { fitb } { /FitB }
1436         { fitbh } { /FitBH }
1437         { fitbv } { /FitBV ~ @xpos }
1438         { fith } { /FitH ~ @ypos }
1439         { fitv } { /FitV ~ @xpos }
1440         { fitr } { /Fit }
1441       }
1442       { /XYZ ~ @xpos ~ @ypos ~ \fp_eval:n { (#2) / 100 } }
1443     ]
1444   }

```

We test if the structure object exist. The object of the structure destination gets the name `@pdf.Sdest.<destname>`, where `<destname>` is the name of the standard destination so that we can reference it in the GoTo links.

```

1445 \exp_args:Ne \pdf_object_if_exist:nT { \l_pdf_current_structure_destination_tl }
1446 {
1447   \__pdf_backend:e
1448   {
1449     obj ~ @pdf.SDest.\exp_not:n{#1}
1450     [
1451       \exp_args:Ne \pdf_object_ref:n { \l_pdf_current_structure_destination_tl }
1452       \str_case:nnF {#2}
1453       {
1454         { xyz } { /XYZ ~ @xpos ~ @ypos ~ null }
1455         { fit } { /Fit }

```



```

1456         { fitb } { /FitB }
1457         { fitbh } { /FitBH }
1458         { fitbv } { /FitBV ~ @xpos }
1459         { fith } { /FitH ~ @ypos }
1460         { fitv } { /FitV ~ @xpos }
1461         { fitr } { /Fit }
1462     }
1463     { /XYZ ~ @xpos ~ @ypos ~ \fp_eval:n { (#2) / 100 } }
1464 ]
1465 }
1466 }
1467 }

```

The second destination command is for the boxed destination. Here we need to define a new auxiliary command:

```

1468 \cs_new_protected:Npn \__pdf_backend_structure_destination_aux:nnnn #1#2#3#4
1469 {
1470     \vbox_to_zero:n
1471     {
1472         \__kernel_kern:n {#4}
1473         \hbox:n
1474         {
1475             \__pdf_backend:n { obj ~ @pdf_ #2 _llx ~ @xpos }
1476             \__pdf_backend:n { obj ~ @pdf_ #2 _lly ~ @ypos }
1477         }
1478         \tex_vss:D
1479     }
1480     \__kernel_kern:n {#1}
1481     \vbox_to_zero:n
1482     {
1483         \__kernel_kern:n { -#3 }
1484         \hbox:n
1485         {
1486             \__pdf_backend:n
1487             {
1488                 dest ~ (#2)
1489                 [
1490                     @thispage
1491                     /FitR ~
1492                     @pdf_ #2 _llx ~ @pdf_ #2 _lly ~
1493                     @xpos ~ @ypos
1494                 ]
1495             }

```

Here we add the structure destination to the same box

```

1496     \exp_args:Ne \pdf_object_if_exist:nT { \l_pdf_current_structure_destination_tl }
1497     {
1498         \__pdf_backend:e
1499         {
1500             obj ~ @pdf.SDest.\exp_not:n{#2}
1501             [
1502                 \exp_args:Ne \pdf_object_ref:n { \l_pdf_current_structure_destination_
1503                 /FitR ~
1504                 @pdf_ #2 _llx ~ @pdf_ #2 _lly ~
1505                 @xpos ~ @ypos

```

```

1506         ]
1507     }
1508 }
1509 }
1510 \tex_vss:D
1511 }
1512 \__kernel_kern:n { -#1 }
1513 }

```

And now we redefine the destination command:

```

1514 \cs_set_protected:Npn \__pdf_backend_structure_destination:nmnn #1#2#3#4
1515 {
1516     \exp_args:Ne \__pdf_backend_structure_destination_aux:nmnn
1517     { \dim_eval:n {#2} } {#1} {#3} {#4}
1518 }

```

At last the goto link.

```

1519 \cs_set_protected:Npn \__pdf_backend_link_begin_structure_goto:nmw #1#2
1520 {
1521     \__pdf_backend_link_begin:n { #1 /Subtype /Link /A << /S /GoTo /D ( #2 ) /SD~@pdf.SDest.
1522 }
1523 </xdvipdfmx | dvipdfmx>

```

Now pdftex. We only redefine for version 1.40 revision 24 or later.

```

1524 <*pdftex>
1525 \bool_lazy_and:nnT
1526 { \int_compare_p:nNn {\tex_pdftexversion:D } > {139} }
1527 { \int_compare_p:nNn {\tex_pdftexrevision:D } > {23} }
1528 {
1529     \cs_set_protected:Npn \__pdf_backend_structure_destination:nn #1#2
1530     {
1531         \tex_pdfdest:D
1532         name {#1}
1533         \str_case:nnF {#2}
1534         {
1535             { xyz } { xyz }
1536             { fit } { fit }
1537             { fitb } { fitb }
1538             { fitbh } { fitbh }
1539             { fitbv } { fitbv }
1540             { fith } { fith }
1541             { fitv } { fitv }
1542             { fitr } { fitr }
1543         }
1544         { xyz ~ zoom \fp_eval:n { #2 * 10 } }
1545         \scan_stop:
1546         \exp_args:Ne \pdf_object_if_exist:nT { \l_pdf_current_structure_destination_tl }
1547         {
1548             \tex_pdfdest:D
1549             struct~
1550             \int_use:c
1551             { c_pdf_object_ \exp_args:Ne \tl_to_str:n {\l_pdf_current_structure_destin
1552             name {#1}
1553             \str_case:nnF {#2}
1554             {

```

```

1555         { xyz } { xyz }
1556         { fit } { fit }
1557         { fitb } { fitb }
1558         { fitbh } { fitbh }
1559         { fitbv } { fitbv }
1560         { fith } { fith }
1561         { fitv } { fitv }
1562         { fitr } { fitr }
1563     }
1564     { xyz ~ zoom \fp_eval:n { #2 * 10 } }
1565     \scan_stop:
1566 }
1567 }
1568 \cs_set_protected:Npn \__pdf_backend_structure_destination:nnnn #1#2#3#4
1569 {
1570     \tex_pdfdest:D
1571     name {#1}
1572     fitr ~
1573     width \dim_eval:n {#2} ~
1574     height \dim_eval:n {#3} ~
1575     depth \dim_eval:n {#4} \scan_stop:
1576     \exp_args:Ne \pdf_object_if_exist:nT { \l_pdf_current_structure_destination_tl }
1577     {
1578         \tex_pdfdest:D
1579         struct~
1580         \int_use:c
1581         { c__pdf_object_ \exp_args:Ne \tl_to_str:n { \l_pdf_current_structure_destination_tl }
1582         name {#1}
1583         fitr ~
1584         width \dim_eval:n {#2} ~
1585         height \dim_eval:n {#3} ~
1586         depth \dim_eval:n {#4} \scan_stop:
1587     }
1588 }
1589 \cs_set_protected:Npn \__pdf_backend_link_begin_structure_goto:nnw #1#2
1590 {
1591     \__pdf_backend_link_begin:nnnw {#1} { goto~struct~name~{#2}~name } {#2}
1592 }
1593 }
1594 </pdfTeX>

```

luatex is quite similar to pdftex. Mostly the test for the version is different

```

1595 <*luatex>
1596 \int_compare:nNnT {\directlua{tex.print(status.list()["development_id"])} } > {7468}
1597 {
1598     \cs_set_protected:Npn \__pdf_backend_structure_destination:nn #1#2
1599     {
1600         \tex_pdfextension:D dest
1601         name {#1}
1602         \str_case:nnF {#2}
1603         {
1604             { xyz } { xyz }
1605             { fit } { fit }
1606             { fitb } { fitb }
1607             { fitbh } { fitbh }

```

```

1608         { fitbv } { fitbv }
1609         { fith } { fith }
1610         { fitv } { fitv }
1611         { fitr } { fitr }
1612     }
1613     { xyz ~ zoom \fp_eval:n { #2 * 10 } }
1614     \scan_stop:
1615 \exp_args:Ne \pdf_object_if_exist:nT { \l_pdf_current_structure_destination_tl }
1616 {
1617     \tex_pdfextension:D dest
1618     struct~
1619     \int_use:c
1620     { c__pdf_object_ \exp_args:Ne \tl_to_str:n {\l_pdf_current_structure_destin
1621     name {#1}
1622     \str_case:nnF {#2}
1623     {
1624         { xyz } { xyz }
1625         { fit } { fit }
1626         { fitb } { fitb }
1627         { fitbh } { fitbh }
1628         { fitbv } { fitbv }
1629         { fith } { fith }
1630         { fitv } { fitv }
1631         { fitr } { fitr }
1632     }
1633     { xyz ~ zoom \fp_eval:n { #2 * 10 } }
1634     \scan_stop:
1635 }
1636 }
1637 \cs_set_protected:Npn \__pdf_backend_structure_destination:nnnn #1#2#3#4
1638 {
1639     \tex_pdfextension:D dest
1640     name {#1}
1641     fitr ~
1642     width \dim_eval:n {#2} ~
1643     height \dim_eval:n {#3} ~
1644     depth \dim_eval:n {#4} \scan_stop:
1645 \exp_args:Ne \pdf_object_if_exist:nT { \l_pdf_current_structure_destination_tl }
1646 {
1647     \tex_pdfextension:D dest
1648     struct~
1649     \int_use:c
1650     { c__pdf_object_ \exp_args:Ne \tl_to_str:n {\l_pdf_current_structure_destinat
1651     name {#1}
1652     fitr ~
1653     width \dim_eval:n {#2} ~
1654     height \dim_eval:n {#3} ~
1655     depth \dim_eval:n {#4} \scan_stop:
1656 }
1657 }
1658 \cs_set_protected:Npn \__pdf_backend_link_begin_structure_goto:nnw #1#2
1659 {
1660     \__pdf_backend_link_begin:nnnw {#1} { goto~struct~name~{#2}~name } {#2}
1661 }

```

```

1662 }
1663 </luatex>

```

(End of definition for `_pdf_backend_structure_destination:nn`, `_pdf_backend_structure_destination:nnnn`, and `_pdf_backend_link_begin_structure_goto:nnw`.)

```

df_backend_indexed_structure_destination:nn
_backend_indexed_structure_destination:nnnn

```

This are the indexed variants of the commands to create a destination and a structure destination. At first xetex/dvipdfmx. The structure destination is an array, so we use `obj` for it so that we can reference it:

```

1664 <*xdvipdfmx | dvipdfmx>
1665 \cs_set_protected:Npn \_pdf_backend_indexed_structure_destination:nn #1#2
1666 {
1667   \_pdf_backend:e
1668   {
1669     dest ~ ( \exp_not:n {#1} )
1670     [
1671       @thispage
1672       \str_case:nnF {#2}
1673       {
1674         { xyz } { /XYZ ~ @xpos ~ @ypos ~ null }
1675         { fit } { /Fit }
1676         { fitb } { /FitB }
1677         { fitbh } { /FitBH }
1678         { fitbv } { /FitBV ~ @xpos }
1679         { fith } { /FitH ~ @ypos }
1680         { fitv } { /FitV ~ @xpos }
1681         { fitr } { /Fit }
1682       }
1683       { /XYZ ~ @xpos ~ @ypos ~ \fp_eval:n { (#2) / 100 } }
1684     ]
1685   }

```

We do not test anymore if the structure object exist. The object of the structure destination gets the name `@pdf.Sdest.<destname>`, where `<destname>` is the name of the standard destination so that we can reference it in the GoTo links.

```

1686   \_pdf_backend:e
1687   {
1688     obj ~ @pdf.SDest.\exp_not:n{#1}
1689     [
1690       \exp_after:wN \pdf_object_ref_indexed:nn \l_pdf_current_structure_destination_t
1691       \str_case:nnF {#2}
1692       {
1693         { xyz } { /XYZ ~ @xpos ~ @ypos ~ null }
1694         { fit } { /Fit }
1695         { fitb } { /FitB }
1696         { fitbh } { /FitBH }
1697         { fitbv } { /FitBV ~ @xpos }
1698         { fith } { /FitH ~ @ypos }
1699         { fitv } { /FitV ~ @xpos }
1700         { fitr } { /Fit }
1701       }
1702       { /XYZ ~ @xpos ~ @ypos ~ \fp_eval:n { (#2) / 100 } }
1703     ]
1704   }
1705 }

```

The second destination command is for the boxed destination. Here we need to define an new auxiliary command:

```

1706 \cs_new_protected:Npn \__pdf_backend_indexed_structure_destination_aux:nnnn #1#2#3#4
1707 {
1708   \vbox_to_zero:n
1709   {
1710     \__kernel_kern:n {#4}
1711     \hbox:n
1712     {
1713       \__pdf_backend:n { obj ~ @pdf_ #2 _llx ~ @xpos }
1714       \__pdf_backend:n { obj ~ @pdf_ #2 _lly ~ @ypos }
1715     }
1716     \tex_vss:D
1717   }
1718   \__kernel_kern:n {#1}
1719   \vbox_to_zero:n
1720   {
1721     \__kernel_kern:n { -#3 }
1722     \hbox:n
1723     {
1724       \__pdf_backend:n
1725       {
1726         dest ~ (#2)
1727         [
1728           @thispage
1729           /FitR ~
1730           @pdf_ #2 _llx ~ @pdf_ #2 _lly ~
1731           @xpos ~ @ypos
1732         ]
1733       }

```

Here we add the structure destination to the same box

```

1734       \__pdf_backend:e
1735       {
1736         obj ~ @pdf.SDest.\exp_not:n{#2}
1737         [
1738           \exp_after:wN \pdf_object_ref_indexed:nm \l_pdf_current_structure_destin
1739           /FitR ~
1740           @pdf_ #2 _llx ~ @pdf_ #2 _lly ~
1741           @xpos ~ @ypos
1742         ]
1743       }
1744     }
1745     \tex_vss:D
1746   }
1747   \__kernel_kern:n { -#1 }
1748 }

```

And now we redefine the destination command:

```

1749 \cs_set_protected:Npn \__pdf_backend_indexed_structure_destination:nnnn #1#2#3#4
1750 {
1751   \exp_args:Ne \__pdf_backend_indexed_structure_destination_aux:nnnn
1752   { \dim_eval:n {#2} } {#1} {#3} {#4}
1753 }
1754 </xdvipdfmx | dvipdfmx>

```

Now pdftex. We only redefine for version 1.40 revision 24 or later.

```

1755 <*pdftex>
1756 \bool_lazy_and:nnT
1757 { \int_compare_p:nNn {\tex_pdftexversion:D } > {139} }
1758 { \int_compare_p:nNn {\tex_pdftexrevision:D } > {23} }
1759 {
1760   \cs_set_protected:Npn \__pdf_backend_indexed_structure_destination:nn #1#2
1761   {
1762     \tex_pdfdest:D
1763     name {#1}
1764     \str_case:nnF {#2}
1765     {
1766       { xyz } { xyz }
1767       { fit } { fit }
1768       { fitb } { fitb }
1769       { fitbh } { fitbh }
1770       { fitbv } { fitbv }
1771       { fith } { fith }
1772       { fitv } { fitv }
1773       { fitr } { fitr }
1774     }
1775     { xyz ~ zoom \fp_eval:n { #2 * 10 } }
1776     \scan_stop:
1777     \tex_pdfdest:D
1778     struct~
1779     \exp_after:wN \__kernel_pdf_object_id_indexed:nn \l_pdf_current_structure_des
1780     name {#1}
1781     \str_case:nnF {#2}
1782     {
1783       { xyz } { xyz }
1784       { fit } { fit }
1785       { fitb } { fitb }
1786       { fitbh } { fitbh }
1787       { fitbv } { fitbv }
1788       { fith } { fith }
1789       { fitv } { fitv }
1790       { fitr } { fitr }
1791     }
1792     { xyz ~ zoom \fp_eval:n { #2 * 10 } }
1793     \scan_stop:
1794   }
1795   \cs_set_protected:Npn \__pdf_backend_indexed_structure_destination:nnnn #1#2#3#4
1796   {
1797     \tex_pdfdest:D
1798     name {#1}
1799     fitr ~
1800     width \dim_eval:n {#2} ~
1801     height \dim_eval:n {#3} ~
1802     depth \dim_eval:n {#4} \scan_stop:
1803     \tex_pdfdest:D
1804     struct~
1805     \exp_after:wN \__kernel_pdf_object_id_indexed:nn \l_pdf_current_structure_destinati
1806     name {#1}
1807     fitr ~

```

```

1808     width \dim_eval:n {#2} ~
1809     height \dim_eval:n {#3} ~
1810     depth \dim_eval:n {#4} \scan_stop:
1811   }
1812 }
1813 </pdfTeX>

```

luatex is quite similar to pdfTeX. Mostly the test for the version is different

```

1814 <*luatex>
1815 \int_compare:nNtT {\directlua{tex.print(status.list()["development_id"])} } > {7468}
1816 {
1817   \cs_set_protected:Npn \__pdf_backend_indexed_structure_destination:nn #1#2
1818   {
1819     \tex_pdfextension:D dest
1820     name {#1}
1821     \str_case:nnF {#2}
1822     {
1823       { xyz } { xyz }
1824       { fit } { fit }
1825       { fitb } { fitb }
1826       { fitbh } { fitbh }
1827       { fitbv } { fitbv }
1828       { fith } { fith }
1829       { fitv } { fitv }
1830       { fitr } { fitr }
1831     }
1832     { xyz ~ zoom \fp_eval:n { #2 * 10 } }
1833     \scan_stop:
1834     \tex_pdfextension:D dest
1835     struct~
1836     \exp_after:wN \__kernel_pdf_object_id_indexed:nn \l_pdf_current_structure_desti
1837     name {#1}
1838     \str_case:nnF {#2}
1839     {
1840       { xyz } { xyz }
1841       { fit } { fit }
1842       { fitb } { fitb }
1843       { fitbh } { fitbh }
1844       { fitbv } { fitbv }
1845       { fith } { fith }
1846       { fitv } { fitv }
1847       { fitr } { fitr }
1848     }
1849     { xyz ~ zoom \fp_eval:n { #2 * 10 } }
1850     \scan_stop:
1851   }
1852   \cs_set_protected:Npn \__pdf_backend_indexed_structure_destination:nnnn #1#2#3#4
1853   {
1854     \tex_pdfextension:D dest
1855     name {#1}
1856     fitr ~
1857     width \dim_eval:n {#2} ~
1858     height \dim_eval:n {#3} ~
1859     depth \dim_eval:n {#4} \scan_stop:
1860     \tex_pdfextension:D dest

```



```

1861     struct~
1862     \exp_after:wN \__kernel_pdf_object_id_indexed:nn \l_pdf_current_structure_destinati
1863     name {#1}
1864     fitr ~
1865     width \dim_eval:n {#2} ~
1866     height \dim_eval:n {#3} ~
1867     depth \dim_eval:n {#4} \scan_stop:
1868   }
1869   \cs_set_protected:Npn \__pdf_backend_link_begin_structure_goto:nnw #1#2
1870   {
1871     \__pdf_backend_link_begin:nnnw {#1} { goto~struct~name~{#2}~name } {#2}
1872   }
1873 }
1874 \</luatex>

```

(End of definition for `__pdf_backend_indexed_structure_destination:nn` and `__pdf_backend_indexed_structure_destination:nnnn`.)

1.12 Settings for regression tests

When doing pdf based regression tests some meta data in the pdf should have fixed values to get identical pdf's. We define here the backend dependent part. The main command is then in `l3pdfmeta`

```

1875 <*drivers>
1876 \cs_new_protected:Npn \__pdf_backend_set_regression_data:
1877 {
1878   \sys_gset_rand_seed:n{1000}
1879   \pdfmanagement_add:nnn{Info}{Creator}{(TeX)}
1880 </drivers>
1881 <*dvips>
1882   \AddToHook{begindocument}{\pdfmanagement_add:nnn{Info}{Producer}{(pdfTeX+dvips)}}
1883   \__kernel_backend_literal:e{!~<</DocumentUUID~(DocumentUUID)>>~setpagedevice}
1884   \__kernel_backend_literal:e{!~<</InstanceUUID~(InstanceUUID)>>~setpagedevice}
1885   \str_if_exist:NTF\c_sys_timestamp_str
1886   {
1887     \pdfmanagement_add:nne{Info}{CreationDate}{(\c_sys_timestamp_str)}
1888     \pdfmanagement_add:nne{Info}{ModDate}{(\c_sys_timestamp_str)}
1889   }
1890   {
1891     \pdfmanagement_add:nnn{Info}{CreationDate}{(D:20010101205959-00'00')}
1892     \pdfmanagement_add:nnn{Info}{ModDate}{(D:20010101205959-00'00')}
1893   }
1894 </dvips>
1895 <*dviPDFMx>
1896   \pdfmanagement_add:nnn{Info}{Producer}{(dviPDFMx)}
1897   \__kernel_backend_literal:e
1898   {pdf:trailerid [~
1899     <00112233445566778899aabbccddeeff>~
1900     <00112233445566778899aabbccddeeff>~
1901   ]}
1902 </dviPDFMx>
1903 <*xdviPDFMx>
1904   \pdfmanagement_add:nnn{Info}{Producer}{(xetex)}
1905   \__kernel_backend_literal:e

```

```

1906     {pdf:trailerid [~
1907     <00112233445566778899aabbccddeeff>~
1908     <00112233445566778899aabbccddeeff>~
1909     ]}
1910 </xdvipdfmx>
1911 <*pdftex>
1912   \pdfmanagement_add:nnn{Info}{Producer}{(pdfTeX)}
1913   \tex_pdfsuppressptexinfo:D 7 \scan_stop:
1914   \pdftrailerid{2350CAD05F8A7AF0AA4058486855344F}
1915 </pdftex>
1916 <*luatex>
1917   \pdfmanagement_add:nnn{Info}{Producer}{(LuaTeX)}
1918   \tex_pdfvariable:D suppressoptionalinfo 7\relax
1919   \tex_pdfvariable:D trailerid
1920   {[~
1921     <2350CAD05F8A7AF0AA4058486855344F>~
1922     <2350CAD05F8A7AF0AA4058486855344F>~
1923   ]}
1924 </luatex>
1925 <*drivers>
1926   \str_if_exist:NF\c_sys_timestamp_str
1927   {
1928     \pdfmanagement_add:nnn{Info}{CreationDate}{(D:20010101205959-00'00')}
1929     \pdfmanagement_add:nnn{Info}{ModDate}{(D:20010101205959-00'00')}
1930     \AddToDocumentProperties[document]{creationdate}{D:20010101205959-00'00'}
1931     \AddToDocumentProperties[document]{moddate}{D:20010101205959-00'00'}
1932     \AddToDocumentProperties[hyperref]{pdfmetadate}{D:20010101205959-00'00'}
1933     \AddToDocumentProperties[hyperref]{pdfdate}{D:20010101205959-00'00'}
1934   }
1935   \AddToDocumentProperties[hyperref]{pdfinstanceid}{uuid:0a57c455-157a-4141-8c19-6237d832f
1936   \AddToDocumentProperties[hyperref]{pdfproducer}{\c_sys_engine_exec_str-NN.NN.NN}
1937   }
1938 </drivers>

```

1.13 Uncompressed metadata object stream

The xmp metadata should be written “uncompressed” to pdf. It is not quite clear what exactly that means. Probably it only means that there should be no `/Filter` key in the stream, but packages like `pdfx` and `hyperref` try to suppress object compression too, so we add support for it too. With `luatex` this is possible by using the `uncompressed` key word. With `pdftex` one can change locally the `compresslevel`. (x)dvipdfmx does it automatically and doesn't need some special command. No solution is known for the dvips route. We need it only once, so we make it special and probably no public interface is needed. It writes an unnamed object so should be referenced directly with `\pdf_object_ref_last`:

```

1939 <*luatex>
1940 \cs_new_protected:Npn \__pdf_backend_metadata_stream:n #1
1941 {
1942   \tex_immediate:D \tex_pdfextension:D obj ~uncompressed~
1943   \__pdf_backend_object_write:nn {stream} {{/Type~/Metadata~/Subtype~/XML}{#1}}
1944 }
1945 </luatex>
1946 <*pdftex>
1947 \cs_new_protected:Npn \__pdf_backend_metadata_stream:n #1

```

```

1948 {
1949   \group_begin:
1950   \tex_pdfcompresslevel:D 0 \scan_stop:
1951   \tex_immediate:D \tex_pdfobj:D
1952   \__pdf_backend_object_write:nn {stream} {{/Type~/Metadata~/Subtype~/XML}{#1}}
1953   \group_end:
1954 }
1955 </pdftex>
1956 <*xdvipdfmx | dvipdfmx | dvips | dvisvgm>
1957 \cs_new_protected:Npn \__pdf_backend_metadata_stream:n #1
1958 {
1959   \pdf_object_unnamed_write:nn {stream}{{/Type~/Metadata~/Subtype~/XML}{#1}}
1960 }
1961 </xdvipdfmx | dvipdfmx | dvips | dvisvgm>

```

1.14 Suppressing deprecated PDF features

/ProcSet, /CharSet and the /Info dictionary are deprecated in PDF 2.0. For the pdf/A-4 standard they must be suppressed. Not every engine is able to do this, but for pdfTeX and luatex we define suitable backend command. /ProcSet is suppressed automatically for pdf version 2.0 starting with in texlive 2023.

`__pdf_backend_omit_charset:n` The option to omit /CharSet exists already for quite some time for the two engines.

```

1962 <*xdvipdfmx | dvipdfmx | dvips | dvisvgm>
1963 \cs_new_protected:Npn \__pdf_backend_omit_charset:n #1 {} %#1 number
1964 </xdvipdfmx | dvipdfmx | dvips | dvisvgm>
1965 <*pdftex>
1966 \cs_new_protected:Npn \__pdf_backend_omit_charset:n #1 %#1 number
1967 {
1968   \tex_pdfomitcharset:D = #1 \scan_stop:
1969 }
1970 </pdftex>
1971 <*luatex>
1972 \cs_new_protected:Npn \__pdf_backend_omit_charset:n #1 %#1 number
1973 {
1974   \tex_pdfvariable:D omitcharset = #1 \scan_stop:
1975 }
1976 </luatex>

```

(End of definition for __pdf_backend_omit_charset:n.)

`__pdf_backend_omit_info:n` The option to suppress the info dictionary will be available in texlive 2023.

```

1977 <*xdvipdfmx | dvipdfmx | dvips | dvisvgm>
1978 \cs_new_protected:Npn \__pdf_backend_omit_info:n #1 {} %#1 number
1979 </xdvipdfmx | dvipdfmx | dvips | dvisvgm>
1980 <*pdftex>
1981 \bool_lazy_and:nnTF
1982 { \int_compare_p:nNn {\tex_pdfversion:D } > {139} }
1983 { \int_compare_p:nNn {\tex_pdfrevision:D } > {24} }
1984 {
1985   \cs_new_protected:Npn \__pdf_backend_omit_info:n #1 %#1 number
1986   {
1987     \pdfomitinfodict = #1 \scan_stop:
1988   }

```

```

1989 }
1990 {
1991   \cs_new_protected:Npn \__pdf_backend_omit_info:n #1 {}%#1 number
1992 }
1993 }
1994 </pdftex>
1995 <*luatex>
1996 \int_compare:nNnTF {\directlua{tex.print(status.list()["development_id"])} } > {7560}
1997 {
1998   \cs_new_protected:Npn \__pdf_backend_omit_info:n #1 %#1 number
1999   {
2000     \tex_pdfvariable:D omitinfodict = #1 \scan_stop:
2001   }
2002 }
2003 {
2004   \cs_new_protected:Npn \__pdf_backend_omit_info:n #1 {} %#1 number
2005 }
2006 </luatex>

```

(End of definition for __pdf_backend_omit_info:n.)

With luatex it is for some standards also necessary to suppress the CidSet entry in the fonts (with xetex there seem to be no problem.

__pdf_backend_omit_cidset:n The option to omit /CharSet exists already for quite some time for the two engines.

```

2007 <*xdvipdfmx | dvipdfmx | dvips | dvisvgm | pdftex>
2008 \cs_new_protected:Npn \__pdf_backend_omit_cidset:n #1 {} %#1 number
2009 </xdvipdfmx | dvipdfmx | dvips | dvisvgm | pdftex>
2010 <*luatex>
2011 \cs_new_protected:Npn \__pdf_backend_omit_cidset:n #1 %#1 number
2012 {
2013   \tex_pdfvariable:D omitcidset = #1 \scan_stop:
2014 }
2015 </luatex>

```

(End of definition for __pdf_backend_omit_cidset:n.)

1.15 lua code for lualatex

```

2016 <*lua>
2017 ltx= ltx or {}
2018 ltx.__pdf = ltx.__pdf or {}
2019 ltx.__pdf.Page = ltx.__pdf.Page or {}
2020 ltx.__pdf.Page.dflt = ltx.__pdf.Page.dflt or {}
2021 ltx.__pdf.Page.Resources = ltx.__pdf.Resources or {}
2022 ltx.__pdf.Page.Resources.Properties = ltx.__pdf.Page.Resources.Properties or {}
2023 ltx.__pdf.Page.Resources.List={"ExtGState","ColorSpace","Pattern","Shading"}
2024 ltx.__pdf.object = ltx.__pdf.object or {}
2025
2026 ltx.pdf= ltx.pdf or {} -- for "public" functions
2027
2028 local __pdf = ltx.__pdf
2029 local pdf = pdf
2030
2031 local function __pdf_backend_Page_gput (name,value)
2032   __pdf.Page.dflt[name]=value

```

```

2033 end
2034
2035 local function __pdf_backend_Page_gremove (name)
2036 __pdf.Page.dflt[name]=nil
2037 end
2038
2039 local function __pdf_backend_Page_gclear ()
2040 __pdf.Page.dflt={}
2041 end
2042
2043 local function __pdf_backend_ThisPage_gput (page,name,value)
2044 __pdf.Page[page] = __pdf.Page[page] or {}
2045 __pdf.Page[page][name]=value
2046 end
2047
2048 local function __pdf_backend_ThisPage_gpush (page)
2049 local token=""
2050 local t = {}
2051 local tkeys= {}
2052 for name,value in pairs(__pdf.Page.dflt) do
2053 t[name]=value
2054 end
2055 if __pdf.Page[page] then
2056 for name,value in pairs(__pdf.Page[page]) do
2057 t[name] = value
2058 end
2059 end
2060 -- sort the table to get reliable test files.
2061 for name,value in pairs(t) do
2062 table.insert(tkeys,name)
2063 end
2064 table.sort(tkeys)
2065 for _,name in ipairs(tkeys) do
2066 token = token .. "/"..name.." "..t[name]
2067 end
2068 return token
2069 end
2070
2071 function ltx.__pdf.backend_ThisPage_gput (page,name,value) -- tex.count["g_shipout_readonly_
2072 __pdf_backend_ThisPage_gput (page,name,value)
2073 end
2074
2075 function ltx.__pdf.backend_ThisPage_gpush (page)
2076 pdf.setpageattributes(__pdf_backend_ThisPage_gpush (page))
2077 end
2078
2079 function ltx.__pdf.backend_Page_gput (name,value)
2080 __pdf_backend_Page_gput (name,value)
2081 end
2082
2083 function ltx.__pdf.backend_Page_gremove (name)
2084 __pdf_backend_Page_gremove (name)
2085 end
2086

```

```

2087 function ltx.__pdf.backend_Page_gclear ()
2088   __pdf_backend_Page_gclear ()
2089 end
2090
2091
2092 local Properties = ltx.__pdf.Page.Resources.Properties
2093 local ResourceList= ltx.__pdf.Page.Resources.List
2094 local function __pdf_backend_PageResources_gpush (page)
2095   local token=""
2096   if Properties[page] then
2097     -- we sort the table, so that the pdf test works
2098     local t = {}
2099     for name,value in pairs (Properties[page]) do
2100       table.insert (t,name)
2101     end
2102     table.sort (t)
2103     for _,name in ipairs(t) do
2104       token = token .. "/"..name.." ".. Properties[page][name]
2105     end
2106     token = "/Properties <<"..token..">>"
2107   end
2108   for i,name in ipairs(ResourceList) do
2109     if ltx.__pdf.Page.Resources[name] then
2110       token = token .. "/"..name.." "..ltx.pdf.object_ref("__pdf/Page/Resources/"..name)
2111     end
2112   end
2113   return token
2114 end
2115
2116 -- the function is public, as I probably need it in tagpdf too ...
2117 function ltx.pdf.Page_Resources_Properties_gput (page,name,value) -- tex.count["g_shipout_re
2118   Properties[page] = Properties[page] or {}
2119   Properties[page][name]=value
2120   pdf.setpageresources(__pdf_backend_PageResources_gpush (page))
2121 end
2122
2123 function ltx.pdf.Page_Resources_gpush(page)
2124   pdf.setpageresources(__pdf_backend_PageResources_gpush (page))
2125 end
2126
2127 function ltx.pdf.object_ref (objname)
2128   if ltx.__pdf.object[objname] then
2129     local ref= ltx.__pdf.object[objname]
2130     return ref
2131   else
2132     return "false"
2133   end
2134 end
2135 </lua>

```

Index

The italic numbers denote the pages where the corresponding entry is described, numbers underlined point to the definition, all others indicate the places where it is used.

A	
<code>\AddToDocumentProperties</code>	1167, 1247, 1264, 1265, 1272, 1366, 1403, 1409, 1468, 1706, 1876, 1940, 1947, 1957, 1963, 1966, 1972, 1978, 1985, 1991, 1998, 2004, 2008, 2011
<code>\AddToHook</code>	1882
B	
bool commands:	
<code>\bool_if:NTF</code> 39, 538, 571, 652, 658, 694, 718, 753, 759, 785, 815, 855, 860	
<code>\bool_lazy_and:nnTF</code> . 1525, 1756, 1981	
<code>\bool_new:N</code>	524
<code>\bool_set_true:N</code> 1005, 1087, 1180, 1281	
box commands:	
<code>\box_dp:N</code> . 1018, 1099, 1191, 1294, 1308	
<code>\box_ht:N</code> . 1015, 1096, 1188, 1291, 1303	
<code>\box_new:N</code>	88, 89, 1177
<code>\box_scale:Nnn</code>	1312
<code>\box_set_dp:Nn</code> 1192, 1258, 1355, 1379	
<code>\box_set_ht:Nn</code> 1193, 1257, 1356, 1378	
<code>\box_set_wd:Nn</code> 1194, 1256, 1357, 1377	
<code>\box_use:N</code>	1361
<code>\box_use_drop:N</code> 1205, 1259, 1336, 1380	
<code>\box_wd:N</code> . 1012, 1093, 1185, 1288, 1298	
C	
clist commands:	
<code>\clist_const:Nn</code>	420
<code>\clist_map_function:NN</code>	898
<code>\clist_map_inline:Nn</code> 429, 463, 479, 674	
cs commands:	
<code>\cs_generate_variant:Nn</code>	28, 31, 32, 35, 36, 79, 80, 417
<code>\cs_gset_eq:NN</code>	653, 654, 754, 755, 856, 857, 1405, 1406, 1407, 1411, 1412, 1413
<code>\cs_if_exist:NTF</code>	432, 961
<code>\cs_new:Npn</code>	74, 100, 106, 248, 874, 1071, 1153, 1242, 1266, 1382
<code>\cs_new_protected:Npn</code> 41, 45, 55, 68, 150, 159, 175, 181, 187, 194, 201, 210, 230, 253, 263, 277, 289, 306, 317, 324, 331, 340, 349, 356, 363, 370, 379, 388, 396, 399, 405, 410, 413, 444, 455, 461, 487, 491, 503, 506, 507, 511, 514, 515, 519, 540, 563, 584, 672, 773, 883, 907, 914, 921, 930, 934, 937, 940, 952, 957, 958, 997, 1064, 1079, 1144,	
<code>\cs_new_protected:Npx</code>	169
<code>\cs_set_eq:NN</code>	664, 765, 866, 1417, 1418, 1419, 1420, 1421
<code>\cs_set_protected:Npn</code>	533, 547, 551, 555, 559, 569, 573, 576, 578, 580, 582, 595, 614, 633, 639, 645, 650, 660, 666, 689, 713, 737, 741, 746, 751, 761, 768, 778, 808, 839, 843, 848, 853, 862, 869, 963, 967, 976, 980, 987, 991, 1424, 1514, 1519, 1529, 1568, 1589, 1598, 1637, 1658, 1665, 1749, 1760, 1795, 1817, 1852, 1869
D	
dim commands:	
<code>\dim_eval:n</code>	1517, 1573, 1574, 1575, 1584, 1585, 1586, 1642, 1643, 1644, 1653, 1654, 1655, 1752, 1800, 1801, 1802, 1808, 1809, 1810, 1857, 1858, 1859, 1865, 1866, 1867
<code>\dim_to_decimal_in_sp:n</code>	1298, 1303, 1308
<code>\c_zero_dim</code>	1192, 1193, 1194, 1355, 1356, 1357
<code>\directlua</code>	97, 1596, 1815, 1996
E	
exp commands:	
<code>\exp_after:wN</code>	1690, 1738, 1779, 1805, 1836, 1862
<code>\exp_args:Ne</code> . 702, 726, 1445, 1451, 1496, 1502, 1516, 1546, 1551, 1576, 1581, 1615, 1620, 1645, 1650, 1751	
<code>\exp_args:NNe</code>	885
<code>\exp_not:n</code>	619, 717, 812, 1428, 1449, 1500, 1669, 1688, 1736
F	
fp commands:	
<code>\fp_eval:n</code>	1442, 1463, 1544, 1564, 1613, 1633, 1683, 1702, 1775, 1792, 1832, 1849

G

group commands:

- `\group_begin:` 1949
- `\group_end:` 1953

H

hbox commands:

- `\hbox:n` 1473, 1484, 1711, 1722
- `\hbox_gset:Nn` 1178
- `\hbox_set:Nn`
 - .. 1003, 1085, 1249, 1279, 1313, 1368

hook commands:

- `\hook_gput_code:nnn` .. 142, 482, 1358
- `\hook_gput_next_code:nn` 1195
- `\hook_gset_rule:nnnn` 476, 477

I

int commands:

- `\int_compare:nNnTF`
 - ... 974, 1026, 1107, 1596, 1815, 1996
- `\int_compare_p:nNn`
 - .. 1526, 1527, 1757, 1758, 1982, 1983
- `\int_const:Nn` . 1059, 1139, 1174, 1275
- `\int_gincr:N` 213, 597, 616,
 - 691, 715, 780, 784, 810, 814, 1173, 1274
- `\int_if_exist:NTF` 1392
- `\int_new:N` 92, 93, 94
- `\int_use:N` 214, 217,
 - 600, 608, 619, 627, 693, 698, 707,
 - 717, 722, 731, 782, 789, 793, 796,
 - 804, 812, 819, 823, 826, 834, 1067,
 - 1073, 1146, 1154, 1244, 1322, 1349,
 - 1373, 1384, 1550, 1580, 1619, 1649

K

kernel internal commands:

- `__kernel_backend_literal:n`
 - .. 31, 83, 598, 602, 617, 621, 635,
 - 647, 668, 678, 1883, 1884, 1897, 1905
- `__kernel_backend_literal_page:n`
 - 28, 692, 716,
 - 739, 748, 770, 781, 811, 841, 850, 871
- `__kernel_backend_postscript:n` ..
 - 35, 1315, 1337, 1343, 1370
- `__kernel_backend_shipout_-literal:n`
 - 39, 41, 542, 662
- `__kernel_backend_shipout_-literal_page:n`
 - ... 55, 55, 763, 864
- `__kernel_backend_shipout_-literal_pdf:n` 45, 45
- `__kernel_kern:n` 1472, 1480,
 - 1483, 1512, 1710, 1718, 1721, 1747
- `__kernel_pdf_name_from_unicode_-e:n` 100, 106

L

latelua commands:

- `\latelua:` 207, 286, 337, 376

M

mode commands:

- `\mode_leave_vertical:` ... 1197, 1360

P

pdf commands:

- `\pdf_activate_indexed_structure_-destination:` 1402, 1409
- `\pdf_activate_structure_destination:`
 - 1402, 1403
- `\l_pdf_current_structure_-destination_tl` 1399,
 - 1445, 1451, 1496, 1502, 1546, 1551,
 - 1576, 1581, 1615, 1620, 1645, 1650,
 - 1690, 1738, 1779, 1805, 1836, 1862
- `\pdf_object_if_exist:nTF`
 - .. 1445, 1496, 1546, 1576, 1615, 1645
- `\pdf_object_new:n` 431, 481
- `\pdf_object_ref:n`
 - 438, 499, 549, 609, 681,
 - 699, 708, 790, 805, 879, 1040, 1045,
 - 1050, 1055, 1120, 1125, 1130, 1135,
 - 1211, 1218, 1225, 1233, 1451, 1502
- `\pdf_object_ref_indexed:nn` 1690, 1738
- `\pdf_object_ref_last:` . 910, 917, 924
- `\pdf_object_unnamed_write:nn` ...
 - ... 641, 743, 845, 909, 916, 923, 1959
- `\pdf_object_write` 496
- `\pdf_object_write:nnn` 468, 485

pdf internal commands:

- `__pdf_backend:n` 32, 177,
 - 489, 497, 924, 989, 993, 1198, 1206,
 - 1207, 1214, 1221, 1228, 1236, 1251,
 - 1426, 1447, 1475, 1476, 1486, 1498,
 - 1667, 1686, 1713, 1714, 1724, 1734
- `__pdf_backend_bdc:nn` 13,
 - 521, 533, 569, 650, 653, 654, 655,
 - 751, 754, 755, 756, 853, 856, 857, 858

N

__kernel_pdf_object_id_indexed:nn 1779, 1805, 1836, 1862

N

__kernel_pdfdict_name:n

- 232, 233, 235,
- 466, 494, 676, 877, 888, 893, 1006,
- 1027, 1038, 1043, 1048, 1053, 1088,
- 1108, 1118, 1123, 1128, 1133, 1282

O

__kernel_pdfmanagement_end_-run_code_tl 115, 122, 129

O

__kernel_pdfmanagement_-thispage_shipout_code_tl 138, 144

__pdf_backend_bdc_contobj:nn . . .	__pdf_backend_NamesEmbeddedFiles_-
. 639, 653, 741, 754, 843, 856	add:nn 936, 937, 940, 952
__pdf_backend_bdc_contstream:nn	\g__pdf_backend_object_int
. 645, 654, 746, 755, 848, 857 1173, 1176, 1274, 1277, 1322
__pdf_backend_bdc_shipout:nn . . .	__pdf_backend_object_last:
. 540, 664, 765, 866 553, 628, 723, 732, 820, 835
__pdf_backend_bdc_shipout_-	__pdf_backend_object_write:nn . . .
contstream:nn 1943, 1952
. 660, 664, 761, 765, 862, 866	__pdf_backend_omit_charset:n
__pdf_backend_bdcobject:n 1962, 1963, 1966, 1972
. 13, 521,	__pdf_backend_omit_cidset:n
551, 578, 614, 642, 713, 744, 808, 846 2007, 2008, 2011
__pdf_backend_bdcobject:nn	__pdf_backend_omit_info:n
. 13, 521, 547, 576, 595, 689, 778 1977, 1978, 1985, 1991, 1998, 2004
__pdf_backend_bmc:n	__pdf_backend_Page_gput:nn
. 13, 521, 559, 582, 633, 737, 839 6, 184, 194, 263, 324, 363, 399
__pdf_backend_catalog_gput:nn . . . 20	__pdf_backend_Page_gremove:n
__pdf_backend_destination:nn 6, 184, 201, 277, 331, 370, 405
. 1405, 1411, 1417, 1420	\g__pdf_backend_page_int 91
__pdf_backend_destination:n	__pdf_backend_Page_primitive:n
. 1406, 1412, 1418, 1421 6, 184, 187, 240, 253,
__pdf_backend_emc:	317, 342, 351, 356, 381, 390, 396, 417
. 13, 521, 555, 580, 666, 768, 869	__pdf_backend_PageResources:n
__pdf_backend_indexed_structure_- 487, 506, 514
destination:nn	\c__pdf_backend_PageResources_-
. 1411, 1420, 1664, 1665, 1760, 1817	clist 419, 429, 463, 479, 674, 899
__pdf_backend_indexed_structure_-	__pdf_backend_PageResources_-
destination:n	gpush:n
. 1412, 1421, 1664, 1749, 1795, 1852 13, 521, 563, 584, 672, 773, 883
__pdf_backend_indexed_structure_-	__pdf_backend_PageResources_-
destination_aux:n 1706, 1751	gpush_aux:n 874, 900
__pdf_backend_link_begin:n . . . 1521	__pdf_backend_PageResources_-
__pdf_backend_link_begin:nnw	gput:nn 428, 444, 455, 491, 507, 515
. 1591, 1660, 1871	__pdf_backend_PageResources_-
__pdf_backend_link_begin_-	obj_gpush: 428, 461, 503, 511, 519
goto:nnw 1407, 1413, 1419	__pdf_backend_Pages_primitive:n
__pdf_backend_link_begin_- 149, 150, 159, 169, 175, 181
structure_goto:nnw 1407, 1413,	__pdf_backend_pdfmark:n
1419, 1423, 1519, 1589, 1658, 1869 36, 535, 549, 553, 557, 561, 942
__pdf_backend_link_off:	__pdf_backend_record_abspage:n
. 957, 963, 976, 987 68, 79, 214, 793, 823
__pdf_backend_link_on:	__pdf_backend_ref_abspage:n
. 958, 967, 980, 991 74, 80, 217, 796, 826
__pdf_backend_luastring:n	\g__pdf_backend_resourceid_int
. 163, 248, 257, 269, 270, 281, 296, 297 91, 213, 214, 217, 784, 789,
__pdf_backend_metadata_stream:n	793, 796, 804, 814, 819, 823, 826, 834
. 1940, 1947, 1957	__pdf_backend_set_regression_-
\g__pdf_backend_name_int	data: 1876
. 91, 597, 600, 608,	__pdf_backend_shipout_bdc:nn
616, 619, 627, 691, 693, 698, 707, 13, 521, 573
715, 717, 722, 731, 780, 782, 810, 812	__pdf_backend_structure_-
__pdf_backend_Names_gpush:nn	destination:nn
. 907, 914, 921, 930, 934 1405, 1417, 1423, 1424, 1529, 1598

__pdf_backend_structure_- destination:nnnn	1406, 1418, 1423, 1514, 1568, 1637	pdfmanagement commands: \pdfmanagement_add:nnn	1879, 1882, 1887, 1888, 1891, 1892, 1896, 1904, 1912, 1917, 1928, 1929
__pdf_backend_structure_- destination_aux:nnnn	1468, 1516	pdfmanagement internal commands: \g__pdfmanagement_active_bool	652, 753, 855
__pdf_backend_ThisPage_gpush:n	6, 184, 230, 306, 349, 388, 413	\l__pdfmanagement_delayed_- shipout_bool	39, 538, 571, 658, 759, 860
__pdf_backend_ThisPage_gput:nn	6, 184, 210, 289, 340, 379, 410	\pdfnames	20
\g__pdf_backend_thispage_- shipout_tl	6	\pdfomitinfodict	1987
\l__pdf_backend_tmpa_box	85, 1003, 1012, 1015, 1018, 1058, 1085, 1093, 1096, 1099, 1138, 1249, 1256, 1257, 1258, 1259, 1279, 1288, 1291, 1294, 1298, 1303, 1308, 1312, 1336, 1368, 1377, 1378, 1379, 1380	\pdfpageref	3
\l__pdf_backend_tmpb_box	89, 1313, 1355, 1356, 1357, 1361	\pdfrunninglinkoff	961, 965
\l__pdf_backend_xform_bool	524, 694, 718, 785, 815, 1005, 1087, 1180, 1281	\pdfrunninglinkon	969
__pdf_backend_xform_if_exist:n	1390, 1396	\pdftrailerid	1914
__pdf_backend_xform_new:nnnn	996, 997, 1079, 1167, 1264, 1272	pdfxform commands: \pdfxform_dp:n	1203, 1258, 1379
__pdf_backend_xform_ref:n	996, 1071, 1153, 1200, 1242, 1253, 1266, 1382	\pdfxform_ht:n	1202, 1257, 1378
\l__pdf_backend_xform_tmpdp_tl	1270, 1306, 1320, 1327	\pdfxform_if_exist:n	1396
\l__pdf_backend_xform_tmpht_tl	1271, 1301, 1325	\pdfxform_wd:n	1201, 1256, 1377
\l__pdf_backend_xform_tmpwd_tl	1269, 1296, 1326	prg commands: \prg_new_conditional:Npnn	1390
__pdf_backend_xform_use:n	996, 1064, 1144, 1247, 1265, 1366	\prg_new_eq_conditional:NNn	1396
\g__pdf_tmpa_prop	85, 232, 237, 242	\prg_return_false:	1394
\l__pdf_tmpa_tl	85, 215, 219, 221, 224, 794, 798, 800, 803, 824, 828, 830, 833, 836	\prg_return_true:	1393
pdfdict commands: \pdfdict_gput:nnn	196, 224, 326, 365, 401, 446, 457, 509, 517, 696, 720, 787, 802, 817, 832	prop commands: \prop_count:N	1027, 1108
\pdfdict_gremove:nn	203, 333, 372, 407	\prop_gclear:N	1006, 1088, 1282
\pdfdict_if_exist:nTF	219, 798, 828	\prop_gput:Nnn	237, 494
\pdfdict_item:nn	242, 879, 894	\prop_gset_eq:NN	232
\pdfdict_new:n	221, 800, 830	\prop_if_empty:NTF	465, 676, 876, 1037, 1042, 1047, 1052, 1117, 1122, 1127, 1132
\pdfdict_show:n	836	\prop_if_exist:NTF	233, 887
\pdfdict_use:n	352, 391, 470, 1033, 1114	\prop_map_function:NN	242, 892
\pdfextension	978, 982	\prop_map_inline:Nn	235
\pdfliteral	2	\prop_new:N	86
		property commands: \property_record:nn	71
		\property_ref:nn	76
		\ProvidesExplFile	1
		R	
		\relax	135, 1918
		S	
		scan commands: \scan_stop:	1068, 1150, 1545, 1565, 1575, 1586, 1614, 1634, 1644, 1655, 1776, 1793, 1802, 1810, 1833, 1850, 1859, 1867, 1913, 1950, 1968, 1974, 1987, 2000, 2013
		\special	2

str commands:	
\str_case:nnTF	1431, 1452, 1533, 1553, 1602, 1622, 1672, 1691, 1764, 1781, 1821, 1838
\str_convert_pdfname:n	102, 495
\str_if_eq:nnTF	1330, 1341
\str_if_exist:NTF	1885, 1926
sys commands:	
\c_sys_engine_exec_str	1936
\sys_gset_rand_seed:n	1878
\sys_if_engine_luatex:TF	157
\c_sys_timestamp_str	1885, 1887, 1888, 1926
T	
T _E X and L ^A T _E X 2 _ε commands:	
\@bsphack	70
\@esphack	72
\@kernel@after@enddocument@afterlastpage	112, 113
\@kernel@after@shipout@background	133, 136
\@kernel@after@shipout@lastpage	119, 120, 126, 127
\@kernel@before@shipout@background	135
\g@addto@macro	135, 136
\special	2
tex commands:	
\tex_directlua:D	161, 265, 279, 432, 434
\tex_global:D	152, 189, 885
\tex_immediate:D	1020, 1101, 1942, 1951
\tex_latelua:D	255, 291, 308, 447, 448, 702, 726
\tex_luaescapestring:D	250
\tex_luatexversion:D	974
\tex_pdfcompresslevel:D	1950
\tex_pdfdest:D	1531, 1548, 1570, 1578, 1762, 1777, 1797, 1803
\tex_pdfextension:D	48, 58, 917, 1600, 1617, 1639, 1647, 1819, 1834, 1854, 1860, 1942
\tex_pdflastxform:D	1061, 1141
\tex_pdfliteral:D	51, 61
\tex_pdfnames:D	910
\tex_pdfobj:D	1951
\tex_pdfomitcharset:D	1968
\tex_pdfpageattr:D	189
\tex_pdfpageresources:D	885
\tex_pdfpagesattr:D	152
\tex_pdfrefxform:D	1066, 1146
\tex_pdfsuppressptexinfo:D	1913
\tex_pdftexrevision:D	1527, 1758, 1983
\tex_pdftexversion:D	1526, 1757, 1982
\tex_pdfvariable:D	1918, 1919, 1974, 2000, 2013
\tex_pdfxform:D	1020, 1101
\tex_special:D	42, 171, 319, 358
\tex_the:D	1012, 1015, 1018, 1093, 1096, 1099, 1185, 1188, 1191, 1288, 1291, 1294
\tex_unexpanded:D	250
\tex_vss:D	1478, 1510, 1716, 1745
text commands:	
\text_expand:n	102, 108
tl commands:	
\c_space_tl	600, 608, 619, 627, 693, 717, 782, 812, 1201, 1202, 1203, 1322
\tl_const:Nn	1010, 1013, 1016, 1091, 1094, 1097, 1183, 1186, 1189, 1286, 1289, 1292
\tl_gput_right:Nn	113, 120, 127
\tl_if_exist:NTF	133
\tl_new:N	87, 1269, 1270, 1271, 1400
\tl_set:Nn	215, 794, 824, 1296, 1301, 1306
\tl_to_str:n	1011, 1014, 1017, 1060, 1067, 1073, 1092, 1095, 1098, 1140, 1148, 1154, 1175, 1184, 1187, 1190, 1244, 1276, 1287, 1290, 1293, 1349, 1373, 1384, 1392, 1551, 1581, 1620, 1650
\tl_use:N	1320, 1325, 1326, 1327
V	
vbox commands:	
\vbox_to_zero:n	1470, 1481, 1708, 1719