Prototype reimplementation of LaTeX 2$_\varepsilon$'s block environments using templates

LaTeX Project*

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Abstract

Contents

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*Initial reimplementation of lists done by Bruno Le Floch, generalized second version with tagging support by Frank Mittelbach.

1 Introduction

The list implementation in LaTeX 2$_\varepsilon$ serves a dual purpose: it implements real lists such as `itemize` or `enumerate`, but it is also used as the basis for vertical blocks, i.e., to specify the vertical spacing and paragraph handling after such block, e.g., in environments like `center`, `quote`, `verbatim`, or in the theorem environments. They are all implemented as "trivial" lists with a single (hidden) item.

While this was convenient to get a consistent layout using a single implementation it is not adequate if it comes to interpreting the structure of a document, because environments based on `trivlist` should not advertise themselves as being a "list" — after all, from a semantic point of view they aren't lists.

The approach taking here is therefore to offer separate object types: *block* (horizontally or vertically oriented data that needs some handling at the start and the end), *para* (that deals with different paragraph layouts), *list* (that handles list related parameters, and *item* (for item layouts and handling), to address the independent aspects and also offer the object type *blockenv* that ties them together as necessary.

For example, a `quote` environment would make use of a (display) *block* and some *para* handling while an standard `enumerate` would make use of a display *block*, a *list*, and an *item* and *para* instance. An inline list (like `enumerate*` from the `enumitem` package) would be using the same *list* instance but a different (horizontally oriented) *block*.

2 Object types and templates for blocks and lists

2.1 Object types

2.1.1 The object type 'block'

Arg: 1 key/value list to alter the default block parameters

Semantics:

Handle the layout aspects of a block of data. In case of a "display" block (i.e., vertically oriented) the spacing and page breaking as well as the handling if the block starts a paragraph or ends one, that is, if text is immediately following the block without being separated by an empty line, then this text is considered to be in the same paragraph as the block.

In case of a horizontally oriented block it covers any special handling at the start and end of the block, e.g, extra spacing, prohibiting or encuraging line breaks, and so forth.

2.1.2 The object type 'para'

Arg: 1 key/value list to alter the default item parameters

Semantics:

Sets up paragraph-specific parameters for H&J, e.g., to implement justification variations, the behavior of \\ etc. The instances are used in higher-level templates, e.g., in a *block*.

2.1.3 The object type 'list'

Arg: 1 key/value list to alter the default item parameters

Semantics:

Handle the aspects related to list design, e.g., the use and formatting of counters, etc.

Note that this does not cover block-related aspects, i.e., a list instance could be used both for a display list or for an inline line.

2.1.4 The object type 'item'

Arg: 1 key/value list to alter the default item parameters

Semantics:

A sub-type used as part of *list* to easily cover alternative layout for list items.

2.1.5 The object type 'blockenv'

Arg: 1 key/value list to alter the default item parameters

Semantics:

This object type is used to implement document-level environments. It defines a *block* instance to handle the layout at the "edge" of the environment data, possibly some paragraph setup through a *para* instance, potentially an "inner" instance for more complicated environments (such as lists), and possibly some additional setup code for certain environments.

It also defines how the *blockenv* behaves with respect to nesting, e.g., does it change when nested and if so how many levels of nesting are supported, etc.

Finally, the object type defines how it appears in a tagged PDF document, what tag names are used, how they are rolemapped and whether it adds additional attributes, etc.

2.2 Templates

2.2.1 The `blockenv` template 'display'

Attributes:

env-name (*tokenlist*) Name of the environment used in tracing and error messages

tag-name (*tokenlist*) Name of the tag in the PDF. If not explicitly given the name is defined by the `tagging-recipe`

tag-class (*tokenlist*) An explicit tag class attribute

tagging-recipe (*tokenlist*) Defines the way tagging is done. Currently the values `basic`, `standard`, and `list` are supported   Default: `standard`

level-increase (*boolean*) Does this *blockenv* increase the block level if it is nested in an outer block?   Default: `true`

setup-code (*tokenlist*) Initial setup code. This is executed after legacy defaults (from `\@listi`, `\@listii`, etc.) are used but before the block instance is called

block-instance (*tokenlist*) Part of the name of the *block* instance that is called. The full name has a -⟨*level*⟩ appended   Default: `displayblock`

para-instance (*tokenlist*)

inner-level-counter (*tokenlist*) Name of an existing (!) counter that is incremented and used to determine final name of the `inner-instance` or empty if always the same inner instance should be used

max-inner-levels (*tokenlist*) Maximum number of nested environments of this kind. Only relevant if there is a `inner-level-counter` specified   Default: `4`

inner-instance-type (*tokenlist*) Object type of the inner instance   Default: `list`

inner-instance (*tokenlist*) Name of the inner instance (if any).

para-flattened (*boolean*) *describe*   Default: `false`

final-code (*tokenlist*) Final setup code   Default: `\ignorespaces`

Semantics & Comments: This *blockenv* template supports the legacy list setting that are found in many document classes in the macros `\@listi`, `\@listii`, up to `\@listvi`. It also uses the counter `\@listdepth` to track nesting of block, again mainly to support legacy setups (internally it gives it a more appropriate name but it remains accessible through the LaTeX 2_ε name).

It first checks that nothing is too deeply nested. If the level should increase then the increments the `\@listdepth` counter and calls the corresponding `\@list...` macro to update the legacy defaults. If `level-increase` is set to false this is bypassed.

It then sets up the tagging via the `tagging-recipe` setting and executes any code in `setup-code`.

Afterwards it calls the appropriate *block* instance based on `block-instance` and current level, e.g., `displayblock-1`. Then it sets up paragraph parameters if a `para-instance` was specified (otherwise they stay as they are).

If a `inner-instance` was specified this is called next, or more precisely: if no `inner-level-counter` was specified the instance `inner-instance` is called.

Otherwise, the `inner-level-counter` is incremented and the instance with the name `inner-instance-inner-level-counter` is called.

Finally, the `final-code` is executed (by default `\ignorespaces`).

The maximum number of *blockenv*s that can be nested into each other is restricted by the LaTeX counter `maxblocklevels` with a default value of 6. If this value is increased then it is necessary to provide additional instances, e.g., `displayblock-7`, etc. Decreasing is, of course, always possible, then some of the instances defined are not used and instead the user gets an error that there is too much nesting going on.

If the key `level-increase` is set to `false` then such an environment doesn't alter the nesting level and therefore you can nest those environments as often as you like (a typical example would be `flushleft` anywhere in the nesting hierarchy, that would have no effect on hitting the boundary).

2.2.2 The `block` template 'display'

Attributes:

`heading` (*tokenlist*) *not really used yet*

`beginsep` (*skip*)   Default: `\topsep`

`begin-par-skip` (*skip*)   Default: `\partopsep`

`par-skip` (*skip*)   Default: `\parsep`

`end-skip` (*skip*)   Default: value from `beginsep`

`end-par-skip` (*skip*)   Default: value from `begin-par-skip`

`item-skip` (*skip*) The space in front of an item if the block is a list; if not the setting has no effect   Default: `\itemsep`

`beginpenalty` (*integer*)   Default: `\@beginparpenalty`

`endpenalty` (*integer*)   Default: `\@endparpenalty`

`leftmargin` (*length*)   Default: `\leftmargin`

`rightmargin` (*length*)   Default: `\rightmargin`

`parindent` (*length*)   Default: `0pt`

Semantics & Comments: The idea of a `heading` key needs some further thoughts. Maybe instead the object type should accept a second argument and receive input for such a heading from the document level instead.

The names of the keys need further thoughts and some decision. Right now it is a mixture of those with hyphens and those that match legacy register names (the way `enumitem` did its keys).

Also `parindent` conflicts with `indent-width`!

2.2.3 The para template 'std'

Attributes:

indent-width (*length*)   Default: `\parindent`

start-skip (*skip*)   Default: `0pt`

left-skip (*skip*)   Default: `0pt`

right-skip (*skip*)   Default: `0pt`

end-skip (*skip*)   Default: `\@flushglue`

fixed-word-spaces (*boolean*)   Default: `false`

final-hyphen-demerits (*integer*)   Default: `5000`

cr-cmd (*tokenlist*)   Default: `\@normalcr`

para-class (*tokenlist*)   Default: `justify`

2.2.4 The `list` template 'std'

Attributes:

counter (*tokenlist*) Counter name to be used in a numbered list or empty, if the list is unnumbered

item-label (*tokenlist*) Label "string" for a fixed label or as generated from the current `counter` value

start (*integer*) Start value for the counter if the list is numbered, otherwise irrelevant
Default: `1`

resume (*boolean*) Should a numbered list be resumed from the last instance?
Default: `false`

item-instance (*instance*) Instance of type `item` to be used to format the label string
Default: `basic`

item-skip (*skip*) The space in front of an item in the list. If not specified the value specified in the block template instance is used

item-indent (*length*) Horizontal displacement of the item.   Default: `0pt`

item-penalty (*integer*) Penalty for breaking before an item (except the first)
Default: `\@itempenalty`

label-width (*length*) Width reserved for the formatted item labelDefault: `\labelwidth`

label-sep (*length*) Horizontal separation between label and following text
Default: `\labelsep`

legacy-support (*boolean*) Is formatting the label via `\makelabel` supported?
Default: `false`

2.2.5 The `item` template 'std'

Attributes:

`counter-label` (*function1*) *unused*   Default: `\arabic{#1}`

`counter-ref` (*function1*) *unused*   Default: value from `counter-label`

`label-ref` (*function1*) *unused*   Default: `#1`

`label-autoref` (*function1*) *unused*   Default: `item #1`

`label-format` (*function1*) Formatting of the label, questionable the way it is used
                                                       Default: `#1`

`label-strut` (*boolean*) Add a `\strut` to the label?   Default: `false`

`label-align` (*choice*) Supported values `left`,`center`, `right`, and `parleft`. *Only partly implemented*   Default: `right`

`label-boxed` (*boolean*) Should the label be boxed?   Default: `true`

`next-line` (*boolean*)   Default: `false`

`text-font` (*tokenlist*) *unused*

`compatibility` (*boolean*)   Default: `true`

Semantics & Comments: This template is only rudimentary implemented at the moment. It probably needs other keys and the existing ones need a proper implementation.

3 Tagging support

3.1 Paragraph tags

Paragraphs in LaTeX can be nested, e.g., you can have a paragraph containing a display quote, which in turn consists of more than one (sub)paragraph, followed by some more text which all belongs to the same outer paragraph.

In the PDF model and in the HTML model that is not supported — a limitation that conflicts with real live, given that such constructs are quite normal in spoken and written language.

The approach we take to resolve this is to model such "big" paragraphs with a structure named `<text-unit>` and use `<text>` (rollmapped to `<P>`) only for (portions of) the actual paragraph text in a way that the `<text>`s are not nested. As a result we have for a simple paragraph the structures

```
<text-unit>
  <text>
    The paragraph text …
  </text>
</text-unit>
```

The `<text-unit>` structure is rollmapped to `<Part>` or possibly to `<Div>` so we get a valid PDF, but processors who care can identify the complete paragraphs by looking for `<text-unit>` tags.

In the case of an element, such as a display quote or a display list inside the paragraph, we then have

```
<text-unit>
  <text>
    The paragraph text before the display element …
  </text>
  <display element structure>
    Content of the display structure possibly involving inner <text-unit> tags
  </display element structure>
  <text>
    … continuing the outer paragraph text
  </text>
</text-unit>
```

In other words such a display block is always embedded in a `<text-unit>` structure, possibly preceded by a `<text>…</text>` block and possibly followed by one, though both such blocks are optional.

Thus an `itemize` environment that has some introductory text but no text immediately following the list would be tagged as follows:

```
<text-unit>
  <text>
    The intro text for the itemize environment …
  </text>
  <itemize>
    <LI>
      <Lbl> label </Lbl>
      <LBody>
        The text of the first item involving <text-unit> as necessary …
      </LBody>
    </LI>
    <LI>
      The second item …
    </LI>
    … further items …
  </itemize>
</text-unit>
```

The `<itemize>` is rollmapped to `<L>`.

For some display blocks, such as centered text, we use a simpler strategy. Such blocks still ensure that they are inside a `<text-unit>` structure but their body uses simple `<text>` blocks and not `<text-unit><text>` inside, e.g., the input

```
This is a paragraph with some
\begin{center}
   centered lines

   with a paragraph break between them
\end{center}
followed by some more text.
```

will be tagged as follows:

```
<text-unit>
  <text>
    This is a paragraph with some
  </text>
  <text /O /Layout /TextAlign/Center>
    centered lines
  </text>
  <text /O /Layout /TextAlign/Center>
    with a paragraph break between them
  </text>
  <text>
    followed by some more text.
</text-unit>
```

3.2 Tagging recipes

There are a number of different tagging recipes that implement different tagging approaches. They are selected through the `tagging-recipe` of the *blockenv* template. Currently the following values are implemented:

standalone This recipe does the following:

- Ensure that the *blockenv* is not inside a `<text-unit>` structure. If necessary, close the open one (and any open `<text>` structure).
- Text inside the body of the environment start with `<text-unit><text>` unless the key `para-flattened` is set to `true` (which is most likely the wrong thing to do because we then get just `<text>` as the structure).
- At the end of the environment close `</text>` and possibly an inner `</text-unit>` if open.
- Finally, ensure that after the environment a new `<text-unit>` is started, if appropriate, e.g., if text is following.

basic This recipe does the following:

- Ensure that the *blockenv* is inside a `<text-unit>` structure, if necessary, start one.

- If inside a `<text-unit><text>`, then close the `</text>` but leave the `<text-unit>` open.
- Text inside the body of the environment start with `<text-unit><text>` if `para-flattened` is set to `false`, otherwise just with `<text>`.
- At the end of the environment close `</text>` and possibly an inner `</text-unit>` if open.
- Then look if the environment is followed by an empty line (`\par`). If so, close the outer `</text-unit>` and start any following text with `<text-unit><text>`. Otherwise, don't and following text restarts with a just a `<text>` (and no paragraph indentation)

standard This recipe is like the **basic** one as far as handling `<text-unit>` and `<text>` is concerned. In addition

- it starts an inner tagging structure (i.e., which is therefore a child of the outer `<text-unit>`).
- By default this structure is a `<Figure>` unless overwritten by the key `tag-name`. If that key is used, a suitable rollmap needs to be provided for the name given.
- At the end of the environment that inner structure is closed again so that we are back on the `<text-unit>` level from the outside.
- Then the lookahead for an empty line is done as described previously.

list This recipe is like the **standard** one except that

- the inner structure is a list (`<L>`).
- Furthermore everything is set up so that we have list items (`<LI>`) with suitable substructures (`<Lbl>` for the item labels and `<LBody>` for the item bodies).
- If the key `tag-name` is specified, this is used as the tag name for the whole list instead of `<L>`. Of course, it should then have a suitable rollmap.
- If the key `tag-class` is specified then this is used as the class attribute. Again, this requires a suitable setup on the outside.
- At the end of the environment the `</LBody>`, `</LI>`, and `</L>` (or the tag name used) are closed.
- Then the lookahead for an empty line is done as described previously.

4 Debugging

`\DebugBlocksOn`
`\DebugBlocksOff`
`\block_debug_on:`
`\block_debug_off:`

These commands enable/disable debugging messages.

5 New and redefined kernel command

`\@doendpe`   The original LaTeX 2ε command is augmented to allow for tagging.

`\legacyverbatimsetup`
`\legacylistsetupcode`   *to be documented*

`\@setupverbinvisiblespace`   A counterpart definition to the kernel command `\@setupverbinvisiblespace`, needed as we need to handle real space chars in verbatim.

`endblockenv`
`\g_block_nesting_depth_int`   *to be documented*

`\newtheorem`
`\@thm`
`\@begintheorem`   Redefined to make theorems tagging aware.

`\item`
`\@itemlabel`   The `\item` is redefined.

`\c@maxblocklevels`   A counter to increase or decrease the number of supported level. If increased, one needs to supply additional level instances.

`\begin`   The `\begin` is slightly redefine to handle `\@doendpe` better. TODO: move to kernel

`\para_end:`   TODO: consider name, document

`para/begin`   The para/begin hook is enhanced to support list ends

6 The Implementation

```
1 ⟨∗package⟩
2 ⟨@@=block⟩

3 \ProvidesPackage {latex-lab-testphase-block}
4                  [\ltlabblockdate\space v\ltlabblockversion\space
5                      blockenv implementation]
```

General kernel changes, also loaded by the sec and toc code.

```
6 \RequirePackage{latex-lab-kernel-changes}
```

```
7 \ExplSyntaxOn
```

6.1 Handling \par after the end of the list

An empty line (or a \par) after a list has semantic meaning as it defines whether then following text is logically within the same paragraph as the list (no empty line) or whether it starts a new paragraph and the paragraph containing the list ends at the end of the list (empty line after the list). This is handled by LaTeX using a legacy flag called @endpe and set of commands inside the generic \end (calling \@doendpe) and as part of the list environments identifying themselves as "paragraph ending environments" (by setting this flag).

For the reimplementation of the list environments including support of tagging we need to augment that mechanism slightly and add some kernel hook(s) to add the tagging code if needed.

\@doendpe
__kernel_displayblock_doendpe:

The original LaTeX 2ε command is augmented to allow for tagging. TODO: use sockets for this and move to the kernel eventually.

```
8  \def\@doendpe{\@endpetrue
9    \def\par
10     {
```

If we are processing a $$ math display and we encounter a real \par after it, we need to add a \parskip when tagging is done, because the one added by TeX is always canceled by the processing in __math_tag_dollardollar_display_end: in that case. This is signaled by the global legacy switch @domathendpe which is set to true in that case. Once the skip is applied we set it to false. If there is no \par at all, it will be reset in \everypar when the next paragraph starts.

```
11        \if@domathendpe
12 %         \typeout{------->~ add~ another~ parskip~ that~ is~
13 %                          not~ canceled:~ \the\parskip }
14          \skip_vertical:n { \tex_parskip:D }
15          \@domathendpefalse
16        \fi
17        \@restorepar
18        \clubpenalty\@clubpenalty
```

At this point we add the tagging code that closes an open `<text-unit>`, `<text>` tag combination, if necessary:

```
19          \_\_kernel_displayblock_doendpe:
```

The standard \par command (\par_end:) acts on @endpe and attempts to close a still open `<text-unit>`s and this would be wrong if it was already closed above. So we have to reset the switch to false first.

```
20          \@endpefalse
21          \everypar{}
22          \par
```

13

```
23        }
24    \everypar{{\setbox\z@\lastbox}
25            \everypar{}
26            \@endpefalse
```

Not sure what is faster: testing for the status of the switch or setting it unconditionally to false (globally), probably roughly the same, so we set it always:

```
27 %            \if@domathendpe
28            \@domathendpefalse
29 %            \fi
30    }
31 }
```

By default we don't do any tagging:

```
32 \cs_new_eq:NN \__kernel_displayblock_doendpe: \prg_do_nothing:
```

(*End of definition for* `\@doendpe` *and* `\__kernel_displayblock_doendpe:`. *This function is documented on page 11.*)

<div style="text-align: right">\if@domathendpe
\@domathendpefalse
\@domathendpetrue</div>

Signal that special paragraph handling after a math display is required.

```
33 \newif\if@domathendpe
34 \def\@domathendpefalse{\global\let\if@domathendpe\iffalse}
35 \def\@domathendpetrue {\global\let\if@domathendpe\iftrue}
```

(*End of definition for* `\if@domathendpe`, `\@domathendpefalse`, *and* `\@domathendpetrue`.)

6.2 Object and template interfaces

<div style="text-align: right">blockenv (*objecttype*)
block (*objecttype*)
para (*objecttype*)
list (*objecttype*)
item (*objecttype*)</div>

All object types expect a single key–value argument used to tweak template parameters specific to a given use in the document. This section is devoted to template interfaces, and the template code is covered later.

```
36 \NewTemplateType{blockenv}{1}
37 \NewTemplateType{block}{1}
38 \NewTemplateType{para}{1}
39 \NewTemplateType{list}{1}
40 \NewTemplateType{item}{1}
```

blockenv display (*templ.*)

```
41 \DeclareTemplateInterface{blockenv}{display}{1}
42 {
43   env-name        : tokenlist ,
44   tag-name        : tokenlist ,
45   tag-class       : tokenlist ,
46   tagging-recipe : tokenlist = standard,
47   level-increase : boolean = true ,
48   setup-code      : tokenlist ,
49   block-instance : tokenlist = displayblock ,
50   para-instance  : tokenlist ,
51   inner-level-counter : tokenlist,
```

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```
52   max-inner-levels    : tokenlist = 4,
53   inner-instance-type : tokenlist = list ,
54   inner-instance      : tokenlist ,
55   para-flattened : boolean = false ,
56   final-code      : tokenlist = \ignorespaces ,
57 }
```

block display (*templ.*)

```
58 \DeclareTemplateInterface{block}{display}{1}
59 {
60   heading       : tokenlist = ,                % ??
61   beginsep      : skip = \topsep ,
62   begin-par-skip : skip = \partopsep ,
63   par-skip      : skip = \parsep ,
64   end-skip      : skip = \KeyValue{beginsep} , % conflict with name below
65   end-par-skip  : skip = \KeyValue{begin-par-skip} ,
66   item-skip     : skip = \itemsep ,
67   beginpenalty  : integer = \UseName{@beginparpenalty} ,
68   endpenalty    : integer = \UseName{@endparpenalty} ,
69   leftmargin    : length = \leftmargin ,
70   rightmargin   : length = \rightmargin ,
71   parindent     : length = 0pt ,
72 % maybe add? (or more general for fonts and color)
73 %  font              : tokenlist
74 }
```

para std (*templ.*)

```
75 \DeclareTemplateInterface{para}{std}{1}
76 {
77   para-class          : tokenlist = justify ,
78   indent-width        : length = \parindent ,
79   start-skip          : skip = 0pt   ,
80   left-skip           : skip = 0pt ,
81   right-skip          : skip = 0pt ,
82   end-skip            : skip = \@flushglue ,
83   fixed-word-spaces   : boolean = false ,
84   final-hyphen-demerits : integer = 5000 ,
85   cr-cmd              : tokenlist = \@normalcr ,
86 }
```

list std (*templ.*)

```
87 \DeclareTemplateInterface{list}{std}{1}     % optional
88 {
89   counter       : tokenlist = ,
90   item-label    : tokenlist = ,
91   start         : integer = 1 ,
92   resume        : boolean = false ,
93   item-instance : instance{item} = basic ,
94   item-skip     : skip = \itemsep ,
95   item-penalty  : integer = \UseName{@itempenalty} ,
```

15

```
96    item-indent    : length = \itemindent ,
97    label-width    : length = \labelwidth ,
98    label-sep      : length = \labelsep ,
99    legacy-support : boolean = false ,
100 }
```

item std (*templ.*)

```
101 \DeclareTemplateInterface{item}{std}{1}
102   {
103     counter-label : function{1} = \arabic{#1} ,
104     counter-ref   : function{1} = \KeyValue{counter-label} ,
105     label-ref     : function{1} = #1 ,
106     label-autoref : function{1} = item~#1 ,
107     label-format  : function{1} = #1 ,
108     label-strut   : boolean = false ,
109     label-align   : choice {left,center,right,parleft} = right ,
110     label-boxed   : boolean = true ,
111     next-line     : boolean = false ,
112     text-font     : tokenlist ,
113     compatibility : boolean = true ,
114   }
```

6.3 Useful helper commands

This section collects expl3 commands that will be useful.

__block_skip_set_to_last:N Set a skip register to the value of an immediately preceding skip or zero if there was
__block_skip_remove_last: none.

```
115 \cs_new_protected:Npn \__block_skip_set_to_last:N #1 {
116   \skip_set:Nn #1 { \tex_lastskip:D }
117 }
```

Remove a skip previous skip if it is directly in front (not allowed in unrestricted vertical mode).

```
118 \cs_new_eq:NN \__block_skip_remove_last: \tex_unskip:D
```

(*End of definition for* __block_skip_set_to_last:N *and* __block_skip_remove_last:.)

```
119 \cs_generate_variant:Nn \tl_if_novalue:nTF { o }
```

6.3.1 Debugging

\g__block_debug_bool

```
120 \bool_new:N \g__block_debug_bool
```

(*End of definition for* \g__block_debug_bool.)

__block_debug:n
__block_debug_typeout:n

```
121 \cs_new_eq:NN \__block_debug:n \use_none:n
122 \cs_new_eq:NN \__block_debug_typeout:n \use_none:n
```

(*End of definition for* __block_debug:n *and* __block_debug_typeout:n.)

\block_debug_on:
\block_debug_off:
__block_debug_gset:

```
123 \cs_new_protected:Npn \block_debug_on:
124   {
125     \bool_gset_true:N \g__block_debug_bool
126     \__block_debug_gset:
127   }

128 \cs_new_protected:Npn \block_debug_off:
129   {
130     \bool_gset_false:N \g__block_debug_bool
131     \__block_debug_gset:
132   }

133 \cs_new_protected:Npn \__block_debug_gset:
134   {
135     \cs_gset_protected:Npx \__block_debug:n ##1
136       { \bool_if:NT \g__block_debug_bool {##1} }
137     \cs_gset_protected:Npx \__block_debug_typeout:n ##1
138       { \bool_if:NT \g__block_debug_bool { \typeout{==>~ ##1} } }
139   }
```

(*End of definition for* \block_debug_on: , \block_debug_off: , *and* __block_debug_gset: . *These functions are documented on page 11.*)

\DebugBlocksOn
\DebugBlocksOff

```
140 \cs_new_protected:Npn \DebugBlocksOn  { \block_debug_on:  }
141 \cs_new_protected:Npn \DebugBlocksOff { \block_debug_off: }

142 \DebugBlocksOff
```

(*End of definition for* \DebugBlocksOn *and* \DebugBlocksOff. *These functions are documented on page 11.*)

6.4   Implementation of templates

6.4.1   Implementation of blockenv templates ...

\g_block_nesting_depth_int   LaTeX 2_ε already has a counter to record the nesting depth of blocks, but we want our own name because it isn't really tied to "lists" any more. However, \@listdepth is really part of the legacy interface (for example minipage alters it to point to a different counter) so that we are stuck with using at least indirectly for now and the following line makes this look like an L3 integer variable but internally expands to \@listdepth:

```
143 \cs_new:Npn \g_block_nesting_depth_int { \@listdepth }  % a fake int
144                                                           % for now
```

(*End of definition for* \g_block_nesting_depth_int. *This function is documented on page 11.*)

17

```
145 \DeclareTemplateCode{blockenv}{display}{1}
146 {
147   env-name       = \l__block_env_name_tl ,
148   tag-name       = \l__block_tag_name_tl ,
149   tag-class      = \l__block_tag_class_tl ,
150   tagging-recipe = \l__block_tagging_recipe_tl ,
151   level-increase = \l__block_level_incr_bool ,
152   setup-code     = \l__block_setup_code_tl ,
153   block-instance = \l__block_block_instance_tl ,
154   para-instance  = \l__block_para_instance_tl ,
155   para-flattened = \l__tag_para_flattened_bool ,
156   inner-level-counter = \l__block_inner_level_counter_tl ,
157   max-inner-levels    = \l__block_max_inner_levels_tl ,
158   inner-instance-type = \l__block_inner_instance_type_tl ,
159   inner-instance      = \l__block_inner_instance_tl ,
160   final-code     = \l__block_final_code_tl ,
161 }
162 {
163   \__block_debug_typeout:n{\l__block_env_name_tl -env-start}
164 %
165   \SetKnownTemplateKeys{blockenv}{display}{#1}
```

We need to know later if we have nested blockenvs inside a flattened environment. Whenever we start a new blockenv we increment `\l__tag_block_flattened_level_int` if it is already different from zero. If it is zero we increment it if flattening is requested. Thus a value of 0 means no flattening requested so far and 1 means this is the first blockenv requesting flattening. In either case we have to make sure that the blockenv is surrounded by a `<text-unit>` tag, while for any value above 1 we have to omit the `<text-unit>`.

```
166   \int_compare:nNnTF \l__tag_block_flattened_level_int > 0
167       {
168         \int_incr:N \l__tag_block_flattened_level_int
169       }
170       {
171         \bool_if:NT \l__tag_para_flattened_bool
172             {
173               \int_incr:N \l__tag_block_flattened_level_int
174             }
175       }
176 %
177   \tl_if_empty:NF \l__block_inner_level_counter_tl
178     {
179       \int_compare:nNnTF  \l__block_inner_level_counter_tl >
180                           { \l__block_max_inner_levels_tl - 1 }
181           { \@toodeep }
182           { \int_incr:N \l__block_inner_level_counter_tl }  % not clean "o"?
183     }
```

Legacy defaults are only roped in if the list level changes. For display blocks that remain on the same level the current values are kept.

```
184   \bool_if:NT \l__block_level_incr_bool
```

18

```
185        {
186          \int_compare:nNnTF  \g_block_nesting_depth_int >
187                             { \c@maxblocklevels - 1 }
188            { \@toodeep }
189            {
190              \int_gincr:N \g_block_nesting_depth_int
```

If there are no legacy defaults for that level then the next line does nothing, i.e., the current values (from the last level become the defaults for the next.

```
191              \use:c { @list \int_to_roman:n
192                             { \g_block_nesting_depth_int } }
193            }
194        }
```

If we are doing tagging we load one of the available recipes for tagging, which alters various kernel hooks to add appropriate tagging structures.

```
195      \tag_if_active:T
196          { \use:c { __block_recipe_ \l__block_tagging_recipe_tl : } }
```

The default for `list` environments is that they have an empty label and are not numbered (something that is then overwritting by the setup of a specific list). We ensure this here even for non-lists, because we need a defined state that then can be overwritting by the legacy setup code for the `list` environment in `\l__block_setup_code_tl`. This is needed in case lists are nested as they otherwise would inherit outer values (and suddenly an `itemize` would start incrementing an outer `enumerate` counter, etc.

```
197      \tl_clear:N \@itemlabel
198      \tl_clear:N \@listctr
199      \legacy_if_set_false:n { @nmbrlist }
```

Then run the setup code if any is given in the instance.

```
200      \l__block_setup_code_tl
```

Next call a block instance at the appropriate level passing it any key/value list provided in the optional argument (keys that are not recognized are ignored—currently with an error).

```
201      \__block_debug_typeout:n{use~ instance:~
202              \l__block_block_instance_tl - \int_use:N \g_block_nesting_depth_int }
203      \UseInstance{block}
204              { \l__block_block_instance_tl - \int_use:N
205                \g_block_nesting_depth_int }
206              \UnusedTemplateKeys
```

After this instance has been processed, any remaining unused keys are stored in `\UnusedTemplateKeys` and we can make use of this data later as long as we do not call another instance that also does unused key processing and overwrites it. This is what happens below, so we better save its current value for now.

```
207      \tl_set_eq:NN \l__block_unused_blockenv_keys_tl \UnusedTemplateKeys
```

After the block instance call the para and then inner (list) instance if either or both are specified (which may not be the case).

```
208    \tl_if_empty:NF \l__block_para_instance_tl
209      {
210        \__block_debug_typeout:n{ use~ para~ instance:~
211                          \l__block_para_instance_tl }
```

For now we don't offer to alter instance parameters here so we pass an empty argument.

```
212        \UseInstance{para}{ \l__block_para_instance_tl } {}
213      }
```

The inner instance may have its own levels or none depending on which the instance name differs. Again we pass it the optional key/value list.

```
214    \tl_if_empty:NF \l__block_inner_instance_tl
215      {
216        \__block_debug_typeout:n{use~ instance:~ \l__block_inner_instance_tl
217              \tl_if_empty:NF \l__block_inner_level_counter_tl
218                    { - \int_use:N \l__block_inner_level_counter_tl }}
219        \UseInstance{ \l__block_inner_instance_type_tl }
220                { \l__block_inner_instance_tl
221                  \tl_if_empty:NF \l__block_inner_level_counter_tl
222                    %  not clean use "o"?
223                    { - \int_use:N \l__block_inner_level_counter_tl }
224                }
225                \l__block_unused_blockenv_keys_tl
```

Again the instance may has processed a few keys from the sofar unused keys, so we update \l__block_unused_blockenv_keys_tl to match the new reality.

```
226        \tl_set_eq:NN \l__block_unused_blockenv_keys_tl \UnusedTemplateKeys
227      }
```

At this point, the \l__block_unused_blockenv_keys_tl token list should either be empty or it should contain only keys that are suitable for the item template, but right now there is no code to test that can test the latter; it would help probably if we have an interface for this.

fix — For now we handle that when the first item is encountered, but that isn't realy clean.

```
228    \tl_if_empty:NF \l__block_unused_blockenv_keys_tl
229      {
230        % check if only item template keys remain
231      }
```

We finish off with \l__block_final_code_tl which defaults to \ignorespaces so that spaces between \begin{...} and the start of the text are ignored.

```
232    \l__block_final_code_tl
233 }
```

234 `\tl_new:N \l__block_unused_blockenv_keys_tl`

(*End of definition for* `\l__block_unused_blockenv_keys_tl`.)

`\l__tag_block_flattened_level_int` Count the levels of nested blockenvs starting with the first that is "flattened". The counter is defined in lttagging.dtx, but until the next release 11/24 we set it up here too

235 `\int_if_exist:NF \l__tag_block_flattened_level_int`
236 `  {`
237 `    \int_new:N \l__tag_block_flattened_level_int`
238 `  }`

(*End of definition for* `\l__tag_block_flattened_level_int`.)

`\c@maxblocklevels` A counter to increase or decrease the number of supported level. If increased, one needs to supply additional level instances.

239 `\newcounter{maxblocklevels}`
240 `\setcounter{maxblocklevels}{6}`

(*End of definition for* `\c@maxblocklevels`. *This function is documented on page 12.*)

`\endblockenv` The code executed when a blockenv ends is 99% the same for all blockenvs (at least up to now). Small differences exist, though. They are accounted for first in the conditionals.

We make this a public command so that new block environments can be set up without the need to resort to L3 layer programming.

name is bad

241 `\cs_new:Npn \endblockenv {`
242 `  \__block_debug_typeout:n{blockenv~ common~ ending \on@line}`

If this block was incrementing the level we have to decrement it now again:

243 `  \bool_if:NT \l__block_level_incr_bool`
244 `    { \int_gdecr:N \g_block_nesting_depth_int }`

If this block was a list and there are still `\item` labels to be placed we move to horizontal mode to get them typeset.

245 `  \legacy_if:nT { @inlabel }`
246 `    {`
247 `      \mode_leave_vertical:`
248 `      \legacy_if_gset_false:n { @inlabel }`
249 `    }`

If we are ending a list environment and we have not seen any `\item`, i.e., `@newlist` is still true, we raise an error. In basic a "displayblock" scenario `@newlist` will always be false, but if such an environment appears inside an outer list then `\noitemerr` could still be triggered and that is undesirable (as the missing item will be detected at the wrong point and again later, during the outer list processing). We therefore run it only if the current environment is a list.

250 `  \__block_if_list:T { \legacy_if:nT { @newlist } { \@noitemerr } }`

```
251    \mode_if_horizontal:TF
252        { \__block_skip_remove_last: \__block_skip_remove_last: \par }
253        { \@inmatherr{\end{\@currenvir}} }
```

Once we are back in vertical mode we can add the appropriate closing tagging structure(s), if we are doing tagging.

```
254    \__kernel_displayblock_end:
```

Resetting the `@newlist` switch is also only done if the current enviornment is a list and not unconditionally.

```
255    \__block_if_list:T { \legacy_if_gset_false:n { @newlist } }
```

What to do in terms of vertical spacing in different situations is still somewhat open to debate, right now this is more or less implementing what LaTeX 2_ε list environment have been doing.

```
256  %      \__block_debug_typeout:n{@noparlist =
257  %                       \legacy_if:nTF { @noparlist }{true}{false}}
258    \legacy_if:nF { @noparlist }
259      {
260        \__block_skip_set_to_last:N \l_tmpa_skip
261        \dim_compare:nNnT \l_tmpa_skip > \c_zero_dim
262          {
263            \skip_vertical:n { - \l_tmpa_skip }
264            \skip_vertical:n { \l_tmpa_skip + \parskip - \@outerparskip }
265          }
266        \addpenalty \@endparpenalty
267        \addvspace \l__block_topsepadd_skip
```

LaTeX 2_ε triggered the paragraph handling after a list at this point here, i.e., only if the list didn't start a paragraph. One can make a case for that, but it can be somewhat surprising to the user and there is a good argument that even such a list could be followed explanatory text that is part of the same paragraph and doesn't start a new one.

```
268  %          \legacy_if_gset_true:n { @endpe }
269      }
```

So this is for now always done. Probably `\l__block_topsepadd_skip` above should be added only if the paragraph ends here and not if it continues, so this need some further cleanup.

Finally, we have a socket that handles the `\par` handling after the block. Normally, we use it with the **on** plug (check for a following `\par`) but in the case of standalone environments we assign it the **off** plug.

```
270    \socket_use:n {block/endpe}
271  }
```

(*End of definition for* `\endblockenv`. *This function is documented on page 11.*)

The following code may need some redesigning, as there is no good test for "is this environment a 'list' that has `\items`". For now this here does the trick well enough.

```
272 \cs_new:Npn \__block_if_list:T
273   { \tl_if_eq:NnT \l__block_block_instance_tl {list} }
```

(*End of definition for* `\__block_if_list:T`.)

`\__kernel_displayblock_end:` The kernel hook for tagging at the end of the block.

```
274 \cs_new:Npn \__kernel_displayblock_end: {
275   \__block_debug_typeout:n{\detokenize{__kernel_displayblock_end:}}
276 }
```

(*End of definition for* `\__kernel_displayblock_end:`.)

block/endpe (*socket*) This socket is responsible for the end environment `\par` handling. We define two plugs for it (`on` and `off`).

```
277 \socket_new:nn       {block/endpe}{0}
```

on (*plug*)   The plugs set the legacy `@endpe` switch. This must always happen because block envi-
off (*plug*)   ronments with different settings can be nested and should not inherit the setting from the outer environment.

```
278 \socket_new_plug:nnn{block/endpe}{on}
```

We can't use `\legacy_if_gset_true:n` because this is now doing more than setting the legacy switch

```
279                       { \@endpetrue }
280 \socket_new_plug:nnn{block/endpe}{off}
281                       { \@endpefalse }

282 \socket_assign_plug:nn{block/endpe}{on}
```

6.4.2 Implementation of para templates ...

para std (*templ.*)

```
283 \DeclareTemplateCode{para}{std}{1}
284 {
285   indent-width       = \parindent ,
286   start-skip         = \l__par_start_skip ,          % name??
287   left-skip          = \leftskip  ,
288   right-skip         = \rightskip  ,
289   end-skip           = \parfillskip ,
290   fixed-word-spaces  = \l__par_fixed_word_spaces_bool ,  % name??
291   final-hyphen-demerits = \finalhyphendemerits ,
292   cr-cmd             = \\ ,
293   para-class         = \l__tag_para_attr_class_tl ,
294 }
295 {
296   \SetTemplateKeys{para}{std}{#1}
297   \skip_set:Nn \@rightskip \rightskip
298 }
```

23

6.4.3 Implementation of block templates …

block display (*templ.*)

In contrast to the LaTeX 2ε implementation we do not directly use `\listparindent` here but a private register of the template. The reason is that block template instances are also used outside of lists.

```
299  \DeclareTemplateCode{block}{display}{1}
300  {
301    heading          = \l__block_heading_tl ,
302    beginsep         = \topsep ,
303    begin-par-skip   = \partopsep ,
304    par-skip         = \parsep ,
305    end-skip         = \l__block_botsep_skip ,
306    end-par-skip     = \l__block_parbotsep_skip ,
307    item-skip        = \itemsep ,
308    beginpenalty     = \@beginparpenalty ,
309    endpenalty       = \@endparpenalty ,
310    rightmargin      = \rightmargin ,
311    leftmargin       = \leftmargin ,
312    parindent        = \l__block_parindent_dim ,
313  }
314  {
315      \SetKnownTemplateKeys{block}{display}{#1}
316      \tl_if_blank:oF \l__block_heading_tl
317        { \mode_leave_vertical:
318          \textbf{\l__block_heading_tl} } % TODO customize
```

generalize heading usage (or drop?)

The code largely follows the logic of LaTeX 2ε's `trivlist` implementation as far as it applicable for the "display block" but coded using the L3 programming layer. However, we keep all the legacy variables (e.g., `@noskipsec`) if there is some chance that they are set in classes or packages.

```
319      \legacy_if:nT { @noskipsec } { \mode_leave_vertical: }
320      \skip_set:Nn \l__block_topsepadd_skip { \topsep }
321      \mode_if_vertical:TF
322        {
323          \skip_add:Nn \l__block_topsepadd_skip { \partopsep }
```

At this point it is safe to add tagging structure(s) so we have a kernel-owned hook here for tagging. This is used to possibly start a paragraph structure (to surround the block, for example, in case of lists) and possibly do some other preparation for tagging the block.

```
324          \__kernel_displayblock_beginpar_vmode:
325        }
326        {
```

If we are in horizontal mode then the displayblock has to return to vertical mode now (after removing any immediately preceding skip or kern. But before we actually issue the`\par` we execute a kernel hook in which we can add tagging code. This hook is "weird"

because by default it does nothing, but if tagging is wanted it takes an argument and grabs the following `\par` in order to put tagging code before and after the `\par`.

```
327        \__block_skip_remove_last: \__block_skip_remove_last:
328        \__kernel_displayblock_beginpar_hmode:w \par
329      }
```

Now we are back to legacy list implementation ...

```
330      \legacy_if:nTF { @inlabel }
331        {
332          \legacy_if_set_true:n { @noparitem }
333          \legacy_if_set_true:n { @noparlist }
334        }
335        {
336          \legacy_if:nT { @newlist } { \@noitemerr }
337          \legacy_if_set_false:n { @noparlist }
338          \skip_set_eq:NN \l__block_effective_top_skip \l__block_topsepadd_skip
339        }
340      \skip_add:Nn \l__block_effective_top_skip { \parskip }
```

Next lines set some paragraph defaults, any of them may get overwritten if there is a `para-instance` specified on the *blockenv* instance.

```
341      \skip_zero:N \leftskip
342      \skip_set_eq:NN \rightskip \@rightskip
343      \skip_set_eq:NN \parfillskip \@flushglue
```

The next lines establish a parshape which is retained across paragraphs be executing `\para_end:` within a group and thus reestablishing the parshape for the next paragraph again. In case a list got started `\par` is ignored until we have seen an `\item` (or we have executed `\par` one thousand times.

```
344      \int_zero:N \par@deathcycles
345      \@setpar
346        {
347          \legacy_if:nTF { @newlist }
348            {
349              \int_incr:N \par@deathcycles
350              \int_compare:nNnTF \par@deathcycles > { 1000 }
351                { \@noitemerr
352                  { \para_end: }
353                }
354            }
355            {
356              { \para_end: }
357            }
358        }
359      \skip_set_eq:NN \@outerparskip \parskip
360      \skip_set_eq:NN \parskip \parsep


361      \dim_set_eq:NN \parindent \l__block_parindent_dim
362      \dim_add:Nn \linewidth { - \rightmargin - \leftmargin }
```

```
363        \dim_add:Nn \@totalleftmargin { \leftmargin }
364        \tex_parshape:D 1 ~ \@totalleftmargin \linewidth
```

This is the point where we are ready to add the tagging structure for the block, e.g., an
`<L>`, a `<Figure>` or some other structure.

```
365        \__kernel_displayblock_begin:
```

Finally, we have to output the vertical separation and penalty at the start of the block
and make corrections for a change in `\parskip` and some other housekeeping, unless this
block is inside a list and the list `\item` has not yet placed. In that case the vertical space
and penalty us suppressed. This is controlled through the legacy switches `@noparitem`,
`minipage`, and `@nobreak`.

```
366        \legacy_if:nTF { @noparitem }
367          {
368            \legacy_if_set_false:n { @noparitem }
369            \hbox_gset:Nn \g__block_labels_box
370              {
371                \skip_horizontal:n { - \leftmargin }
372                \hbox_unpack_drop:N \g__block_labels_box
373                \skip_horizontal:n { \leftmargin }
374              }
```

document 2e
logic used here

```
375            \legacy_if:nF { @minipage } % Why this chunk of code?
376              {
377                \__block_skip_set_to_last:N \l__block_tmpa_skip
378                \skip_vertical:n { - \l__block_tmpa_skip }
379                \skip_vertical:n { \l__block_tmpa_skip +
380                                   \@outerparskip - \parskip }
381              }
382          }
383          {
384            \legacy_if:nTF { @nobreak }
385              { \addvspace{\skip_eval:n{\@outerparskip-\parskip}} }
386              {
387                \addpenalty \@beginparpenalty
388                \addvspace \l__block_effective_top_skip
389                \addvspace{-\parskip}
390              }
391          }
392    }
```

Extra keys to support enumitem conventions:

```
393  \keys_define:nn { template/block/display }
394  {
395    ,topsep        .skip_set:N = \topsep
396    ,partopsep     .skip_set:N = \partopsep
397    ,listparindent .skip_set:N = \listparindent
398  }
```

The internal kernel hooks for tagging.

`\__kernel_displayblock_begin:`
`\__kernel_displayblock_beginpar_hmode:w`
`\__kernel_displayblock_beginpar_vmode:`

```
399 \cs_new:Npn \__kernel_displayblock_begin: {
400   \__block_debug_typeout:n
401     {\detokenize{__kernel_displayblock_begin:}}
402 }

403 \cs_new:Npn \__kernel_displayblock_beginpar_hmode:w {
404   \__block_debug_typeout:n
405     {\detokenize{__kernel_displayblock_beginpar_hmode:w}}
406 }

407 \cs_new:Npn \__kernel_displayblock_beginpar_vmode: {
408   \__block_debug_typeout:n
409     {\detokenize{__kernel_displayblock_beginpar_vmode:}}
410 }
```

(*End of definition for* `\__kernel_displayblock_begin:`, `\__kernel_displayblock_beginpar_hmode:w`, *and* `\__kernel_displayblock_beginpar_vmode:`.)

6.4.4 Implementation of list templates ...

`\@itemlabel`
`\@listctr`

Both `\@itemlabel` and `\@listctr` from the LaTeX 2ε list implementation are used (or set) by various packages. We therefore use them too, so that these packages have a fighting chance to work with the new tagging-aware implementation for `list`.

```
411 \tl_new:N \@itemlabel        % should have a top-level definition
412 \tl_new:N \@listctr          % should have a top-level definition
```

(*End of definition for* `\@itemlabel` *and* `\@listctr`. *These functions are documented on page 12.*)

`\__block_evaluate_saved_user_keys:nn`

Keys set on individual list environments may be intended to alter the behavior of the template instance that defines the `\item` command. If meant to alter only a single `\item` command one would specify them in the optional argument of the `\item`, but if they should alter all items the right place would be the list environment. For this reason we need to store the values and then set them inside the `\item` template code using `\SetKnownTemplateKeys` in the appropriate context (template type and template name). This is done in `\__block_evaluate_saved_user_keys:nn`. The context is provided in the two arguments (because different list environments may use different `\item` instances based on different templates. By default the command does nothing because most environments do not have user key settings.

```
413 \cs_new_eq:NN \__block_evaluate_saved_user_keys:nn \use_none:nn
```

Maybe something like this should become a public function, but for now this is a one-off for the `\item` command and therefore coded inline and internal to the block code.

```
414 %\cs_new:Npn \__block_save_user_keys:n #1 {
415 %  \tl_if_empty:nTF {#1}
416 %    { \cs_set_eq:NN \__block_evaluate_saved_user_keys:nn \use_none:nn }
417 %    { \cs_set:Npe \__block_evaluate_saved_user_keys:nn ##1##2
418 %       { \SetKnownTemplateKeys{##1}{##2}{ \exp_not:n{#1} }    }
419 %}
```

(End of definition for `\__block_evaluate_saved_user_keys:nn`.*)*

`list std` (*templ.*)

This template implements numbered and unnumbered lists and can be combined with display blocks or with inline blocks.

```
420 \DeclareTemplateCode{list}{std}{1}
421 {
422   counter          = \l__block_counter_tl,
423   item-label       = \l__block_item_label_tl,
424   start            = \l__block_counter_start_int ,
425   resume           = \l__block_resume_bool ,
426   item-instance    = \__block_item_instance:n ,
427   item-skip        = \itemsep ,
428 %  item-par-skip   = \parsep ,
429   item-penalty     = \@itempenalty ,
430   item-indent      = \itemindent ,
431   label-width      = \labelwidth ,
432   label-sep        = \labelsep ,
433   legacy-support   = \l__block_legacy_support_bool , % FMi questionable
434 }
435 {
436   \__block_debug_typeout:n{template:list:std}
437 %
```

We start by looking at the user supplied keys in `#1`. If there aren't any we reset `\__block_evaluate_saved_user_keys:nn` to do nothing. Otherwise we evaluate and set the keys in the context of the current list template. In addition we prepare `\__block_-evaluate_saved_user_keys:nn` for execution in the template for `\item`.

```
438   \tl_if_empty:oTF {#1}
439     { \cs_set_eq:NN \__block_evaluate_saved_user_keys:nn \use_none:nn }
440     {
441       \SetKnownTemplateKeys{list}{std}{#1}
```

The setup for `\__block_evaluate_saved_user_keys:nn` is a bit trcky and has to be done with `\cs_set:Npe` even though we don't want to expand anything and therefore use `\exp_not:n` inside. All this does is that any `#` passed in via `#1` is doubled (e.g., from `label-format=\fbox{#1}` which is represented as `...\fbox{##1}`). Otherwise, we would end up with a replacement text like

`\SetTemplateKeys {#1}{#2}{label-format=\fbox {#1}}`

instead of

`\SetTemplateKeys {#1}{#2}{label-format=\fbox {##1}}`

resulting in very odd and puzzling behavior.

```
442       \cs_set:Npe \__block_evaluate_saved_user_keys:nn ##1##2
443         { \SetKnownTemplateKeys{##1}{##2}{
444             \exp_not:o { \UnusedTemplateKeys }
445           }
```

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```
446            \exp_not:n {
447              \tl_if_empty:NF \UnusedTemplateKeys
448                {
449                  \msg_error:nnee { block } { unknown-keys }
450                      { \l__block_env_name_tl \space environment}
451                      \UnusedTemplateKeys
452                }
453            }
454          }
455      }
```

Has this list a counter name defined in the instance?

```
456    \tl_if_empty:NTF \l__block_counter_tl
457      {
```

If not we check if \@nmbrlist is true which may be the case in legacy environments that used \usecounter in the argument to the list environment.

```
458      \legacy_if:nT { @nmbrlist }
459        {
```

In that case we only check if we should resume a previous list (\@listctr should be set in that case through the legacy method as well so we should be able to use it).

```
460          \bool_if:NF \l__block_resume_bool
461            {
462              \int_gset:cn{ c@ \@listctr }
463                  { \l__block_counter_start_int - 1 }
464            }
465        }
466      }
```

If a counter is set in the list instance we use that one. This should be the name of a LaTeX counter that is already allocated externally—no runtime check is made for this: if it is not declared one will get "no such counter" error when the list is used.

```
467      {
468      \@nmbrlisttrue
469      \tl_set_eq:NN \@listctr \l__block_counter_tl
470      \bool_if:NF \l__block_resume_bool
471        {
472          \int_gset:cn{ c@ \@listctr }
473              { \l__block_counter_start_int - 1 }
474        }
475      }
```

Does the current instance has an item label representation? This would be possible whether or not we have a numbered list. If yes, then we use this for \@itemlabel, otherwise we expect that \@itemlabel is provided from the outside, e.g., as part of the list environment argument.

```
476    \tl_if_empty:NF \l__block_item_label_tl
```

```
477      {
478        \tl_set_eq:NN \@itemlabel \l__block_item_label_tl
479      }
```

Finally, we signal that we are at the start of a new list (which affects how the first `\item` is handled and how `\par` commands are interpreted.

```
480      \legacy_if_gset_true:n { @newlist }
```

If we encounter horizontal material before the first `\item` we do want a `\@noitemerr` straight away, because afterwards we end up with tagging structure faults whose cause is the missing `\item`. So we setup up `\__block_item_everypar:` to test for this; when the first `\item` is encountered this will get reset. This is only relevant for vertical lists, when dealing with inline lists one would need to test for something else to identify that there is horizontal material between the start of the list and the first `\item` (maybe some `\spacefactor` trick could be used then, or the material is boxed first and the width is inspected as suggested by Joseph).

> Think about a better implementation at some point.

```
481      \cs_set_eq:NN \__block_item_everypar: \__block_item_everypar_first:

482    \__block_debug_typeout:n{template:list:std~end}
483  }
```

The message that is used above when we are left with keys that are unknown:

```
484  \msg_new:nnnn { block } { unknown-keys }
485    { Some~ keys~ specified~ on~ the~ #1~ are~ unknown. }
486    {
487      The~ following~ keys~ are~ unknown~ and~ their~
488      values~ are~ ignored:\\
489      \space\space #2\\
490      Perhaps~ a~ misspelling~ or~ the~ current~ template~
491      instance~ uses~ special~ keys.
492    }
```

Extra keys to support enumitem conventions:

```
493  \keys_define:nn { template/list/std }
494  {
495    ,nosep .code:n =
496      \dim_zero:N \itemsep
497      \dim_zero:N \parsep
498      \dim_zero:N \topsep
499      \dim_zero:N \l__block_botsep_skip
500      \dim_zero:N \l__block_parbotsep_skip
501    ,midsep    .skip_set:N = \topsep
502  }
```

6.4.5 Implementation of `\item` template(s)

item std (*templ.*) The item template has one hidden key `label` which is not available on the template for setting because it is only used to receive any optional data passed to the `\item` command.

We therefore declare it with `\keys_define:nn` and ensure that the optional argument data to `\item` (if it is not a key/value list already) is passed to this `label` key.

```
503 \keys_define:nn { template/item/std }
504                 { label .tl_set:N = \l__block_label_given_tl }
```

```
505 \DeclareTemplateCode{item}{std}{1}
506   {
507     counter-label   = \__block_counter_label:n ,
508     counter-ref     = \__block_counter_ref:n ,
```

```
509     label-ref       = \__block_label_ref:n ,
510     label-autoref   = \__block_label_autoref:n ,
511     label-format    = \__block_label_format:n ,
512     label-strut     = \l__block_label_strut_bool ,
513     label-boxed     = \l__block_label_boxed_bool ,
514     next-line       = \l__block_next_line_bool ,
515     text-font       = \l__block_text_font_tl ,
516     compatibility   = \l__block_item_compatibility_bool ,
```

This probably needs a different implementation (and needs completing)

```
517     label-align     = {
518       left    = \tl_set:Nn \l__block_item_align_tl { \relax \hss } ,
519       center  = \tl_set:Nn \l__block_item_align_tl { \hss \hss } ,
520       right   = \tl_set:Nn \l__block_item_align_tl { \hss \relax } ,
521       parleft = \NOT_IMPLEMENTED ,
522     } ,
523   }
```

Then typeset the label at its natural width by applying `\__block_make_label_box:n` to the label given or to a label constructed from the counter. If it is boxed and reasonably short, add padding to make it at least of size `\labelwidth`, then add another layer of box. This way, when we unpack it in `\g__block_labels_box` it correctly remains boxed in those cases. Afterwards, in the `nextline` case add `\newline` if the label did not fit in the allotted space.

```
524   {
525     \__block_debug_typeout:n{template:item:std}
```

First deal with the key–value input, which in particular may provide a value for the label (the usual optional argument of `\item`). For this we set `\l__block_label_given_tl` to `\c_novalue_tl` so that we can identify if an optional argument was given.

```
526     \tl_set_eq:NN \l__block_label_given_tl \c_novalue_tl
```

First we evaluate and set any keys specified on the list environment by calling `\__block_-evaluate_saved_user_keys:nn`. Then we do the same with all keys specified on this `\item` command (which may overwrite one or the other setting just made).

```
527     \__block_evaluate_saved_user_keys:nn {item}{std}
```

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We don't care whether all of the user keys from the list level have been applied, but those explicitly set on the `\item` command should be aplicable, so we generate an error if that isn't the case:

```
528        \SetKnownTemplateKeys{item}{std}{#1}
529        \tl_if_empty:NF \UnusedTemplateKeys
530          {
531            \msg_error:nnee { block } { unknown-keys }
532                { \noexpand\item command }
533                \UnusedTemplateKeys
534          }
```

If no optional argument was given then `\l__block_label_given_tl` is still equal to `\c_novalue_tl` and so we can distinuish that from `\item[]`.

```
535        \tl_if_novalue:oTF \l__block_label_given_tl
536          {
```

The rest of the code for this template needs work and is both incomplete and partly wrong.

```
537            \tl_if_blank:oF \@listctr { \@kernel@refstepcounter \@listctr }
538            \bool_if:NTF \l__block_item_compatibility_bool   % not sure that
539                                                    %  conditional
540                                                    %  makes sense
541          { \__block_make_label_box:n { \MakeLinkTarget[\@listctr]{}%
542                                \@itemlabel } } % TODO ?
543          { \__block_make_label_box:n { \MakeLinkTarget[\@listctr]{}%
544                                \__block_counter_label:n { \@listctr } } }
545        }


546        {
547          \__block_debug_typeout:n{item~ with~ optional}
548          \__block_make_label_box:n {\MakeLinkTarget[\l__block_env_name_tl]{}\l__block_label_g
549      \bool_if:nT
550        {
551          \l__block_label_boxed_bool
552 %   TODO: is \linewidth correct?
553          && \dim_compare_p:n
554                { \box_wd:N \l__block_one_label_box <= \linewidth }
555        }
556        {
557          \dim_compare:nNnT
558            { \box_wd:N \l__block_one_label_box } < \labelwidth
559            {
560              \hbox_set_to_wd:Nnn \l__block_one_label_box { \labelwidth }
561                {
562                  \exp_after:wN \use_i:nn \l__block_item_align_tl
```

FMi: LaTeX 2_ε keeps the label boxed inside (not unboxed). This means that the content stays rigid and does not vary based on glue setting in the line with the label. There are

cases where we do want the unboxed version (I think enumitem offers that in some cases too) but it should probably not the default.

```
563 %                    TODO: customize?
564 %                    \hbox_unpack_drop:N \l__block_one_label_box
565                        \box_use_drop:N \l__block_one_label_box

566                        \exp_after:wN \use_ii:nn \l__block_item_align_tl
567                    }
568                }
```

Add another box level to the label box:

```
569          \hbox_set:Nn \l__block_one_label_box
570                    { \box_use_drop:N \l__block_one_label_box }
571      }
572    \dim_compare:nNnTF { \box_wd:N \l__block_one_label_box } > \labelwidth
573      { \bool_set_true:N \l__block_long_label_bool }
574      { \bool_set_false:N \l__block_long_label_bool }
575    \hbox_gset:Nn \g__block_labels_box
576      {
577        \hbox_unpack_drop:N \g__block_labels_box
578        \skip_horizontal:n { \itemindent - \labelsep - \labelwidth }
579        \hbox_unpack_drop:N \l__block_one_label_box
580        \skip_horizontal:n { \labelsep }
581        \bool_if:NT \l__block_next_line_bool
582          { \bool_if:NT \l__block_long_label_bool { \nobreak \hfil \break } }
583        % version of \newline inside an hbox that will be unpacked
584      }
585    % TODO??? FMi what's that?
586    % \skip_set_eq:NN \parsep \l__block_item_parsep_skip
```

The next setting is for compatibility: The list template sets \listparindent to zero and otherwise doesn't use it any more. However, in the second argument of a legacy list envrironment the user may have set it explicitly to some other value and whatever value it had was then used for \parindent within the list. Now we use its value only if it differs from zero but otherwise use whatever the template instances specify. This gives 99.9% compatibility for legacy documents. 100% for definitions using the list environment and a setting inside, but if the user used \listparindent within the document, e.g., inside a verse environment there there is one case in which the setting is ignored, i.e., when it was set back to zero. That's a rather unlikely scenario, but it is not impossible. However, I couldn't think of an approach that circumvents such boundary cases.

```
587      \dim_compare:nNnF \listparindent = {0pt}
588        { \dim_set_eq:NN \parindent \listparindent }
```

Placing the list label(s) is done when the paragraph for the \item is started, which executes __block_item_everypar: inside para/begin. By default this command does nothing, now we change it to attach the pending label or labels.

```
589      \cs_set_eq:NN \__block_item_everypar: \__block_item_everypar_std:
590  }
```

`\l__block_item_align_tl`

> 591 `\tl_new:N \l__block_item_align_tl`

(*End of definition for* `\l__block_item_align_tl`.)

`\l__block_one_label_box`
`\g__block_labels_box`

Each label is typeset in `\l__block_one_label_box` to be measured. Once this is ready, it is put (boxed or unboxed) in `\g__block_labels_box`, together with any pending labels (for the case where a list begins just after `\item`). This is an analogue of LaTeX 2ε's `\@labels`, but it is always unboxed before use, to support both boxed and unboxed labels.

> 592 `\box_new:N \l__block_one_label_box`
> 593 `\box_new:N \g__block_labels_box`

(*End of definition for* `\l__block_one_label_box` *and* `\g__block_labels_box`.)

`\l__block_long_label_bool`

Track whether the `\l__block_one_label_box` is larger than `\labelwidth`.

> 594 `\bool_new:N \l__block_long_label_bool`

(*End of definition for* `\l__block_long_label_bool`.)

`\__block_make_label_box:n`
`\__block_label_format:e`

Make one label, wrapped in `\__block_label_format:n`, with an appropriate `\strut` and possibly `\makelabel` in compatibility mode (used for the `list` environment).

> 595 `\cs_new_protected:Npn \__block_make_label_box:n #1`
> 596 `  {`
> 597 `    \hbox_set:Nn \l__block_one_label_box`
> 598 `      {`

If we do tagging then the contents of this box may need to be wrapped into a structure, e.g., `<Lbl>`.

> 599 `        \__kernel_list_label_begin:`

> 600 `        \__block_label_format:n`
> 601 `          {`
> 602 `            \bool_if:NT \l__block_label_strut_bool { \strut }`
> 603 `            \bool_if:NTF \l__block_legacy_support_bool`
> 604 `                        \makelabel`
> 605 `                        \use:n`
> 606 `              {#1}`
> 607 `          }`

And what gets opened also needs closing:

> 608 `        \__kernel_list_label_end:`
> 609 `      }`
> 610 `  }`

(*End of definition for* `\__block_make_label_box:n` *and* `\__block_label_format:e`.)

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If we aren't doing tagging the kernel hooks do nothing.

```
611 \cs_new_eq:NN \__kernel_list_label_begin: \prg_do_nothing:
612 \cs_new_eq:NN \__kernel_list_label_end:   \prg_do_nothing:
```

(*End of definition for* __kernel_list_label_begin: *and* __kernel_list_label_end:*.*)

The __block_item_everypar: command is executed as part of para/begin but most of the time does nothing, i.e., it has the following default definition outside of lists (and most of the time within lists).

```
613 \cs_new_eq:NN \__block_item_everypar: \prg_do_nothing:
```

```
614 \AddToHook{para/begin}[items]{\__block_item_everypar:}
```

Note that we have to make sure that the above code is executed after the hook chunk from tagpdf because the latter uses @inlabel to make a decision.

By the end of the day both should probably move into the kernel hook instead or, better, into sockets.

```
615 \DeclareHookRule{para/begin}{items}{after}{tagpdf}
```

What follows is the version that resets various legacy booleans and puts the label box in the right place and finally resets itself to do nothing next time. __block_item_-everypar: is set to this by the item template so that the next paragraph start runs the code below.

```
616 \cs_new_protected:Npn \__block_item_everypar_std: {
617     \__block_debug_typeout:n{item~ everypar \on@line }
618     \legacy_if_set_false:n { @minipage }
619     \legacy_if_gset_false:n { @newlist }
620     \legacy_if:nT { @inlabel }
621         {
622             \legacy_if_gset_false:n { @inlabel }

623             \box_if_empty:NT \g_para_indent_box { \kern - \itemindent }
624             \para_omit_indent:

625             \box_use_drop:N \g__block_labels_box
```

After the labels are placed we start a paragraph structure (if appropriate). This is handled in the following kernel hook:

```
626             \__kernel_list_label_after:

627             \penalty \c_zero_int
628         }
629     \legacy_if:nTF { @nobreak }
630         {
631             \legacy_if_gset_false:n { @nobreak }
632             \int_set:Nn \clubpenalty { 10000 }
633         }
634         {
635             \int_set_eq:NN \clubpenalty \@clubpenalty
```

35

Once the label(s) are typeset and we are past any special `@nobreak` handling we reset `\__block_item_everypar:` to do nothing.

```
636                \cs_set_eq:NN \__block_item_everypar: \prg_do_nothing:
637            }
638 }
```

This is the definition of `\__block_item_everypar:` before the first `\item` is encountered.

```
639 \cs_new:Npn \__block_item_everypar_first: {
640    \legacy_if:nT { @newlist }  { \@noitemerr }
641 }
```

(*End of definition for* `\__block_item_everypar:` , `\__block_item_everypar_std:` , *and* `\__block_item_-everypar_first:`.)

`\__kernel_list_label_after:`

```
642 \cs_new_eq:NN \__kernel_list_label_after: \prg_do_nothing:
```

(*End of definition for* `\__kernel_list_label_after:`.)

`\l__block_tmpa_skip`

```
643 \skip_new:N \l__block_tmpa_skip
```

(*End of definition for* `\l__block_tmpa_skip`.)

`\l__block_topsepadd_skip`
`\l__block_effective_top_skip`

Variables equivalent to LaTeX 2_ε's `\@topsepadd` and `\@topsep`. Roughly equal to a mixture of `topsep`, `partopsep`, and various `parskip` at different nesting levels in lists. The code is really elaborate when `@inlabel` is true.

```
644 \skip_new:N \l__block_topsepadd_skip
645 \skip_new:N \l__block_effective_top_skip
```

(*End of definition for* `\l__block_topsepadd_skip` *and* `\l__block_effective_top_skip`.)

`\item`

Here we already have all the building blocks. Complain in math mode. Distinguish between first item (do necessary tagging) and later items `\__block_inter_-item:` to cleanly close what's before, then call `\__block_item_instance:n` (which calls `\UseInstance{item}{⟨instance⟩}`) to prepare the upcoming item: it will be actually inserted only once some later material triggers `\everypar`.

```
646 \AddToHook{begindocument/before}{
647    \RenewDocumentCommand{\item}{ ={label}o }
648        {
649            \@inmatherr \item
```

TODO: Check if test for being outside of a list is sensible

```
650            \cs_if_free:NTF \__block_item_instance:n
651                {
652                    \@latex@error{Lonely~\string\item--perhaps~a~missing~
653                    list~environment}\@ehc
```

36

```
654              }
655          {
656            \legacy_if:nTF { @newlist }
657              {
658                \__kernel_list_item_begin:
```

The first item of a list also has to change the **@newlist** switch.

```
659                \legacy_if_gset_false:n { @newlist }
660              }
661          { \__block_inter_item: }
```

To avoid unnecessary key/val processing we make a quick check if there was an optional argument.

```
662          \tl_if_novalue:nTF {#1}           % avoids reparsing label={}
663            { \__block_item_instance:n { } }
664            { \__block_item_instance:n {#1} }
```

Set the legacy switch that signals that we have a pending item label:

```
665          \legacy_if_gset_true:n { @inlabel }
666          \ignorespaces
667        }
668      }
669 }
```

(*End of definition for* \item. *This function is documented on page 12.*)

__block_inter_item: Between items. If the previous item had no content then we need to trigger **\everypar**. Otherwise we simply close the previous item with **\par** after removing some horizontal space. Between items, there is a penalty and some space.

```
670 \cs_new_protected:Npn \__block_inter_item: {
671   \legacy_if:nT { @inlabel }
672                  { \indent \par } % case of \item\item
```

\par may have a strange definition and may not get us back to vertical mode in one go, so we better do not treat the next line as an else case to the above conditional (for now).

```
673   \mode_if_horizontal:T { \__block_skip_remove_last:
674                           \__block_skip_remove_last: \par }
```

End any LI-tag, then start the next LI-tag (if doing tagging):

```
675   \__kernel_list_item_end:
676   \__kernel_list_item_begin:

677   \addpenalty \@itempenalty
678   \addvspace \itemsep
679 }
```

(*End of definition for* __block_inter_item:.)

__kernel_list_item_begin:
__kernel_list_item_end:

```
680 \cs_new_eq:NN \__kernel_list_item_begin: \prg_do_nothing:
681 \cs_new_eq:NN \__kernel_list_item_end:   \prg_do_nothing:
```

(*End of definition for* __kernel_list_item_begin: *and* __kernel_list_item_end:.)

6.5 Tagging support commands

In this section we provide code to the various kernel hooks to support the tagging of different displayblock environments.

All of the following definitions should only be made if tagging is active!

```
682 \tag_if_active:TF {
```

__block_beginpar_vmode: When a block starts out in vertical mode, i.e., is not yet part of a paragraph, we have to start a paragraph structure. However, this is not the case if we are already flattening paragraphs, thus in this case we do nothing. We also do nothing if @endpe is currently true, because that means we are right now just after the end of a blockenv and in the process of looking if we have to end the current `<text-unit>`, i.e., it is already open.

```
683   \cs_set:Npn \__block_beginpar_vmode: {
684           \__block_debug_typeout:n
685             { @endpe = \legacy_if:nTF { @endpe }{true}{false}
686             \on@line }
687   \legacy_if:nTF { @endpe }
688       {
689         \legacy_if_gset_false:n { @endpe }
690       }
```

We test for <2 because the first flattened environment has to surround itself with a `<text-unit>`. Only any inner ones then have to avoid adding another `<text-unit>`.

```
691         {
692         \int_compare:nNnT \l__tag_block_flattened_level_int < 2
693             {
694             \__tag_gincr_para_main_begin_int:
695             \tag_struct_begin:n
696               {
697                 tag=\l__tag_para_main_tag_tl,
698                 attribute-class=\l__tag_para_main_attr_class_tl,
699               }
700             \__tag_para_main_store_struct:
701           }
702       }
703     }
```

(*End of definition for* __block_beginpar_vmode:.)

__block_beginpar_hmode:N   If the block is already part of a part of a paragraph, i.e., when it has some text directly in front, then the first thing to do is to return to vertical mode. However, that should be done without inserting a paragraph end tag, so before calling \par to do its normal work, we disable paragraph tagging and restarting afterwards again. The argument to

this config point simply gobbles the \par following it in the code above (which is used when there is no tagging going on.

```
704    \cs_set:Npn \__block_beginpar_hmode:N #1
705      {
706        \tag_mc_end:
707        \__tag_gincr_para_end_int:
708        \__block_debug_typeout:n{increment~ /P \on@line }
709        \bool_if:NT \l__tag_para_show_bool
710          { \tag_mc_begin:n{artifact}
711            \rlap{\color_select:n{red}\tiny\ \int_use:N\g__tag_para_end_int}
712            \tag_mc_end:
713          }
714        \tag_struct_end:
715        \tagpdfparaOff \par \tagpdfparaOn
716      }
```

(*End of definition for* __block_beginpar_hmode:N.)

__kernel_displayblock_doendpe: If a display block ends and is followed by a blank line we have to end the enclosing paragraph tagging structure.

```
717 \cs_set:Npn \__kernel_displayblock_doendpe: {
718      \bool_if:NT \l__tag_para_bool
719        {
```

Given that restoring \par through the legacy LATEX 2ε method can take a few iterations (for example, in case of nested lists, e.g., ...\end{itemize} \item ...\par it can happen that __kernel_displayblock_doendpe: is called while @endpe is already handled and then we should not attempt to close a <text-unit> structure). So we need to check for this.

```
720          \legacy_if:nT { @endpe }
721            {
```

If the display block currently ending was "flattened" (i.e., uses simplified paragraphs that are not tagged by a combination of <text-unit> followed by <text>, but simply with a <text>), then we don't have to do anything, because the <text> is already closed.

```
722              \__block_debug_typeout:n
723                { flattened= \bool_if:NTF
724                              \l__tag_para_flattened_bool
725                              {true}{false}
726                  \on@line }
727              \bool_if:NF \l__tag_para_flattened_bool
728                {
729                  \__block_debug_typeout:n{Structure-end~
730                    \l__tag_para_main_tag_tl\space
731                    after~ displayblock \on@line     }
732                  \__tag_gincr_para_main_end_int:
733                  \tag_struct_end: %text-unit
734                }
735            }
736        }
737 }
```

(*End of definition for* `\__kernel_displayblock_doendpe:`.)

para/begin

Paragraph tagging is mainly done using the paragraph hooks (will get moved eventually). The default hook setting is not good enough when lists get supported: we need to delay starting the paragraph tagging if we still have to place the list label. We therefore remove the existing hook data and replace it with an augmented version (this will get combined eventually).

```
738 \RemoveFromHook{para/begin}[tagpdf]
```

```
739 \AddToHook{para/begin}[tagpdf]{
740   \bool_if:NT \l__tag_para_bool {
```

if we are still waiting to typeset the list label we do nothing (the paragraph tagging then happens when the list is finally typeset).

```
741     \legacy_if:nF { @inlabel }
742       {
```

Otherwise, we start a `<text>` tag structure but only if we are not starting a paragraph immediately *after* a list, in which case we only start a new MC (because the `<text>` tag is still open from before the list — one of the reasons why lists are always put "inside" paragraphs.

We do this in a separate command, because it is needed elsewhere too.

```
743         \__block_start_para_structure:n { \PARALABEL }
744       }
745     }
746 }
```

`\__block_start_para_structure:n`

```
747 \cs_new_protected:Npn \__block_start_para_structure:n #1 {
748   \__block_debug_typeout:n
749     { @endpe = \legacy_if:nTF { @endpe }{true}{false}
750       \on@line }
751   \legacy_if:nF { @endpe }
752     {
753       \bool_if:NF \l__tag_para_flattened_bool
754         {
755           \__tag_gincr_para_main_begin_int:
756           \tag_struct_begin:n
757             {
758               tag=\l__tag_para_main_tag_tl,
759               attribute-class=\l__tag_para_main_attr_class_tl,
760             }
761           \__tag_para_main_store_struct:
762         }
763     }
764   \__tag_gincr_para_begin_int:
765   \__block_debug_typeout:n{increment~ P \on@line }
```

```
766    \tag_struct_begin:n
767        {
768            tag=\l__tag_para_tag_tl
769            ,attribute-class=\l__tag_para_attr_class_tl
770        }
771    \__tag_check_para_begin_show:nn {green}{#1}
772    \tag_mc_begin:n {}
773 }
```

The same code, but without testing @endpe. This is not needed in the standalone case and wrong inside lists.

```
774 \cs_new_protected:Npn \__block_start_para_structure_unconditionally:n #1 {
775    \bool_if:NF \l__tag_para_flattened_bool
776        {
777            \__tag_gincr_para_main_begin_int:
778            \tag_struct_begin:n
779              {
780                tag=\l__tag_para_main_tag_tl,
781                attribute-class=\l__tag_para_main_attr_class_tl,
782              }
783            \__tag_para_main_store_struct:
784        }
785    \__tag_gincr_para_begin_int:
786    \__block_debug_typeout:n{increment~ P \on@line }
787    \tag_struct_begin:n
788        {
789            tag=\l__tag_para_tag_tl
790            ,attribute-class=\l__tag_para_attr_class_tl
791        }
792    \__tag_check_para_begin_show:nn {green}{#1}
793    \tag_mc_begin:n {}
794 }

795 \RemoveFromHook{para/end}[tagpdf]
796 \AddToHook{para/end}
797    {
798      \bool_if:NT \l__tag_para_bool
799        {
800          \__tag_gincr_para_end_int:
801          \__block_debug_typeout:n{increment~ /P \on@line }
802          \tag_mc_end:
803          \__tag_check_para_end_show:nn {red}{}
804          \tag_struct_end:
805          \bool_if:NF \l__tag_para_flattened_bool
806            {
807              \__tag_gincr_para_main_end_int:
808              \tag_struct_end:
809            }
810        }
811    }

812 \def\PARALABEL{NP-}
```

(End of definition for para/begin *and* __block_start_para_structure:n. *This function is documented on page 12.)*

\para_end: If we see a \par in vmode and a <text-unit> is still open we need to close that. For this we check if a request for @endpe was made (but the \par redefinition got lost due to (bad?) coding).

```
813 \cs_set_protected:Npn \para_end: {
814   \scan_stop:
815   \mode_if_horizontal:TF {
816     \mode_if_inner:F {
817         \tex_unskip:D
818         \hook_use:n{para/end}
819         \@kernel@after@para@end
820         \mode_if_horizontal:TF {
821           \if_int_compare:w 11 = \tex_lastnodetype:D
822             \tex_hskip:D \c_zero_dim
823           \fi:
824           \tex_par:D
825           \hook_use:n{para/after}
826           \@kernel@after@para@after
827         }
828         { \msg_error:nnnn { hooks }{ para-mode }{end}{horizontal} }
829     }
830   }
831   {
832     \__kernel_endpe_vmode:        % should do nothing if no tagging
833     \tex_par:D
834   }
835 }
836 \cs_set_eq:NN \par       \para_end:
837 \cs_set_eq:NN \__blockpar   \para_end:
838 \cs_set_eq:NN \endgraf \para_end:
```

(End of definition for \para_end:. *This function is documented on page 12.)*

\begin We need to do a little more than canceling @endpe now.

```
839 \DeclareRobustCommand*\begin[1]{%
840   \UseHook{env/#1/before}%
841   \@ifundefined{#1}%
842     {\def\reserved@a{\@latex@error{Environment~#1~undefined}\@eha}}%
843     {\def\reserved@a{\def\@currenvir{#1}%
844         \edef\@currenvline{\on@line}%
845         \@execute@begin@hook{#1}%
846         \csname #1\endcsname}}%
847   \@ignorefalse
848   \begingroup
849     \__kernel_endpe_vmode:
850     \reserved@a}
```

(End of definition for \begin. *This function is documented on page 12.)*

__kernel_endpe_vmode: Close an open <text-unit> if @endpe is true and we are in vmode. Used in \para_end: and \begin.

```
851 \cs_new:Npn \__kernel_endpe_vmode: {
```

```
852    \if@endpe \ifvmode
853        \bool_if:NT \l__tag_para_bool
854  {
855    \bool_if:NF \l__tag_para_flattened_bool
856      {
857        \__tag_gincr_para_main_end_int:
858        \tag_struct_end:
859      }
860    \@endpefalse
861  }
862        \fi \fi
863 }
```

(*End of definition for* __kernel_endpe_vmode:.)

__kernel_list_label_after: If starting the text-unit/text tags got delayed because of a pending label we have to do
it after the label got typeset

```
864 \cs_set:Npn \__kernel_list_label_after: {
865    \bool_if:NT \l__tag_para_bool
866      {
867        \__block_start_para_structure_unconditionally:n { LI- }
868      }
869 }
```

(*End of definition for* __kernel_list_label_after:.)

__block_inner_begin: Start a block that has an inner structure if it isn't also a list.

```
870 \cs_new:Npn \__block_inner_begin: {
871    \tagstructbegin{tag=\l__block_tag_inner_tag_tl}
872 }
```

(*End of definition for* __block_inner_begin:.)

__block_inner_end: End a block (which isn't also a list).

```
873 \cs_new:Npn \__block_inner_end: {
874    \__block_debug_typeout:n{block-end \on@line}
875    \legacy_if:nT { @endpe }
876      {
877        \__tag_gincr_para_main_end_int:
878        \__block_debug_typeout:n{close~ /text-unit \on@line}
879        \tagstructend
880      }
881    \tagstructend        % end inner structure
882 }
```

(*End of definition for* __block_inner_end:.)

6.5.1 List tags

```
883 \tl_new:N  \l__tag_L_tag_tl
884 \tl_set:Nn \l__tag_L_tag_tl {L}
885
```

43

```
886 \tl_new:N\l__tag_L_attr_class_tl
887 \tl_set:Nn \l__tag_L_attr_class_tl {list}

888 \tag_if_active:T
889 {
890   \tagpdfsetup
891       {
892         role/new-attribute = {itemize}
893                             {/O /List /ListNumbering/Unordered},
894         role/new-attribute = {enumerate}
895                             {/O /List /ListNumbering/Ordered},
896         role/new-attribute = {description}
897                             {/O /List /ListNumbering/Description},
```

Initially, we had /None for the basic list environment, but that is not allowed in PDF/UA-2 if the list contains any Lbl tags. So now we default to Unordered.

```
898         % default if unknown
899         role/new-attribute = {list}{/O /List /ListNumbering/Unordered},
900       }
901 }

902 \def\LItag{LI}
```

__block_list_begin: Start a list …

```
903 \cs_set:Npn \__block_list_begin: {
904   \tagstructbegin
905       {
906          tag=\l__tag_L_tag_tl
907         ,attribute-class=\l__tag_L_attr_class_tl
908       }
909 }
```

(*End of definition for* __block_list_begin:.)

__block_list_item_begin: Start tagging a list item.

```
910 \cs_set:Npn \__block_list_item_begin: { \tagstructbegin{tag=\LItag} }
```

(*End of definition for* __block_list_item_begin:.)

__kernel_list_label_begin: A list label needs a <Lbl> structure tag and an MC.

```
911 \cs_set:Npn \__kernel_list_label_begin: {
912 %
913 % FMi: this needs a different logic to decide when to make the label
914 %    an artifact (after cleaning up the \item code  ), therefore
915 %    disabled for now
916 %  \tl_if_empty:oTF \@itemlabel
917 %    {
918 %      \tag_mc_begin:n {artifact}
919 %    }
920 %    {
921       \tagstructbegin{tag=Lbl}
922       \tagmcbegin{tag=Lbl}
923 %    }
924 }
```

(*End of definition for* `\__kernel_list_label_begin:`.)

`\__kernel_list_label_end:` And when we are done with the label we have to close the MC and the `<Lbl>` structure. We then start the `<LBody>`. The material inside will be "paragraph" text and the tagging for that is handled by the normal para tagging.

```
925 \cs_set:Npn \__kernel_list_label_end: {
926   \tagmcend                                 % end mc-Lbl or artifact
927 % FMi: unconditionally for now
928 %  \tl_if_empty:oF \@itemlabel
929         \tagstructend   % end   Lbl
930   \tagstructbegin{tag=\LBody}
931 }
932 \def\LBody{LBody}
```

(*End of definition for* `\__kernel_list_label_end:`.)

`\__block_list_item_end:` When a list item ends we have to close `<LBody>` and `<LI>` but also a `<text>` in the special case that the item material ends in a list (identifiable via `@endpe`).

```
933 \cs_set:Npn \__block_list_item_end: {
934   \legacy_if:nT { @endpe }
935     {
936       \__tag_gincr_para_main_end_int:
937       \tagstructend                              % text-unit
938 %       \__block_debug_typeout:n{Structure-end~ P~ at~ item-end \on@line }
939     }
940   \tagstructend \tagstructend   % end LBody, LI
941 }
```

(*End of definition for* `\__block_list_item_end:`.)

`\__block_list_end:` Finally, at the list end we have to close the open `<LBody>`, `<LI>`, `<L>`, and possibly a `<text>` if the last item ends with a list. However, if the user forgot to add an `\item` then there will be no `<LI>` and `<LBody>` open, so we check for the status of `@newlist`. The corresponding no-item error was generated earlier outside the tagging code.

One could argue that it doesn't matter if the tagging is wrong after a `\@noitemerr` was issued. However, there is one case where it isn't an error: In the `thebibliography` environment (which is internally a list) it is often the case that documents start out with an empty environment, not containing any `\bibitem`s. For that reason `\@noitemerr` is redefined inside that environment to only produce a warning; hence we have to produce correct tag structures in that case.

```
942 \cs_set:Npn \__block_list_end: {
```

If `@newlist` is true (i.e., when we have an error or warning situation) there is not much to close.

```
943   \legacy_if:nF { @newlist }
944     {
945       \legacy_if:nT { @endpe }
946         {
947           \__tag_gincr_para_main_end_int:
948           \tagstructend                              % text-unit
949           \__block_debug_typeout:n{Structure-end~ P~ at~ list-end \on@line }
950         }
```

45

```
951        \tagstructend\tagstructend  % end LBody, LI
952      }
953    \tagstructend                    % end L
954 }
```

(*End of definition for* `\__block_list_end:`.)

End of tagging related declarations.

```
955 }
```

These command should have a dummy declaration if tagging is not active

```
956 {
957    \cs_new:Npn \__block_start_para_structure_unconditionally:n #1 {}
958 }
```

6.6 Tagging recipes

`\__block_recipe_basic:`   The `basic` recipe simply ensures that the block is inside a `<text-unit>` structure and if necessary starts one. When the block ends and is followed by a blank line the `<text-unit>` structure is closed too, otherwise it remains open and further text starts with just a `<text>` structure.

There is otherwise no inner structure so `\__kernel_displayblock_begin:` and `\__kernel_displayblock_end:` do nothing—blockenvs with inner structure use the `standard` or `list` recipe instead.

```
959 \cs_new:Npn \__block_recipe_basic: {
960    \cs_set_eq:NN \__kernel_displayblock_beginpar_hmode:w
961                                                \__block_beginpar_hmode:N
962    \cs_set_eq:NN \__kernel_displayblock_beginpar_vmode:
963                                                \__block_beginpar_vmode:
964    \let \__kernel_displayblock_begin:          \prg_do_nothing:
965    \let \__kernel_displayblock_end:            \prg_do_nothing:
```

End environment `\par` handling:

```
966    \socket_assign_plug:nn{block/endpe}{on}
967 }
```

(*End of definition for* `\__block_recipe_basic:`.)

`\__block_recipe_standalone:`

The `standalone` recipe produces a block that ensures that a previous `<text-unit>` ends and that after the block a new `<text-unit>` starts.

```
968 \cs_new:Npn \__block_recipe_standalone: {
969    \cs_set_eq:NN \__kernel_displayblock_beginpar_hmode:w
970                                                \prg_do_nothing:
971    \cs_set_eq:NN \__kernel_displayblock_beginpar_vmode:
972                                                \prg_do_nothing:
973    \cs_set_eq:NN \__kernel_displayblock_begin: \__block_inner_begin:
974    \cs_set_eq:NN \__kernel_displayblock_end:   \__block_inner_end:
```

End environment `\par` handling:

```
975    \socket_assign_plug:nn{block/endpe}{off}
```

```
976    \tl_if_empty:NTF \l__block_tag_name_tl
977      { \tl_set:Nn    \l__block_tag_inner_tag_tl {Sect}            }
978      { \tl_set_eq:NN \l__block_tag_inner_tag_tl \l__block_tag_name_tl }
979  }
```

(*End of definition for* __block_recipe_standalone:.)

__block_recipe_standard: The standard recipe does the following:

- surround the block with a <text-unit> structure if not already in a a <text-unit>.
  In the latter case end the MC and the <text> but leave the <text-unit> open.

  If we are producing flattened paragraphs, just close any <text> but do not open a
  <text-unit>.

- Then open an new (inner) structure (by default <Figure> but typically the one
  specified on the instance).

- At the end of the block close the inner structure (<Figure> or explicit one) but
  leave the <text-unit> open to be either continued or closed due to a following
  \par.

```
980  \cs_new:Npn \__block_recipe_standard:
981  {
982    \cs_set_eq:NN \__kernel_displayblock_beginpar_hmode:w
983                                          \__block_beginpar_hmode:N
984    \cs_set_eq:NN \__kernel_displayblock_beginpar_vmode:
985                                          \__block_beginpar_vmode:
986    \cs_set_eq:NN \__kernel_displayblock_begin: \__block_inner_begin:
987    \cs_set_eq:NN \__kernel_displayblock_end:   \__block_inner_end:
```

End environment \par handling:

```
988    \socket_assign_plug:nn{block/endpe}{on}
```

```
989    \tl_if_empty:NTF \l__block_tag_name_tl
990      { \tl_set:Nn    \l__block_tag_inner_tag_tl {Figure}          }
991      { \tl_set_eq:NN \l__block_tag_inner_tag_tl \l__block_tag_name_tl }
992  }
```

(*End of definition for* __block_recipe_standard:.)

\l__block_tag_inner_tag_tl

```
993  \tl_new:N \l__block_tag_inner_tag_tl
```

(*End of definition for* \l__block_tag_inner_tag_tl.)

__block_recipe_list: The list recipe does the following.

- It opens a <text-unit>-structure or keeps the current one open (only closing the
  MC).

- It then starts a new structure rolemapped to L-structure and arranges for handling
  list items, e.g., Li, Lbl and LBody structures.

47

- At the end it closes open list structures as needed but keeps the `<text-unit>`-structure open to continue the paragraph after the list, if necessary.

```
994 \cs_new:Npn \__block_recipe_list:
995 {
996   \cs_set_eq:NN \__kernel_displayblock_beginpar_hmode:w
997                                           \__block_beginpar_hmode:N
998   \cs_set_eq:NN \__kernel_displayblock_beginpar_vmode:
999                                           \__block_beginpar_vmode:
1000  \cs_set_eq:NN \__kernel_displayblock_begin: \__block_list_begin:
1001  \cs_set_eq:NN \__kernel_displayblock_end:   \__block_list_end:
```

The next two lines could be done globally, because they are only called if we do have `\items`, i.e., if we are in a list. It is therefore also not necessary to reset them in other recipes (right now—this may change if we get more templates (like inline lists)).

```
1002  \cs_set_eq:NN \__kernel_list_item_begin:   \__block_list_item_begin:
1003  \cs_set_eq:NN \__kernel_list_item_end:     \__block_list_item_end:
```

End environment `\par` handling:

```
1004  \socket_assign_plug:nn{block/endpe}{on}
```

Handle the tag name and attribute classes using the key values from the current list instance.

```
1005  \tl_if_empty:NTF \l__block_tag_name_tl
1006     { \tl_set:Nn    \l__tag_L_tag_tl {L}                  }
1007     { \tl_set_eq:NN \l__tag_L_tag_tl \l__block_tag_name_tl }
1008  \tl_if_empty:NTF \l__block_tag_class_tl
1009     { \tl_set:Nn    \l__tag_L_attr_class_tl {}                }
1010     { \tl_set_eq:NN \l__tag_L_attr_class_tl \l__block_tag_class_tl }
1011 }
```

(*End of definition for* `\__block_recipe_list:`.)

7 Implementation of document-level block environments

Most such environments are pretty simple: they take an optional argument and call a `blockenv` instance to do the work. At the end of environment we call `\endblockenv` to finish.

7.1 Displayblock environments

There are two basic block environment which are similar to LaTeX 2_ε's `trivlist` except that there aren't degenerated lists and thus have no hidden `\item` inside.

displayblock (*env.*)

```
1012 \NewDocumentEnvironment{displayblock}{ !O{} }
1013   { \UseInstance{blockenv}{displayblock} {#1} }
1014   { \endblockenv }
```

```
1015 \NewDocumentEnvironment{displayblockflattened}{ !O{} }
1016   { \UseInstance{blockenv}{displayblockflattened} {#1} }
1017   { \endblockenv }
```

7.2 The `center`, `flushleft`, and `flushright` environments

```
1018 \AddToHook{begindocument/before}{
1019   \RenewDocumentEnvironment{center} { !O{} }
1020   { \UseInstance{blockenv}{center}{#1} }
1021   { \endblockenv }
1022
1022   \RenewDocumentEnvironment{flushright} { !O{} }
1023   { \UseInstance{blockenv}{flushright}{#1} }
1024   { \endblockenv }
1025
1025   \RenewDocumentEnvironment{flushleft} { !O{} }
1026   { \UseInstance{blockenv}{flushleft}{#1} }
1027   { \endblockenv }
1028 }
```

7.3 Display quote environments

```
1029 \AddToHook{begindocument/before}{
1030   \RenewDocumentEnvironment{quote}{ !O{} }
1031     { \UseInstance{blockenv}{quote} {#1} }
1032     { \endblockenv }
1033
1033   \RenewDocumentEnvironment{quotation}{ !O{} }
1034     { \UseInstance{blockenv}{quotation} {#1} }
1035     { \endblockenv }
1036 }
```

7.4 Verbatim environments

```
1037 \AddToHook{begindocument/before}{
1038   \RenewDocumentEnvironment{verbatim}{ !O{} }
1039     { \UseInstance{blockenv}{verbatim} {#1}
```

This is the part of the code where verbatim and verbatim* differ.

```
1040       \@setupverbinvisiblespace\frenchspacing\@vobeyspaces
1041       \@xverbatim
1042     }
1043     { \endblockenv }
```

49

```
1044  \RenewDocumentEnvironment{verbatim*}{ !O{} }
1045    { \UseInstance{blockenv}{verbatim} {#1}
1046      \@setupverbvisiblespace\frenchspacing\@vobeyspaces
1047      \@sxverbatim
1048    }
1049    { \endblockenv }
1050 }
```

7.4.1 Helper commands for verbatim

\legacyverbatimsetup

This code resembles the LaTeX 2ε verbatim implementation with a slight twist: in LaTeX 2ε each code line was a paragraph using `\leftskip=\@totalleftmargin`. This was possible because the whole environment was implemented as a trivlist. As this is no longer the case setting `\leftskip` would alter the layout of a surrounding list. So instead we need to make sure that the paragraph end is executed in a group so that any parshape setup is preserved.

```
1051 ⟨@@=⟩
1052 \def\legacyverbatimsetup{%
1053   \language\l@nohyphenation
1054   \@tempswafalse
1055   \def\par{%
1056     \if@tempswa
1057       \leavevmode \null {\@@par}\penalty\interlinepenalty
1058     \else
1059       \@tempswatrue
1060       \ifhmode{\@@par}\penalty\interlinepenalty\fi
1061     \fi}%
1062   \let\do\@makeother \dospecials
1063   \obeylines \verbatim@font \@noligs
1064   \everypar \expandafter{\the\everypar \unpenalty}%

1065   \tl_set:Nn \l__tag_para_tag_tl {codeline}
1066 }
1067 ⟨@@=block⟩
```

(*End of definition for* `\legacyverbatimsetup`. *This function is documented on page 11.*)

\@setupverbinvisiblespace In the pdfTeX engine we need to use `\pdffakespace` chars for the invisible spaces.

```
1068 \newcommand\@setupverbinvisiblespace{}
1069 \tag_if_active:T {
1070   \bool_if:NF\g__tag_mode_lua_bool
1071     {
1072       \renewcommand\@setupverbinvisiblespace
1073         {\def\@xobeysp{\nobreakspace\pdffakespace}}
1074     }
1075 }
```

(*End of definition for* `\@setupverbinvisiblespace`. *This function is documented on page 11.*)

7.5 Standard list environments

For the standard lists everything is managed by the blockenv instance.

```
1076 \AddToHook{begindocument/before}{
1077   \RenewDocumentEnvironment{itemize}{!O{}}
1078     { \UseInstance{blockenv}{itemize} {#1} }
1079     { \endblockenv }

1080   \RenewDocumentEnvironment{enumerate}{!O{}}
1081     { \UseInstance{blockenv}{enumerate} {#1} }
1082     { \endblockenv }

1083   \RenewDocumentEnvironment{description}{!O{}}
1084     { \UseInstance{blockenv}{description} {#1} }
1085     { \endblockenv }
1086 }
```

7.6 verse environment

verse *(env.)* The verse environment has not special tagging currently. It is defined as a simple standard list and takes the tagging from there. But it must be redefined so that `\itemindent` is correctly set.

```
1087 \AddToHook{begindocument/before}{
1088   \RenewDocumentEnvironment{verse}{ !O{} }
1089     {
1090       \let\\\@centercr
1091       \UseInstance{blockenv}{list}
1092         {
1093           item-indent=-1.5em,
1094           parindent=-1.5em,
1095           item-skip=0pt,
1096           rightmargin=\leftmargin,
1097           leftmargin=\leftmargin+1.5em,
1098           #1
1099         }
1100       \item\relax
1101     }
1102     { \endblockenv }
1103   }
```

list *(env.)*

The legacy 2e list environment is more complicated as we have to get the extra arguments accounted for.

```
1104 \AddToHook{begindocument/before}{
1105   \RenewDocumentEnvironment{list}{O{} m m }
1106     {
```

51

We do this by storing them away and then call the list instance. Inside this instance the `setup-code` key contains `\legacylistsetupcode`, which makes use of the stored values.

```
1107        \tl_set:Nn \l__block_legacy_env_params_tl
1108          {
1109            \tl_set:Nn \@itemlabel {#2}
1110            #3
1111          }

1112        \UseInstance{blockenv}{list} {#1}
1113      }
1114      { \endblockenv }
1115 }
```

\legacylistsetupcode

And here is the extra code for use in the list instance setup inside the key `setup-code`.

```
1116 \cs_new:Npn \legacylistsetupcode {
```

Reset values to defaults:

```
1117        \dim_zero:N \listparindent
1118        \dim_zero:N \rightmargin
1119        \dim_zero:N \itemindent
```

By default a `list` environment is not numbered, but this happens already in the block template.

```
1120 %     \tl_set:Nn \@listctr {}
1121 %     \legacy_if_set_false:n { @nmbrlist } % needed if lists are nested
```

By default there is a simple definition for `\makelabel`. It can be overwritten in the second mandatory argument to the list environment (stored in `\l__block_legacy_-env_params_tl`) and is used if the instance sets the compatibility key to true.

```
1122        \let\makelabel\@mklab % TODO: customize
```

Now we use the argument with parameter settings to update some or all of the above defaults:

```
1123        \l__block_legacy_env_params_tl
```

As we don't know much about this list we can only make a guess about the nature of the list and the setting of the tag name (default `list` rolemapped to `<L>`) and any tag attributes may have to be overwritten in the optional key/value argument. But we do have some hints to play with.

```
1124        \legacy_if:nTF { @nmbrlist }
1125          { \tl_set:Nn \l__tag_L_attr_class_tl {enumerate} }   % numbered list
1126          { \tl_if_empty:NTF \@itemlabel
1127              { \tl_set:Nn \l__tag_L_attr_class_tl {list}     } % no label
```

```
1128              { \tl_set:Nn \l__tag_L_attr_class_tl {itemize} } % unnumbered,
1129                                                                %   unordered
1130          }
1131    }
```

(*End of definition for* `\legacylistsetupcode`. *This function is documented on page 11.*)

`\l__block_legacy_env_params_tl`

```
1132    \tl_new:N\l__block_legacy_env_params_tl
```

(*End of definition for* `\l__block_legacy_env_params_tl`.)

> **Replace with code not using `\list`**

```
1133    \AddToHook{begindocument/before}{
1134      \RenewDocumentEnvironment{trivlist}{ !O{} }
1135                              { \list[#1]{}
1136                                {
1137                                  \dim_zero:N \leftmargin
1138                                  \dim_zero:N \labelwidth
1139                                  \cs_set_eq:NN \makelabel \use:n
1140                                }
1141                              }
1142        { \endblockenv }
1143    }
```

7.7 Theorem-like environments

Theorem-like environments are defined in LaTeX with the help of `\newtheorem` declarations. Internally they used a list with a single item. Using lists was convenient back then, but in a tagged document you end up with a strange structure. We therefore alter the mechanism.

`\newtheorem`   This is a slightly streamlined version of `\newtheorem`, but it still uses a lot of the 2e code for now. Eventually this will change.

```
1144    \RenewDocumentCommand \newtheorem { m O{#1} m o }
1145    {
1146      \expandafter\@ifdefinable\csname #1\endcsname
1147        {
1148          \str_if_eq:nnTF{#1}{#2}
1149            {
1150              \@definecounter {#2}
1151              \IfNoValueTF {#4}
1152                {  % @ynthm
1153                  \tl_gset:ce { the #2 }
1154                    {
1155                      \@thmcounter{#2}
1156                    }
1157                }
1158                {  % @xnthm
1159                  \@newctr{#1}[#4]
1160                  \tl_gset:ce { the #2 }
```

```
1161                 {
1162                     \expandafter\noexpand\csname the#4\endcsname
1163                     \@thmcountersep
1164                     \@thmcounter{#2}
1165                 }
1166             }
1167         }
1168         {  % @othm
1169             \@ifundefined{c@#2}
1170                 { \@nocounterr{#2} }
1171                 {
1172                     \tl_gset:cn { the #1 }
1173                         { \UseName { the #2 } }
1174                 }
1175         }
1176         \global\@namedef{#1}    { \@thm{#2}{#3} }
1177         \global\@namedef{end#1}{ \@endtheorem  }
1178     }
1179 }
```

(*End of definition for* `\newtheorem`.)

`\@thm` `\@thm` executes `\refstepcounter` too early for hyperref and structure destinations: the generated target is outside the structure and can be separated from the theorem by a page break. We therefore move the anchor setting into `\@begintheorem`. `\@begintheorem` doesn't currently get the name of the counter as argument, so we store it in variable for now, to be able to pass it along.

```
1180 \tl_new:N \l__block_thm_current_counter_tl
1181 \def\@thm#1#2{%
1182   \@kernel@refstepcounter{#1}
1183   \tl_set:Nn \l__block_thm_current_counter_tl{#1}
1184   \@ifnextchar[{\@ythm{#1}{#2}}{\@xthm{#1}{#2}}}
```

To avoid that hyperref overwrites the definition again we must its patch:

```
1185 \def\hyper@nopatch@thm{}
```

(*End of definition for* `\@thm`.)

`\@begintheorem`
`\@opargbegintheorem` The `\@thm` command expands to either `\@beginthorem` or `\@opargbegintheorem`. For the moment we stick with this as it will help with the transition. But instead of using a `trivlist` we use a blockenv and some tagging for the title (as a Caption). We do not want potential tagging from `\textbf` here, so we use `\bfseries` to set the font. The commands set also the link targets which should be inside the main structure.

```
1186 \def\@begintheorem#1#2{
1187   \UseInstance{blockenv}{theorem}{}
1188   \tagpdfparaOff

1189   \noindent
1190   \MakeLinkTarget{\l__block_thm_current_counter_tl}
```

```
1191    \tag_struct_begin:n{tag=Caption}
1192     \group_begin:
1193     \bfseries
1194     \tag_mc_begin:n {}
1195       #1\
1196     \tag_mc_end:
1197      \tag_struct_begin:n{tag=Lbl}
1198        \tag_mc_begin:n {}
1199            #2
1200        \tag_mc_end:
1201      \tag_struct_end:
1202      \group_end:
1203    \tag_struct_end:
1204    \tagpdfparaOn

1205    \__block_start_para_structure_unconditionally:n { \PARALABEL }

1206    \itshape
1207    \hskip\labelsep
1208    \ignorespaces
1209 }
1210 \def\@opargbegintheorem#1#2#3{
1211    \UseInstance{blockenv}{theorem}{}
1212    \tagpdfparaOff

1213    \noindent
1214    \MakeLinkTarget{\l__block_thm_current_counter_tl}
1215    \tag_struct_begin:n{tag=Caption}
1216     \group_begin:
1217     \bfseries
1218     \tag_mc_begin:n {}
1219         #1\
1220     \tag_mc_end:
1221     \tag_struct_begin:n{tag=Lbl}
1222        \tag_mc_begin:n {}
1223          #2
1224        \tag_mc_end:
1225     \tag_struct_end:
1226        \tag_mc_begin:n {}
1227         \ (#3)
1228        \tag_mc_end:
1229      \group_end:
1230    \tag_struct_end:
1231    \tagpdfparaOn

1232    \__block_start_para_structure_unconditionally:n { \PARALABEL }

1233    \itshape
1234    \hskip\labelsep
1235    \ignorespaces
1236 }

1237 \def\@endtheorem{\endblockenv}
```

(*End of definition for* \@begintheorem *and* \@opargbegintheorem.)

8 Instance declarations for environments

8.1 Blockenv instances

The blockenv instances handle overall setup for the document-level environments, i.e.,

- name of the environment for debugging purposes (`env-name`)

- how tagging should be performed (`tagging-recipe`, `tag-name`, `tag-class`)

- does this environment changes the block level if nested (`level-increase`)

- any special setup code; normally not used (`setup-code`)

- what kind of block instance should be used (`block-instance`)

- what kind of para instance should be used; empty means inherit from the outside (`para-instance`)

- are inner paragraphs real paragraphs (default) or are they just `<text>` structures and part of an outer paragraph (`para-flattened`)

- what kind of inner instance should be used, if any (`inner-instance`, `inner-instance-type`)

- the counter name of the inner level, if any (`inner-level-counter`)

- supported nesting depth of the inner level, if relevant (`max-inner-levels`)

- extra code executed at the end, by default `\ignorespaces` (`final-code`)

The blockenv displayblock instance below shows the full set with those using default values being commented out.

8.1.1 Basic instances

`blockenv displayblock` (*inst.*) This is like LaTeX 2_ε's `trivlist`, i.e., it produces a vertical block with default setting, but doesn't put a list inside but uses a `<Figure>` structure.

> should this really generate a /Figure structure?

```
1238 \DeclareInstance{blockenv}{displayblock}{display}
1239 {
1240   env-name       = displayblock,
1241 %  tagging-recipe = standard,
1242 %  tag-name       = ,
1243 %  tag-class      = ,
1244   level-increase = false,
1245 %  setup-code     = ,
1246 %  block-instance = displayblock ,
1247 %  para-instance  = ,
1248 %  para-flattened = false ,
1249 %  inner-instance = ,
1250 %  inner-instance-type = list , % not relevant as there is no inner instance
1251 %  inner-level-counter  = ,     % not relevant as there is no inner instance
1252 %  max-inner-levels = 4,        % not relevant as there is no inner instance
1253 %  final-code = \ignorespaces ,
1254 }
```

This flattens inner paragraphs without any surrounding tag structure by using the `basic`
tagging recipe.

```
1255 \DeclareInstance{blockenv}{displayblockflattened}{display}
1256 {
1257   env-name        = displayblockflattened,
1258   tag-name        = ,
1259   tag-class       = ,
1260   tagging-recipe = basic,
1261   inner-level-counter  = ,
1262   level-increase = false,
1263   setup-code      = ,
1264   block-instance = displayblock ,
1265   para-flattened = true ,
1266   inner-instance = ,
1267 }
```

8.1.2   Center, flushleft, and flushright instances

All three environments use the `displayblock` instance as block instance. They only
differ in the choice of para instance.

blockenv center (*inst.*)   The `center` environment without using a list internally.

```
1268 \DeclareInstance{blockenv}{center}{display}
1269 {
1270   env-name        = center,
1271   tag-name        = ,
1272   tag-class       = ,
1273   tagging-recipe = basic,
1274   inner-level-counter  = ,
1275   level-increase = false,
1276   setup-code      = ,
1277   block-instance = displayblock ,
1278   para-flattened = true ,
1279   para-instance  = center ,
1280   inner-instance = ,
1281 }
```

blockenv flushleft (*inst.*)   The `flushleft` environment without using a list internally.

```
1282 \DeclareInstance{blockenv}{flushleft}{display}
1283 {
1284   env-name        = flushleft,
1285   tag-name        = ,
1286   tag-class       = ,
1287   tagging-recipe = basic,
1288   inner-level-counter  = ,
1289   level-increase = false,
1290   setup-code      = ,
1291   block-instance = displayblock ,
1292   para-flattened = true ,
1293   para-instance  = raggedright ,
1294   inner-instance = ,
1295 }
```

The `flushright` environment without using a list internally.

```
1296 \DeclareInstance{blockenv}{flushright}{display}
1297 {
1298   env-name        = flushleft,
1299   tag-name        = ,
1300   tag-class       = ,
1301   tagging-recipe = basic,
1302   inner-level-counter  = ,
1303   level-increase = false,
1304   setup-code      = ,
1305   block-instance = displayblock ,
1306   para-flattened = true ,
1307   para-instance  = raggedleft ,
1308   inner-instance = ,
1309 }
```

8.1.3 Blockquote instances

LaTeX 2_ε has two environments for quoting: `quote` and `quoation`. By default they differ only in indentation of inner paragraphs. This is handled by using separate block instances.
The tag names are both roll-mapped to `<BlockQuote>`.

For the `quotation` environment:

```
1310 \DeclareInstance{blockenv}{quotation}{display}
1311 {
1312   env-name        = quotation,
1313   tag-name        = quotation,
1314   tag-class       = ,
1315   tagging-recipe = standard,
1316   inner-level-counter  = ,
1317   level-increase = true,
1318   setup-code      = ,
1319   block-instance = quotationblock ,
1320   inner-instance =   ,
1321 }
```

For the `quote` environment:

```
1322 \DeclareInstance{blockenv}{quote}{display}
1323 {
1324   env-name        = quote,
1325   tag-name        = quote,
1326   tag-class       = ,
1327   tagging-recipe = standard,
1328   inner-level-counter  = ,
1329   level-increase = true,
1330   setup-code      = ,
1331   block-instance = quoteblock ,
1332   inner-instance =   ,
1333 }
```

8.1.4 The theorem instance

We use `<theorem-like>` as the structure name and rolemap it to a `<Sect>` because that can hold a `<Caption>`.

```
1334 \DeclareInstance{blockenv}{theorem}{display}
1335 {
1336   env-name       = theorem-like,
1337   tag-name       = theorem-like,
1338   tag-class      = ,
1339   tagging-recipe = standalone,
1340   inner-level-counter  = ,
1341   level-increase = false,
1342   setup-code     = ,
1343   block-instance = theoremblock ,
1344 }
```

8.1.5 The verbatim instance

The rolemapping is `<verbatim>` to `<Code>` and `<codeline>` to `<Sub>` (which is role mapped to `<Span>` in pdf 1.7). Sub inside Code is allowed according the errata of ISO 32005. The paragraphs inside verbatim are flattened. Line numbers should inside the `<codeline>` structure and be tagged either as `<Lbl>` or `<Artifact><Lbl>`.

```
1345 \DeclareInstance{blockenv}{verbatim}{display}
1346 {
1347   env-name       = verbatim,
1348   tag-name       = verbatim,
1349   tag-class      = ,
1350   tagging-recipe = standard,
1351   para-flattened = true,
1352   inner-level-counter  = ,
1353   level-increase = false,
1354   setup-code     = ,
1355   block-instance = verbatimblock ,
1356   inner-instance = ,
1357   final-code     = \legacyverbatimsetup ,
1358   para-instance  = justify
1359 }
```

8.1.6 Standard list instances

For the `itemize` environment:

```
1360 \DeclareInstance{blockenv}{itemize}{display}
1361 {
1362   env-name       = itemize,
1363   tag-name       = itemize,
1364   tag-class      = itemize,
1365   tagging-recipe = list,
1366   inner-level-counter  = \@itemdepth,
```

```
1367    level-increase = true,
1368    max-inner-levels = 4,
1369    setup-code      = ,
1370    block-instance = list ,
1371    inner-instance = itemize ,
1372  }
```

blockenv enumerate (*inst.*)

For the enumerate environment:

```
1373  \DeclareInstance{blockenv}{enumerate}{display}
1374  {
1375    env-name            = enumerate,
1376    tag-name            = enumerate,
1377    tag-class           = enumerate,
1378    tagging-recipe      = list,
1379    level-increase      = true,
1380    setup-code          = ,
1381    block-instance      = list ,
1382    inner-level-counter = \@enumdepth,
1383    max-inner-levels    = 4,
1384    inner-instance      = enum ,
1385  }
```

blockenv description (*inst.*)

For the description environment:

```
1386  \DeclareInstance{blockenv}{description}{display}
1387  {
1388    env-name        = description,
1389    tag-name        = description,
1390    tag-class       = description,
1391    tagging-recipe = list,
1392    inner-level-counter  = ,
1393    level-increase = true,
1394    setup-code      = ,
1395    block-instance = list ,
1396    inner-instance = description ,
1397  }
```

blockenv list (*inst.*) The general (legacy) list environment does some of its setup in the setup-code key.

```
1398  \DeclareInstance{blockenv}{list}{display}
1399  {
1400    env-name        = list,
1401    tag-name        = list,
1402    tag-class       = ,
1403    tagging-recipe = list,
1404    level-increase = true,
1405    setup-code      = \legacylistsetupcode ,
1406    block-instance = list ,
1407    inner-level-counter  = ,
1408    inner-instance = legacy ,
1409  }
```

60

8.2 Block instances

Below, we declare the different block instances for the document-level environments. Some, such as the displayblock ones are shared between different environments (as long as one doesn't need to adjust individual values), other environments have their own instances (for precisely that reason).

8.2.1 Displayblock instances

We provide 6 nesting levels (as in LaTeX 2_ε). If you want to provide more you need to change the `maxblocklevels` counter, offer further `displayblock-xx` instances but also define further (legacy) `\list⟨romannumeral⟩` commands for the defaults. If not, then the settings from the previous level are reused automatically—which may or may not be good enough).

```
1410 \setcounter{maxblocklevels}{6}
```

Here we need level zero as well in case a flattened displayblock (like the center env) it is used on top-level.

We show all keys here for reference, with those using their default values commented out:

```
1411 \DeclareInstance{block}{displayblock-0}{display}
1412   {
1413 %    heading       = ,                              %??
1414 %    beginsep      = \topsep ,
1415 %    begin-par-skip = \partopsep ,
1416 %    par-skip      = \parsep ,
1417 %    end-skip      = \KeyValue{beginsep} ,
1418 %    end-par-skip  = \KeyValue{begin-par-skip} ,
1419 %    item-skip     = \itemsep ,
1420 %    beginpenalty  = \UseName{@beginparpenalty} ,
1421 %    endpenalty    = \UseName{@endparpenalty} ,
1422     leftmargin    = 0pt ,
1423 %    rightmargin   = \rightmargin ,
1424 %    parindent     = 0pt ,
1425   }
```

```
1426 \DeclareInstanceCopy{block}{displayblock-1}{displayblock-0}
1427 \DeclareInstanceCopy{block}{displayblock-2}{displayblock-0}
1428 \DeclareInstanceCopy{block}{displayblock-3}{displayblock-0}
1429 \DeclareInstanceCopy{block}{displayblock-4}{displayblock-0}
1430 \DeclareInstanceCopy{block}{displayblock-5}{displayblock-0}
1431 \DeclareInstanceCopy{block}{displayblock-6}{displayblock-0}
```

8.2.2 Verbatim instances

Verbatim instances have there own levels so that one can specify specific indentations or vertical separations between line.

```
1432 \DeclareInstance{block}{verbatimblock-0}{display}
```

61

```
1433   {
1434     leftmargin        = 0pt ,
1435     par-skip          = 0pt ,
1436   }
```

```
1437 \DeclareInstanceCopy{block}{verbatimblock-1}{verbatimblock-0}
1438 \DeclareInstanceCopy{block}{verbatimblock-2}{verbatimblock-0}
1439 \DeclareInstanceCopy{block}{verbatimblock-3}{verbatimblock-0}
1440 \DeclareInstanceCopy{block}{verbatimblock-4}{verbatimblock-0}
1441 \DeclareInstanceCopy{block}{verbatimblock-5}{verbatimblock-0}
1442 \DeclareInstanceCopy{block}{verbatimblock-6}{verbatimblock-0}
```

8.2.3   Quote/quotationblock instances

Quote and quotation are not flattened, i.e., they change levels, thus they start with level 1 not 0.

block quoteblock-1 (*inst.*)
block quoteblock-2 (*inst.*)
block quoteblock-3 (*inst.*)
block quoteblock-4 (*inst.*)
block quoteblock-5 (*inst.*)
block quoteblock-6 (*inst.*)

Default layout is to indent equally from both sides.

```
1443 \DeclareInstance{block}{quoteblock-1}{display}
1444   { rightmargin = \KeyValue{leftmargin} }
```

```
1445 \DeclareInstanceCopy{block}{quoteblock-2}{quoteblock-1}
1446 \DeclareInstanceCopy{block}{quoteblock-3}{quoteblock-1}
1447 \DeclareInstanceCopy{block}{quoteblock-4}{quoteblock-1}
1448 \DeclareInstanceCopy{block}{quoteblock-5}{quoteblock-1}
1449 \DeclareInstanceCopy{block}{quoteblock-6}{quoteblock-1}
```

block quotationblock-1 (*inst.*)
block quotationblock-2 (*inst.*)
block quotationblock-3 (*inst.*)
block quotationblock-4 (*inst.*)
block quotationblock-5 (*inst.*)
block quotationblock-6 (*inst.*)

Quotation additionally changes the parindent.

```
1450 \DeclareInstance{block}{quotationblock-1}{display}
1451   { parindent = 1.5em , rightmargin = \KeyValue{leftmargin} }
```

```
1452 \DeclareInstanceCopy{block}{quotationblock-2}{quotationblock-1}
1453 \DeclareInstanceCopy{block}{quotationblock-3}{quotationblock-1}
1454 \DeclareInstanceCopy{block}{quotationblock-4}{quotationblock-1}
1455 \DeclareInstanceCopy{block}{quotationblock-5}{quotationblock-1}
1456 \DeclareInstanceCopy{block}{quotationblock-6}{quotationblock-1}
```

8.2.4   Block instances for the theorems

block theoremblock-0 (*inst.*)

Theorems do not support nesting, so we have only one to set up. The LaTeX default reused the general value of \parindent and \parskip and, of course, they start at the outer margin.

```
1457 \DeclareInstance{block}{theoremblock-0}{display}
1458   {
1459     leftmargin        = 0pt ,
1460     parindent         = \parindent ,
1461     par-skip          = \parskip ,
1462   }
```

8.2.5 Block instances for the standard lists

The block instances for the various list environments use the same underlying instance (well, by default) and nothing needs to be set up specifically (because that is already done in the legacy \list⟨*romannumeral*⟩ unless a different layout is wanted.

```
1463 \DeclareInstance{block}{list-1}{display}{
1464 %   heading         = ,                        % unused, might vanish
1465 %   beginsep        = \topsep ,
1466 %   begin-par-skip  = \partopsep ,
1467 %   par-skip        = \parsep ,
1468 %   end-skip        = \KeyValue{beginsep} ,
1469 %   end-par-skip    = \KeyValue{begin-par-skip} ,
1470 %   beginpenalty    = \UseName{@beginparpenalty} ,
1471 %   endpenalty      = \UseName{@endparpenalty} ,
1472 %   leftmargin      = \leftmargin ,
1473 %   rightmargin     = \rightmargin ,
1474 %   parindent       = 0pt ,
1475 }
1476 \DeclareInstance{block}{list-2}{display}{}
1477 \DeclareInstance{block}{list-3}{display}{}
1478 \DeclareInstance{block}{list-4}{display}{}
1479 \DeclareInstance{block}{list-5}{display}{}
1480 \DeclareInstance{block}{list-6}{display}{}
```

8.3 List instances for the standard lists

For all list instances we have to say what kind of label we want (`item-label`) and how it should be formatted.

For `itemize` environments this is all we need to do and we refer back to the external definitions rather than defining the `item-label` code in the instance to ensure that old documents still work.

```
1481 \DeclareInstance{list}{itemize-1}{std}{ item-label = \labelitemi }
1482 \DeclareInstance{list}{itemize-2}{std}{ item-label = \labelitemii }
1483 \DeclareInstance{list}{itemize-3}{std}{ item-label = \labelitemiii }
1484 \DeclareInstance{list}{itemize-4}{std}{ item-label = \labelitemiv }
```

`enumerate` environments are similar, except that we also have to say which counter to use on each level.

```
1485 \DeclareInstance{list}{enum-1}{std}
1486   { item-label = \labelenumi ,   counter = enumi }
1487 \DeclareInstance{list}{enum-2}{std}
1488   { item-label = \labelenumii ,  counter = enumii }
1489 \DeclareInstance{list}{enum-3}{std}
1490   { item-label = \labelenumiii , counter = enumiii }
1491 \DeclareInstance{list}{enum-4}{std}
1492   { item-label = \labelenumiv ,  counter = enumiv }
```

For the legacy `list` environment there is only one instance which is reused on all levels. This is done this way one because the legacy `list` environment sets all its parameters

through its arguments. So this instances shouldn't really be touched. It sets the `legacy-support` key to true, which means that the list code uses `\makelabel` for formatting the label

```
1493 \DeclareInstance{list}{legacy}{std} {
1494   item-instance = basic ,
1495   legacy-support = true ,
1496 }
```

list description (*inst.*) The `description` lists also use only a single list instance with only one key not using the default:

```
1497 \DeclareInstance{list}{description}{std} { item-instance = description }
```

8.4   Item instances

item basic (*inst.*)   There two item instances set up: `description` for use with the `description` environ-
item description (*inst.*) ment and `basic` for use with all other lists (up to now).

```
1498 \DeclareInstance{item}{basic}{std}
1499                   { label-align = right }
```

```
1500 \DeclareInstance{item}{description}{std}
1501   {
1502     label-format = \normalfont\bfseries #1 ,
1503     label-align = left
1504   }
```

8.5   Para instances

```
1505 \tag_if_active:T
1506 {
1507   \tagpdfsetup
1508     {
1509        role/new-attribute = {justify}     {/O /Layout /TextAlign/Justify},
1510        role/new-attribute = {center}      {/O /Layout /TextAlign/Center},
1511        role/new-attribute = {raggedright}{/O /Layout /TextAlign/Start},
1512        role/new-attribute = {raggedleft} {/O /Layout /TextAlign/End},
1513     }
1514 }
```

para center (*inst.*)

```
1515 \DeclareInstance{para}{center}{std}
1516 {
1517   para-class            = center ,
1518   indent-width          = 0pt ,
1519 %  start-skip            = 0pt ,
1520   left-skip             = \@flushglue ,
1521   right-skip            = \@flushglue ,
1522   end-skip              = \z@skip ,
1523   final-hyphen-demerits = 0 ,
1524   cr-cmd                = \@centercr ,
1525 }
```

para raggedright (*inst.*)

```
1526 \DeclareInstance{para}{raggedright}{std}
1527 {
1528   para-class          = raggedright ,
1529   indent-width        = 0pt ,
1530 % start-skip           = 0pt ,
1531   left-skip           = \z@skip ,
1532   right-skip          = \@flushglue ,
1533   end-skip            = \z@skip ,
1534   final-hyphen-demerits = 0 ,
1535   cr-cmd              = \@centercr ,
1536 }
```

para raggedleft (*inst.*)

```
1537 \DeclareInstance{para}{raggedleft}{std}
1538 {
1539   para-class          = raggedleft ,
1540   indent-width        = 0pt ,
1541 % start-skip           = 0pt ,
1542   left-skip           = \@flushglue ,
1543   right-skip          = \z@skip ,
1544   end-skip            = \z@skip ,
1545   final-hyphen-demerits = 0 ,
1546   cr-cmd              = \@centercr ,
1547 }
```

para justify (*inst.*) Justifying is exactly what the default values do, so the instance hasn't any special setup.

```
1548 \DeclareInstance{para}{justify}{std}
1549 {
1550 % para-class          = justify ,
1551 % indent-width        = \parindent ,
1552 % start-skip           = 0pt ,
1553 % left-skip           = \z@skip ,
1554 % right-skip          = \z@skip ,
1555 % end-skip            = \@flushglue ,
1556 % final-hyphen-demerits =  5000 ,
1557 % cr-cmd              = \@normalcr ,
1558 }
```

\centering
\raggedleft
\raggedright
\justifying

```
1559 \DeclareRobustCommand\centering  {\UseInstance{para}{center}{}}
1560 \DeclareRobustCommand\raggedleft {\UseInstance{para}{raggedleft}{}}
1561 \DeclareRobustCommand\raggedright{\UseInstance{para}{raggedright}{}}
1562 \DeclareRobustCommand\justifying {\UseInstance{para}{justify}{}}

1563 \justifying
```

(*End of definition for* \centering *and others.*)

```
1564 ⟨/package⟩

1565 ⟨∗latex-lab⟩
1566 \ProvidesFile{block-latex-lab-testphase.ltx}
```

65

```
1567              [\ltlabblockdate\space v\ltlabblockversion\space
1568                            blockenv implementation]
1569 \RequirePackage{latex-lab-testphase-block}
1570 ⟨/latex-lab⟩
```

A Documentation from first prototype implementations

A.1 Open questions

- Existing questions — moved to issues —

A.2 Code cleanup

- Actually implement what's announced.

- Encapsulate most uses of `\legacy_if…` into commands with expl3 syntax: we cannot rename these booleans for compatibility reasons but we can make the code cleaner nevertheless. — made issue —

- The `\topsep` and `\partopsep` business is tricky to reproduce exactly (see `\@topsepadd` and `\@topsep`) because of how it accumulates when lists are nested immediately.

A.3 Tasks

- Change author to LaTeX Team once it's nice enough to deserve that label.

- Reproducing exactly the standard layouts and examples in the enumitem documentation.

- Hooks, but do not duplicate those that already exist as environment hooks. Hence, mostly around items.

- Customization and interaction with LDB:

  - Allow arbitrary nesting depth with automatically defined styles for labels, counters etc.
  - Adapt everything to font size! (e.g. footnotes).
  - How to model the inheritance from trivlist to list to enumerate?

- Add key–value settings mimicking enumitem's ability to set any four of five horizontal parameters and deduce the fifth by `\leftmargin` + `\itemindent` = `\labelindent` + `\labelwidth` + `\labelsep`.

- Provide good ways to customize how overlong labels are dealt with.

- Use the `.aux` file.

  - Implement the `\ref` styles that enumitem provides.
  - Reverse enumerations, important in publication lists and the like. Somehow avoid needing 3 compilations for references to reverse enumerations to settle?

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- Ability to calculate `\labelwidth` from the label contents. Share calculated parameters between multiple environments (cf. `resume` option).

- Related to grabbing the whole list environment, and input syntax variations:

  - Other layouts: tabular (see listliketab vs typed-checklist), multicolumn and horizontally numbered (see `tasks`), inline lists, runin lists in the easy case where there is no intervening `\par`.

  - Formatting the item text in a box or similar (requires grabbing the whole list).

  - Filtering which items to show: hide certain items according to criteria (useful together with list reuse), see typed-checklist.

  - Shorthands `\iitem` for automatic nested lists, or `\1`, `\2` etc from outlines.

  - Support markdown input like asciilist.

- Check interaction with `babel` options such as `french` or `accadian` (see FrenchItemizeSpacing)

- RTL and vertical typesetting.

B Plan of attack of first prototype

Typesetting list environments involves a rather large number of parameters. They can be affected by the context such as the total list nesting level, the nesting level of the given type of list, and the font size. An environment like `enumerate` has two main aspects.

- It has a certain layout in the page, with vertical and horizontal spacing around it. This type of layout is shared with environments such as `quote`, `flushright`, or `tabbing`. This common layout is implemented in LaTeX 2_ε through `\trivlist` (or `\list`).

- It defines how each `\item` should be typeset: how to construct the label, in particular the `counter` name, and how to format the content of the item.

This suggests defining two object types, *block* and *item* covering these two aspects.[1] While the *item* type will perhaps have a single template, one could typeset a *block* object in several ways, for instance the standard LaTeX 2_ε way or a fancy colored box.

The *general block* template should receive the following parameters. The *plain block* template is a restricted template that freezes all item-related parameters to dummy values (`counter`, `start`, `resume`, `label-width`, `label-sep` and all `item-*`). The *list block* template is a restricted template[2] that omits the `heading` parameter and whose default for `item-instance` is non-empty.

- Structural parameters: the `heading` to place before, `counter` name, `start` value, whether to `resume` a previous list, and the `item-instance` (an *item* instance) to use when typesetting items.

---

[1]Possibly also *endblock* to deal with decorations at the end?

[2]A better approach could be to have a notion of inheritance for object types, so that we end up with two different *object types*. Then we can implement other template for the list object type: *table* for lists typeset as rows/columns of a table, *inline* for lists typeset in horizontal mode within a paragraph, and *runin* for run-in lists.

- Vertical spacing and penalties: `beginpenalty`, `beginsep`, `begin-par-skip`, `item-penalty`, `item-skip`, `item-par-skip`, `endpenalty`, `end-skip`, `end-par-skip`.

- Horizontal spacing: `rightmargin`, `leftmargin`, `parindent`, `item-indent`, `label-width`, `label-sep`.

document class
customizations

A document class should edit these templates (or define restricted templates) to set up default values that depend on `\g_block_nesting_depth_int`, namely how many lists are nested overall.[3] The document class should then set up an instance of these templates for each environment, with appropriate settings such as a `heading`, a suitable `item-instance`, or making `margin-right` equal to `margin-left` in a `quote` environment.

The *inline-list block* template receives many fewer parameters. Note that `beginsep`, `item-skip`, `end-skip` are now *horizontal* skips.

- Structural parameters: `counter`, `start`, `resume`, `item-instance`.

- Spacing and penalties: `beginpenalty`, `beginsep`, `item-penalty`, `item-skip`, `endpenalty`, `end-skip`.

- Horizontal spacing: `label-width`, `label-sep`.

The *std item* template should receive the following parameters. They depend on the type of list and its nesting level among lists of such type, but typically not on the total nesting level.

- Counter name (`counter`), shared with the parent *list block* template, but needed for incrementing.

- Label construction: a function `counter-label` that produces the label from the counter name, used if `\item` is given without argument.

- References: a function `counter-ref` for how the label should be referred to when it is constructed from the counter, `label-ref` and `label-autoref` used when `\item` has an optional argument.

- Label formatting: `label-format` function, `label-strut` boolean.

- Label alignment (`label-align`, `label-boxed`, `next-line`).

- Content parameters: `text-font`.

- A `compatibility` boolean that controls for instance whether `\makelabel` is used.

document class
customizations

The document class should set up an instance such as *enumiii* for each environment and nesting level.[4]

A given environment will adjust some nesting levels, then call the *block* instance appropriate to the environment type, passing it the *item* instance appropriate to the environment and depth. Additional context-dependence could be provided by l3ldb, but the main context-dependence should not rely on it for simplicity reasons and incidentally because l3ldb is not yet available.

---

[3]Does xtemplate provide a way to specify default values that are only evaluated once an instance is used?

[4]This should be made easily extendible to deeper levels.

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