The l3tl-build package: building token lists*

The LaTeX3 Project†

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1 l3tl-build documentation

This module provides no user function: it is meant for kernel use only.

There are two main ways of building token lists from individual tokens. Either in one go within an `x`-expanding assignment, or by repeatedly using `\tl_put_right:Nn`. The first method takes a linear time, but only allows expandable operations. The second method takes a time quadratic in the length of the token list, but allows expandable and non-expandable operations.

The goal of this module is to provide functions to build a token list piece by piece in linear time, while allowing non-expandable operations. This is achieved by abusing `\toks`: adding some tokens to the token list is done by storing them in a free token register (time $O(1)$ for each such operation). Those token registers are only put together at the end, within an `x`-expanding assignment, which takes a linear time.[1] Of course, all this must be done in a group: we can't go and clobber the values of legitimate `\toks` used by LaTeX 2_ε.

Since none of the current applications need the ability to insert material on the left of the token list, I have not implemented that. This could be done for instance by using odd-numbered `\toks` for the left part, and even-numbered `\toks` for the right part.

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[1] If we run out of token registers, then the currently filled-up `\toks` are put together in a temporary token list, and cleared, and we ultimately use `\tl_put_right:Nx` to put those chunks together. Hence the true asymptotic is quadratic, with a very small constant.

1.1 Internal functions

__tl_build:Nw
__tl_gbuild:Nw
__tl_build_x:Nw
__tl_gbuild_x:Nw

```
\__tl_build:Nw ⟨tl var⟩ ...
\__tl_build_one:n {⟨tokens_1⟩} ...
\__tl_build_one:n {⟨tokens_2⟩} ...
...
\__tl_build_end:
```

Defines the ⟨*tl var*⟩ to contain the contents of ⟨*tokens1*⟩ followed by ⟨*tokens2*⟩, *etc.* This is built in such a way to be more efficient than repeatedly using `\tl_put_right:Nn`. The code in "`...`" does not need to be expandable. The commands `\__tl_build:Nw` and `\__tl_build_end:` start and end a group. The assignment to the ⟨*tl var*⟩ occurs just after the end of that group, using `\tl_set:Nn`, `\tl_gset:Nn`, `\tl_set:Nx`, or `\tl_gset:Nx`.

__tl_build_one:n
__tl_build_one:(o|x)

```
\__tl_build_one:n {⟨tokens⟩}
```

This function may only be used within the scope of a `\__tl_build:Nw` function. It adds the ⟨*tokens*⟩ on the right of the current token list.

__tl_build_end:

Ends the scope started by `\__tl_build:Nw`, and performs the relevant assignment.

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