LaTeX3 News

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Now that we're back from the TeX Users Group conference in San Francisco, it's time to discuss what's been going on over the last six months. Due to some extra travel plans after the conference, this issue is slightly late in coming out.

expl3 in practice

Joseph Wright and Will Robertson have both released significant new versions of their packages, resp., siunitx and fontspec. These have been re-written in the LaTeX3 programming language expl3, which we have discussed here previously. Using expl3 for production code has been very successful, both in demonstrating that the concepts are sound and highlighting areas that still need some attention.

In the case of fontspec, expl3 programming is being used to target LaTeX running on either XeTeX and LuaTeX. In the latter case, the package is a mixture of Lua code and expl3 code; Will presented the unicode-math package at TUG 2010, which is developed in the same style.

New xpackages

Frank Mittelbach has started to work on a new experimental LaTeX3 package xhead that provides templates for one of the most complex areas of document design: section headings and document divisions. This is the beginning of an ambitious idea to map out the requirements for typesetting most documents currently processed with LaTeX.

One of the challenges here is providing a "natural" design language for describing the two-dimensional spatial relationships of objects participating in the design, e.g., the placement of a heading number in relation to the heading title, a possible sub-title, etc. In answer to this challenge Frank developed the xcoffin package, which he presented at TUG 2010. It is designed as a high-level interface for placing and aligning boxes on a page, allowing a 'designer's approach' for indicating the positional relationship between boxes. (A 'coffin' is a box with handles.) As an example, it is possible to represent ideas such as 'align the lower-left corner of box A with the upper-right corner of box B after rotating it ninety degrees', without having to calculate the intermediate positions.

We expect a future version of xcoffin (after some further work on its interface layer and its internal implementation) to play a major role in all packages providing layout templates for higher-level document objects, such as table of contents designs, floats, etc.

Finally, Joseph Wright has begun work with the current 'galley' packages, producing the new, minimal, xgalley based on xfm-galley as a testbed for what we need and what will work.

Developments with expl3

Meanwhile, Joseph's *also* been writing a new floating-point calculation module, called l3fp, for expl3. This module allows manipulation and calculation of numbers with a much larger range than TeX allows naturally. The l3fp module has already been utilised in the xcoffin code for calculatations such as coordinate rotations and intersection points of vectors.

The modules l3io and l3file have been revised, rethinking the way that read and write streams are dealt with. TeX has a hard limit of sixteen input and output streams open at any one time, and the new implementation for expl3 provides more flexibility in how they are allocated; there's now much less chance of running into a '`No room for a new \read`' (or `\write`) error.

Sometimes we discuss ideas for expl3 that *don't* end up making it into the final code. One example of this is the concept of having 'local registers' for integers, boxes, and so on, that do not survive outside of the group they are defined in (in contrast to Plain TeX and LaTeX, where allocators such as `\newcount` and `\newbox` are always global). Despite the scope for some small benefit, we decided that the extra complexity that the additional functions required, in both syntax and documentation, was not justified.

TUG 2010 reflections

Our interpretation of the broad themes discussed at the conference are that TeX-based systems are still thriving and there are some big problems to solve with robust solutions to transform LaTeX source, including mathematics, into a form such as HTML. While there are big pushes for standardising various aspects of the LaTeX syntax, we also believe that it is LaTeX's very flexibility—its inherently non-standardised markup—that has allowed it to survive for so many years. There is a delicate trade-off here between moving forward into more standards-based territory while also retaining the extensibility of the third-party package system.

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