New Interfaces for LaTeX Class Design: Parts I and II

David Carlisle
LaTeX3 Project
david.carlisle@latex-project.org

Frank Mittelbach
LaTeX3 Project
frank.mittelbach@latex-project.org

Chris Rowley
LaTeX3 Project and Open University, UK
chris.rowley@latex-project.org

Introduction Traditional LaTeX class files typically implement one fixed design via ad hoc, and often low-level, (LA)TeX code. This style of implementation makes it much harder than is either desirable or necessary to produce classes that implement a specific visual design. Moreover, the construction of such classes typically involves a lot of work that is essentially programming and thus does not live easily with the declarative kind of design specification for a document (or range of documents) that would be produced by a professional typographic designer.[1]

This work introduces some extensions to LaTeX that will help to provide a new, more declarative interface that can be used in class files. It is based on the idea of a *template*, which describes how to carry out some action but which provides some flexibility since its code uses the values of a set of named (keyword) parameters. The specific design for this action, as required for a particular class, is then selected by choosing values for the template's named parameters.

Plans The plan is to provide standard *templates* for a wide range of typographic objects but, of course, new templates for new ideas can be created, possibly by adapting an existing one or by a little LaTeX programming. It is our firm belief that there will soon be a large range of templates available and that it will thus be possible for the majority of class files to be implemented in a declarative way, by simply choosing suitable templates and supplying values for their named parameters.

Spin-off technology Whilst applying the idea of templates to document design in LaTeX we have had the opportunity to substantially rethink many of the basic concepts of LaTeX's formatting machinery. This has led to the development of major enhancements in the following parts of LaTeX.

Paragraphs: there will be a completely new model and design interface for all aspects of paragraph-making, including: the parameters that control TeX's hyphenation and justification system; special typographical treatment of the beginning and end of paragraphs, e.g., initial letters/words (lettrines), nested run-on headings, etc.

Galleys: the paragraph model will be linked to a new model for the construction of galleys from paragraphs and other material; this model will incorporate current standard LaTeX concepts such as logical labels, marks and colour-change nodes, together with more experimental objects such as hyper-information nodes.

Floats: these elements have undergone a major redevelopment:

Captions: the formatting and positioning of the caption can be decided individually for each float and can depend on exactly where on the spread it appears.

Position: the position specification allows changes if the float does not fit on the current page.

[1] [This is an up-to-the-minute report from the LaTeX3 team; a written version will follow in a future issue of *TUGboat*. – Ed.]

Pages: more flexibility and better specification of both individual float pages and sequences of float pages (e.g., at chapter ends), including more possibilities to choose whether a text page or float page should be used.

Margins: better integration of floats and marginal material, allowing floats to appear in margins and for text to be changed according to which margin is used.

Alignment: better support for alignment between 'minipages', specified using logical handles such as 'top centre', 'centre left' or 'first baseline right': the relative positioning of two boxes (with such handles) is done by choosing a handle on each box and the (2-D) offset between these handles.

Page layout: more types of pages and spreads within a document; more layout choices and parameterisations.

Document commands: new tools for providing document-level syntax.

Professional support: for editorial and page make-up processes currently used in the publishing industry: e.g., flexible manual control over positioning of floats, etc. in the final form document; automated handling of complex bibliographic information in the front-matter of journal articles.

These are all, of course, still severely limited by what is practical within current TEX; for example, precise control over page-breaking within paragraphs is simply unobtainable using TEX's standard mechanisms. Nevertheless, we hope that what we have been able to do will inspire others to use the tools we provide in the creation and use of high-quality typographic designs.

Talks The two talks will explain these concepts and show examples of their use, covering both the current standard LATEX designs and some more exciting new possibilities.

We shall demonstrate working examples of the application of these ideas in most of the major areas of document design, including page layout, section headings, lists and captions.

We shall also report on the current status of this work and on our plans to complete and publish it.