

## A roadmap for $\TeX$ development

TUG's  $\TeX$  Development Fund committee

A foundation has generously provided a substantial outright grant and an equal matching grant to the  $\TeX$  Users Group (TUG) to be used for  $\TeX$  development. Along with these grants, there was a strong suggestion, with which we fully concur, to create a “roadmap” of  $\TeX$  development for allocating these and future funds.

We do not contemplate a prescriptive roadmap. No central authority can dictate  $\TeX$  directions, as many independent institutions and individuals contribute to  $\TeX$ 's development. In addition, the available money is not sufficient to fully fund (and thus perhaps more strongly direct) major projects.

The  $\TeX$  user groups do cooperate in many ways, including coordination of development efforts. For instance, one major community project is the Comprehensive  $\TeX$  Archive Network (CTAN), supported by the user groups and other institutions. CTAN amounts to a giant library of user-developed shared routines, and is the central release point for  $\TeX$  updates; the  $\TeX$  Live and MiK $\TeX$  distributions take the bulk of their material from CTAN.

Overall, we feel our best general strategy for allocating funding is to select existing efforts that look especially significant and promising, and which already involve people who have the necessary skill, motivation, availability, and a track record of major  $\TeX$  accomplishments. We can then give those people a financial boost, as well as a nudge of approval, that we can hope will help them stay motivated and working, perhaps finishing a little faster and with greater certainty.

When we look around the  $\TeX$  world for such ongoing efforts and people, three activities look especially exciting to us:

- Lua $\TeX$ , <http://www.luatex.org/>
- $\TeX$  Gyre fonts, <http://www.gust.org.pl/projects/e-foundry/tex-gyre/>
- X $\TeX$ , <http://scripts.sil.org/xetex/>

### Lua $\TeX$

The Lua $\TeX$  effort aims to fulfill the long-held desire for a general purpose programming language embedded in  $\TeX$ : the difficulty of coding everything in  $\TeX$  macros is well known.

The project is being led by Hans Hagen (developer of the Con $\TeX$ t macro package et al., as well as president of the Dutch language  $\TeX$  user group), Taco Hoekwater (current maintainer of MetaPost and long-time  $\TeX$  developer), and Hartmut Henkel

(another long-time developer on pdf $\TeX$  and other projects), with assistance from several others. Generally speaking, Hans is handling the Lua side of things, Taco is handling the  $\TeX$  side of things, and Hartmut is handling the PDF side of things. The project is guided to some extent by the successful development of pdf $\TeX$ , originated by Hàn Thê Thành (who is consulting to Lua $\TeX$ ) and subsequently joined by essentially this same group of people.

The Lua $\TeX$  FAQ gives the following criteria which resulted in Lua being the language chosen for the project: freely available, portable, straightforward to embed within pdf $\TeX$ , small footprint, easy to extend with pdf $\TeX$ -specific functionality, and fun to work with.<sup>1</sup> In addition to Lua and some of its libraries, the Lua $\TeX$  project intends to include bidirectional typesetting functionality from Aleph, have flexible and diverse font support (including Unicode and OpenType), and integrate MetaPost as a native graphics capability in the system.

The project has been underway for about two years, and the first public beta demonstration was in July 2007 at the TUG 2007 conference: the third day of the conference included several presentations relating to Lua $\TeX$ .<sup>2</sup> A public release is expected in the summer of 2008, and some early users are already working with and testing it.

A related project is MPlib: modernizing the MetaPost implementation to greatly improve graphics support in Lua $\TeX$ , among other benefits.

Lua $\TeX$  has already received a grant from Colorado State University (for support of typesetting of Oriental languages, which relates to the features above) and support from the  $\TeX$  user groups. Continued funding is critical to maintain progress.

### $\TeX$ Gyre fonts

The  $\TeX$  Gyre project aims at extending the 33 base PostScript text fonts (the 35 fonts minus the two symbol fonts) by adding glyphs and accents to support all languages using the Latin character set, and also making them available in OpenType format. Furthermore, the existing free versions of these fonts never had enough math capability for the needs of many  $\TeX$  users, and so Gyre also plans to add Unicode-based math — a gargantuan effort.

The people doing this work are Bogusław Jackowski and Janusz Nowacki of the Polish lan-

<sup>1</sup> The FAQ continues, “Lua was the first language to match all these criteria. The ‘known’ scripting languages tended to be much too large for our use. Specifically, we have rejected Java, Perl, Python, Ruby, Scheme on one or more of those criteria.”

<sup>2</sup> <http://river-valley.tv/conferences/tex/tug2007>

guage T<sub>E</sub>X user group, who developed and continue to maintain the Latin Modern font family (<http://www.gust.org.pl/projects/e-foundry/latin-modern>), which extend Knuth's Computer Modern in just the same way. They have also reconstituted several other historical typefaces. The infrastructure for these prior projects is now being brought to bear on Gyre.

An interesting connection is that the LuaT<sub>E</sub>X developers have stated that the Gyre fonts will be a basic component of the LuaT<sub>E</sub>X distribution.

To date, the Gyre project has been funded by the T<sub>E</sub>X user groups. Again, continued funding is critical to maintain progress.

### X<sub>Ǝ</sub>T<sub>E</sub>X

X<sub>Ǝ</sub>T<sub>E</sub>X has been developed by Jonathan Kew of SIL. It is a modification of Knuth's T<sub>E</sub>X engine enabling use of Unicode and modern font technologies. X<sub>Ǝ</sub>T<sub>E</sub>X thus allows users to ignore the complexities that typically frustrate a new T<sub>E</sub>X user (and many long-time T<sub>E</sub>X users) when they try to configure their systems to use fonts not originally built for use with T<sub>E</sub>X, i.e., most of the fonts in the world.

X<sub>Ǝ</sub>T<sub>E</sub>X is substantially a one-man show, and the product of Jonathan's efforts is eliciting great excitement and interest in the T<sub>E</sub>X world. While X<sub>Ǝ</sub>T<sub>E</sub>X was originally developed for Mac OS X systems, the 2007 release of T<sub>E</sub>X Live includes X<sub>Ǝ</sub>T<sub>E</sub>X binaries for Windows, GNU/Linux, and many other Unix variants. Jonathan's presentation on X<sub>Ǝ</sub>T<sub>E</sub>X at the TUG 2007 conference is available from the same web site cited earlier.

While the X<sub>Ǝ</sub>T<sub>E</sub>X and LuaT<sub>E</sub>X project are basically independent, Hans et al. and Jonathan maintain contact and see no severe incompatibilities.

Jonathan's work with X<sub>Ǝ</sub>T<sub>E</sub>X shows his motivation and capabilities. However, we have caught the X<sub>Ǝ</sub>T<sub>E</sub>X effort at a point where its core functionality is already complete, and therefore is not a good candidate for our limited funding — which brings us to the next project.

### A new front-end

Our donor strongly requested consideration of a new or updated front end, based especially on experiences working with students. As it turns out, Jonathan Kew is seeking additional work, and he is also personally interested in working on such a front-end project.

Thus, he, Karl Berry, and Richard Koch (who created and maintains the successful TeXShop front end for Mac OS X, and is also a new TUG director) have sketched some approaches for a new front end

and how it could improve on the many extant programs in this area. Examples: use an existing cross-platform toolkit (the goal being to appear “native” to users on any platform); ease importing, conversion, and placement of graphics; ease handling of errors; automate typeset output refresh to minimize pain from the edit-compile-preview cycle.

Of course we cannot know precisely how a new program will turn out, but we are confident that there is a niche for it, and that Jonathan is the right person to get the project off the ground.

### Other worthy work

There is plenty of other worthy work going on, and it is not our intention to slight it. However, we feel it is better to select a few important projects where funding is known both to be needed and to make a significant difference, rather than to try to fund many projects in a smaller way.

### Our recommendations

Based on the above, we propose to divide the grant funds into three parts, allocating one part to LuaT<sub>E</sub>X, one part to T<sub>E</sub>X Gyre, and one part to initiating a suitable front-end project, making use of Jonathan Kew's availability. The proportions will be determined as the need arises; for instance, if a particular project receives significant support from other sources, clearly that could have an impact.

We cannot emphasize enough that we believe the best way to make use of these funds is to find motivated and capable people who we can expect to work in sensible and pragmatic directions — not to try to guess the best directions and then struggle to find people to do work not of their own choosing.

### T<sub>E</sub>X Development Fund committee

TUG president Karl Berry is deeply involved in many areas of the T<sub>E</sub>X world, including aspects of core T<sub>E</sub>X development. Kaja Christiansen is the vice-president of TUG, has a development background, maintains T<sub>E</sub>X (among other things) at the University of Århus in Denmark, and supports the TUG web site there. Jim Hefferon is a TUG director and on the mathematics faculty at Saint Michael's College in Vermont, where he runs one of the three backbone CTAN nodes. Dave Walden is treasurer of TUG, is an intermediately skilled user of T<sub>E</sub>X, and spent his pre-retirement working life contributing to and leading significant and innovative software development projects.

- ◇ TUG's T<sub>E</sub>X Development Fund committee  
Info: <http://tug.org/tc/devfund>  
Donations: <http://tug.org/donate>