

# Integration with 3rd party applications

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Slides at [mathtran docs](#) on SVN on Sourceforge

## Jon Udell's insight on T<sub>E</sub>X, L<sup>A</sup>T<sub>E</sub>X and the web

In 2000 Jon Udell, in a report on *Internet Groupware for Scientific Collaboration* wrote:

*T<sub>E</sub>X and L<sup>A</sup>T<sub>E</sub>X define scientific publishing for a generation of scientists. But these formats don't integrate directly into the shared spaces of the Web.*

In July 2009, after encountering the Polymath project, he wrote:

*Why didn't I see, then, that the crux of the issue wasn't XML and MathML and SVG, but rather the ability to **“integrate directly into the shared spaces of the Web”**? And that what ought to be integrated directly was the typesetting language already familiar to mathematicians, namely L<sup>A</sup>T<sub>E</sub>X?*

<http://blog.jonudell.net/2009/07/31/polymath-equals-user-innovatio/>

mimetex: <http://www.forkosh.com/mimetex.html>

Easily deployed pseudo- $\text{\LaTeX}$  image server, written by John Forkosh.

Example of a *dynamic image server*. Place portable C-program into CGI folder and your web server will now serve images.

For example, to get something like  $x^2 + y^2 = z^2$  use

`http://example.org/mimetex.cgi?x^2%2By^2%3Dz^2`

(which is prefix plus the  $\text{\TeX}$  source escaped for use in a URL).

**Pro:** Easily deployed. In particular, works on Windows. Good performance.

**Con:** Not really  $\text{\TeX}$ / $\text{\LaTeX}$ , both in typesetting and input. Difficult to extend. No error messages for bad input.

Widely used as part of the Moodle VLE.

# JavaScript and img:alt

Here's an unusual HTML image tag.

```
<img alt="tex:x^2+y^2=z^2" />
```

The IMG does not have a SRC attribute, to tell us what image to display.

The ALT text is used for accessibility, and when there's no image.

However, it's easy to write some JavaScript that

1. Finds all the IMG elements on the page
2. that have an ALT attribute that starts 'tex:'
3. and adds to these IMG elements
4. a SRC attribute that points to the image on a server

## www.mathtran.org: a $\text{T}_{\text{E}}\text{X}$ based image server

Inspired by mimetex, but really uses  $\text{T}_{\text{E}}\text{X}$  for its typesetting.  
Developed by Jonathan Fine.

- ▶ Served smart images, containing (a)  $\text{T}_{\text{E}}\text{X}$  source, (b) output dvi, (c) error log, (d) image depth.
- ▶ We can ‘unrender’, resize and edit smart images.
- ▶  $\text{T}_{\text{E}}\text{X}$  run as a daemon — images are too cheap to cache.
- ▶ Uses a secure offshoot of  $\text{T}_{\text{E}}\text{X}$ ’s plain format.

**Pro:** Really uses  $\text{T}_{\text{E}}\text{X}$ . High-performance (runs  $\text{T}_{\text{E}}\text{X}$  as a daemon). Serves smart images. Available as maintained public service.

**Con:** Requires Unix/Linux, difficult to deploy. Plain  $\text{T}_{\text{E}}\text{X}$  extended, not  $\text{\LaTeX}$ .

**Note:** In input syntax, mimetex is closer to  $\text{\LaTeX}$  than MathTran. But in architecture and typesetting, MathTran is closer than mimetex.

## Web services — MathML, Illustrator and beyond

JavaScript/web service combination (sometimes called AJAX) is very powerful.

Suppose we have a T<sub>E</sub>X-to-MathML web service. By changing the JavaScript at the top of the page we can replace

```
<img alt="tex:x^2+y^2=z^2" />
```

by a MathML element.

We'd like to know that all our T<sub>E</sub>X-notation formulas can be translated to MathML (standards and validation).

Instead of using JavaScript in web browser as client, we could use any other program. Easy to fetch images using http.

This allows us to, say plug in a formula editor into Adobe Illustrator. Speaker has written a proof-of-concept version.

## Client side integration: JsMath, AsciiMathML, MathJax

Goal is to create web-page 'drop-in' that provides math support.

**JsMath** (Davide Cervone) is an emulation of  $\text{\LaTeX}$  math typesetting for the browser. It uses  $\text{\TeX}$ 's math fonts, if installed, otherwise downloads bitmap fonts.

**Pro:** Nice looking output, scalable fonts,  $\text{\LaTeX}$  input. **Con:** Slow, not exactly  $\text{\LaTeX}$ .

**AsciiMathML** (Peter Jipsen) is browser JavaScript that translates a custom language into MathML.

**Pro:** MathML, instant preview editor. **Con:** Custom language.

**MathJax** (Davide Cervone, Design Science) is *project*: JsMath brought up to date on fonts, to support both  $\text{\LaTeX}$  and MathML, and to provide integration API.

# Documentation, examples, help and templates

This is related to GUI tools for authoring math formulas. Many users will require *on page help*.

This help should be readily customisable, to make it depend on subject and level. Here's a wish-list:

- ▶ List of all commands
- ▶ Help should depend on context, e.g. subject and level.
- ▶ Provide templates
- ▶ Hyperlink commands to definitions
- ▶ Highlight errors in  $\text{T}_\text{E}\text{X}$  markup

MathTran is being developed to allow this sort of help to be authored, stored and delivered.

Wish to make the help system a 'drop-in' component that can be placed on 3rd-party web pages.



# Mathematics for the math-unaware system

**Problem:** How do I get math into a document/forum that doesn't support maths? I want editable, reusable, accessible.

**Solution:** Can't be done nicely, so cheat.

- ▶ Use either an image or a link to an image. But use smart images and smart links (e.g. ALT text).
- ▶ In browser use extension, plugin or bookmarklet.
- ▶ On desktop use Object-Link-Embedding (OLE) or similar technology.
- ▶ Supplement standard client with web-service.

Browser plugin: <http://labs.mozilla.com/ubiquity/> (Ubiquity)

Desktop plugin: <http://humanized.com/> (Enso)

# Conclusions

Advice for now:

- ▶ Try to future-proof your investment in content and tools.

Wish-list:

- ▶ Uniform math notation for both print and web use.
- ▶  $\text{T}_{\text{E}}\text{X}$  quality typesetting as readily available and easily deployed web-service.
- ▶ Ditto for  $\text{T}_{\text{E}}\text{X}$  to MathML translation.
- ▶ Combining of forces (both AsciiMathML and MathJax generate generate MathML).
- ▶ Useful JavaScript modules and libraries.
- ▶ Browser (and other) plug-ins for mathematical content.