MM Support in VTeX 7.3+

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1 Multiple Master fonts

The Multiple Master (MM) technology has been offered by Adobe in the early nineties as a way of creating a large number of variant fonts, differing from the basic design in weight, spacing, or the design size. Adobe, over a span of a few years, has designed about ninety multiple master fonts, extending several traditional designs into MM, as well as offering several brand new ones (Minion and Myriad, for example). While ultimately Adobe has abandoned its MM effort, the existing Multiple Master fonts are among the most interesting fonts around.

Until now, there was no transparent way of using MM fonts in TeX. While any MM font can be used as a single-master font (based on the default parameter values), and most TeX software can use MM fonts in such way, this forfeits all the design variations, which is the only reason to use MM fonts in the first place. The use of the MM instancing software (MMInstance, for example) does allow access to the designs, but only the pre-chosen ones, and requires to maintain the instance fonts.

VTeX 7.3+, on the other hand, incorporates the instancing ability as part of the compiler and creates both the instance fonts and the required metrics on the fly.

2 Font name and metrics instancing

To simplify the access to the instance fonts, VTeX extends the syntax of the TeX `\font` command with this convention: if the font name includes brackets, the values within the brackets are the instancing parameters. For example, in

```
\font\sm=xo_____
\font\mm=xo_____[300,10]
```

the `\sm \font` declaration defines the default shape of the Multiple Master CronosMM font; but the second declaration defines an instance of this MM font to be constructed dynamically.

The first declaration causes TeX to load the usual `.tfm` metrics file (`xo_____.tfm`); the second declaration causes TeX to load the Multiple

font Metrics file (xo⎯⎯⎯.mfm) and generate the instance metrics on the fly. Because of the use of .mfm files providing metrics file for each instance becomes unnecessary.

The additional variation of the syntax is the encoding vector. Without the encoding vector, MM instances are built in the StandardEncoding layouts; these are generally suitable only for English writing. Reencoded fonts can be specified with the e=... clause. For example

```
\font\mm=xo⎯⎯⎯[e=ly1,300,10]
```

builds a LY1-encoded instance of the CronosMM font.

Since it is currently impossible to use virtual fonts over MM instances (the Multiple Master Virtual Font format is yet to be invented), we recommend using MM instances together with a suitable encoding vector. For most european languages, the LY1 encoding is suitable.

3   Dynamic metrics creation

The following rules govern the dynamic font metrics creation:

▷   space size (\param[1]) is set to the width of the space character (which is always present in MM fonts).

▷   space stretch (\param[2]) is set to double of space size.

▷   space shrink (\param[3]) is set to two thirds of space size.

▷   x-height (\param[4]) is set to height of the always present letter x.

▷   quad (\param[5]) is set to four times of space size.

▷   extra space (\param[6]) is set to be equal to space size.

All of these assignments can be changed by changing the parameters upon loading the font.

The following ligatures are automatically formed when creating the instance metrics (assuming that the ligatures are indeed present in the fonts):

▷   /fi

▷   /fl

▷   /endash

▷   /emdash

▷   /quotedblleft

▷   /quotedblright

4   Font instancing; Configuration

MM support necessitated making several changes in the format of VTeX font mapping files. These changes are

▷   the g option

▷ the m option

▷ the dynamic name option

All three syntax additions are used in the file, `mm.ali`. Here are the sample entries to declare the CronosMM font:

```
@CronosMM = xo_____  %100,100
@CronosMM%s_%04d_wt_%04d_op = xo_____  %100,100,g,
  b="xo_____",m="250..700,6..72"
```

The first entry is used for declare the non-reencoded, non-instanced version of CronosMM; the second is the template for the instance fonts, as explained below.

The font instancing is accomplished by pure PostScript (GeX) means. An essential twist here is that by default VTeX does not load Type 1 fonts into GeX (which would have hurt the performance).

VTeX 7.3+ allows the additional option "g" to be listed in the font configuration files. The g option forces the fonts to be loaded via the GeX interpreter; this makes instancing possible. In addition to g, the m option is used to specify the valid ranges for the MM instancing. For example, the Cronos MM font, which has two design axes, is defined in the configuration files with the

```
m="250..700,6..72"
```

option; this means that the first axis (weight) parameter ranges between 250 and 700; the second axis (design size) ranges between 6 and 72.

In order to avoid having to declare each instance of the Multiple Master font, the new syntax allows to define the font names as templates (C-formattable strings). For example, the instances of Cronos MM are declared as

```
CronosMM%s_%04d_wt_%04d_op
```

where the `%04d` substrings get replaced with the weight and design size of the instance, when it is formed; the `%s` substring gets replaced with the encoding name.

5 The distribution

MM support is part of the VTeX/Free distribution from release 8.36 on and covers two areas:

▷ Metrics and font mapping files for a number of MM fonts from Adobe.

▷ A MM math extension font named "cmm10exMM" and the related support files.

In detail, this comprises the following files (path names are relative to `texmf/`):

`fonts/tfm/adobe/mm/*` Font metrics (`mfm` and `tfm`) for Adobe's MM fonts.

`fonts/map/vtex/mm.ali` A font mapping file for Adobe's MM fonts.

`fonts/type1/micropress/mathexmm/cmex10mm.pfb` The MM math extension font cmm10exMM.

`fonts/tfm/micropress/mathexmm/*` Metrics files for cmm10exMM.

`tex/latex/mathexmm/mathexmm.sty` A LaTeX macro package to make use of the cmm10exMM font.

`doc/latex/mathexmm/mathexmm.pdf` Documentation on cmex10MM and the related macro package.

`doc/vtex/MM/mm_man.tex` The LaTeX source code of the present document (with some changes, so that it can be compiled using the `article` class and CM fonts). It requires the below `*.exm` example fragments and the "Adobe Sans" and "Adobe Serif" fonts.

`texmf/doc/vtex/MM/*.exm` Source code fragments to show instances for various MM fonts. These files can also be compiled stand-alone in the PDF mode with GeX enabled under the Plain TeX format.

Adobe's MM fonts can be installed by copying or linking them into the directory `texmf/fonts/type1/adobe/MM`. On Unix, make sure that the file names are lowercase! The fonts are *not* part of the VTeX distribution; "Adobe Sans" and "Adobe Serif" (zx_____ and \zy_____), however, come with Acrobat, so you should have these at least.

Notice that before using Adobe's MM fonts, you need to include a record for the `mm.ali` file into the TYPE1 section of the configuration file `pdf.fm`. The cmex10MM font, in contrast, is already usable with the default configuration.

6 Samples: Adobe Sans

`Font=zx_____[50,50]:` Here is a sample test to illustrate MM instancing as performed by VTeX 7.3+. VTeX's MM instancing for the first time makes the use of Multiple Matrix fonts totally transparent to the end user; Multiple Matrix fonts add myriads of new font variations.

`Font=zx_____[750,50]:` Here is a sample test to illustrate MM instancing as performed by VTeX 7.3+. VTeX's MM instancing for the first time makes the use of Multiple Matrix fonts totally transparent to the end user; Multiple Matrix fonts add myriads of new font variations.

`Font=zx_____[1450,50]:` Here is a sample test to illustrate MM instancing as performed by VTeX 7.3+. VTeX's MM instancing for the first time makes the use of Multiple Matrix fonts totally transparent to the end user; Multiple Matrix fonts add myriads of new font variations.

`Font=zx_____[50,750]:` Here is a sample test to illustrate MM instancing as performed by VTeX 7.3+. VTeX's MM instancing for the first time makes the use of Multiple Matrix fonts totally transparent to the end user; Multiple Matrix fonts add myriads of new font variations.

`Font=zx_____[750,750]:` Here is a sample test to illustrate MM instancing as performed by VTeX 7.3+. VTeX's MM instancing for the first time makes the use of Multiple Matrix fonts totally transparent to the end user; Multiple Matrix fonts add myriads of new font variations.

`Font=zx_____[1450,750]:` Here is a sample test to illustrate MM instancing as performed by VTeX 7.3+.

VTeX's MM instancing for the first time makes the use of Multiple Matrix fonts totally transparent to the end user; Multiple Matrix fonts add myriads of new font variations.

Font=zx_____[50,1450]: Here is a sample test to illustrate MM instancing as performed by VTeX 7.3+. VTeX's MM instancing for the first time makes the use of Multiple Matrix fonts totally transparent to the end user; Multiple Matrix fonts add myriads of new font variations.

Font=zx_____[750,1450]: Here is a sample test to illustrate MM instancing as performed by VTeX 7.3+. VTeX's MM instancing for the first time makes the use of Multiple Matrix fonts totally transparent to the end user; Multiple Matrix fonts add myriads of new font variations.

Font=zx_____[1450,1450]: **Here is a sample test to illustrate MM instancing as performed by VTeX 7.3+. VTeX's MM instancing for the first time makes the use of Multiple Matrix fonts totally transparent to the end user; Multiple Matrix fonts add myriads of new font variations.**

7 Samples: Adobe Serif

Font=zy_____[110,100]: Here is a sample test to illustrate MM instancing as performed by VTeX 7.3+. VTeX's MM instancing for the first time makes the use of Multiple Matrix fonts totally transparent to the end user; Multiple Matrix fonts add myriads of new font variations.

Font=zy_____[450,100]: **Here is a sample test to illustrate MM instancing as performed by VTeX 7.3+. VTeX's MM instancing for the first time makes the use of Multiple Matrix fonts totally transparent to the end user; Multiple Matrix fonts add myriads of new font variations.**

Font=zy_____[790,100]: **Here is a sample test to illustrate MM instancing as performed by VTeX 7.3+. VTeX's MM instancing for the first time makes the use of Multiple Matrix fonts totally transparent to the end user; Multiple Matrix fonts add myriads of new font variations.**

Font=zy_____[110,500]: Here is a sample test to illustrate MM instancing as performed by VTeX 7.3+. VTeX's MM instancing for the first time makes the use of Multiple Matrix fonts totally transparent to the end user; Multiple Matrix fonts add myriads of new font variations.

Font=zy_____[450,500]: **Here is a sample test to illustrate MM instancing as performed by VTeX 7.3+. VTeX's MM instancing for the**

first time makes the use of Multiple Matrix fonts totally transparent to the end user; Multiple Matrix fonts add myriads of new font variations.

Font=zy_____[790,500]: **Here is a sample test to illustrate MM instancing as performed by VTeX 7.3+. VTeX's MM instancing for the first time makes the use of Multiple Matrix fonts totally transparent to the end user; Multiple Matrix fonts add myriads of new font variations.**

Font=zy_____[110,900]: Here is a sample test to illustrate MM instancing as performed by VTeX 7.3+. VTeX's MM instancing for the first time makes the use of Multiple Matrix fonts totally transparent to the end user; Multiple Matrix fonts add myriads of new font variations.

Font=zy_____[450,900]: Here is a sample test to illustrate MM instancing as performed by VTeX 7.3+. VTeX's MM instancing for the first time makes the use of Multiple Matrix fonts totally transparent to the end user; Multiple Matrix fonts add myriads of new font variations.

Font=zy_____[790,900]: **Here is a sample test to illustrate MM instancing as performed by VTeX 7.3+. VTeX's MM instancing for the first time makes the use of Multiple Matrix fonts totally transparent to the end user; Multiple Matrix fonts add myriads of new font variations.**