Typographic Perfection with OpenType?

Adam Twardoch

February 26, 2005

Abstract

In September 1999, Adobe Systems declared their PostScript Type 1 font format "obsolete". Until then, this font format was dominating the professional pre-press and printing business, but now was to be replaced with OpenType – a font format developed by Microsoft and Adobe, with collaboration from Apple. Four and a half years later, OpenType is a fact: both the world’s largest font foundries and individual type designer publish new fonts in this format.

OpenType fonts have numerous advantages: they can be used in many operating systems without any conversions (Windows 9x/2000/XP, MacOS 9/X, some Unix environments); they use the universal character encoding standard Unicode; finally, they can include typographic layout features that allow for comfortable use of ligatures, small caps, swash alternates or old-style numerals, as well as more advanced functionality such as justification alternates.

You may have heard that Unicode is the only solution for the encoding mess in electronic text processing. You may have also heard that OpenType is the new cross-platform font format that enables unprecedented typographic perfection. Adam Twardoch will present these technologies and discuss how much truth and how much myth these promises hold.

Bio:

Born 1975 in Poland, Adam now lives in Frankfurt (Oder), at the German-Polish border. He is Scripting Products and Marketing Manager at Fontlab Ltd., an international software vendor specializing in font editors and typography products. He serves as typographic consultant to MyFonts, a major online font distributor. Adam provides consulting services in font creation, font tool development, font technology and multilingual typography for Adobe, Bitstream, Corel, Linotype, Microsoft and other clients. Adam regularly writes and lectures about fonts and typography. He is member of Association Typographique Internationale (ATypI) and of the Polish \TeX Users’ Group (GUST).
3 "No one will ever need more than 128 characters!" – ASCII

4 "No one will ever need more than 128 characters"?

The quick brown fox jumps over the lazy dog. Zwei Boxkämpfer jagen Eva quer durch Sylt.
5. “No one will ever need more than 128 characters!”

6. Codepage soup: incompatible 8-bit encodings that only cover a subset of the necessary character set

7. Typesetting multilingual text has always been a challenge in GUI layout applications and in TeX

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9 Different character groups stored in separate fonts, switching fonts often necessary


10 In GUI applications, switching fonts may lead to unwanted effects, in TEX ligature information stored in separate files (.tfm).

§89. Zdanie, w którym występują wszystkie litery alfabetu, nazywamy pangramem. Autorem najstarszego polskiego pangramu „Pójdźże, kiń tę chmurność w głąb flashy!” jest J. G. H. Pawlikowski. Autorem filigranowego quasi-pangramu „Książęcych spóźnienie czułość” jest Waldemar Pałasz. Ogłosił on w 1998 roku konkurs na polskie pangramy i quasi-

11 Unicode assigns numeric codes to characters

<table>
<thead>
<tr>
<th>Character</th>
<th>Code</th>
<th>Hex Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>a</td>
<td>97</td>
<td>0x0061</td>
</tr>
<tr>
<td>á</td>
<td>225</td>
<td>0x00E1</td>
</tr>
<tr>
<td>ą</td>
<td>261</td>
<td>0x0105</td>
</tr>
<tr>
<td>α</td>
<td>945</td>
<td>0x03B1</td>
</tr>
<tr>
<td>ρ</td>
<td>1103</td>
<td>0x044F</td>
</tr>
<tr>
<td>κ</td>
<td>1488</td>
<td>0x05D0</td>
</tr>
<tr>
<td>練</td>
<td>9787</td>
<td>0x263B</td>
</tr>
<tr>
<td>練</td>
<td>32244</td>
<td>0x7DF4</td>
</tr>
</tbody>
</table>

12 The Unicode Standard encodes 100 000 characters, 1 million possible.

The table above shows a fragment of the Unicode standard, encoding 100,000 characters. Each character is assigned a numeric code ranging from 0 to 97,877, as well as a hexadecimal code. This allows for the representation of a wide variety of characters in various scripts and languages.
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14 The Unicode Standard encodes 100,000 characters, 1 million possible

15 Brief history of the Unicode Standard

1984 ISO working group created to define universal character set

1987 Unicode working group created to define universal character set (Apple, Xerox)

1990 Distinct Unicode 1.0 and ISO 10646 published

1991 “Two universal character sets? Not a good idea!”: Unicode and ISO 10646 merged

1993 Merged Unicode 1.1 and ISO 10646-1:1993 published

1996 Unicode 2.0 published, 38,885 encoded characters

1998 Unicode 2.1 published, adding e.g. the euro character

1999 Unicode 3.0 published, 49,194 encoded characters

2000 ISO/IEC 10646-1:2000 published (Unicode 3.0 equivalent)

2002 Unicode 3.2 published, 95,156 encoded characters (> 65,536!)

2003 Unicode 4.0 published, 96,513 encoded characters

2005 Unicode 4.1 beta, 97,786 encoded characters

16 Thirty years of digital outline font technology: 1975–2005

1975 Peter Karow announces Ikarus at the ATypI conference in Warsaw

1985 Adobe Systems creates the PostScript language and defines the PostScript Type 1 font format (the specification is confidential)

1987 Apple Computer and Microsoft Corp start creating their own font format that would be independent from an Adobe license

1990 Adobe publishes the PostScript Type 1 specification

1991 Adobe publishes ATM, Apple and Microsoft publish the TrueType format

1993–96 Apple develops TrueType into TrueType GX (later: AAT), Microsoft develops TrueType into TrueType Open

1998 Adobe joins the Microsoft initiative and creates the CFF format that allows placing PostScript font data into the TrueType file structure

1995 Adobe and Microsoft announce OpenType based on TrueType Open and CFF

2000 First OpenType fonts published by Adobe and Microsoft
17 One format, many platforms: OpenType

Mac TrueType works on Mac OS Classic and Mac OS X

Mac PostScript works on Mac OS Classic and Mac OS X

Windows TrueType works on Microsoft Windows and Mac OS X

Windows PostScript works on Microsoft Windows

18 One character, many glyphs

0 1 2 A K a b e s
0030 0031 0032 0041 004B 0061 0062 0065 0073

19 In addition to default character forms, OpenType fonts can have variant glyphs associated with so-called layout features

0 1 2 A K a b e s
onum smcp fina init salt hist

20 Brioso Pro (Robert Slimbach, Adobe Systems)
Layout features: standard ligatures (liga)

JAN KOTT Jonasz Kofta
JAN KOTT Jonasz Kofta
Thorgal fjord szufla firet motto
Thorgal fjord szufla firet motto
In the Arabic writing system, each letter has four different forms: isolated, initial, medial and final.

The OpenType font contains appropriate layout features (init, medi, fina) that map the default form to the contextual forms.

Some languages have localized glyph forms in handwriting.
25 **OpenType allows for language-sensitive substitutions**
so for Polish language, the calligraphic lslash can be substituted

26 **OpenType allows for language-sensitive substitutions**
so different glyph variants can be selected depending on language

27 **OpenType fonts exist in two “flavors”: OpenType TT and OpenType PS**

<table>
<thead>
<tr>
<th>TrueType</th>
<th>PostScript Type 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>flexible and extensible, one disk file, Unicode</td>
<td>high quality outline definition, standard in prepress/publishing</td>
</tr>
</tbody>
</table>

**OpenType** combines advantages of TrueType and PostScript, adds new features

- **OpenType TT (.otf)** best suitable for corporate/office use where high screen quality and good multilingual support are critical — backwards-compatible with TrueType
- **OpenType PS (.otf)** best suitable for prepress/publishing use where high outline quality, PostScript compatibility and typographic features are critical — not fully compatible with old environments

28 **OpenType fonts exist in two “flavors”: OpenType TT and OpenType PS**

<table>
<thead>
<tr>
<th>Microsoft</th>
<th>Mac OS</th>
<th>Windows</th>
</tr>
</thead>
<tbody>
<tr>
<td>Office 2000</td>
<td>OpenType TT (OTF)</td>
<td>OpenType TT (OTF)</td>
</tr>
<tr>
<td>Office 2002</td>
<td>OpenType TT (OTF)</td>
<td>OpenType TT (OTF)</td>
</tr>
<tr>
<td>InDesign 1.0, 1.5, 2.0</td>
<td>Adobe Photoshop 7.0</td>
<td>Adobe Illustrator 10.0</td>
</tr>
<tr>
<td>Quark XPress 4.5</td>
<td>Adobe Phample 10.0</td>
<td>Adobe Illustrator 10.0</td>
</tr>
<tr>
<td>Macromedia Freehand 10.0</td>
<td>Corel Draw 10.0</td>
<td>Adobe Illustrator 10.0</td>
</tr>
</tbody>
</table>

- basic font support
- multilingual support
- advanced feature support
Calligraphic Typeface by Hermann Zapf
Published in OpenType Format by Linotype Library

Originally published as a series of Type 1 fonts

Zapfino Extra LT Pro contains an extensive set of contextual features that simulate calligraphic "randomness"
33 Works on Windows XP SP-2 in many applications including Notepad, also Adobe InDesign, Illustrator CS, Photoshop CS, soon Mac OS X

34 Upcoming: Garamond Premier Pro
A new typeface family by Robert Slimbach, Adobe Systems

35 Calligraphy is freehand.
ABCDEFG in which the freedom
HIJKLMNOP is so reconciled with order
QRSTUVWXYZ that the understanding eye
 VWXYZ is pleased to contemplate it:
STANLEY MORISON

36 Formal and Freestyle Scripts
Tools of the Trade
A VARIETY OF INSTRUMENTS
Myriad Arabesques
Vernacular of their Time
Humanistic Book Hands
Professionals and Amateurs
Window to the Past
Typographic Perfection with OpenType?

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Proceedings EuroTeX2005 – Pont-à-Mousson, France
TUT04
42 Side-effect: better design in OpenType fonts

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