Kazuraki: Adobe Systems' Groundbreaking New Japanese Typeface

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Background

- Adobe's Type Engineering team in Japan has created a groundbreaking new typeface that is visually rich and free from the rigid design protocols that have constrained Japanese fonts for decades.

- Called *Kazuraki* (かづらき or 葛城), this new typeface design serves as an inspiration and model for other CJK type designers and type foundries.

- The Kazuraki typeface design was inspired by the calligraphy of 12th century artist and writer Fujiwara-no-Teika (藤原定家), who is considered to be one of the greatest poets in Japan's history. Inspired by Teika's calligraphy, Adobe Senior Designer Ryoko Nishizuka (西塚涼子) began creating a new typeface years ago. Her initial work won the Silver Prize at Morisawa's 2002 International Typeface Design Competition. Kazuraki itself was among the winning typeface designs in the Typeface Directors Club 2010 competition.

- While Kazuraki is not suitable for typesetting books, it is intended for "display purposes." Display uses include advertising copy, headlines, greeting cards, movie and book titles, restaurant menus, and so on.

Why Develop Kazuraki?

- To build excitement and awareness about OpenType Japanese fonts

  - Kazuraki is the first fully-proportional OpenType Japanese font

- To demonstrate advanced OpenType layout capabilities of Adobe applications

- To guide other type foundries to design and develop comparable fonts

  - The interest in developing such fonts is not only in Japan, but also in China

  - Adobe Tech Note #5901 was specifically authored for this purpose

- To expose poor assumptions in applications and font tools

  - So that they can be flagged then subsequently fixed

Design & Development Team

- ## Tokyo, Japan
  - Ryoko Nishizuka—Designer
  - Masataka Hattori—Production
  - Taro Yamamoto—Manager
- ## San Jose, California
  - Ken Lunde—Production
  - David Lemon—Manager
- ## Beijing, China
  - Gu Hua—QE

小林剣

西塚涼子
服部正貴
山本太郎

Typical Japanese Font Characteristics

- Full-width (monospaced) kana and kanji

- The design space is usually square, but sometimes compressed

  - Popular for newspaper use, but also applicable for mobile devices

- The point is that the glyphs are monospaced, and were designed to be so

普通の「ＤＴＰシステム」は縦書きレイアウ
トはサポートしています。簡単なワープロや
テキストエディターはサポートしません。縦
書きのサポートの為にはフォントも必要です。
全てのポストスクリプト中日韓越フォントに
は縦書きフォントも含まれています。

- The glyphs are originally designed to be monospaced

- Portions of their widths are trimmed away, resulting in proportional widths

- Early DTP implementations in PageMaker via "SBX" files

- The next implementation was via 'ALMX' tables in sfnt-CID fonts

- OpenType has support for pseudo-proportional glyphs via GPOS features
  - Via 'palt' GPOS feature for horizontal
  - Via 'vpal' GPOS feature for vertical

それでは大リーグの試合を見ましょう。

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Problem: Non-standard Glyph Set

- Virtually all glyphs require separate vertical forms
  - The glyphs may be identical, but shifting and other metrics necessitate separate glyphs
  - For a very small number of glyphs, there are only vertical forms
- Specialized glyphs
  - Two-, three-, and four-character vertical hiragana ligatures
- Conclusion: Kazuraki does not "fit" the Adobe-Japan1-*x* glyph set
  - The Adobe-Japan1-*x* glyph set is the industry standard for OpenType Japanese fonts

Solution: Adobe-Identity-0 ROS

- A dynamic, locale-unspecific special-purpose glyph set

- ROS means /Registry = "Adobe"; /Ordering = "Identity"; and /Supplement = 0

  - Specified in the /CIDSystemInfo dictionary

- Locale and language are specified via other attributes in the OpenType font

  - Via the 'OS/2' and 'name' tables

OpenType Implementation Details

- Two important goals

  1) Proportional metrics are the default—'palt' and 'vpal' GPOS features are not used

  2) Vertical hiragana ligatures are "on" by default

- Solutions

  - Proportional metrics are specified as default in standard OpenType tables—'hmtx' and 'vmtx'

  - Vertical hiragana ligatures are accessible via the 'liga' GSUB feature

- GSUB feature ordering is important

  - 'vert' (and 'vrt2') before 'liga'

  - Clients—meaning OSes, applications, and libraries—must respect feature ordering

- Serves as an example for other type foundries to follow

  - The production techniques are described and detailed in Adobe Tech Note #5901

   - Includes Japanese and Chinese translations

- The data is first built as an intermediate OpenType font with standard features

  - The glyphs are optically centered within the 1000×1000 em-box

    - With mono-spaced 1000-unit horizontal and vertical advances

  - The 'palt' and 'vpal' GPOS features provide X- and Y-axis shifting values and new widths

    - The horizontal and vertical glyphs require X- and Y-axis shifting, respectively

- Intermediate glyphs are named according to Adobe-Japan1-6 CIDs

  - Ligatures were named as sequences of Adobe-Japan1-6 CIDs

- Proportional Latin glyphs were added

  - Brioso Pro Semibold Display scaled to 108%

- An elaborate Perl script was used to process the data
  - The separate vertical glyphs were created by an AFDKO "mergeFonts" tool mapping file
  - The 'palt' (horizontal) GPOS metrics were converted to AFDKO "rotateFont" tool directives
    - X-axis shifting and new horizontal advances
  - The 'vpal' (vertical) GPOS metrics were converted to 'vmtx' table overrides
    - Y-axis shifting and new vertical advances
  - The Unicode CMap resource, used to generate the 'cmap' table, was automatically created
    - Adobe-Japan1-6 CIDs and UTF-32 CMap resources were leveraged
  - The 'vert' and 'liga' GSUB features were automatically created
- The same Perl script was used for the production of all three versions
  - Prototype—1,223 glyphs (297 kanji, 17 vertical hiragana ligatures)
  - Version 1—2,973 glyphs (1,082 kanji, 50 vertical hiragana ligatures)—*shipping*
  - Version 2—3,776 glyphs (1,483 kanji, 51 vertical hiragana ligatures)

- Kazuraki sources
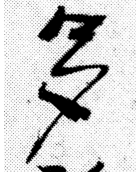
- Final Kazuraki glyph—CIDs 1262 (horizontal) and 3121 (vertical)

- Horizontal metrics directives—expressed in 'CFF' and 'hmtx' tables

  - 881-unit advance—narrow

  - 78-unit left shift

- Vertical metrics directives—expressed in 'vmtx' table

  - 1,306-unit advance—tall

  - 24-unit downward shift

- Kazuraki sources

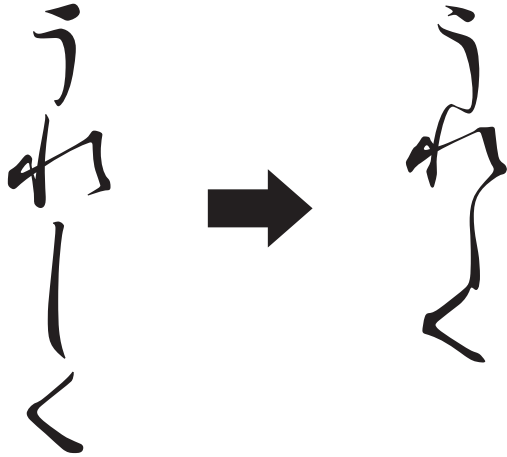- Final Kazuraki glyph—CIDs 1531 (horizontal) and 3390 (vertical)

- Horizontal metrics directives—expressed in 'CFF' and 'hmtx' tables
  - 1,376-unit advance—wide
  - 154-unit right shift
- Vertical metrics directives—expressed in 'vmtx' table
  - 835-unit advance—short
  - 125-unit upward shift

- Final Kazuraki glyph—CID+3730 (vertical only)—うれしく (*ureshiku*)

- Horizontal metrics directives—expressed in 'CFF' and 'hmtx' tables (unused)
  - Default advance (1000 units)
  - No shift

- Vertical metrics directives—expressed in 'vmtx' table
  - 3,219-unit advance—*very* tall
  - 1,119-unit downward shift

Vertical Considerations

- Small kana and punctuation require separate vertical forms in standard fonts

  - They are repositioned, rotated, or rotated+flipped

- Kazuraki requires separate vertical forms for *all* kana, kanji, and punctuation

  - Their shapes are otherwise identical

- Why is this necessary?

  - The genuine proportional nature of the design necessitates X- *and* Y-axis shifting

    - Horizontal requires X-axis shifting

    - Vertical required Y-axis shifting

  - The OpenType table that records default vertical metrics does not support X-axis shifts

    - The 'vmtx' table can record only vertical widths and Y-axis shifts

- Thanks to subroutinization, the difference in filesize is minimal

  - The AFDKO "makeotf" tool, an OpenType font compiler, applies subroutinization by default

Glyph Set Details—Kazuraki Version 2

- All kana—hiragana and katakana

- Punctuation and symbols

- A total of 51 two-, three-, and four-character vertical hiragana ligatures

- 1,483 kanji
  - All 1,006 Gakushū Kanji (学習漢字) are now included

- 3,776 total glyphs—CIDs 0 through 3775
  - CIDs 1 through 1863: horizontal glyphs (Latin, punctuation, symbols, kana, and kanji)
  - CIDs 1864 through 3722: vertical forms of CIDs 1 through 1863
  - CIDs 3723 through 3775: vertical hiragana ligatures and kana iteration marks

- Version 2 includes glyphs for 401 additional kanji plus one more ligature
  - Version 1 is shipping, and is one of the CS5 complimentary benefits for Japanese customers
    - Version 2 missed the deadline to be included in CS5

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デジタルフォントのあり方をさぐるなかで
あたらしいかな書体がうまれました
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かづらき®

Adobe

あるところ

これされしか

なぞおなぞなる

られるよ

Application Testing Issues

- Common assumptions
  - Monospaced glyphs or shared horizontal/vertical metrics
    - Must respect the metrics specified in the 'hmtx' and 'vmtx' tables
  - GSUB feature ordering
    - Must respect GSUB feature ordering—critical for vertical hiragana ligatures

- Use of Adobe-Identity-0 ROS
  - Other font characteristics are used to identify it as a Japanese font
    - Japanese characteristics are specified in the 'name' and 'OS/2' tables

- Adobe InDesign CS2 and greater handles Kazuraki well

- Other CS4/5 applications have no problems with Kazuraki

Demo

- InDesign + Kazuraki OpenType font

  - Character entry

  - Horizontal versus vertical metrics

  - Seamless support for vertical writing

  - Vertical hiragana ligatures

  - Kerning

Future Enhancements

- Additional kanji
  - Those found in *Hyakunin Isshu* (百人一首), which is a series of 100 famous poems
    - Compiled by Fujiwara-no-Teika, whose handwriting inspired Kazuraki
  - Those used in words that are important for funeral and Buddhist services
  - Complete coverage of Jōyō Kanji (常用漢字) or Jinmei-yō Kanji (人名用漢字)
    - The former is the basic set of kanji, and the latter is used for personal names

- Additional vertical hiragana ligatures

- Alternate kana forms

- Alternate kanji forms

Further Reading & Resources

- Type Development @ Adobe

  mailto:type-questions@adobe.com

- Adobe Type Showroom

  http://www.adobe.com/type/

- *CJKV Information Processing*, Second Edition (O'Reilly Media, 2009)

  http://oreilly.com/catalog/9780596514471/

- OpenType Specification

  http://www.microsoft.com/typography/otspec/

- AFDKO (Adobe Font Development Kit for OpenType)

  http://www.adobe.com/devnet/opentype/afdko/

- Adobe Tech Note #5901

  http://www.adobe.com/devnet/font/pdfs/5901.Kazuraki_Tutorial.pdf