

# 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.
- While Kazuraki is clearly not suitable for typesetting text in books, it is expected to be used by designers for what typographers refer to as "display uses." Display uses include advertising copy, headlines, greeting cards, movie and book titles, restaurant menus, and so on.

# Design & Development Team

- Tokyo, Japan
  - Ryoko Nishizuka—Designer
  - Masataka Hattori—Production
  - Taro Yamamoto—Manager
- San Jose, California
  - Ken Lunde—Production
  - David Lemon—Manager

小林 剣

山本 太郎

眼部 正貴

西塚 涼子

# 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。

# Pseudo-proportional Glyphs

- The glyphs are originally designed to be monospaced
- Portions of their widths are trimmed away, and results 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 some glyphs there are only vertical forms
- Specialized glyphs
  - Two-, three-, and four-character vertical hiragana ligatures
- Kazuraki thus 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
  - ROS means /Registry = “Adobe”; /Ordering = “Identity”; and /Supplement = 0
  - A dynamic, locale-unspecific special-purpose glyph set

# 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 in default OpenType tables—'hmtx' and 'vmtx'
  - Vertical hiragana ligatures are specified using 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 Japanese type foundries to follow
  - The production techniques are described and detailed in Adobe Tech Note #5901
    - Includes a Japanese translation

# OpenType Implementation Details—Production Process

- Data delivered as monospaced glyphs with 'palt' and 'vpal' GPOS features
  - The delivered glyphs are 1000-unit and optically centered within the 1000×1000 em-box
  - The 'palt' and 'vpal' GPOS features provide X- and Y-axis shifting values and new widths
    - The horizontal and vertical glyphs require only X- and Y-axis shifting, respectively
- 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 widths
  - The 'vpal' (vertical) GPOS metrics were converted to 'vmtx' table overrides
    - Y-axis shifting and new widths
  - The Unicode CMap resource, used to generate the 'cmap' table, was automatically created
    - Adobe-Japan1-6 CIDs and CMap resources were leveraged
  - The 'vert' and 'liga' GSUB features were automatically created

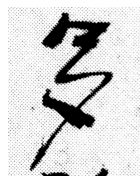


# OpenType Implementation Details—U+591A 多

- Final Kazuraki glyph—CIDs 1000 (horizontal) and 2458 (vertical)



- Kazuraki sources



- Horizontal metrics directives—expressed in ‘hmtx’ table
  - 881-unit advance—thin
  - 78-unit left shift
- Vertical metrics directives—expressed in ‘vmtx’ table
  - 1,306-unit advance—tall
  - 24-unit downward shift

# OpenType Implementation Details—U+5FC5 必

- Final Kazuraki glyph—CIDs 1200 (horizontal) and 2658 (vertical)



- Kazuraki sources



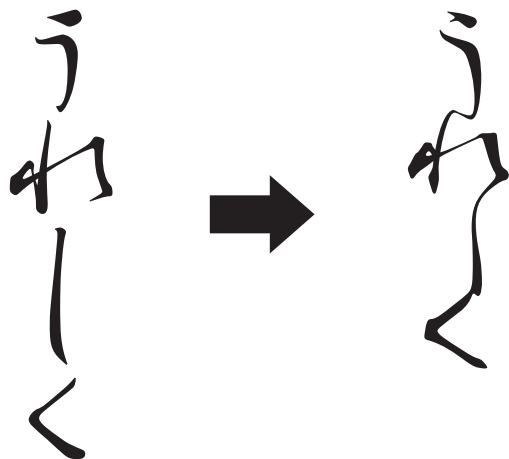
- Horizontal metrics directives—expressed in ‘hmtx’ table
  - 1,376-unit advance—wide
  - 154-unit right shift
- Vertical metrics directives—expressed in ‘vmtx’ table
  - 835-unit advance—short
  - 125-unit upward shift

# OpenType Implementation Details—U+5FC5 必 (cont'd)



# OpenType Implementation Details—Vertical Hiragana Ligature

- Final Kazuraki glyph—CID+2928 (vertical only)—うれしく (*ureshiku*)



- Horizontal metrics directives—expressed in ‘hmtx’ table (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

- All kana
  - Hiragana and katakana
- Punctuation and symbols
- A total of 50 two-, three-, and four-character vertical hiragana ligatures
- 1,082 kanji
  - Of the 1,006 Gakushū Kanji, only 328 are missing
- 2,973 total glyphs—CIDs 0 through 2972
  - CIDs 1 through 1462: horizontal glyphs (Latin, punctuation, symbols, kana, and kanji)
  - CIDs 1463 through 2920: vertical forms of CIDs 1 through 1462
  - CIDs 2921 through 2972: vertical hiragana ligatures and kana iteration marks
- The next version will include more kanji
  - For example, the 328 missing Gakushū Kanji will be among those that are added

かなの書風を活かすものである

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あたらしいかな書体がうまれました

それがかづら子です

デジタルフォントと書体デザインの

新しい地平の広がりを感じてもらえ

かづら子についで

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プロポーショナルかな書体

かづら子<sup>®</sup>





# 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 applications have no problems with Kazuraki

- InDesign + Kazuraki OpenType font
  - Character entry
  - Horizontal versus vertical metrics
  - Seamless support for vertical writing
  - Vertical hiragana ligatures
  - Kerning

# Future Enhancements

- Additional kanji
  - The 328 missing Gakushū Kanji will be included
  - Six additional kanji, beyond Gakushū Kanji, have been identified and will also be included
    - 喫嗜討詳鱧鱸
- Additional vertical hiragana ligatures
- Alternate kana forms
- Alternate kanji forms

# Further Reading & Resources

- 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](http://www.adobe.com/devnet/font/pdfs/5901.Kazuraki_Tutorial.pdf)
- Kazuraki Specimen Book
  - Attached to this presentation



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