

# Proposal to create open source OpenType tables for modern Mongolian

Andrew Glass

Complex orthography

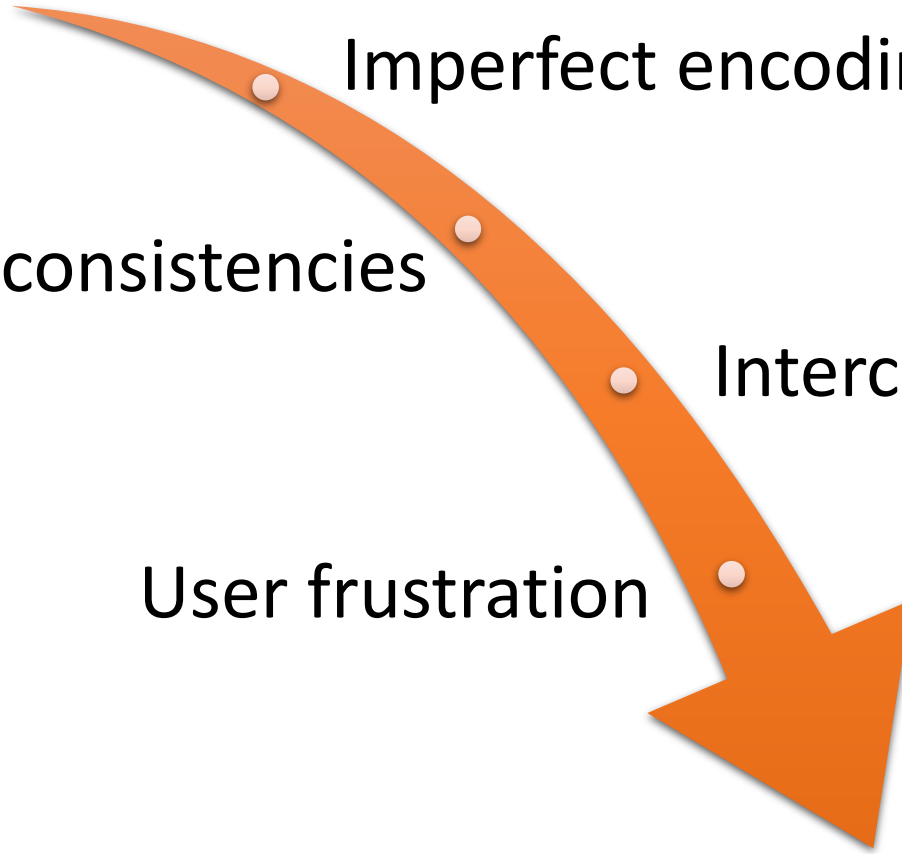
Imperfect encoding model

Font inconsistencies

Interchange difficulties

User frustration

Decreasing user interest



Mongolian orthography is complex. The existing encoding contributes to a cascade of issues that affect adoption of the script.

Complex orthography

Imperfect encoding model

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We are working together to address these issues. In this presentation I want to make a suggestion to help with fonts.

Complex orthography

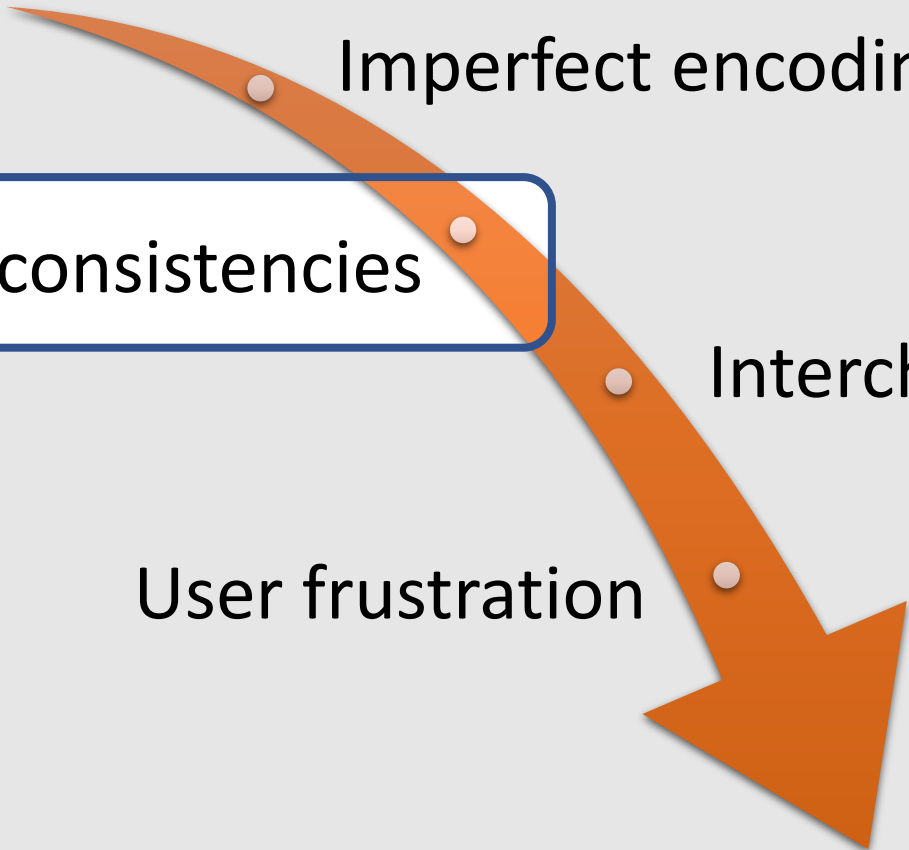
Imperfect encoding model

Font inconsistencies

Interchange difficulties

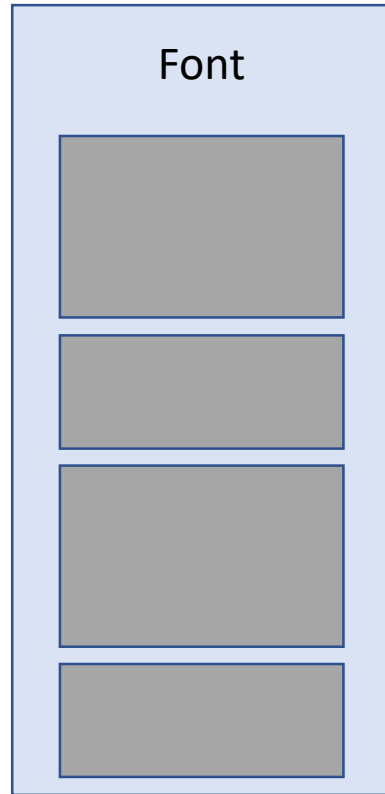
User frustration

Decreasing user interest



We are working together to address these issues. In this presentation I want to make a suggestion to help with fonts.

# Key parts of a font



Font Chef

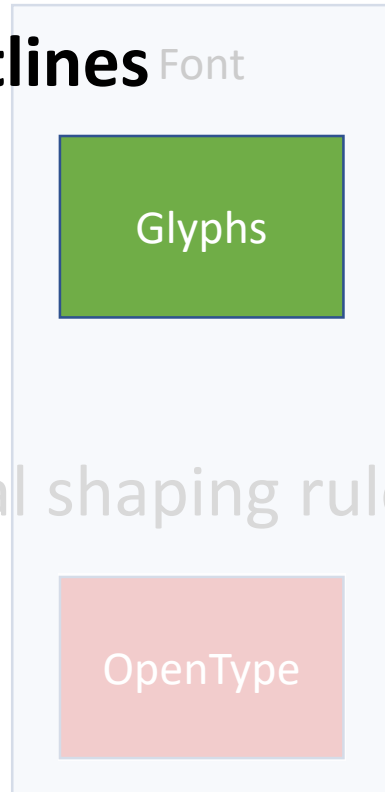
File Edit Dump Load Utility Window Help

table	156Ship074.ttf
DSIG	8; 0x00000001
GDEF	42; 0x0DFA167B
GPOS	200; 0xC91DD481
<b>GSUB</b>	<b>45072; 0xFAF3AAF1</b>
OS/2	96; 0x3992EA28
cmap	4004; 0xCE714BCB
cvt	1440; 0x12F2C1DA
fpgm	17437; 0x479949E7
gasp	8; 0x00000010
<b>glyf</b>	<b>509340; 0x8F45B776</b>
head	54; 0x24950CF8
hhea	36; 0x1DFE1453
hmtx	8880; 0x5540C600
loca	8884; 0x217E8AAC
maxp	32; 0x13D6069A
name	3360; 0x49414EA7
post	23325; 0x69C40742
prep	6906; 0xCF4CB0EB

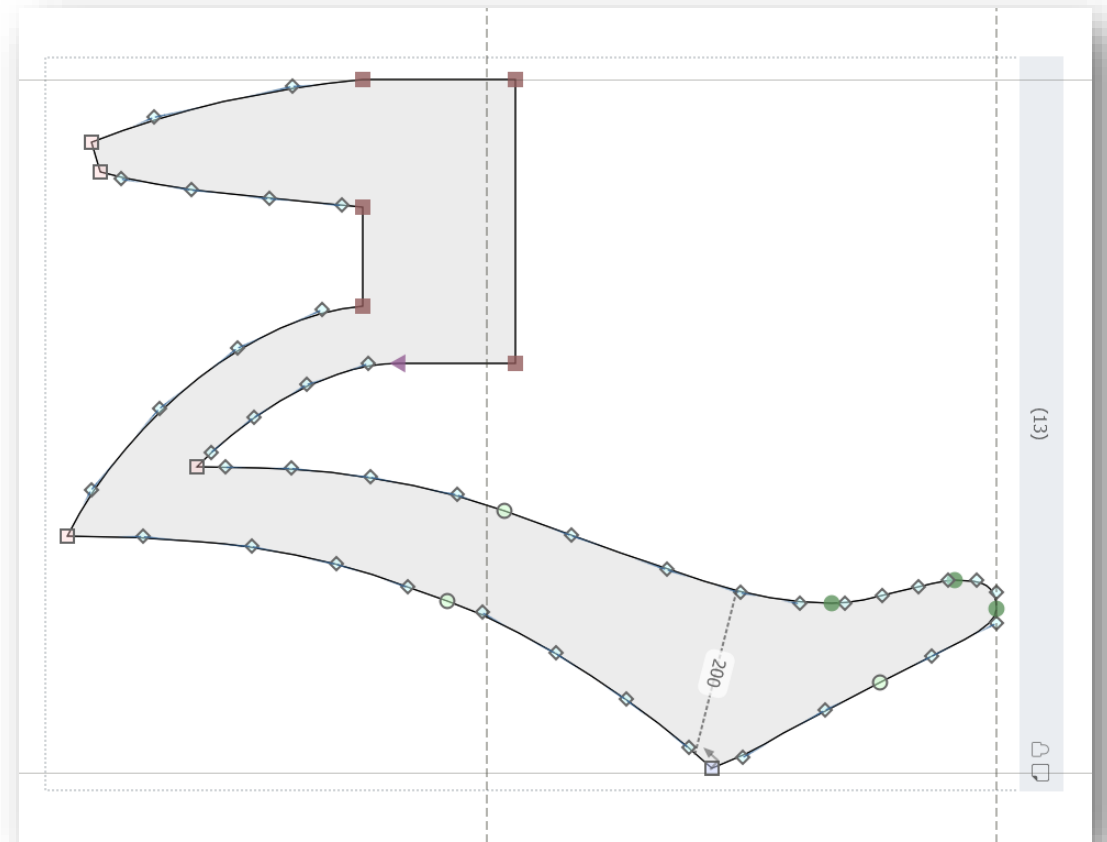
A font is a collection of data tables.

# Key parts of a font

- **Glyph outlines** Font



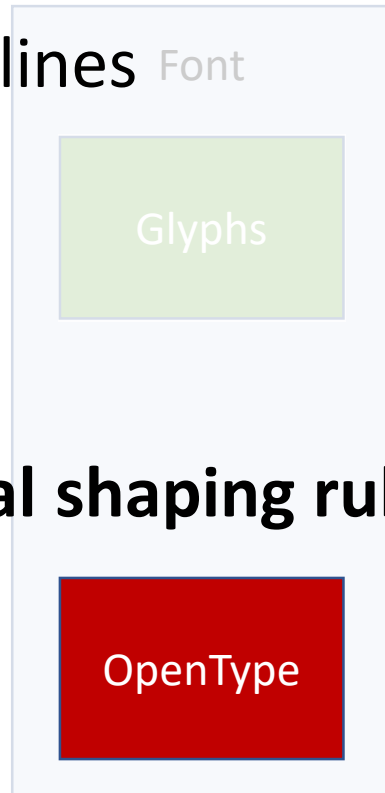
- Contextual shaping rules



The most important table is the glyph table which contains definitions of the glyph shapes.

# Key parts of a font

- Glyph outlines **Font**



- **Contextual shaping rules**

ML\_MVSPPlusAETsatslaga\_Rule01

Sort By... Add Comment...

ML\_MVSPPlusAETsatslaga\_Rul Single Substitution  Reversal

Process Marks: NONE  Process Base Glyphs LTR

Substitute

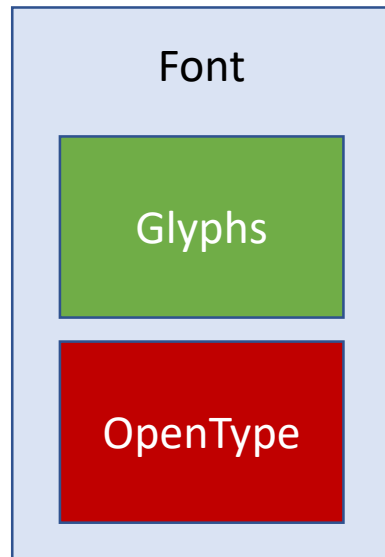
Shapes	From Glyphs ->	To Glyphs
ᠠ → ᠡ	uni1820.isol ->	uni1820.isolvar2
ᠢ → ᠣ	uni1821.isol ->	uni1821.isolvar1

Context Before | Context After

[M VS]		uni180E
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For a complex script such as Mongolian, the OpenType substitution table is also essential.

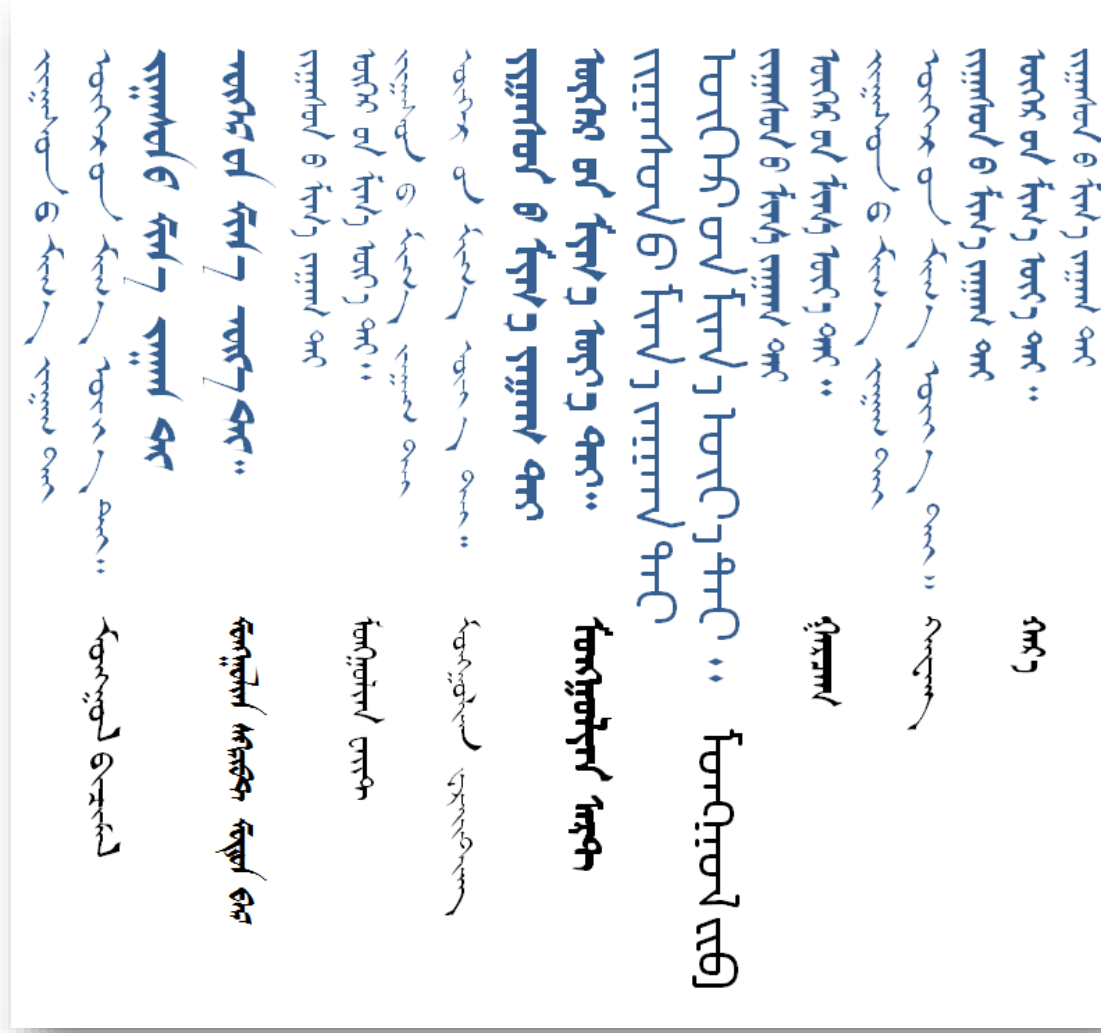
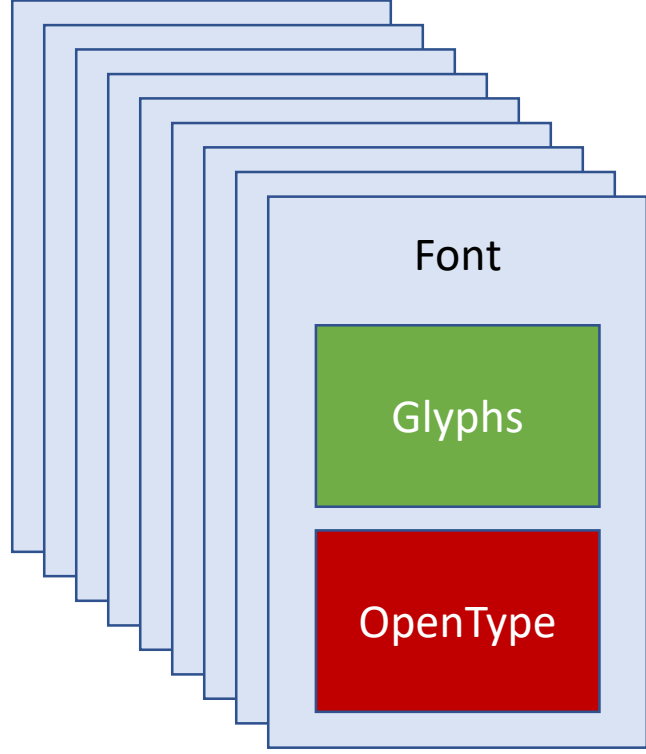
# Key parts of a font



Together these, and additional tables make a functioning font.

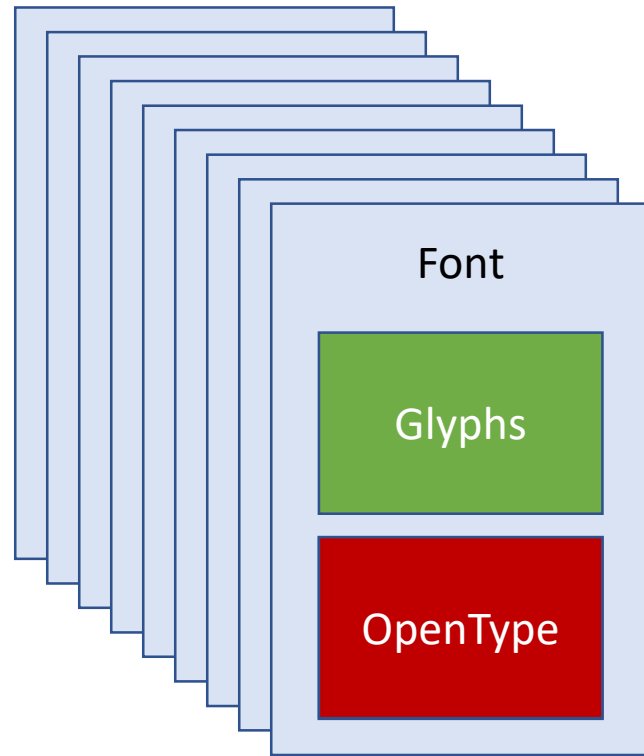


# Font variety



Users want to have a wide selection of fonts for different purposes. Variety amounts to having different glyphs.

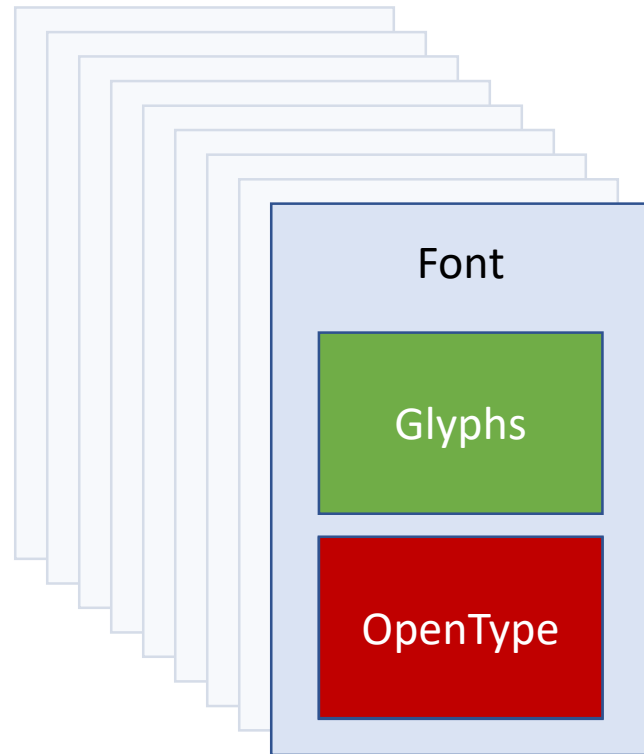
# Common shaping



Substitute	
Shapes	From Glyphs -> To Glyphs
ŵ → ˆ	uni1820.isol -> uni1820.isolvar2
h → ˆ	uni1821.isol -> uni1821.isolvar1
Context Before   Context After	
[M]	uni180E

Building the OpenType for a complex script is hard. There are no prizes for being better, every font needs to be conformant.

# Conformant shaping



Test Report For Mongolian Fonts

Based on Rules V1.0.3 (2019.01.18.03)

All Chars  All Words  Error Only

SEARCH UNICODE FONTS

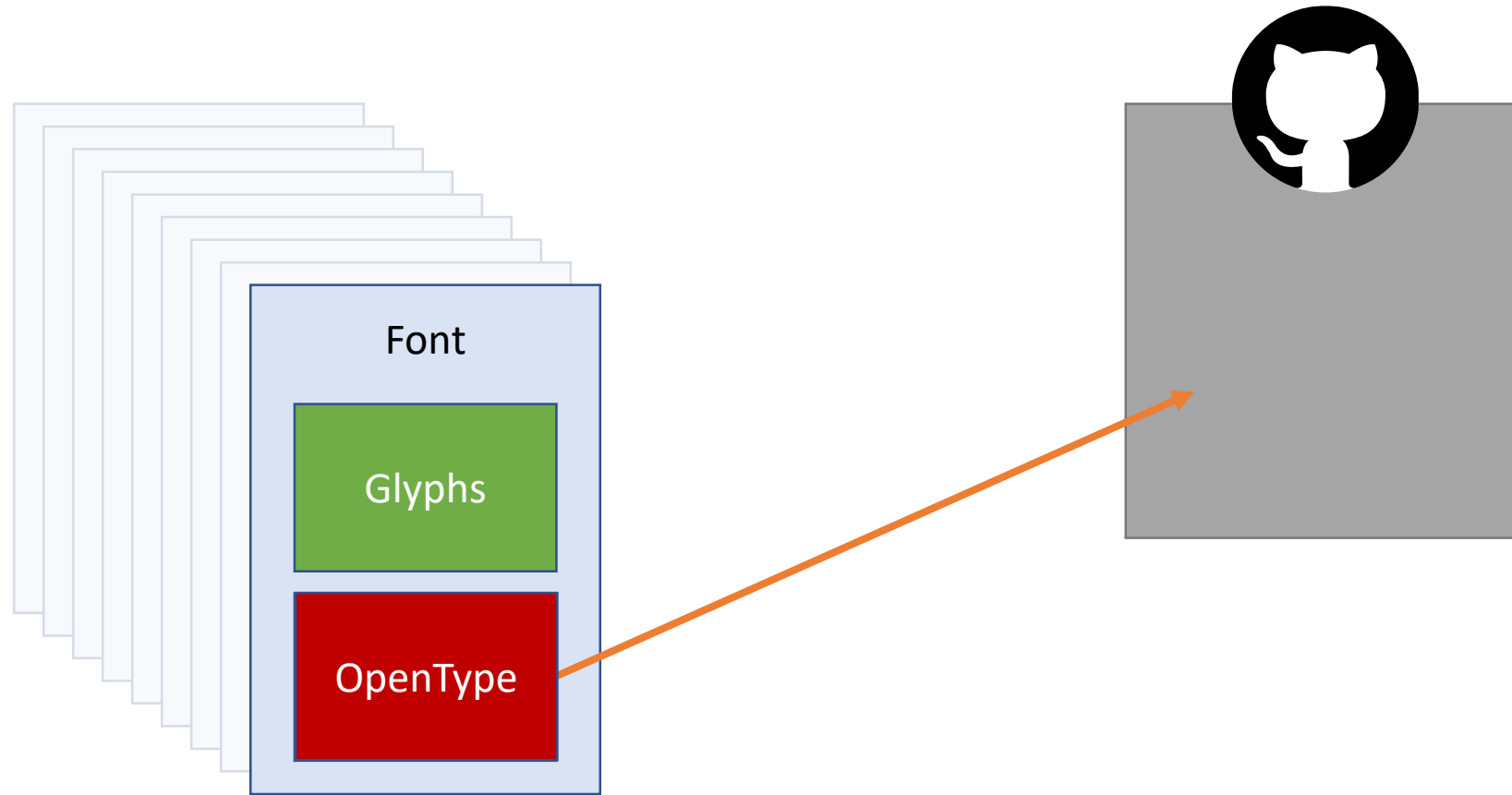
1820 A  1821 E  1822 I  1823 O  1824 U  1825 OE  1826 UE  1827 EE  1828 NA  
 1829 ANG  182A BA  182B PA  182C QA  182D GA  182E MA  182F LA  1830 SA  1831 SHA  
 1832 TA  1833 DA  1834 CHA  1835 JA  1836 YA  1837 RA  1838 WA  1839 FA  183A KA  
 183B KHA  183C TSA  183D ZA  183E HAA  183F ZRA  1840 LHA  1841 ZHI  1842 CHI  180A NIRUGU

182D GA

	No.	form	fvs	Testing Words				
				ruleid	Expected	NewOyun		
ISOL	1	ᠠ	3	MGD10	1	ᠠ	ᠠ	
				MGD11	1	ᠠ	ᠠ	
	2	ᠡ	1	MGD20	1	ᠡ	ᠡ	
				MGD21	1	ᠡ	ᠡ	
	3	ᠢ	2	MGD30	1	ᠢ	ᠢ	
				MGD31	1	ᠢ	ᠢ	
	4	ᠣ	4	MGD40	1	ᠣ		
				MGD41	1	ᠣ		
				MGS10	1	ᠠ	ᠠ	
				MGS10	2	ᠠ	ᠠ	
					MGS11	1	ᠠᠨᠭ	ᠠᠨᠭ
					MGS11	2	ᠠ	ᠠ
					MGS11	3	ᠠ	ᠠ

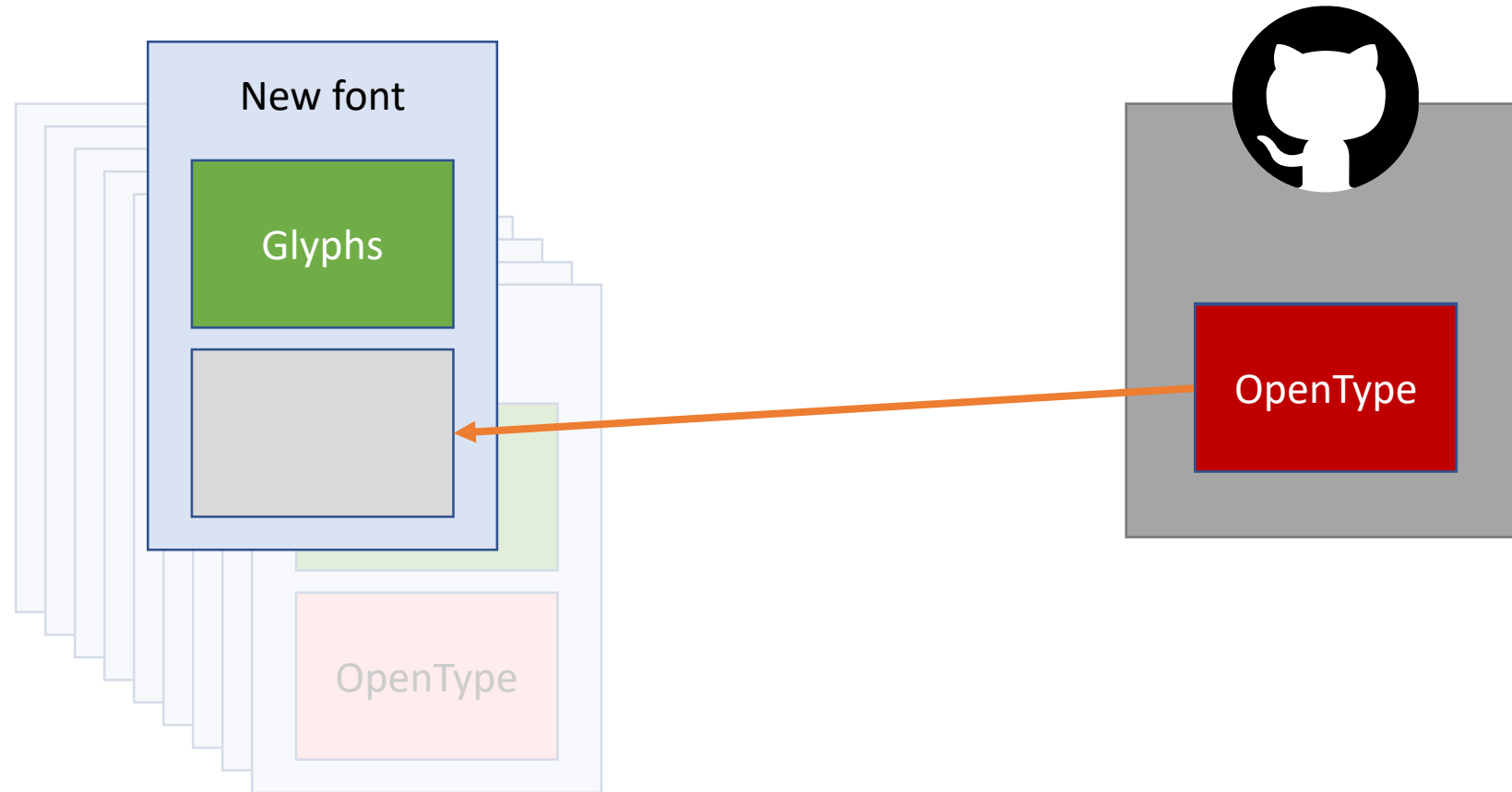
A conformant Mongolian OpenType font passes the test suite (<http://rule.mongoltoli.cn/ruletest.php>)

# OpenSource shaping



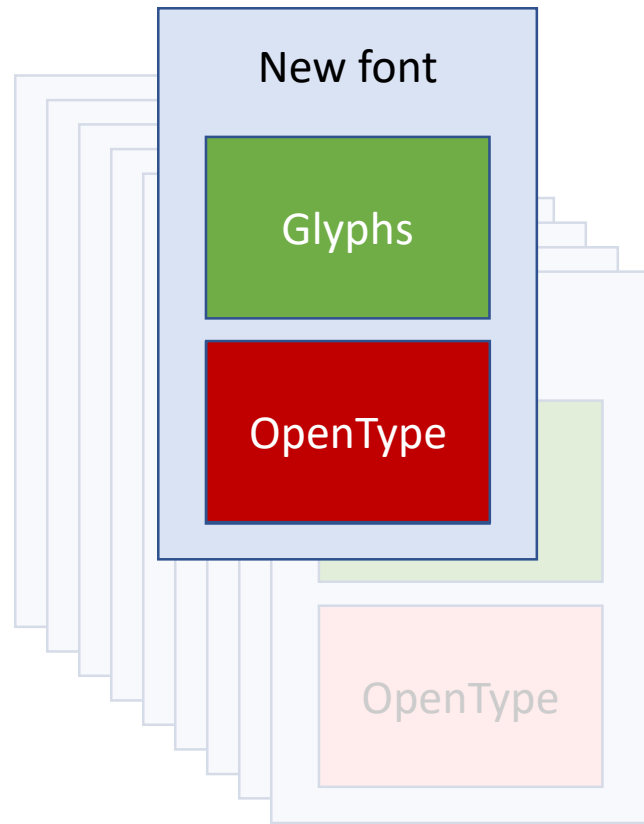
When we have a font that passes all of the tests, let's make the OpenType table available to everyone.

# OpenSource shaping



Any new font that implements the same glyph set can use the same OpenType solution and become conformant.

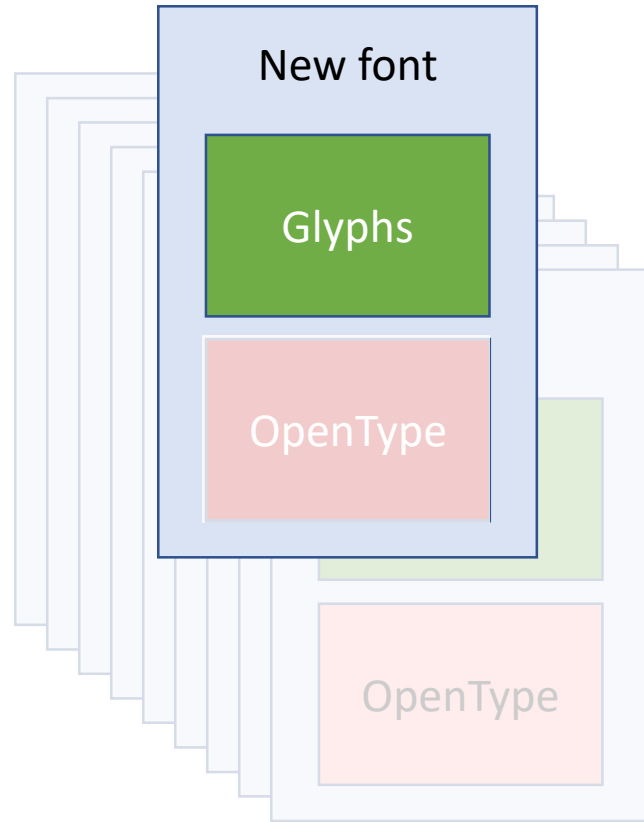
# OpenSource shaping



```
Windows PowerShell
PS C:\Users\anglass\source\mongolianopentype> python .\motgen.py
Start processing Mongolian font
Load font
Read 2219 glyphs
All required glyphs present
Generating OpenType tables
Write OpenType tables to font
Finished
PS C:\Users\anglass\source\mongolianopentype>
```

Loading the OpenType tables for a font could be as simple as running a script from a command line.

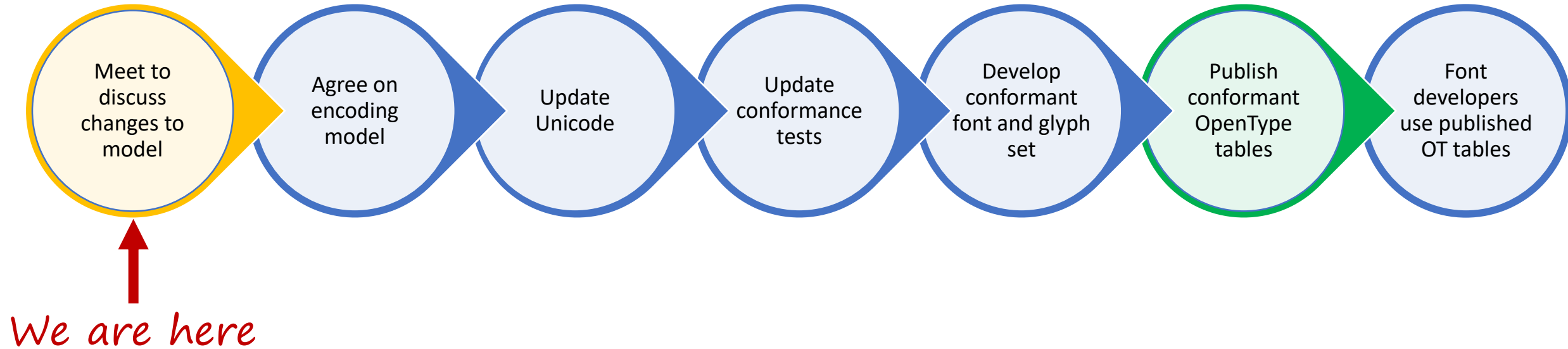
# Requirements



glyph416	glyph417	glyph418	glyph419	glyph420	glyph421	glyph422	glyph423	glyph424	glyph425	glyph426	glyph427	glyph428	glyph429	glyph430	glyph431
୧	୨	୩	୪	୫	୬	୭	୮	୯	୧୦	୧୧	୧୨	୧୩	୧୪	୧୫	୧୬
glyph432	glyph433	glyph434	glyph435	glyph436	glyph437	glyph438	glyph439	glyph440	glyph441	glyph442	glyph443	glyph444	glyph445	glyph446	glyph447
୧୭	୧୮	୧୯	୨୦	୨୧	୨୨	୨୩	୨୪	୨୫	୨୬	୨୭	୨୮	୨୯	୩୦	୩୧	୩୨
glyph448	glyph449	glyph450	glyph451	glyph452	uni182B	glyph454	glyph455	glyph456	glyph457	glyph458	glyph459	glyph460	glyph461	glyph462	glyph463
୩୩	୩୪	୩୫	୩୬	୩୭	୩୮	୩୯	୪୦	୪୧	୪୨	୪୩	୪୪	୪୫	୪୬	୪୭	୪୮
glyph464	glyph465	glyph466	glyph467	glyph468	glyph469	glyph470	glyph471	glyph472	glyph473	glyph474	glyph475	glyph476	glyph477	glyph478	glyph479
୪୯	୫୦	୫୧	୫୨	୫୩	୫୪	୫୫	୫୬	୫୭	୫୮	୫୯	୬୦	୬୧	୬୨	୬୩	୬୪
glyph480	glyph481	glyph482	glyph483	glyph484	glyph485	glyph486	glyph487	glyph488	glyph489	glyph490	glyph491	glyph492	glyph493	glyph494	glyph495
୬୫	୬୬	୬୭	୬୮	୬୯	୭୦	୭୧	୭୨	୭୩	୭୪	୭୫	୭୬	୭୭	୭୮	୭୯	୮୦
glyph496	glyph497	glyph498	uni182C	glyph500	glyph501	glyph502	glyph503	glyph504	glyph505	glyph506	glyph507	glyph508	glyph509	glyph510	glyph511
୮୧	୮୨	୮୩	୮୪	୮୫	୮୬	୮୭	୮୮	୮୯	୯୦	୯୧	୯୨	୯୩	୯୪	୯୫	୯୬
glyph512	glyph513	glyph514	glyph515	glyph516	glyph517	glyph518	glyph519	glyph520	glyph521	glyph522	glyph523	glyph524	glyph525	glyph526	glyph527
୯୭	୯୮	୯୯	୧୦୦	୧୦୧	୧୦୨	୧୦୩	୧୦୪	୧୦୫	୧୦୬	୧୦୭	୧୦୮	୧୦୯	୧୧୦	୧୧୧	୧୧୨
glyph528	glyph529	glyph530	glyph531	glyph532	glyph533	glyph534	glyph535	glyph536	glyph537	glyph538	glyph539	glyph540	glyph541	glyph542	glyph543
୧୧୩	୧୧୪	୧୧୫	୧୧୬	୧୧୭	୧୧୮	୧୧୯	୧୨୦	୧୨୧	୧୨୨	୧୨୩	୧୨୪	୧୨୫	୧୨୬	୧୨୭	୧୨୮
glyph544	glyph545	glyph546	glyph547	glyph548	glyph549	glyph550	glyph551	glyph552	glyph553	glyph554	glyph555	glyph556	glyph557	glyph558	glyph559
୧୨୯	୧୩୦	୧୩୧	୧୩୨	୧୩୩	୧୩୪	୧୩୫	୧୩୬	୧୩୭	୧୩୮	୧୩୯	୧୪୦	୧୪୧	୧୪୨	୧୪୩	୧୪୪
glyph560	glyph561	glyph562	glyph563	glyph564	glyph565	glyph566	glyph567	glyph568	glyph569	glyph570	glyph571	uni182D	glyph573	glyph574	glyph575
୧୪୫	୧୪୬	୧୪୭	୧୪୮	୧୪୯	୧୫୦	୧୫୧	୧୫୨	୧୫୩	୧୫୪	୧୫୫	୧୫୬	୧୫୭	୧୫୮	୧୫୯	୧୬୦
glyph576	glyph577	glyph578	glyph579	glyph580	glyph581	glyph582	glyph583	glyph584	glyph585	glyph586	glyph587	glyph588	glyph589	glyph590	glyph591
୧୬୧	୧୬୨	୧୬୩	୧୬୪	୧୬୫	୧୬୬	୧୬୭	୧୬୮	୧୬୯	୧୭୦	୧୭୧	୧୭୨	୧୭୩	୧୭୪	୧୭୫	୧୭୬

In order to have the shared OpenType tables apply across fonts, each font must implement the same glyph set.

# Process



Open-sourcing a conformant OpenType table comes near the end of our work to stabilize the Mongolian encoding.