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**ORGANISATION INTERNATIONALE DE NORMALISATION**

**ISO/IEC JTC1/SC 29/WG 3**

**CODING OF MOVING PICTURES AND AUDIO**

**ISO/IEC JTC1/SC 29/WG 3/M64672**

**October 16, 2023**

**Source: AHG on Font Format**

**Status: Contribution to the 13th SC29/WG3 (MPEG Systems) Meeting**

**Title: Report of the AHG on Font Format**

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# Ad Hoc group mandates

1. Review the text of the updated Working Draft of ISO/IEC 14496-22 5th edition (WG03N0933).
2. Review the remaining parts of “Technologies under consideration for ISO/IEC 14496-22 5th edition Open Font Format” document (WG03N0888), work on developing and finalizing specification changes to overcome the 64K glyph limit and other changes, and provide recommendations for the WG3 on how these changes can be integrated in the “Open Font Format” standard.
3. Explore potential future changes and updates and propose new items (if applicable) for consideration in the 5th edition of the OFF specification.

# Input Contributions for this meeting

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| --- | --- |
| m64672 | Report of the AHG on Font Format |
| m65472 | Proposed OFF changes to accommodate larger character sets and to add new features |
| m65515 | Updating OFF to add condition values |
| m65516 | Updating 'fvar' in OFF to add representative instance |

# AHG Activities

* + - * The “Technologies under consideration for ISO/IEC 14496-22” document (MDS22631\_WG03\_N00888) was published on May 4, 2023. In the time that followed since the WG3 meeting in Geneva, the AHG conducted active discussions that have been mostly focused on finding ways to incorporate proposed new features and overcome the 64K glyph limit without breaking backward compatibility between new and legacy implementations.
			* The AHG had two Zoom meetings where updated proposals were discussed – the first AHG hybrid (F2F / Zoom) meeting co-located with TypeCon2023 conference in Partland, OR on Aug. 17, 2023, and the second follow-up Zoom meeting on Sep. 27, 2023.
			* AHG F2F/Zoom hybrid meeting (Aug. 17, 2023) summary report.
			*1. Overcoming 64K glyph limit*

Attempts to reuse existing 'head' table format fields (glyphDataFormat / indexToLocFormat) are error prone - many existing implementations are used to ignore these values. As a result, an approach involving modifying existing fields and 'glyf' / other tables would very likely break existing implementations. An alternative approach that was discussed at length and agreed upon is to introduce new table tags/versions, and give font developers full control and final authority over backward compatible behavior of a font that will be designed to support more than 64K glyphs. E.g. font developers would decide what subset of the larger number of glyphs would be supported by a new font that is fully compatible with existing implementations [which would simply ignore new tables] and also designed to support more than 64K glyphs for use in updated implementations.

Additional experiments (+ test fonts) would be needed to validate certain assumptions made as part of the discussion.

(Sideline discussions included questions regarding consideration of 24- vs. 32-bit indices, and whether font sizes should still be considered as a limiting factor that we need to optimize for.)

Action Item: Prepare, validate and submit an updated proposal to reflect the new approach.

*2. 'avar' version 2*

Updated Working Draft text splits the discussion of coordinate scale and normalization into two separate parts of the spec, which was previously flagged as a spec concern and is less than ideal.

Fonts with avar2 [as currently specified] do not really offer a fallback and may not be truly backward compatible / might behave differently on older implementations. However, the use of avar2 is very appealing for cost / benefits, does solve some actual

problems and cost to implement is very low. Commitments from implementers to introduce support for avar2 in a timely manner (e.g. 12-18 months) would be needed to make this a success.

Follow up discussions touched on current implementations, including HarfBuzz support, Chrome currently supports avar2 behind a compile-time flag, Apple supports avar2 based on HB spec. Future updates to "avar.next" might introduce per glyph axes, different adjustments for different scripts, etc. - need more discussions / use cases regarding the kind of things we need / want to be expressed.

*3. Composite glyphs / variable components*

There are significant benefits of enabling new types of composite glyphs allowing variability of components' weights and widths, variable translate / scale for better transformations, etc. Implementing it would require a relatively small amount of code, while benefits could be significant - hangul fonts see up to 80% size reduction, Kanji - 65% reduction, etc. Other scripts might benefit as well - e.g. North Indic calligraphic scripts can be deconstructed into straight / curved strokes. One can create a single font supporting multiple scripts (Bengali, Devanagari, and more) that would require smaller development time.

Part of the discussions were focused on current hinting approaches, and the value of hinting for various scripts / geographic regions where low cost devices with relatively lower res screens are still widely in use. The discussion also focused on possible hinting approaches for variable components and the role autohinting might play. Introducing all these new functions as part of the new glyf table would make sense [as far as introducing braking changes is concerned], and making the new table format future-proof.

*4. Combining cubic and quadratic Bézier curves in glyphs*

Focused discussions on advantages / disadvantages of various approaches, followed by the discussion of benefits of doing so. We established the fact that supporting both cubic and quadratic outlines would benefit both users and type designers / font developers (who currently almost exclusively work in cubics), and that the conversion of cubic to quadratic outline is lossy - it makes for a compelling story to support both. It also seems to be a natural fit into a new glyph format supported by a new table tag. (During the discussion of benefits / drawbacks of supporting both outline formats, we also noted that while forcing new glyph outlines to only use cubics is a possibility, and mixing different types of outlines might complicate glyf table flags - mixed versions showed better file sizes in the initial experiments.)

*5a.*[*Font interface default settings*](https://github.com/MPEGGroup/OpenFontFormat/issues/52)

Variable fonts used in environments that don't support variability offer named instances as defaults; however, there are no requirement for a font to have an instance named "Regular", and not all formats (e.g. CFF2) are backward compatible in that way (and fonts aren't always built with intermediate masters). While some environments like the Web (CSS Fonts Module) offer mechanisms for setting default values for common axes, some font selector UI would typically present a format default (e.g. zero for all axes), which in some cases would be an extreme. In order to be able to build fonts with extreme masters we need to be able to define a default instance [via an InstanceRecord in 'fvar' table, see [proposal](https://github.com/MPEGGroup/OpenFontFormat/issues/52) for details].

*5b. Variable substitutions (also see GitHub issues*[*#53*](https://github.com/MPEGGroup/OpenFontFormat/issues/53)*&*[*#54*](https://github.com/MPEGGroup/OpenFontFormat/issues/54)*)*

Discussions were centered on the examples described in both GitHub issues and in more details in the [conditions.pdf](https://github.com/MPEGGroup/OpenFontFormat/files/12198534/conditions.pdf) document. The overall responses to the proposed were very positive, the consensus decision was that a more formal proposal outlining the necessary spec changes would be prepared for review on GitHub and also be available for discussion at the next AHG meeting.

* + - * + AHG Zoom meeting (Sep. 27, 2023) summary report.

*1. On "Beyond 64K glyphs" proposal (submitted as m65472):*

Accepted in principle with minor changes and typo fixes. The finalized submission should use capitalized table tags for all new tables, with each table description getting its own subclause to preserve the overall structure of the OFF standard. Changes and extensions in the existing tables should be clearly defined as amended content.
*2. On "Representative Instance" proposal (submitted as m65516):*Accepted in principle with minor clarifications. The finalized submission should be prepared against the existing text of the current Working Draft (rev.7).
*3. On "Condition value" proposal (submitted as m65515):*Accepted as proposed, with additional editorial changes to be made regarding the positioning of explanatory / normative spec content. The finalized submission should be prepared against the existing text of the current Working Draft (rev.7).
*4. On "Feature variations:*New Substitution mechanism" proposal: deferred for further discussions after the October 2023 SC29/WG3 meeting.

# AHG Recommendations

The AHG recommends reviewing and adopting proposed updates and republish the updated version of the Working Draft text of the 5th edition of ISO/IEC 14496-22 making it available for public review.