
**Information technology — Font
information interchange —**

**Part 3:
Glyph shape representation**

**AMENDMENT 2: Additional shape
representation technology for Open Font
Format**

*Technologies de l'information — Échange d'informations sur les
fontes —*

Partie 3: Représentation de la forme de glyphes

*AMENDEMENT 2: Technologie de représentation de forme
additionnelle pour format de fontes ouvert*

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Foreword

ISO (the International Organization for Standardization) and IEC (the International Electrotechnical Commission) form the specialized system for worldwide standardization. National bodies that are members of ISO or IEC participate in the development of International Standards through technical committees established by the respective organization to deal with particular fields of technical activity. ISO and IEC technical committees collaborate in fields of mutual interest. Other international organizations, governmental and non-governmental, in liaison with ISO and IEC, also take part in the work. In the field of information technology, ISO and IEC have established a joint technical committee, ISO/IEC JTC 1.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of the joint technical committee is to prepare International Standards. Draft International Standards adopted by the joint technical committee are circulated to national bodies for voting. Publication as an International Standard requires approval by at least 75 % of the national bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO and IEC shall not be held responsible for identifying any or all such patent rights.

Amendment 2 to ISO/IEC 9541-3:2008 was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 34, *Document description and processing languages*.

This Amendment appends an additional glyph shape representation technology for the harmonization of ISO/IEC 9541-3 to Open Font Format (ISO/IEC 14496-22). In Open Font Format file, the scalable glyph shape representations by TrueType instructions or Adobe Type2 CharStrings are possible, but ISO/IEC 14496-22 does not include it. For the harmonization between ISO/IEC 9541 and ISO/IEC 14496-22, this Amendment covers Adobe Type2 CharStrings that is the half of the scalable glyph shape representation in ISO/IEC 14496-22. It is an extended version of ISO/IEC 9541-3 Type 1 glyph shape representation.

The additional interchange format is described by SGML (Standard Generalized Markup Language) conforming to ISO 8879:1986 and ISO 8879:1986/Cor.2:1999 (Annex K: Web SGML Adaptations).

Information technology — Font information interchange —

Part 3: Glyph shape representation

AMENDMENT 2: Additional shape representation technology for Open Font Format

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Replace the declaration with the following:

```
<!-- (c) International Organization for Standardization 2004 Permission
      to copy in any form is granted for use with conforming WebSGML
      systems and applications as defined in ISO 8879:1986(WWW),
      provided this notice is included in all copies. -->
<!-- Public document type definition. Typical invocation:
      <!DOCTYPE gshapes PUBLIC "ISO 9541-3:1994 AM1:2004 and AM2:2008//DTD Glyph Shapes//EN">
-->

<!-- GLYPHSHAPES -->
      <!ELEMENT gshapes (t1shapes | t2shapes | ot3shapes | niprop)+ >

<!-- Type 1 shape information. Typical invocation:
      <!DOCTYPE t1shapes PUBLIC "ISO 9541-3:1994//DTD Type 1 Glyph Shapes//EN">
-->

<!-- Type 2 shape information. Typical invocation:
      <!DOCTYPE t2shapes PUBLIC "ISO 9541-3:1994 AM1:2004//DTD Type 2 Glyph Shapes//EN">
-->

<!-- Open Type 3 shape information. Typical invocation:
      <!DOCTYPE ot3shapes PUBLIC "ISO 9541-3:1994 AM2:2008//DTD Open Type 3 Glyph Shapes//EN">
-->
```

Add the following after Section 3:

Section 4: Open Type 3 glyph shape representation

4.1 Scope

This section specifies the architecture and interchange format of one standard Glyph Shape Representation: ISO/IEC 9541 Standard OPEN TYPE 3. The Open Type 3 glyph shape representation is designed for the harmonization to the glyph shape representation used in “CFF” table in Open Font Format (ISO/IEC 14496-22). It is an extended version of ISO/IEC 9541-3 Type 1 glyph shape representation.

4.2 Definitions

This section uses the terms defined by 2.2. Extra terms in the following definitions are specific to this section.

4.3 Overview of Open Type 3 glyph shape representation architecture

4.3.1 Difference from Type 1 glyph shape representation

The original ISO/IEC 9541-3 Type 1 glyph shape representation used graphical drawing operators that take single set of operands. For example, relative lineto operator (`rlneto`, described in 2.7.3.2.5) takes 2 number object operands of `dx` and `dy` that specifies relative displacements. To compress the glyph procedures, the Open Type 3 glyph shape representation enhances Type 1 glyph procedure operators to take multiple set of operands. The relative lineto operator in the Open Type 3 glyph shape representation recognizes the operand list as an array of pairs of `dx` and `dy`. By this enhancement, the glyph procedure repeating `rlneto` operator can be compressed to multiple sets of relative displacements and single `rlneto` operator. By the operator to be interpreted and the length of the operand list, the glyph procedure interpreter dynamically determines how many sets of operands are taken from the tail of operand list.

4.3.2 Extended virtual machine

The interpretation of Open Type 3 glyph procedure is modelled by the virtual machine that is described in 2.7.1. To illustrate the interpretation of Open Type 3 glyph shape representation, “a transient array” to store any objects is introduced in state variables (described in 2.7.1.4). The Open Type 3 glyph procedure has no operators to allocate, free, initialize the transient array explicitly, it must be allocated dynamically or pre-allocated before the interpretation. The size of the transient array must at least 32 elements, although individual implementations may have longer array. As other state variables, the entries of the transient array are persistent only during the interpretation of each glyph procedures. The transient array has no default values. Therefore, it is possible that individual implementation resets all entries to number 0, or to random number, or keeps the objects stored in previous interpretation.

4.4 Open Type 3 glyph shape representation

By the comparison with original Type 1 glyph shape representation in the section 2, the Open Type 3 glyph procedure is classified into 4 groups.

- Original Type 1 glyph procedure operators that are not modified from the definition in section 2
- Enhanced Type 1 glyph procedure operators that the syntaxes are enhanced for Open Type 3
- Additional operators that are not defined in original Type 1 glyph shape representation
- Obsolete operators that described in section 2 but deprecated in Open Type 3