

ICC Technical Note

Guidelines on populating the profileSequenceDescTag

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Introduction

The profileSequenceDescTag was introduced with the version 4 ICC profile specification. This tag is defined in the specification as “an array of descriptions of the profile sequence” used to create the device link profile. This tag is required in all version 4 device link profiles. It uses a profileSequenceDescType structure which is populated with appropriate information from the original profiles used to create the device link profile.

This tag type is rather involved and care needs to be taken when populating the tag to avoid problems when parsing it. This document discusses some of the caveats to encoding and parsing the tag and provides some guidelines to mitigate these caveats.

profileSequenceDescType Structure

The profileSequenceDescType is a variable sized structure which consists of an array of profile description structures from byte 12. Each profile description structure consists of information that was extracted from the profiles used to create the device link profile as follows:

1. Device Manufacturer and Model signatures
2. Device Attribute information
3. Device Technology signature
4. Two multiLocalizedUnicodeType structures that contain displayable information about the device manufacturer and model

A significant point of ambiguity in encoding and parsing each profileSequenceDescType structure can be found in the two multiLocalizedUnicodeType structures. Methods of embedding these structures can present some ambiguities when later trying to parse the profileSequenceDescType structure. A closer look at the multiLocalizedUnicodeType structure is needed to provide a background for the discussion of the ambiguities.

The table in Figure 1 taken from the ICC.1:2004-10 specification shows the structure of the multiLocalizedUnicodeType. It should be noted that this structure does not store the total size of the data in the tag. This is because generally the size of the tag data is stored in the tag directory and not in the tags themselves.

However, when a multiLocalizedUnicodeType structure is embedded in a profileSequenceDescType structure, the sizes of the multiLocalizedUnicodeType portions are not stored anywhere and thus are not available while parsing the profileSequenceDescType structure.

Table 44 — multiLocalizedUnicodeType

Byte Position	Field Length (bytes)	Content	Encoded as...
0..3	4	'mluc' (0x6D6C7563) type signature	
4..7	4	reserved, must be set to 0	
8..11	4	number of names (n): the number of name records that follow.	uint32Number
12..15	4	name record size: the length in bytes of each name record that follows. Each name record currently consists of the field's first name language code to first name offset.	uint32Number
16..17	2	first name language code: language code from ISO-639	uint16Number
18..19	2	first name country code: region code from ISO-3166	uint16Number
20-23	4	first name length: the length in bytes of the string	uint32Number
24..27	4	first name offset: the offset from the start of the tag in bytes	uint32Number
28..28+(12*(n-1))-1 (or 15+12*n)	12*(n-1)	if more than one name record, store them here	
28+(12*(n-1) (or (16+12*n))...end		Storage area of Unicode characters	

Figure 1 - multiLocalizedUnicodeType Structure

Therefore, the sizes of the embedded multiLocalizedUnicodeType structures need to be guessed at. However, because there is some flexibility in encoding a multiLocalizedUnicodeType structure it can become problematic to guess the sizes correctly.

The following sections discuss some ambiguities and make recommendations to help mitigate problems.

Component profile does not contain either a deviceMfgDescTag or a deviceModelDescTag

If the component profile does not contain the two tags, then the ICC.1:2004-10 specification states that “placeholder” tags should be inserted. “Placeholder” tags are defined as multiLocalizedUnicodeType structures with the number of name records set to zero and no name record or strings.

Points of confusion exist in encoding a multiLocalizedUnicodeType structure with zero name records. If a zero is placed in the number of name records field (bytes 8 to 11) no additional data is actually needed in the structure (I.E. the name record size and contents of the first record are not required). Because these fields are present in table 44, encoding implementations might possibly encode 12 bytes, 16 bytes, or 28 bytes for a multiLocalizedUnicodeType structure with no name records. This makes parsing of these structures problematic.

To reduce this ambiguity it is recommended that multiLocalizedUnicodeType structures with zero names encode a '0' in the number of names field (bytes 8 to 11) with no other additional information stored. Thus, the size of the structure would be 12 bytes.

Component profile contains deviceMfgDescTag and deviceModelDescTag

If the component profile contains the two tags, then these tags need to be inserted in their entirety. But, the specification does not explicitly mention the procedure to be adopted when the component profile is a version 2 ICC profile. The Version 2 ICC specification did not have multiLocalizedUnicodeType tags and the deviceMfgDescTag and deviceModelDescTag were made of textDescriptionType structures. Additionally, the version 4 specification has deprecated the textDescriptionType structure. Hence, the textDescriptionType structure needs to be converted to multiLocalizedUnicodeType structure before being inserted in the profileSequenceDescTag. Please refer to the 'Profile Sequence Identifier Tag' amendment for a way to create a multiLocalizedUnicodeType from a textDescriptionType.

If the component profile is a version 4 ICC profile, some additional changes might be required to encode multiLocalizedUnicodeType data into a profileSequenceDescTag.

The name records of a multiLocalizedUnicodeType structure can point anywhere in the storage area and can be in any order with overlaps. Sharing of named records is also allowed. Additionally, the element storage area could potentially contain empty space between or at the end of the named records.

This makes it difficult to guess the size of the storage area accurately.

To reduce ambiguity when inserting the structure, it is recommended that the length of the structure be the largest sum of each record's name length and name offset. This will remove the guess work in determining the size of the structure when later parsing the profileSequenceDescTag.

Padding of multiLocalizedUnicodeType data

According to section 7.1 of the ICC.1:2004-10 specification, all tagged element data, including the last, shall be padded by no more than three following pad bytes to reach a 4-byte boundary and all pad bytes shall be NULL.

To be consistent with this requirement, it is recommended that pad bytes are properly added (as needed) to each multiLocalizedUnicodeType structure to ensure that any subsequent structure in a profileSequenceDescriptionType tag properly starts on a 4-byte boundary.