Action Plan Background: TIFF 5.0
Author: Andrea Goethals, FCLA
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Preface: The TIFF 5.0 specification makes a distinction between 'TIFF Classes' and other TIFF features. Note that this terminology was changed in TIFF 6.0 to 'Baseline TIFF' to represent the former, and 'TIFF extensions' to represent the latter. TIFF Classes are the core elements of the TIFF 5.0 specification that should be implemented by TIFF 5.0 readers. Other TIFF 5.0 features that are not part of TIFF Classes are less likely to be supported by TIFF 5.0 readers.

1 General Description

1.1 Format Name: TIFF (Tag Image File Format)

1.2 Version: 5.0

1.3 MIME media type name: image

1.4 MIME subtype: tiff

1.5 Short Description: A tag-based raster image file format

1.6 Common Extensions: .tiff, .tif

1.7 Color depth: Bi-tonal to 24-bit

1.8 Color Space: Palette, RGB, bilevel (1-bit) and grayscale

1.9 Compression: Varies, can be any of: LZW (for grayscale, mapped color, full color), PackBits (Run-length Encoding), raw uncompressed, Modified CCITT Group III

1.10 Progressive Display: Possible when using LZW compression

1.11 Animation: No

1.12 Magic number(s) or equivalent:
II (little-endian): 49 49 2A 00 hex
MM (big-endian): 4D 4D 00 2A hex

2 Essential and Distinguishing Characteristics

Can describe bilevel, grayscale, palette-color, and full-color image data. Supports three compression schemes, is hardware and software independent, supports the inclusion of private or special-purpose information. It's capable of embedding multiple images within a single file so it

can act as a wrapper for a document with multiple images or a single image with multiple alpha channels. Capable of encoding non-image textual information which can be used for metadata. The compression scheme can be lossy or lossless, depending on which compression algorithm was used. Maximum file size is capped at 4GB (2^32-1).

3 Usefulness

3.1 Version Duration: 3 years, 8 months

3.2 History of Prior Versions Duration:

- First version: Fall 1986: TIFF (no revision number – should have been TIFF 3.0 because there were two earlier major draft releases) by Aldus Corporation and Microsoft
- Second version: April 1987: TIFF 4.0 (minor enhancements)
- Third version: October 1988: TIFF 5.0 (added support for palette color images and LZW compression)

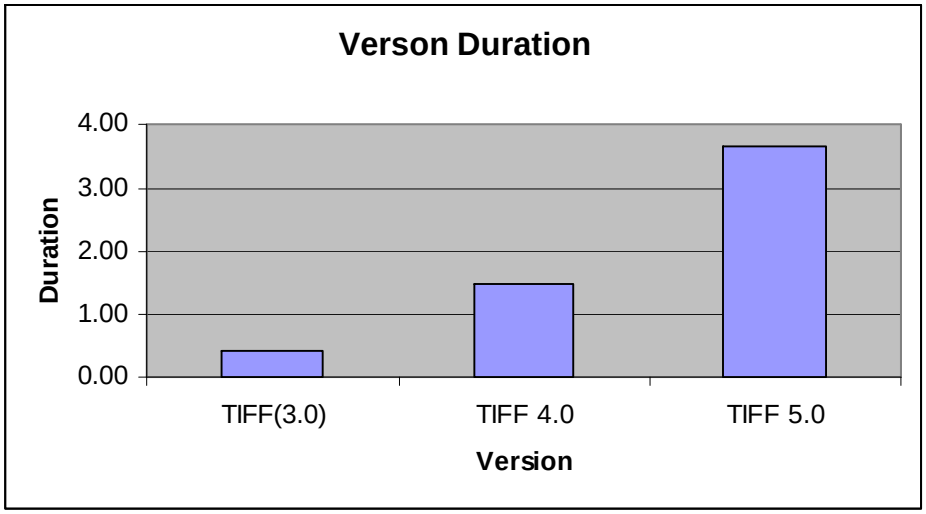

Figure 1: Duration in Years of Tiff Versions

3.3 Expected Newer Versions:
TIFF 5.0 was superceded by TIFF 6.0 in June, 1992.

3.4 Existence of Publicly Available Complete Specifications: Adobe tends to only make their most recent format specifications available. While the TIFF 5.0 specification is not available on Adobe's website, it can be found at other places on the WWW, including: http://myfileformats.com/download_info.php?id=9010

3.5 Specifications-controlling Body:
TIFF was developed by Aldus and Microsoft Corp, and the specification was owned by Aldus, which in turn merged with Adobe Systems, Incorporated. Adobe Systems now holds the Copyright for the TIFF specification. TIFF is a trademark, formerly registered to Aldus, and which is now claimed (though not yet registered) by Adobe Systems, Inc.

3.6 Related Legal Issues:
A TIFF image may optionally use LZW compression, which is the subject of United States patent number 4,558,302 owned by the Unisys Corporation. This U.S. patent is scheduled to expire on June 20, 2003. There remains a lot of uncertainty as to the legal uses of LZW after the expiration. Unisys will still hold foreign LZW patents and the US patent could be theoretically be extended if Unisys added extensions to the original patent. In addition, other US companies may also hold LZW patents. These issues could make it less likely for future applications to support the decoding and encoding of LZW-compressed images.

When LZW compression was added to the TIFF 5.0 specification it was thought to be public domain. In TIFF revision 6.0, LZW compression was included as a TIFF extension and was excluded from the Baseline TIFF specification.

3.7 Application and Platform Support: TIFFs are software and hardware independent. They are supported by the majority of scanners and most image viewing and editing software. They are not supported natively by WWW browsers, but can be viewed using plug-ins and helper applications. Because TIFF is a flexible specification, not all of its features are supported by TIFF readers.

3.8 Limitations: Not natively supported by WWW browsers; can not store vector graphics. TIFF uses 4-byte integer file offsets to store image data, with the consequence that a TIFF file cannot have more than 4 Gigabytes of raster data. However, this is 4G of compressed data, and so if the compression ratio is high enough, theoretically a TIFF image could be much larger (in fact, 2**32-1 pixels square). Its versatile nature can be problematic, with issues such as large strip sizes (a contiguous portion of the image) overflowing memory allocation, and byte ordering.

3.9 Perceived Popularity: TIFFs are widely used in the areas of archiving, scanning, faxing, prepress, remote sensing and multispectral applications.

4 Related Formats

4.1 Specification Variations: There are many proposed and existing extensions to the TIFF specification, including: GeoTIFF, Adobe extensions foe PageMaker, JPEG-in-TIFF, Zip-in-TIFF, TIFF Class F Revised Specification, TIFF/IT Prepress Interchange Standard, TIFF enhancements for Adobe PageMaker 6.0, RichTIFF, Wang TIFF Image-Annotation Extensions, Kodak TIFF extensions, and many Internet RFC's related to TIFF.

5 Summary and Conclusions

The TIFF 5.0 specification was superceded by the TIFF 6.0 specification in 1992. While for many file formats we might consider converting older formats to the newest formats, TIFFs present a special case. The TIFF 5.0 specification (p.4) states that:

> *A TIFF file does not have a real version/revision number. This was an explicit, conscious design decision… We wanted TIFF fields to have a permanent and well-defined meaning, so that "older" software can usually read "newer" TIFF files.*

In fact, as can be found by examining a TIFF header, all TIFF files are version[1] 42 ("chosen for its deep philosophical significance"). The importance of this for archival purposes is that the TIFF format is intended to be backwards-compatible. Theoretically, a TIFF 5.0 image should be as archival as a TIFF 6.0 image, especially those that do not use LZW compression.

6 References

Aldus Corporation and Microsoft Corporation, "TIFF Revision 5.0", Aldus/Microsoft Technical Memorandum, 8/8/88. (http://myfileformats.com/download_info.php?id=9010)

Adobe Developers Association, "TIFF Revision 6.0", Adobe Systems Incorporated, Final - June 3, 1992. (http://partners.adobe.com/asn/developer/pdfs/tn/TIFF6.pdf)

[1] The TIFF 5.0 specification distinguishes between a file's *version* number and its specification's *revision* number.