Exiv2 - Feature #1074
ICC Profile in APP2 segment.

07 May 2015 12:24 - Tim Zaman

Status:	Closed		**Start date:**	07 May 2015
Priority:	Normal		**Due date:**	
Assignee:	Robin Mills		**% Done:**	100%
Category:	metadata		**Estimated time:**	50.00 hours
Target version:	0.26			

Description

See thread on forum [[http://dev.exiv2.org/boards/3/topics/2059?r=2065#message-2065]].

Currently, exiv2 cannot store an ICC profile (custom) in a way that is readable by most viewers (f.e. previewers or Adobe). They want the ICC profile to be in the APP2 segment. As a feature, i would like to see this possibility in exiv2. To my opinion, exiv2 would be *the* perfect c++ metadata/xmp/iptc/exif page in zie world.

Maybe nice to pursue for 0.27?

Related issues:

Related to Exiv2 - Feature # 756: Access to ICC Profile (TAG: 0x8773) data in...	**Closed**	**04 Feb 2011**
Related to Exiv2 - Patch # 676: Patch for reading ICC color profiles	**Closed**	**26 Jan 2010**
Related to Exiv2 - Bug # 1126: Extracting Exif from PNG in Exiv2-0.25	**Closed**	**08 Oct 2015**
Related to Exiv2 - Feature # 1057: Implement target/modifier - (stdin/stdout)...	**Closed**	**17 Apr 2015**

Associated revisions

Revision 3898 - 26 Aug 2015 15:05 - Robin Mills

#1074. Implemented exiv2 options -eC and -pC for JPEG.

Revision 4166 - 05 Jan 2016 16:52 - Robin Mills

#1108 and #1074 Correction to r4165 to fix MSVC build breaker and to document: exiv2 -eC (extract ICC profile).

Revision 4168 - 07 Jan 2016 16:13 - Robin Mills

#1108 and #1074 -pC and -pR (print Color Profile, print Recursively) now work on png.

Revision 4169 - 07 Jan 2016 19:05 - Robin Mills

#1074 -pC now works on tiff files. Added test convenience targets to Makefile

Revision 4170 - 07 Jan 2016 19:20 - Robin Mills

#1074 Correction to r4169. Changes to config/Makefile.in to match Makefile

Revision 4171 - 07 Jan 2016 20:32 - Robin Mills

#1108 and #1074 Correction to r4168 to fix MSVC build breaker.

Revision 4172 - 07 Jan 2016 21:15 - Robin Mills

#1074 Correction to r4169 to fix test suite for platform/wc dependencies on Linux.

Revision 4173 - 07 Jan 2016 21:48 - Robin Mills

#1074 Correction to r4169. Use cksum (better than wc) to test extracted profile correctness. wc is platform dependant.

Revision 4193 - 22 Jan 2016 06:57 - Robin Mills

#1074 test files

Revision 4229 - 17 Mar 2016 22:36 - Robin Mills

#1074. Thanks to Max for reporting this and providing the test file.

Revision 4230 - 17 Mar 2016 22:56 - Robin Mills

#1074 Added Max's file to the test suite.

Revision 4234 - 18 Mar 2016 08:42 - Robin Mills

#1074 Fixed 'overwrite?' prompt in command: exiv2 -eC image

Revision 4241 - 23 Mar 2016 13:49 - Robin Mills

#1074 #1108 Added ICC profile to test/data/Reagan.jpg

Revision 4242 - 23 Mar 2016 17:06 - Robin Mills

#1074. jpgimage.cpp ICC support (Work in Progress)

Revision 4455 - 01 Sep 2016 14:17 - Robin Mills

#1074 Work in progress for ICC/jpg - changes to readMetadata() and printStructure()

Revision 4456 - 01 Sep 2016 14:32 - Robin Mills

#1074 Correction to r4455 where in updated test/bugfixes-test.sh instead of test/data/bugfixes-test.out

Revision 4457 - 01 Sep 2016 16:44 - Robin Mills

#1074 ICC support in jpgimage.cpp. Add test/icc-test.sh

Revision 4458 - 01 Sep 2016 17:38 - Robin Mills

#1074 Correction to r4457 to fix msvc build-breaker.

Revision 4461 - 05 Sep 2016 11:39 - Robin Mills

#1220 and #1074 Work in progress. Improved -pS for JPEG. #1220 is due to a bug in writing the ICC profile in jpgimage.cpp/doWriteMetadata()

Revision 4469 - 06 Sep 2016 23:11 - Robin Mills

#1074 Correction to r4466 to fix MinGW build breaker on include <sys/select.h>

Revision 4470 - 07 Sep 2016 13:17 - Robin Mills

#1074 and #1057 Fixing build breakers on Cygwin and msvc MinGW to be further investigaged. add checkSum to test functions

Revision 4471 - 07 Sep 2016 13:18 - Robin Mills

#1074 Omitted from previous commit.

Revision 4479 - 09 Sep 2016 15:18 - Robin Mills

#1074 Added ICC support to tiffimage.writeMetadata(). pngimage.readMetadata() is not complete.

Revision 4481 - 11 Sep 2016 15:31 - Robin Mills

#1074. Rollback r4479 which has inflicted a lot harm on the test harness.

Revision 4485 - 12 Sep 2016 17:42 - Robin Mills

#1074 Work in progress. ICC Jpeg/Png/Tiff exiv2 -eC foo.xxx writes good foo.icc profiles. icc-test.sh is broken and to be investigated.

Revision 4490 - 13 Sep 2016 09:47 - Robin Mills

#1074. Fix bug in jpgimage.cpp/readMetadata() concerning ICC profile

Revision 4492 - 14 Sep 2016 10:02 - Robin Mills

#1074 For discussion see: http://dev.exiv2.org/issues/1074#note-23

Revision 4493 - 14 Sep 2016 20:25 - Robin Mills

#1074 Work in progress. ~~eC pC eC~~ work for JPG/PNG/TIFF/WEBP. pngimage::doWriteMetadata() does not update iCCP chunk.

Revision 4495 - 15 Sep 2016 12:20 - Robin Mills

#1074 Work in progress. fixed pngimage.cpp doWriteMetadata().

Revision 4499 - 15 Sep 2016 14:52 - Robin Mills

#1074 Tests for webp, png, tiff and jpg

Revision 4540 - 22 Sep 2016 20:52 - Robin Mills

#1074 Fix bug in TiffImage printStructure() for large icc profiles.

Revision 4541 - 22 Sep 2016 20:58 - Robin Mills

#1074 Correction to r4540. Rollback changes to actions.cpp which should not have been submitted. Resubmitted test/data/icc-test.out

History

#1 - 07 May 2015 13:39 - Robin Mills

- Category changed from not-a-bug to metadata

- Priority changed from Low to Normal

Thanks, Tim. I think Exiv2 is already the ***best*** metadata library in the world and feature would make it ***best++***.

Can we clarify the scope of this. Remember, the more you want, the less likely you are to get it *AND* the longer it will take!

1. Read AND Write ICC Profiles?
2. Most formats: JPEG, TIFF, PNG (raw, dng etc)?
3. Can XMP sidecars deal with color profiles?
4. Do you want to treat a Profile as a metadata container?

I've set the target to v0.26 because the other choice is 1.0. This is unlikely to be ready for v0.26 due to contention with existing commitments.

#2 - 07 May 2015 14:46 - Tim Zaman

Reading the APP2 profile data is usually not necessary, as it is often also, duplicated, (in my experience) in the normal section. Formats, most common where one would use this, TIFF and JPG. If you really care about color you often use JPG and TIFF.
So writing for JPEG/TIFF would be a good start. I think profile could indeed be seen as a separate container im, should be straightforward without many bells and whistles. In my experience you can almost copy the .icc file to the header verbatim.

#3 - 07 May 2015 15:37 - Robin Mills

Tim

To keep this simple, I'd like to limit this to JPEG, TIFF and PNG:

1) Extract ICC profile
add the option -eC extract color profile. So foo.jpg -> foo.icc
add the option -pC to write the color profile to stdout
I think the code that handles -pS (print Structure) and -pX (print XMP) can do this will minor modification

2) Replace/embed the profile:
add the option -iC import color profile. So foo.icc -> foo.{tiff|jpg|png}

I'm not offering to delve inside the data of the profile. There is all manner of color magic (LUTs and what not), however I am only offering treat the profile as a blob of binary data.

#4 - 07 May 2015 15:41 - Tim Zaman

Yeah making color profiles is as much art as it is science. In terms of options in a command line program, i was more interested in the c++ api, or is the cli derived from this?

#5 - 07 May 2015 15:50 - Robin Mills

I'll have to think about the API. At the moment, the interface on -pS and -pX is in image.hpp: image.hpp: typedef enum { kpsNone, kpsBasic,
    kpsXMP } printStructureOption_e ;
    image.hpp: virtual void printStructure(std::ostream& out,printStructureOption_e option=kpsNone);
So you open the image and call printStructure with an option. printStructureOption_e can easily extended with kpsProfile.

I'll have to think about the API to embed/replacing an object in the image.

#6 - 23 May 2015 08:33 - Robin Mills
- Assignee deleted (Robin Mills)

#7 - 26 Aug 2015 14:35 - Robin Mills
- File Reagan.jpg added
- Status changed from New to Assigned
- Assignee set to Robin Mills
- % Done changed from 0 to 30
- Estimated time set to 20.00

I'm going to implement the following for jpeg/png/tiff files. Of course, only jpeg have an APP2 block, however I'll also extract the profile from PNG and TIFF. All other file formats will throw an exception.

exiv2 -pC file # print profile to std::out
exiv2 -eC file # extract profile to file.icc
exiv2 -iC profile file # replace/add profile to an image

Regrettably the ICC sample application iccDumpProfile does not read from stdin and can't be used as a pipe.   794 rmills@rmillsmbp:~ $ exiv2
    --verbose -pS http://dev.exiv2.org/attachments/download/820/Reagan.jpg
    File 1/1: http://dev.exiv2.org/attachments/download/820/Reagan.jpg

STRUCTURE OF JPEG FILE: http://dev.exiv2.org/attachments/download/820/Reagan.jpg

```
address | marker    | length | data
      2 | 0xd8 SOI  |      0
      4 | 0xe0 APP0 |     16 | JFIF.....,.,......Exif..MM.*....
     22 | 0xe1 APP1 |   5642 | Exif..MM.*.....................
   5666 | 0xe1 APP1 |   3672 | http://ns.adobe.com/xap/1.0/.<?x
   9340 | 0xe2 APP2 |   3160 | ICC_PROFILE......HLino....mntrRG
  12502 | 0xed APP13 |  13986 | Photoshop 3.0.8BIM.............
  26490 | 0xee APP14 |     14 | Adobe.d@.......................
  26506 | 0xdb DQT  |    132
  26640 | 0xc0 SOF0 |     17
  26659 | 0xdd DRI  |      4
  26665 | 0xc4 DHT  |    418
  27085 | 0xda SOS  |     12
```

795 rmills@rmillsmbp:~ $ exiv2 --verbose -pC http://dev.exiv2.org/attachments/download/820/Reagan.jpg > Reagan.iccProfile

796 rmills@rmillsmbp:~ $ exiv2 --verbose -eC http://dev.exiv2.org/attachments/download/820/Reagan.jpg

File 1/1: http://dev.exiv2.org/attachments/download/820/Reagan.jpg

Writing iccProfile: Reagan.icc

797 rmills@rmillsmbp:~ $ ls -alt Reag*

-rw-r--r-- 1 rmills staff   9 26 Aug 17:40 Reagan.exv

-rw-r--r-- 1 rmills staff 3144 26 Aug 17:40 Reagan.icc

-rw-r--r-- 1 rmills staff 3211 26 Aug 17:40 Reagan.iccProfile

798 rmills@rmillsmbp:~ $ diff Reagan.icc Reagan.iccProfile

Binary files Reagan.icc and Reagan.iccProfile differ

799 rmills@rmillsmbp:~ $ iccDumpProfile Reagan.icc

Profile: 'Reagan.icc'

Profile ID: Profile ID not calculated.

Size: 3144(0xc48) bytes

Header

Attributes: Reflective | Glossy

Cmm: Unknown 'Lino' = 4C696E6F

Creation Date: 2/9/1998 06:49:00

Creator: 'HP ' = 48502020

Data Color Space: RgbData

Flags   EmbeddedProfileFalse | UseAnywhere

PCS Color Space: XYZData

Platform: Microsoft

Rendering Intent: Perceptual

Type: DisplayClass

Version: 2.10

Illuminant: X=0.9642, Y=1.0000, Z=0.8249

Profile Tags

```
              Tag    ID      Offset      Size
              ----  ------  ------      ----
      copyrightTag  'cprt'    336        51
 profileDescriptionTag  'desc'    388       108
    mediaWhitePointTag  'wtpt'    496        20
    mediaBlackPointTag  'bkpt'    516        20
      redColorantTag  'rXYZ'    536        20
```

```
         greenColorantTag 'gXYZ'      556        20
          blueColorantTag 'bXYZ'      576        20
          deviceMfgDescTag 'dmnd'     596       112
        deviceModelDescTag 'dmdd'     708       136
        viewingCondDescTag 'vued'     844       134
      viewingConditionsTag 'view'     980        36
               luminanceTag 'lumi'   1016        20
            measurementTag 'meas'    1036        36
             technologyTag 'tech'    1072        12
                 redTRCTag 'rTRC'    1084      2060
               greenTRCTag 'gTRC'    1084      2060
                blueTRCTag 'bTRC'    1084      2060
      800 rmills@rmillsmbp:~ $
```

#8 - 26 Aug 2015 16:51 - Robin Mills
- File Reagan.tiff added

Adding Reagan.tiff with an embedded ICC profile.

Neither PhotoShop Elements nor Apple/Preview appear to be able to embed ICC profiles in PNG files.

#9 - 27 Aug 2015 09:25 - Tim Zaman

Redmine is not the place for compliments, but: awesome! <3 Robin.

#10 - 05 Jan 2016 14:57 - Robin Mills
- % Done changed from 30 to 50

r4165 I've done more work on option -pC for PNG files. The location of the profile is documented here: http://www.w3.org/TR/PNG/#11iCCP I've can easily find the profile - however zlib refuses to decompress it! How odd. The code is submitted.

I've put in effort on -pR (recursive dump), so I now have the code available to locate profiles which are embedded in tiff-encoded records which can appear in tiff files, Exif datablocks, ExifTag records, or tiff-encoded MakerNotes.

Exiv2 man page updated to include -pC (print ICC profile to stdout) and -eC (extract ICC profile to file.icc)

#11 - 08 Jan 2016 16:23 - Robin Mills

State of play:
Done:
 -pC extract the ICC profile from png, tiff and jpeg

TODO *to complete ICC Profile support for v0.26*:
1 Extract ICC profile to .exv file (-eC) (Import is done, as a .exv file is a JPEG)
2 Extract ICC profile from foo.jpg to foo.icc (-ec)

3 Import ICC profile -iC

4 Update metacopy (and other samples) to respect ICC profiles

There is a related issue #1057 to add tgt modifier - for stdin/stdout to -etgt and -itgt. This will enable a useful work flow to pipe an ICC profile from one image to another: $ exiv2 -eC- foo.tiff | exiv2 -iC- foo.jpg foo.png

#12 - 17 Mar 2016 17:59 - Max Pozdeev

- File scan.png added

Hi Robin,

I found an png image where icc profile is not displayed by exiv2. Image was produced by Apple Image Capture from scanner in grayscale. Here the structure. Seems the profile is present.

```
STRUCTURE OF PNG FILE: /Pictures/scan.png
 address | index | chunk_type | length | data
      8 |   0 |    IHDR |    13 | ............
     33 |   1 |    iCCP |  3294 | ICC Profile..X..W.XS...[...z..:.
   3339 |   2 |    pHYs |     9 | .........
   3360 |   3 |    iTXt |   596 | XML:com.adobe.xmp.....<x:xmpmeta
   3968 |   4 |    IDAT | 16384 | x.....%Y.......UY.==.0.p...w..".
  20364 |   5 |    IDAT | 14548 | y.oCU`......C7... ..9.1N#......1
  34924 |   6 |    IEND |     0 |
```

#13 - 17 Mar 2016 21:22 - Robin Mills

Ah, that's very helpful. I'll have a look at that. Thanks for letting me know.

#14 - 17 Mar 2016 22:39 - Robin Mills

Fixed. Good find, Max. Fix submitted r4229

I've modified the code to do case-independant check on the "ICC...".
```
   $ exiv2 -pR ~/Downloads/scan.png
   STRUCTURE OF PNG FILE: /Users/rmills/Downloads/scan.png
    address | index | chunk_type | length | data
        8 |   0 |    IHDR |    13 | ............
       33 |   1 |    iCCP |  3294 | ICC Profile..X..W.XS...[...z..:.
     3339 |   2 |    pHYs |     9 | .........
     3360 |   3 |    iTXt |   596 | XML:com.adobe.xmp.....<x:xmpmeta
     3968 |   4 |    IDAT | 16384 | x.....%Y.......UY.==.0.p...w..".
    20364 |   5 |    IDAT | 14548 | y.oCU`......C7.....9.1N#......1
    34924 |   6 |    IEND |     0 |
   $ exiv2 -pC ~/Downloads/scan.png > /tmp/scan.icc ; ls -alt /tmp/scan.icc
   -rw-r--r--  1 rmills  wheel  6562 17 Mar 22:29 /tmp/scan.icc
   $ iccDumpProfile /tmp/scan.icc
   Profile:        '/tmp/scan.icc'
```

```
Profile ID:      Profile ID not calculated.
Size:            4456(0x1168) bytes

Header
------
Attributes:      Reflective | Glossy
Cmm:             Apple
Creation Date:   8/23/2012  15:46:15
Creator:         'appl' = 6170706C
Data Color Space: GrayData
Flags            EmbeddedProfileFalse | UseAnywhere
PCS Color Space:  XYZData
Platform:        Macintosh
Rendering Intent: Perceptual
Type:            DisplayClass
Version:         2.00
Illuminant:      X=0.9642, Y=1.0000, Z=0.8249

Profile Tags
------------
               Tag    ID    Offset      Size
               ----  ------  ------      ----
    profileDescriptionTag  'desc'   192      121
Unknown 'dscm' = 6473636D  'dscm'   316      2024
        copyrightTag  'cprt'   2340       35
     mediaWhitePointTag  'wtpt'   2376       20
         grayTRCTag  'kTRC'   2396       2060
$
```

#15 - 17 Mar 2016 22:59 - Robin Mills

I've updated the test suite to include Max's file. r4230. I assume you are happy to donate your file, please say otherwise.

#16 - 18 Mar 2016 07:02 - Max Pozdeev

Robin, thank you for the patch. The file was made specially for tests, use as you wish.

#17 - 23 Mar 2016 17:05 - Robin Mills
- % Done changed from 50 to 70

#18 - 24 Aug 2016 09:00 - Robin Mills
- % Done changed from 70 to 80

Mostly done. I'll have to test this, update the test suite appropriately and fix things that have still to be implemented.

#19 - 02 Sep 2016 09:23 - Robin Mills
- % Done changed from 80 to 60
- Estimated time changed from 20.00 to 60.00

#20 - 05 Sep 2016 18:08 - Robin Mills

- % Done changed from 60 to 70

- Estimated time changed from 60.00 to 40.00

r4462 Fixed #1220 (JPEG/ICC corrupting files). r4463 implemented -iC-.

Work in progress. Still have to deal with ICC in PNG and Tiff images. Reduced time estimate to 40 hours.

#21 - 08 Sep 2016 09:40 - Robin Mills

- % Done changed from 70 to 80

#22 - 09 Sep 2016 15:21 - Robin Mills

- % Done changed from 80 to 90

r4479 Fix submitted for tiffImage::doWriteMetadata().

image::findIccProfile() is closed the FILE* when called from pngImage::readMetadata().

#23 - 14 Sep 2016 10:00 - Robin Mills

- % Done changed from 90 to 80

- Estimated time changed from 40.00 to 50.00

r4492 Many fixes.

Thanks to Phil for some advice about the jpeg/embedding. http://u88.n24.queensu.ca/exiftool/forum/index.php/topic,7586.0.html

And Thanks to Ben for using GIMP to to create test/data/ReaganLargeXxx.xxx files.

Stuff remaining:

1) $ exiv2 -iC foo.png (in pngimage.cpp/doWriteMetadata())

2) tests for tiff/jpeg/png/webp in test/icc-test.sh

3) $ exiv2 -iC- to read profile from stdin is doubtful

4) $ exiv2 -eC- to write profile to stdout is doubtful

#24 - 15 Sep 2016 12:26 - Robin Mills

- % Done changed from 80 to 90

r4495 Fix writing PNG files. Into the end game. More testing and this will be finished.

#25 - 15 Sep 2016 14:54 - Robin Mills

- Status changed from Assigned to Closed

- % Done changed from 90 to 100

r4499 Tests for JPG/WEBP/TIFF/PNG

Files

Reagan.jpg	713 KB	26 Aug 2015	Robin Mills
Reagan.tiff	8.23 MB	26 Aug 2015	Robin Mills
scan.png	34.1 KB	17 Mar 2016	Max Pozdeev