



# IPP Fax Project

## *Universal Image Format requirements*

Revision	Date	Author	Notes
1	10/16/00	Paul Moore, Peerless Systems Networking	Initial version

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1 This document captures the requirements for the document format that is to be used for  
2 the IPP Fax project. The requirements are separated from those for the transport layer for  
3 two reasons :\_

- 4 • The format can be used without using the IPP transport extensions
- 5 • The requirements for the format are independent of the transport modifications.

6 Two aspects of the document format are covered :-

- 7 • The characteristics of the document format itself
- 8 • The means by which a sender can discover the capabilities of the receiver  
9 (resolutions, color depth, etc.)

10 Note that the expectation of the group is that the current TIFF-FX (RFC2301) will be  
11 used as the foundation for this format.

12 I propose the name 'Universal Image Format' (UIF) for the resulting specification since  
13 this covers more than just the data format and the new name will allow manufacturers to  
14 indicate to customers support for this feature as a whole.

## 15 **Data format requirements**

### 16 ***Image format***

- 17 • UIF supports raster image data.
- 18 • A well-known set of image formats, compressions and profiles is specified. (As  
19 per TIFF-FX)
- 20 • Some image formats, compressions and profiles are mandatory for a receiver to  
21 support.
- 22 • UIF supports JPEG, JBIG MH and MMH image compression types.
- 23 • The set of compressions supported is extensible.
- 24 • It is extensible so as to allow PDL and vector data in the future.

### 25 ***Color***

- 26 • UIF support color, grayscale and mono images.
- 27 • The color space is CIELAB.

### 28 ***Resolution***

- 29 • Various resolutions are supported.
- 30 • The horizontal and vertical resolutions are the same.
- 31 • Resolutions are specified in DPI. (Not TIFF-FX)

- 1 • A well-known set of resolutions is defined. This set includes 300, 600 and 1200
- 2 dpi
- 3 • All receivers must support some of these well-known resolutions. 300dpi?
- 4 • This set of resolutions can be extended

## 5 **Pages**

- 6 • UIF supports multi-page documents.
- 7 • The data is presented within a UIF document in its ‘natural’ order. In particular a
- 8 receiver does not need to buffer more than one page of data to be able to process
- 9 it. Note this is only a SHOULD in TIFF-FX for some profiles
- 10 • An individual page is presented from top-left to bottom-right. A receiver therefore
- 11 does not need to buffer a whole page. Exception is MRC. Note that this is only a
- 12 SHOULD in TIFF-FX
- 13 • A page is presented as a single image –i.e. there is no layout capability (banding
- 14 is permitted)
- 15 • Orientation is performed by the sender
- 16 • Pages are independent with regards to color, resolution and image format.

## 17 **Printable area**

- 18 • The receiver is not expected to scale the image so that it fits a whole page – this is
- 19 to be interpreted as meaning that the client wants those parts of the page left blank
- 20 • If a client transmits an image that is too large for the printable area of the page
- 21 then the receiver must truncate.
- 22 • A sender cannot control the placement of an image on a page. The first image
- 23 pixel is place at the top left hand corner of the printable area of the page
- 24 • The UIF document may specify which paper size should be used (*or this could be*
- 25 *indicated by the transport mechanism*)

## 26 **Meta-data**

- 27 • UIF is capable of carrying meta-data as well as images.
- 28 • *Define what meta-data*
- 29 • The set of meta-data attributes is extensible.

## 30 **Persistence**

- 31 • A UIF document can be persisted to a file.
- 32 • It is possible to locate an individual page in a UIF file without having to read the
- 33 entire data set.

# 1 **Capability discovery**

## 2 **Overview**

3 The current plan is that this be based on the IFAX work specified in RFC 2531 and 2533.

4 A sender must be able to determine the valid combinations of UIF parameters that it can  
5 use. A sender must never blindly send a UIF stream to a receiver; there is no guarantee  
6 that the receiver can print it correctly. Although some things such as resolution are  
7 mandated there are no mandatory media sizes for example.

8 UIF adopts the ‘sender makes right’ policy. This means that the sender must ensure that  
9 the parameters of the UIF document it sends correspond to a set of capabilities supported  
10 by the receiver.

- 11 • A receiver receiving a document that does not match should reject it.
- 12 • A receiver should not lie about its capabilities.

## 13 **Dynamics of discovery**

14 Some of the original design ideas for IPP Fax and the current IFAX products have used  
15 the idea of a sender looking up the capabilities of a receiver in a passive way. In other  
16 words the sender somehow obtains a data set that describes what the receiver can do.

17 One of the main reasons for this was that there was no synchronous communication  
18 channel available between the sender and the receiver. This is not so in the IPP Fax world  
19 (or in many of the other possible uses of UIF). It is not clear therefore that this is a  
20 requirement (i.e the requirements that the capabilities of a receiver be completely  
21 described in one ‘chunk’). An alternative mechanism is that sender and receiver negotiate  
22 with each other.

23 Additionally the transport itself may already provide discovery of some of the capabilities  
24 (for example media-supported in IPP).

## 25 **Parameters**

26 The following parameters can be discovered – almost verbatim from RFC 2301.

- 27 • Resolution (in dpi)
- 28 • Paper size (named media)
- 29 • Imageable area (in inches)
- 30 • Media type (named media types such as ‘transparency’, etc.)
- 31 • Color – named color summary (Binary, grey, full, etc)
- 32 • Colors – integer specifying number of colors per pixel.
- 33 • Color-space – CIELAB (plus some CIELAB parameters)
- 34 • Image Profile – The TIFF-FX profile names (plus some detailed constraints for  
35 specific image encodings)

1 This set of parameters must be extensible

## 2 **Combinations**

3 There needs to be a mechanism (or set of mechanisms) that enables a sender to discover  
4 valid combinations of supported parameters. RFC 2533 presents a grammar for  
5 expressing this as a single text attribute.

6 RFC 2533 takes the approach of expressing valid combinations. For example a device  
7 can say 'I support 300 or 600 dpi on A4 paper using profile S or profile M'.

8 An alternative approach is to express the valid values for each parameter independently  
9 (ie. 'I support 300,600 dpi', 'I support JPEG and JBIG', etc) and then to exclude  
10 unsupported combinations ('however 600 dpi is not valid for A0 paper').

11 Yet another discovery mechanism is more dynamic, the client selects one or more  
12 parameters and asks for the allowed values of an other parameter – 'If I were to select  
13 Letter and 600dpi what image profiles could I use'.

14 From a strict requirements perspective there is not a lot to say

- 15 • The receiver can express allowed or forbidden combinations or parameters – this  
16 included the case of expressing all the values for a parameter
- 17 • There is no mechanism to express recommended values

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