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IEEE-ISTO

Printer Working Group

IPP Fax Project

Standard for IPPFAX/1.0 Protocol

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Abstract: This document specifies the IPPFAX/1.0 protocol. The IPPFAX requirements [ifx-req] are derived from the requirements for Internet Fax [RFC2542].

In summary, IPPFAX is used to provide a synchronous, reliable exchange of image Documents between clients and servers. The primary use envisaged of this protocol is to provide a synchronous image transmission service for the Internet. Contrast this with the Internet FAX protocol specified in [RFC2305] and [RFC2532] that uses the SMTP mail protocol as a transport.

The IPPFAX/1.0 protocol is a specialization of the IPP/1.1 [RFC2911], [RFC2910] protocol supporting a subset of the IPP operations with increased conformance requirements in some cases, some restrictions in other cases, and some additional REQUIRED attributes. The IPPFAX Protocol uses the 'ippfax' URL scheme (instead of the 'ipp' URL scheme) in all its operations. Most of the new attributes defined in this document MAY be supported by IPP Printers as OPTIONAL extensions to IPP as well. An IPPFAX Printer object is called a Receiver. A Receiver MUST support at least the PDF/IS as specified in [ifx-pdfis] which is defined for the 'application/pdf' document format MIME type. A Print System MAY be configured to support both the IPPFAX and IPP protocols concurrently, but each protocol requires separate Printer objects with distinct URLs.

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90 end

91

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180

181 **1 Introduction**

182 This document specifies the IPPFAX/1.0 protocol. The IPPFAX requirements [ifx-req] are derived from
183 the requirements for Internet Fax [RFC2542].

184 In summary IPPFAX is used to provide a synchronous, reliable exchange of image documents between
185 clients and servers. The primary use envisaged of this protocol is to provide a synchronous image
186 transmission service for the Internet. Contrast this with the Internet FAX protocol specified in [RFC2305]
187 and [RFC2532] that uses the SMTP mail protocol as a transport.

188 IPPFAX is primarily intended as a method of supporting a synchronous, secure, high quality document
189 distribution protocol over the Internet. It therefore discusses paper, pages, scanning and printing, etc.
190 There is, however, no requirement that the input documents come from actual paper nor is there a
191 requirement that the output of the process be printed paper. The only conformance requirements are those
192 associated with the exchange of data over the network.

193 The IPPFAX/1.0 protocol is a specialization of the IPP/1.1 [RFC2911], [RFC2910] protocol supporting a
194 subset of the IPP operations with increased conformance requirements in some cases, some restrictions in
195 other cases, and some additional REQUIRED attributes. The IPPFAX Protocol uses the 'ippfax' URL
196 scheme (instead of the 'ipp' URL scheme) for all operations.

197 An IPPFAX Printer object is called a Receiver. A Receiver MUST support at least PDF/is [ifx-pdfis]
198 which is defined for the 'application/pdf' document format MIME type. A Print System MAY be
199 configured to support both the IPPFAX and IPP protocols concurrently for a single output device (or
200 multiple output devices), but each protocol requires separate Printer objects with distinct URLs. Note - It
201 is assumed that the reader is familiar with IPP/1.1 [RFC2911], [RFC2910], [RFC3196], and [ipp-iig-bis].

202 An IPPFAX client is called a Sender. The user of the Sender is called the Sending User. The Sending
203 User either (1a) loads the Document into the Sender or (1b) causes the Sender to generate the
204 Document data by means outside the scope of this standard, (2) indicates the Receiver's network
205 location, and (3) starts the exchange.

206 The target market for an IPPFAX receiver is a midrange imaging device that can support the minimum
207 memory requirements that are required by the data format PDF/is, but the image format is structured in
208 such a way that the Receiver is not required to include a disk or other permanent storage.

209 **1.1 Operations Supported**

210 All IPPFax Senders and Receivers MUST support the following operations:

211

- 212 1. Get-Printer-Attributes - If the document-format-version is not PDF/is or the media is not
213 iso_a4_210x297mm or na_letter_8.5x11in, then the Sender MUST verify that the Receiver can
214 support the alternate attributes. Rational: Using Get-Printer-Attributes would avoid rejection of
215 the job which is important if the document data is very large.
- 216 2. Print-Job - Sender MUST submit the IPPFAX job with a single document (Create-Job, Send-
217 document and Send-URI and Print-URI MUST NOT be supported by Senders or Receivers).
- 218 3. Get-Job-Attributes - The Sender MUST support and MUST use this operation to check for
219 successful job completion unless the Sending User wishes otherwise. Job-History MUST be
220 retained by the Receiver for at least 5 minutes after job completion. See 4.3.7.2 of RFC2911 for
221 printer object Job-History discussion.
- 222 4. Job-Cancel – Receivers MUST support this operation but only for authenticated Administrators
223 or Operators.
- 224 All IPPFax Senders and Receivers MUST NOT support any other IPP operations including job
225 operations and administrative operation.

226 1.2 Typical exchange

227 This section lists a typical exchange of information between a Sender and a Receiver using the four
228 operations listed in section 1.1.

- 229 1. The Sending User determines the network location of the Receiver (value of the “printer-uri”
230 operation attribute) – see section 4.1. This document does not specify how the Sending User does
231 this. Possible methods include directory lookup, search engines, business cards, network discovery
232 protocols such as SLP, etc. See Appendix E Generic Directory Schema of IPP/1.1 [RFC 2911].
- 233 2. The Sending User either (1) loads the Document into the Sender or (2) causes the Sender to
234 generate the Document data by means outside the scope of this document, indicates the Receiver’s
235 network location and starts the exchange.
- 236 3. The Sender MAY determine other PDF versions supported by the Receiver and the Sender MAY
237 discovery media-supported and media-ready.
- 238 4. The Sender converts the document, if necessary, into PDF/is or another PDF subset depending on
239 the Receiver’s capabilities. The PDF/is data format is described in detail in the “PDF Image-
240 Streamable (PDF/is)” specification [PWG5102.3-2004].
- 241 5. The Sender submits the document in a Print-Job request to the Receiver. The Sender SHOULD
242 include the sending user VCard and receiving user VCard in the Print-Job operations.

- 243 6. The Receiver returns a Print-Job response to the Sender. The Sender in turn **MUST** inform the
244 Sending-User.
- 245 7. The Sender **MUST** use Get-Job-Attributes to check for successful job completion unless the
246 Sending User wishes otherwise.

247 **2 Terminology**

248 This section defines the following additional terms that are used throughout this standard.

249 **2.1 Conformance Terminology**

250 Capitalized terms, such as **MUST**, **MUST NOT**, **REQUIRED**, **SHOULD**, **SHOULD NOT**, **MAY**,
251 **NEED NOT**, and **OPTIONAL**, have special meaning relating to conformance to this specification. These
252 terms are defined in [RFC2911] section 13.1 on conformance terminology, most of which is taken from
253 RFC 2119 [RFC2119]. In order to help the reader compare and contrast the IPP and IPPFAX protocols,
254 this document uses lower case “must”, “may” etc., to reproduce IPP Protocol conformance requirements
255 for IPP clients and IPP Printer objects as stated in other documents. If such reproduction in this document
256 contradicts an IPP document, it is a mistake, and that IPP document prevails.

257 **2.2 Other Terminology**

258 This standard defines a logical model of an IPPFAX interchange. The following terms are introduced and
259 capitalized in order to indicate their specific meaning:

260 **IPP Protocol** The protocol defined in [RFC2911] and [RFC2910] and any IPP Protocol Extension
261 document (see section 17). For the IPP/1.1 Protocol each operation request must use the ‘ipp’ URL
262 scheme.

263 **IPPFAX Protocol** The protocol defined in this or a future revision document and any future extension
264 document. For the IPPFAX Protocol each operation request **MUST** use the ‘ippfax’ URL scheme (see
265 section 4.1 and 15). Unless a specific version number is appended to “IPPFAX”, such as “IPPFAX/1.0”,
266 the term IPPFAX applies to all versions.

267 **Printer object (or Printer)** A hardware or software entity that accepts protocol operation requests and
268 returns protocol responses. A Printer object **MAY** be: (1) an IPP Printer object or (2) an IPPFAX Printer
269 object, **DEPENDING ON IMPLEMENTATION** (see section 3.3), but **MUST NOT** be both (since they
270 support some different operations and attributes and are really two different kinds of Print Services). A
271 Printer object **MAY** support multiple URLs with different security, authentication, and/or access control

272 (see [RFC2911] sections 4.4.1, 4.4.2, 4.4.3, and 8). However, each URL for a Printer object MUST
273 support the same operations and attributes with the same values, except as restricted depending on the
274 security, authentication, and/or access control implied by the URL. In other words, each URL for a given
275 Printer object is offering the same Print Service.

276 Note: For brevity, this document uses the term “Receiver” instead of “IPPFAX Printer object”.
277 This document uses the term “Printer object” (and “Printer”) when the statement is intended to
278 apply to a Printer object that MAY support the IPP Protocol or the IPPFAX protocol (but not both).

279 **Print Service** The print functionality offered by a Printer object. Several different Printer objects MAY
280 offer the same Print Service.

281 **IPP Printer object** A Printer object that supports the IPP Protocol and offers the IPP Print Service (by
282 definition).

283 **Receiver** The Printer object that accepts IPPFAX protocol operations and receives the Document sent by
284 the Sender. A Receiver offers the IPPFAX Print Service (by definition).

285 **Print System** All of the Printer objects on a single managed host network node. A Print System MAY
286 support IPP and IPPFAX protocols concurrently (see section 3.3) for a single output device (or multiple
287 output devices), but each protocol requires separate Printer objects with distinct URLs.

288 **client** A hardware and/or software entity that initiates protocol operation requests and accepts responses.
289 A client MAY be: (1) an IPP client, (2) an IPPFAX client, or (3) both. However, this document uses the
290 term “Sender”, instead of “IPPFAX client”. This document uses the term “client” when the statement is
291 intended to apply to a client that MAY support the IPP Protocol, the IPPFAX protocol, or both protocols.

292 **IPP client** A client that uses the IPP Protocol to interact with an IPP Printer object.

293 **Sender** A client that uses the IPPFAX Protocol to query a Receiver and transmit a Document to that
294 Receiver.

295 **Document** The electronic representation of a set of one or more pages that the Sender sends to the
296 Receiver.

297 **Sending User** The person interacting with the Sender.

298 **Receiving User** The intended human recipient of the Document being sent by the Sender to the Receiver.

299 **IPP Job** A job submitted by an IPP client to an IPP Printer object using the IPP Protocol.

300 **IPPFAX Job** A job submitted by a Sender to a Receiver using the IPPFAX Protocol.

301 **PDF/is** The file format defined by [ifx-pdfis].

302 **Delivered** The Receiver has either printed the Document and delivered the last sheet to the output bin or
303 has forwarded the Document to some other system.

304 The terminology defined in [RFC2911], such as **attribute, operation, request, response, operation**
305 **attribute, Printer Description attribute, Job Description attribute, integrity, and privacy** is also used
306 in this document with the same capitalization conventions and semantics.

307 **3 IPPFAX Model**

308 This sub-section defines the IPPFAX Model and its relationship to the IPP Protocol and Model.

309 **3.1 Printer Object Relationships**

310 A Print System MAY support one or more Printer objects on a single network host. RFC 2911 [RFC2911]
311 defines the relationship between Printer objects and output devices to be many to many (see [RFC2911]
312 section 2.1). So one Printer object can represent one or more output devices and an output device can be
313 represented by one or more Printer objects. The same relationships hold for the IPPFAX Protocol so that
314 the relationship between Receivers and output devices is many to many.

315 **3.2 A Printer object with multiple URLs**

316 For a Printer object that has multiple URLs, the multiple URLs MUST only be aliases for the Printer
317 object, not connections to different Print Services. In other words, the semantics of operations and
318 attributes accessed by the different URLs for a given Printer object MUST differ only in the security,
319 authentication, and/or access control depending on the URL used.

320 The three parallel “printer-uri-supported” (1setOf uri), “uri-authentication-supported” (1setOf type2
321 keyword), and “uri-security-supported” (1setOf type2 keyword) Printer Description attributes (see
322 [RFC2911] sections 4.4.1, 4.4.2, and 4.4.3, respectively) MUST contain the URLs, authentication, and
323 security, respectively, supported by the Printer object. See also the OPTIONAL “printer-xri-supported”
324 (collection) Printer Description attribute [ipp-set-ops], which, if supported, MUST be used to set these
325 three parallel attributes using the protocol. [ipp-set-ops] and other system administrator operations MUST
326 only be supported if TLS client authentication has been performed and the system administrator role has
327 been confirmed.

328 Note: For a Printer object that supports multiple URLs, neither the IPP/1.1 protocol nor the IPPFAX/1.0
329 protocol provides a way for the administrator to Set or Get the values of Printer attributes whose values

330 MAY depend on the URL used and/or MAY depend on the authenticated role of the requesting user. So,
331 for example, there is no way to set the differing values of the “operations-supported” Printer attribute (see
332 section 6.4) that depend on the URL using the IPP or IPPFAX protocol. Providing such means is left for
333 future work as a single specification for use by both IPP and IPPFAX.

334 **3.3 A Print System supporting both IPP and IPPFAX protocols**

335 From section 3.2, if a Print System supports both IPP and IPPFAX, it MUST do so with separate Printer
336 objects, not with a single Printer object with IPP and IPPFAX URLs. Each such Printer object MUST
337 support either IPP or IPPFAX, but not both. In other words, each URL for a Printer object MUST have the
338 same scheme, namely, ‘ipp’ or ‘ippfax’, i.e., MUST NOT have some URLs with the ‘ipp’ scheme and other
339 URLs with the ‘ippfax’ scheme. The reason for this requirement for separate Printer objects for IPP and
340 IPPFAX is because a URL and its Printer object is intended to represent a network resource offering a
341 particular type of service, not several different types of services.

342 Note: it is possible to support IPP and IPPFAX Printer objects with a single piece of code in a Print
343 System with conditional branching to handle the differences in conformance requirements between IPP and
344 IPPFAX. For example, such conditional branching could depend on the “printer-uri” operation attribute
345 supplied by the client in each request to the Print System. See section 1 for a comparison of IPP/1.1 and
346 IPPFAX/1.0.

347 **4 Common IPPFAX Operation Attribute Semantics**

348 This section describes the IPPFAX/1.0 operation attribute semantics that are common to all operations.
349 IPPFAX/1.0 does not define any new operations. Instead, IPPFAX/1.0 semantics are provided using
350 existing IPP operations in [RFC2911], [ipp-ntfy], [ipp-get-method], [ipp-set-ops], etc. with increased
351 conformance requirements as specified in this document.

352 **4.1 printer-uri (uri) operation attribute ([RFC2911] section 3.1.5)**

353 This operation attribute specifies the transfer path to the Receiver for the operation. As in IPP/1.1, the
354 client MUST supply the “printer-uri” operation attribute in every IPPFAX request (see [RFC2911] section
355 3.1.5). For IPPFAX, the attribute value MUST be a URL using the ‘ippfax’ scheme (see section 15)
356 specifying the Receiver’s network location.

357 The following is an example value of the target “printer-uri” operation attribute and “printer-uri-supported”
358 Printer Description attribute:

359 `ippfax://www.acme.com/ippfax-printers/printer5`

360 As in all URLs, the scheme identifies the protocol. For example, if a client supports both the IPP and
361 IPPFAX protocols, then the URL scheme in the “printer-uri” operation attribute that the client supplies
362 indicates the protocol and determines whether the client intends the Print System to use IPP or IPPFAX
363 semantics. Similarly, if a Print System supports both the IPP and IPPFAX protocols, then the URL scheme
364 in the target “printer-uri” operation attribute that the client supplies MUST determine the protocol, the
365 Printer object, and the semantics that the Print System performs.

366 As in IPP/1.1 [RFC2911] for each operation, the Receiver NEED NOT validate that the “printer-uri”
367 operation attribute is present and that the value supplied by the Sender matches one of the Receiver’s
368 “printer-uri-supported” Printer Description attribute (see section 6.1). For URI matching rules see section
369 15.7. If the Receiver does validate the “printer-uri” operation attribute and the URI value supplied does not
370 match any value of the Receiver’s “printer-uri-supported” Printer Description attribute, the Receiver
371 MUST reject the request, return the ‘client-error-attributes-or-values-not-supported’ status code, and return
372 the attribute and value in the Unsupported Attributes Group.

373 **4.2 version-number parameter ([RFC2911] section 3.1.8)**

374 This IPP/1.1 operation parameter ([RFC2911] section 3.1.8) specifies the major and minor version number
375 of the IPP Protocol being used *as part of the IPPFAX Protocol*. As in IPP/1.1, the Sender MUST supply
376 this parameter in every request and the Receiver MUST return this parameter in every response.

377 For IPPFAX version 1.0 as specified in this document, the value of the IPP “version-number” parameter
378 MUST be ‘1.1’ or a higher minor version number. The value is represented as 0x0101 (see [RFC2910])
379 where the major version number comes first (so-called “network byte order”).

380 If the Receiver does not support the supplied IPP major version *as part of the IPPFAX protocol*, the
381 Receiver MUST respond as specified in [RFC2911] section 3.1.8 with the ‘server-error-version-not-
382 supported’ status code. As in IPP/1.1, if the major version number is supported, but the minor version
383 number is not, the Receiver SHOULD accept and attempt to perform the request (or reject the request if the
384 operation is not supported), else the Receiver MUST reject the request and returns the ‘server-error-
385 version-not-supported’ status code. In all cases as in IPP/1.1, the Receiver MUST return the “version-
386 number” parameter with the value that it supports that is closest to the version number supplied by the
387 client in the “version-number” parameter in the request.

388 **4.3 ippfax-version (type2 keyword) operation attribute**

389 The value of this operation attribute indicates the version of the IPPFAX Protocol and encoding that the
390 Sender is requesting and the Receiver is returning. The Sender MUST supply this operation attribute in
391 every request and the Receiver MUST return this operation attribute in every response. This operation
392 attribute MUST be placed in the Operation Attributes Group *immediately* after the operation attributes

393 whose order is specified in IPP/1.1 [RFC2911]. The semantics of the “ippfax-version” operation attribute
394 serves the same purpose for the IPPFAX Protocol as the IPP/1.1 “version-number” parameter serves for the
395 IPP Protocol (see [RFC2911] section 3.1.8).

396 If the Sender does not supply this attribute, the Receiver MUST reject the operation, MUST return the
397 ‘client-error-bad-request’ status code, and SHOULD return the ‘ippfax-version attribute name keyword in
398 the Unsupported Attributes Group (see section **Error! Reference source not found.**).

399 For IPPFAX version 1.0 as specified in this document, the value of the “ippfax-version” operation attribute
400 MUST be ‘1.0’ keyword value. By including an IPPFAX version number in the client request, it allows the
401 Sender to identify which version of IPPFAX the Sender is requesting to be used, i.e., the version whose
402 conformance requirements the Sender may be depending upon the Receiver to meet.

403 The Receiver MUST indicate the IPPFAX versions supported using the “ippfax-versions-supported”
404 (1setOf type2 keyword) Printer Description attribute (see section 6.3).

405 As in IPP/1.1, if the Receiver does not support the major version number supplied by the Sender, i.e., the
406 major version field of the “ippfax-version” operation attribute does not match any of the values of the
407 Printer’s “ippfax-versions-supported” (see section 6.3), the Receiver MUST respond with a status code of
408 ‘server-error-version-not-supported’ along with the closest version number that is supported (see
409 [RFC2911] section 13.1.5.4). If the major version number is supported, but the minor version number is
410 not, the Receiver SHOULD accept and attempt to perform the request (or reject the request if the operation
411 is not supported), else it rejects the request and returns the ‘server-error-version-not-supported’ status code.
412 In all cases, the Receiver MUST return the “ippfax-version” operation attribute in the response with the
413 value that it supports that is closest to the version number supplied by the Sender in the request.

414 There is no version negotiation per se. However, if after receiving a ‘server-error-version-not-supported’
415 status code from a Receiver, a Sender SHOULD try again with a different version number. A Sender MAY
416 also determine the versions supported either from a directory (see section **Error! Reference source not
417 found.**) or by querying the Printer object’s “ipp-versions-supported” (see section 6.2) and “ippfax-
418 versions-supported” attributes (see section 6.3) to determine which IPP and IPPFAX versions are
419 supported, respectively, as part of IPPFAX.

420 The Sender MUST send and the Receiver MUST check both the IPP (see section 4.2) and IPPFAX version
421 numbers supplied by the Sender in each request, not just the IPPFAX version number.

422 **5 Get-Printer-Attributes operation semantics**

423 The Receiver MUST support the Get-Printer-Attributes operation as defined in [RFC2911] as extended by
424 the semantics defined in this section.

425 **5.1 document-format (mimeMediaType) operation attribute ([RFC2911] section 3.2.5.1)**

426 This operation attribute identifies the document-format for which the Receiver MUST return the supported
427 values of the requested attributes. The semantics of this Get-Printer-Attributes operation attribute is the
428 same as for IPP ([RFC2911] section 3.2.5), with the following conformance requirement changes:

- 429 1. The Sender SHOULD supply the “document-format” operation attribute (IPP client may) and, if
430 supplied, the value MUST be “application/PDF”.

431 **6 IPPFAX Printer Description Attributes**

432 This section defines the IPPFAX Printer Description attributes and the IPP Printer Description attributes
433 whose semantics are augmented for IPPFAX.

434 Table 1 lists all the IPPFAX conformance requirements for IPP and IPPFAX Printer Description attributes
435 whose semantics are defined in this document.

436 All Printer Description attributes not listed in Table 1 have the same conformance requirements as defined
437 in IPP/1.1 [RFC2911]. Any other Printer Description attributes defined in other documents are
438 **OPTIONAL for IPPFAX.**

439 See section 9.2 for the Receiver conformance requirements for the “xxx-supported”, “xxx-default”, and
440 “xxx-ready” Job Template Printer attributes.

441

Table 1 - Printer Description attributes conformance requirements

| Attribute Name (attribute syntax) | IPP Printer support [RFC 2911] | IPP Fax Receiver support | Section |
|---|--------------------------------|--------------------------|---|
| printer-uri-supported (1setOf uri) * | must | MUST | 6.1, Error! Reference source not found. |
| ipp-versions-supported (1setOf type2 keyword) * | must | MUST*** | 6.2 |
| ippfax-versions-supported (1setOf type2 keyword) | MUST NOT | MUST*** | 6.3 |
| operations-supported (1setOf type2 enum) * | must | MUST | 6.4 |
| document-format-supported (1setOf mimeType) * | must | MUST | 6.5 |
| document-format-version-supported (1setOf text(127)) ** | ---- | MUST | 6.6 |
| digital-signature-supported (1setOf type2 keyword) ** | ---- | MUST | 6.7 |
| pdl-override-supported (type2 keyword) * | must | MUST | 6.8 |

442 * These IPP/1.1 attributes are defined in [RFC2911], but have enhanced semantics defined in this
443 document.

444 ** These attributes are defined in [?JobX extensions?], but have enhanced or constrained semantics defined
445 in this document.

446 *** A Printer object that supports IPPFAX MUST NOT support IPP as well, but MUST support the “ipp-
447 versions-supported” attribute to indicate the version(s) of IPP that are supported *as part of IPPFAX*
448 *operations*. A Print System that supports both IPP and IPPFAX MUST support them as separate
449 Printer objects (see section 3.3).

450 **6.1 printer-uri-supported (1setOf uri) ([RFC 2911] section 4.4.1)**

451 This attribute contains the set of target URIs that the Receiver supports, i.e., the URI values that a client
452 can supply as values of the “printer-uri” target operation attribute in requests. As in IPP/1.1, the Receiver
453 MUST support this Printer Description attribute (see [RFC2911] section 4.4.1). However, a single Printer
454 object MUST NOT support both ‘ipp’ and ‘ippfax’ schemed URIs. Therefore, the schemes MUST all be
455 ‘ipp’ or all ‘ippfax’. In order for a Print System to support both IPP and IPPFAX, it MUST use separate
456 Printer objects (see section 3.3).

457 If a Print System supports both the IPP and IPPFAX protocols, it is RECOMMENDED that the Print
458 System support Printer objects whose target URIs differ only in the scheme. Then a client that queries the
459 “printer-uri-supported” attribute of one of the Printer objects with one of these two protocols, can query the

460 same Print System with the other protocol just by changing the scheme to see if the other protocol is
461 supported (as a separate Printer object).

462 The Receiver MUST support the 'ippfax' URL scheme (see section 15) and only the 'ippfax' URL scheme
463 for this attribute (see section 3.3).

464 **6.2 ipp-versions-supported (1setOf type2 keyword) ([RFC2911] section 4.4.14)**

465 This attribute identifies the version or versions of the IPP Protocol that this Receiver supports as part of the
466 IPPFAX Protocol (rather than indicating that the Receiver supports the IPP Protocol), including major and
467 minor versions, i.e., the version numbers for which this Receiver meets the conformance requirements.
468 The Receiver MUST support this Printer Description attribute. The Receiver MUST compare the "version-
469 number" parameter (see section 4.2), with the values of this attribute in order to determine whether the
470 Printer supports the IPP version requested by the Sender *as part of the IPPFAX Protocol*.

471 Standard keyword values are (from [RFC2911]):

472 '1.1': The "IPP part" of the IPPFAX operations meets the protocol and encoding conformance
473 requirements of IPP version 1.1 as specified in [RFC2911], [RFC2910], and IPP extensions.

474

475 Note: As in [RFC2911] section 4.4.14, these version keyword values violate the syntax for
476 keywords, by starting with an ASCII digit, instead of an ASCII lower case letter.

477 **6.3 ippfax-versions-supported (1setOf type2 keyword)**

478 This attribute identifies the version or versions of the IPPFAX Protocol that this Receiver supports,
479 including major and minor versions, i.e., the version numbers for which this Receiver meets the
480 conformance requirements. The support of this attribute indicates that this Printer object is a Receiver as
481 opposed to an IPP Printer object. The Receiver MUST support this Printer Description attribute. An IPP
482 Printer object MUST NOT support this attribute, since a Printer object MUST NOT support both IPP and
483 IPPFAX (see section 3.3).

484 The Receiver MUST compare the "ippfax-version" operation attribute (see section 4.3) supplied by the
485 Sender in each request, with the values of this attribute in order to determine whether the Receiver supports
486 the IPPFAX version requested by the Sender.

487 Since a Printer object MUST NOT support both the IPP and IPPFAX protocols, there is no ambiguity with
488 requiring a Receiver to support both the "ipp-versions-supported" and "ippfax-versions-supported" Printer
489 Description attributes (see sections 6.2 and 6.3). If a Printer object supports the "ipp-versions-supported"
490 attribute, but not the "ippfax-versions-supported" attribute, then by definition that Printer object supports

491 the IPP Protocol. If a Printer object supports the “ippfax-versions-supported” Printer Description attribute,
492 then by definition that Printer object is a Receiver and supports the IPPFAX Protocol and not the IPP
493 Protocol. For such a Printer object, the “ipp-versions-supported” attribute indicates the versions of IPP that
494 it supports *as part of IPPFAX operations*, rather than indicating that it supports the IPP Protocol (by itself).

495 Standard keyword values are:

496 ‘1.0’: Meets the conformance requirements of IPPFAX version 1.0 as specified in this document.

497

498 Note: As in [RFC2911] section 4.4.14, these version keyword values violate the syntax for
499 keywords, by starting with an ASCII digit, instead of an ASCII lower case letter. However, for
500 consistency with IPP, these IPPFAX version keyword values are defined compatibly with the IPP
501 version keyword values.

502 **6.4 operations-supported (1setOf type2 enum) ([RFC 2911] section 4.4.15)**

503 This attribute identifies the set of supported operations for this Receiver and contained Job objects. As in
504 IPP/1.1, the Receiver MUST support this Printer Description attribute (see [RFC2911] section 4.4.15).

505 The values of this attribute MAY depend on the URL supplied in the “printer-uri” operation attribute
506 and/or MAY depend on the authority of the authenticated requesting user. For example, a Receiver that
507 supports administrative operations MUST NOT support administrative operations for use by end users, but
508 such a Receiver MAY return the administrative operation enums to end users.

509 **The list of operations is restricted! This section should list all the operations that we allow/disallow**

510 **6.5 document-format-supported (1setOf mimeMediaType) ([RFC 2911] section 4.4.22)**

511 This attribute identifies which document formats the Receiver supports. As in IPP/1.1, the Receiver MUST
512 support this Printer Description attribute (see [RFC2911] section 4.4.22).

513 Since most document formats don’t give the “blind interchange” guarantee of document presentation
514 fidelity for all implementations and configurations, the IPPFAX document formats supported MUST be a
515 subset of the IPP document formats supported.

516 Both the Sender and Receiver MUST only support application/pdf.

517 **6.6 document-format-version-supported (1setOf text(127))**

518 **CHANGE: Reference the “Job X extensions” Specification.**

519 This attribute identifies which PDF formats the Receiver supports. A Receiver MUST support this
520 attribute, a Sender MAY support this attribute.

521 Both the Sender and Receiver MUST support “PDF/is-1.0”. The Receiver MAY support other versions of
522 PDF and if it does then the Receiver MUST only list formats that it fully supports.

523 **6.7 digital-signatures-supported (1setOf type2 keyword)**

524 This attribute identifies which digital signature technologies are supported by the Receiver. A Receiver
525 MUST support this Printer Description attribute.

526 Digital-signature and digital-signature-supported will move to [jobX] specification. Reference them from
527 that specification

528 If the Receiver cannot validate the digital signature or if the digital signature fails to verify, then the
529 Receiver MUST notify the Receiving User using an implementation specific method.

530 **6.8 pdl-override-supported (type2 keyword)**

531 This attribute expresses the ability for a particular Receiver implementation to either attempt to override
532 document data instructions with IPPFAX attributes or not.

533
534 This attribute MUST have the value ‘attempted’ or a higher quality IANA-registered value (such as a
535 hypothetical ‘guaranteed’ value), and the Receiver MUST attempt to override at least the media.

536
537 NOTE: RFC2911 only requires that the attribute be supported but the supported may be not-attempted

538 **7 Sender Validation of the Receiver’s Capabilities**

539 This section describes how a Sender MUST first validate the target Printer as a Receiver and determines its
540 basic capabilities (section 7.1) and then validate the IPPFAX Job (section **Error! Reference source not
541 found.**).

542 NOTE: This WHOLE section needs revision and possible wholesale deletion

543 **7.1 Sender Validates the target Printer as a Receiver and determines its basic capabilities**

544 The order of presentation in Table 2 is the likely order that a Sender would check the values, though the
545 Sender can request all of the attributes in a single Get-Printer-Attributes operation (and the Receiver MAY
546 return them in any order as specified in [RFC2911]).

547

Table 2 - Receiver Attributes that the Sender validates with Get-Printer-Attributes

| Attribute | Ref. | Sender action |
|-----------------------------------|---|---|
| Operation attributes: | | |
| printer-uri | 4.1 | Sender MUST validate whether or not the Get-Printer-Attributes operation with a “printer-uri” target URL using the ‘ippfax’ scheme locates a valid Receiver destination. |
| Printer Description attributes: | | |
| ippfax-versions-supported | 6.3 | Sender MUST check whether the Printer supports the IPPFAX Protocol on the target URL by checking whether or not the Printer supports this attribute, i.e., validate that the Printer is a Receiver. |
| document-format-version-supported | 6.6 | If the Sender would like to use a document format other than PDF/is, then the Sender MUST verify that the desired version of PDF is supported by the Receiver.. |
| Job Template Printer attributes: | | |
| media-supported | 9.2.1.1 | If the Sending user requests a paper size other than iso_a4_210x297mm or na_letter_8.5x11in then the Sender MUST verify that the requested paper size is supported by the receiver |
| printer-resolutions-supported | Error! Reference source not found. | Sender SHOULD check which resolutions are supported, so that it can use the highest resolution supported by the Receiver. |

548

Table needs review

549

8 Identity exchange

550

Need to move these in with the other operation attributes (section 9)and remove section 8

551

552

553

This section defines the attributes that the Sender and the Receiver can use to identify each to the other and to identify the Sending User and the Receiver User. Table 3 lists these attributes and shows the Sender and Receiver conformance requirements.

554

Table 3 - Summary of Identify Exchange attributes

| Attribute | Sender supplies * | Receiver supports |
|----------------------------------|-------------------|-------------------|
| sending-user-vcard (text(MAX)) | MAY | MUST |
| receiving-user-vcard (text(MAX)) | SHOULD | MUST |
| sender-uri (uri) | MUST | MUST |

555

* Sender supplies in a Print-Job,operation.

556

8.1 sending-user-vcard (text(MAX)) operation/Job Description attribute

557

This operation attribute identifies the Sending User in MIME vCard v3.0 [RFC2426, RFC2425] format.

558

The Sender MAY send this operation attribute in an IPPFAX Print-Job operation. The Receiver MUST

559

support this Print-Job operation attribute according to the vCard v3.0 specification and MUST populate the

560

job's corresponding Job Description attribute. The Receiver MUST support MAX (1023) octets of text.

561

However, the Receiver MAY ignore any image, logo, and sound parts, in which case it MUST still accept

562

the Print-Job request and return the 'successful-ok-ignored-or-substituted-attributes' status code (see

563

[RFC2911] section 13.1.2.2), but NEED NOT return the attribute and its ignored values in the Unsupported

564

Attributes Group.

565

For a sample vCard see section 1. If the Sender supplies the attribute, then the Receiver MUST use its

566

value to populate the Job object's corresponding Job Description attribute of the same name.

567

The Receiver MAY choose to use this information on a job start and end sheet (banner page) for the job.

568

As in IPP/1.1, whether or not the Receiver prints a separate job start sheet depends on the "job-sheets" Job

569

Template attribute, if supported. The Sender can request the Receiver to print a separate start sheet if the

570

Receiver's "job-sheets-supported" Printer attribute (see [RFC2911] section 4.2.3) contains a value other

571

than 'none'. The Sender can suppress the Receiver's separate start sheet if the Receiver's "job-sheets-

572

supported" Printer attribute contains the 'none' value. If the Sender omits the "job-sheets" Job Template

573

attribute, the Receiver's "job-sheets-default" value will be used.

574

8.2 receiving-user-vcard (text(MAX)) operation/Job Description attribute

575

This operation attribute identifies the intended Receiving User in MIME vCard format [RFC2426,

576

RFC2425]. The Sender SHOULD send this operation attribute in an IPPFAX Print-Job operation. The

577

Receiver MUST support this Print-Job operation attribute and MUST populate the job's corresponding Job

578

Description attribute. The Receiver MUST support MAX (1023) octets of text. However, the Receiver

579

MAY ignore any image, logo, and sound parts, in which case it MUST still accept the Print-Job request and

580

return the 'successful-ok-ignored-or-substituted-attributes' status code (see [RFC2911] section 13.1.2.2),

581

but NEED NOT return the attribute and its ignored values in the Unsupported Attributes Group.

582 For a sample vCard see section 1. If the Sender supplies the attribute, then the Receiver MUST use its
583 value to populate the Job object's corresponding Job Description attribute of the same name.

584 The Receiver MAY choose to use this information on a job start and end sheet (banner page) for the job.
585 See discussion under section 8.1.

586 **8.3 sender-uri (uri) operation/Job Description attribute**

587 This operation attribute identifies the Sender in a similar manner to the way a Sending Station ID is used in
588 a GSTN fax device. The value of this identity is not specified in this document but MUST uniquely
589 identify the Sender device and be traceable to the Sender. The manufacturer of the Sender MUST ensure
590 that the customer configures the Sender with a value for this attribute that is a syntactically valid URI
591 before first attempt to send an IPPFAX Job.

592 The Sender MUST send this operation attribute with the configured value in an IPPFAX Print-Job
593 operation. The Receiver MUST support this Print-Job operation attribute and MUST populate the job's
594 corresponding Job Description attribute.

595 The Receiver MUST use its value to populate the Job object's corresponding Job Description attribute of
596 the same name. This value is only a comment (since it can be spoofed) and is used for logging purposes
597 and has nothing to do with authentication (for which, see section 11). This attribute is more akin to an
598 email 'Reply-To' field.

599 **9 Submission using Print-Job**

600 The Sender and Receiver MUST support creating IPPFAX Jobs using the Print-Job. The Sender and
601 Receiver MUST NOT support print by reference, i.e., MUST NOT support the Print-URI and Send-URI
602 operations, since they do not provide the same security and assurance of accessibility as pushing the
603 document data does.

604 **9.1 IPP/1.1 Print-Job operation attributes**

605 Table 4 lists the operation attributes for Print-Job operations for Senders, IPP/1.1 Printers, and Receivers.
606 Differences in Sender conformance from IPP/1.1 clients are indicated with footnotes. Any other IPP
607 operation attributes defined in other documents are OPTIONAL for IPPFAX.

608

Table 4 - [RFC 2911] Print-Job operation attributes

| Operation attribute | Section | Sender supplies | IPP/1.1 [RFC 2911]Printer supports | Receiver supports |
|---|---------|-------------------------------------|------------------------------------|-------------------|
| attributes-charset (charset) | | MUST | must | MUST |
| attributes-natural-language (naturalLanguage) | | MUST | must | MUST |
| printer-uri (uri) * | 4.1 | MUST | must | MUST |
| requesting-user-name (name(MAX)) * | | SHOULD | must | MUST |
| job-name (name(MAX)) | | MAY | must | MUST |
| ipp-attribute-fidelity (boolean) * | 9.1.1 | MUST with 'true' value ¹ | must | MUST |
| document-name (name(MAX)) * | | MAY | must | MUST |
| compression (type3 keyword) * | | MAY | must | MUST |
| document-format (mimeMediaType) * | 9.1.2 | MUST ² | must | MUST |
| document-format-version (type2 keyword) | 9.1.3 | MUST ³ | may | MUST |
| document-natural-language (naturalLanguage) * | | MAY | may | MAY |
| job-k-octets (integer(0:MAX)) | | MAY | may | MAY |
| job-impressions (integer(0:MAX)) | | MAY | may | MAY |
| job-media-sheets (integer(0:MAX)) | | MAY | may | MAY |
| sending-user-vcard (1setOf text(MAX)) | 8.1 | MAY ³ | may | MUST |
| receiving-user-vcard (text(MAX)) | 8.2 | SHOULD ³ | may | MUST |
| sender-uri (name(MAX)) | 8.3 | MUST ³ | may | MUST |

609 * As in IPP/1.1, these attributes are NOT Job Description attributes, only Operation attributes.
610

611 9.1.1 ipp-attribute-fidelity operation attribute ([RFC2911] section 3.2.1.1)

612 In IPP/1.1, this operation attribute indicates whether or not the client requires the Printer to support all Job
613 Template attributes and values supplied. The Sender MUST supply this operation attribute in the Print-Job
614 operations and the value MUST be 'true'. A Receiver MUST validate and support this operation attribute.

¹ [RFC2911] does not require the client to supply the "ipp-attribute-fidelity" and allows the client to supply either the 'true' or 'false' value.

² The [RFC2911] does not require the IPP client to supply the "document-format" operation attribute.

³ These attributes were not defined in [RFC2911].

615 Note: [RFC2911] does not REQUIRE the IPP Client to supply this operation attribute and allows the client
616 to supply the ‘false’ value.

617 If the Sender does not supply this attribute or supplies the ‘false’ value, the Receiver MUST reject the
618 operation, MUST return the ‘client-error-bad-request’ status code, and SHOULD return the ‘ipp-attribute-
619 fidelity’ attribute name keyword in the Unsupported Attributes Group (see section **Error! Reference
620 source not found.**).

621 **9.1.2 document-format (mimeMediaType) operation attribute ([RFC2911] section 3.2.1.1)**

622 This operation attribute identifies the MIME Media Type of the document that the Sender is sending. The
623 Sender MUST supply this operation attribute in the Print-Job operation and the value MUST be
624 “application/PDF”. A Receiver MUST validate that the value of attribute is “application/pdf”. Note:
625 [RFC2911] does not REQUIRE the IPP Client to supply this operation attribute.

626 If the Sender does not supply this attribute, the Receiver MUST reject the operation, MUST return the
627 ‘client-error-bad-request’ status code, and SHOULD return the ‘document-format’ attribute name keyword
628 in the Unsupported Attributes Group (see section **Error! Reference source not found.**).

629 Because only one document-format MAY be supported, attribute coloring is not relevant for IPPFax. If the
630 Sender desires to send a different format, then it should use a different transmission protocol than IPPFax.

631 **9.1.3 document-format-version (type2 keyword) operation attribute ([RFC2911] section 632 3.2.1.1)**

633 This attribute should be taken from the JobX specification. **Revise this section. Reference the JobX spec.**

634 **(Add somewhere a mention that Sender must support generating and transmitting PDF/is-1.0. Maybe in
635 section 1 to make it clear that it is a basic part of IPPFAX?)**

636 This operation attribute identifies the type2 keyword of the pdf document that the Sender is sending. The
637 Sender MUST supply this operation attribute in the Print-Job operation. A Receiver MUST validate and
638 support this operation attribute.

639 If the Sender supplies a value that the Receiver does not support, i.e., not a value of the Receiver’s
640 “document-format-versions-supported” Printer Description attribute, the Receiver MUST reject the
641 operation and return the ‘client-error-document-format-not-supported’ status code.

642 Standard keyword values are defined in section 6.6.

643 9.2 Job Template Attributes (for Print-Job)

644 Table 5 lists all of the Job Template attributes that have enhanced or constrained semantics for IPP Fax.
645 IPP Fax Senders SHOULD NOT supply Job Template attributes except Media[RFC2911].

646 As in [RFC2911], the term “Job Template attribute” is actually up to four attributes: the “xxx” Job
647 attribute, and the “xxx-default”, “xxx-supported”, and possibly the “xxx-ready” Printer attributes. Any
648 other IPP Job Template attributes defined in other documents are OPTIONAL for IPPFAX.

649 As in IPP/1.1, if a Receiver supports the “xxx” Job Template attribute, then it MUST support the
650 corresponding “xxx-default” (if defined) and “xxx-supported” Printer attributes as well, and MAY support
651 the “xxx-ready” attribute (if defined).

652 In Table 5, if the “Sender supply” and “Receiver support” columns contain an explicit single value, the
653 Sender MAY send and the Receiver MAY support the Job Template attribute for an IPPFAX Job. When
654 supported, the Sender MUST send and the Receiver MUST support only the indicated value; that is, there
655 is only one allowed value. Each such single value has been selected as the value for the attribute that would
656 correspond to the *expected behavior* if the attribute were not supported at all. If these attributes are
657 supplied in an IPPFAX Job with any other value, the Receiver MUST reject the Print-Job operation (since
658 the value isn’t supported and “ipp-attribute-fidelity” MUST be ‘true’).

659 If the Receiver supports this attribute, the Receiver MUST return only the indicated value in the Get-
660 Printer-Attributes response for the corresponding “xxx-supported” and “xxx-default” Printer attributes.
661 Note: These are attributes which might degrade the appearance of the document or provide a significantly
662 non-FAX feature if the non-default value were supplied and supported, such as “number-up” = 2 or “job-
663 priority” = 100, respectively.

664 In Table 5, if the “Sender supply” and “Receiver support” columns contain “MUST NOT”, the Sender
665 MUST NOT supply and the Receiver MUST NOT support the Job Template attribute for an IPPFAX Job.
666 If these attributes are supplied in an IPPFAX Job, the Receiver MUST reject the Print-Job operation (since
667 the attribute isn’t supported and “ipp-attribute-fidelity” MUST be ‘true’). When querying the Receiver
668 with the Get-Printer-Attributes operation, the corresponding “xxx-default” and “xxx-supported” MUST
669 NOT be returned. Note: These are attributes which might degrade the appearance of the document or
670 provide a significantly non-FAX feature and do not have an obvious value which corresponds to the
671 behavior when the attribute is not supported at all, such as media-input-tray-check (type3 keyword |
672 name(MAX)) or output-bin (type2 keyword | name(MAX)).

673

674

675

Table 5 - IPPFAX Semantics for Job Template Attributes

| Job Template attribute | Sender supply /Receiver support | IPP Fax behavior | Reference |
|--|---|---------------------------|-----------|
| copies (integer(1:MAX)) | MUST NOT | 1 copy | [RFC2911] |
| finishings (1setOf type2 enum) | MUST NOT | Administrator's choice | [RFC2911] |
| job-hold-until (type3 keyword name(MAX)) | MUST NOT | 'no-hold' | [RFC2911] |
| job-priority (integer(1:100)) | MUST NOT | 50 | [RFC2911] |
| job-sheets (type3 keyword name(MAX)) | MUST NOT | Administrator's choice | [RFC2911] |
| media (type3 keyword name(MAX)) | MUST (see section 9.2.1) | | [RFC2911] |
| multiple-document-handling (type2 keyword) | MUST NOT | No multiple document jobs | [RFC2911] |
| number-up (integer(1:MAX)) | MUST NOT | 1 | [RFC2911] |
| orientation-requested (type2 enum) | MUST NOT | | [RFC2911] |
| page-ranges (1setOf rangeOfInteger(1:MAX)) | MUST NOT | 1:MAX | [RFC2911] |
| print-quality (type2 enum) | MUST NOT | Administrator's choice | [RFC2911] |
| printer-resolution (resolution) | MUST NOT (see section Error! Reference source not found.) | | [RFC2911] |
| sides (type2 keyword) | MUST NOT | Administrator's choice | [RFC2911] |

676 **9.2.1 media (type2 keyword | name(MAX)) Job Template attribute ([RFC2911] section**
677 **4.2.11)**

678 This Job Template attribute ([RFC2911] section 4.2.11) identifies the medium to be used for all sheets of
679 the job. The Sender MUST supply and the Receiver MUST support the "media" Job Template attribute in
680 the Print-Job requests. The Receiver MUST support the "media-default", and "media-supported" Printer
681 attributes and MAY support the "media-ready" Printer attribute.

682 The keyword values MUST be Media Size Self Describing names defined in the PWG Standardized Name
683 standard [pwg-media].

684 At a minimum, an IPPFAX receiver MUST be able to render the sizes ‘na_letter_8.5x11in’
685 ‘iso_a4_210x297mm’ and be able to print on at least one of those two sizes. The Receiver MAY
686 scale down at most 10% (PDF/is directives may prohibit this scaling), overflow to another page, or
687 truncate. If the Receiver does truncate then it MUST notify the Receiving User. Any scaling
688 performed MUST be isomorphic.
689 PDF Crop boxes SHOULD be used when the Sender knows that the imageable region is less than the
690 media size. If the crop box is the union of the lesser size of iso_a4_210x297mm and na_letter_8.5x11in
691 minus ¼ of an inch, then the Sender can be sure that the majority of Receivers can print the complete image
692 without loss of data. However, this does mean that there is the possibility that data may lost.
693

694 Standard keyword values are defined in section 9.2.1.1.

695 **9.2.1.1 media-supported Job Template Printer attributes**

696 The following standard keywords MUST be supported. Any other paper sizes supported MUST use the
697 self-describing names as defined in ([5101.1]):

698 ‘na_letter_8.5x11in’
699 ‘iso_a4_210x297mm’
700 ‘choice_iso_a4_210x297mm_na_letter_8.5x11in’ - represents both ‘na_letter_8.5x11in’ and
701 ‘iso_a4_210x297mm’ and indicates that either is acceptable. See [jobx].

702 **9.3 Delivery Confirmation using the Print-job response**

703 The Sender knows when the Receiver has successfully received the entire Document when the Receiver
704 returns the ‘successful-ok’ status code in the Print-Job. The Sender SHOULD then inform the Sending
705 User by means outside the scope of this standard that the document has successfully been received. .

706 **9.4 Originator identifier image**

707 The Sender MUST place an originator identifier, i.e., the value of the “sender-uri” attribute (see section
708 8.3), along with the date and time, in one of the following places, DEPENDING ON
709 IMPLEMENTATION:

- 710 1. On a cover page automatically generated by the Sender that is pre-pended before the first page
711 of user data in the PDF document.
- 712 2. Merged with the first page of the document.
- 713 3. At the top of every page of the sent Document.

714 The Sender MAY include additional data (Sending User, Receiver identity, etc.).

715 Reference PDF/is method.

716 **10 IPPFAX Implementation of other IPP operations**

717 Other IPP operations? I think not!

718 Section 5 defined the semantic requirements for the Get-Printer-Attributes operation, section 7 defined the
719 semantic requirements for Validate-Job, and section 9 defined the semantic requirements for Print-Job
720 operations for IPPFAX. This section defines the IPPFAX semantics and conformance requirements for the
721 other IPP operations.

722 IPPFAX restricts the use of IPP in certain cases in order to make attaching a Receiver to the Internet a safe
723 option – see section 11.

724 The Receiver MUST fully support the Print-Job, and Get-Printer-Attributes operations, as defined by this
725 document. The following subsections define restrictions and conformance requirements placed on the
726 Cancel-Job, Get-Job-Attributes, and Get-Jobs, operations. For a conforming IPPFAX Receiver
727 implementation, the support for each of the IPP operations is indicated in Table 6 and Table 7.

728 An IPPFax receiver MUST NOT support any optional features of IPP unless explicitly stated in this
729 document.

730 **10.1 Operation Conformance Requirements**

731 Table 6 lists the conformance requirements for Printer operations for (1) an IPP/1.1 Printer ('ipp' URL), (2)
732 the non-privileged IPPFAX Sender, (3) an IPPFAX Receiver receiving a request from a non-privileged
733 User, and (4) an IPPFAX Receiver receiving a request from an authenticated and authorized operator or
734 administrator, if the Receiver supports operator/administrator authentication and authorization.

735 Table 7 lists the conformance requirements for Job and Subscription operations for (1) an IPP/1.1 Printer
736 ('ipp') URL, (2) the non-privileged IPPFAX Sender which MUST be on the same URL as the job was
737 created (the target "printer-uri" MUST match the Job's "job-printer-uri" Job Description attribute), (3) an
738 IPPFAX Receiver receiving a request from the Job or Subscription Object Owner, (4) from some other
739 non-privileged user, and (5) if the operation is supported at all - from an authenticated and authorized
740 operator or administrator.

746 **MAY*** - Get-Job-Attributes restricts certain. See section 10.3.
 747 **Owner** refers to the owner of the Job or Subscription object.

748 **10.2 Cancel-Job operation**

749 **Only Operators/Administrators can cancel IPPFax jobs.**

750 **10.3 Get-Job-Attributes and Get-Jobs operations**

751 **Separate into two sections! Get-Jobs is Operator/Admin only operation**

752 The public nature of IPPFAX interactions make it inappropriate for a client to be able to query a Receiver
 753 for certain information about jobs that it did not send.

754 The Receiver SHOULD restrict the job attributes that any Sender can request for any IPPFAX Job in a Get-
 755 Jobs or a Get-Job-Attributes operation to appropriate ones for a public service. For example, a Receiver
 756 MAY return only the following Job attributes:

757 job-id, job-uri
 758 job-k-octets, job-k-octets-completed
 759 job-media-sheets, job-media-sheets-completed,
 760 time-at-creation, time-at-processing
 761 job-state, job-state-reasons
 762 **number-of-intervening-jobs – NOT!!!!**

763
 764 The exact choice of Job attributes that a client can query for IPPFAX Jobs, including not returning any,
 765 DEPENDS ON IMPLEMENTATION and the security policy in force and is outside the scope of this
 766 standard (as in IPP/1.1).

767 This attribute set allows a client to determine the load on a Receiver (and perhaps choose an alternative
 768 destination or warn the Sending User).

769 See the discussion in [RFC2911] section 8.4 for a description of how a Receiver MUST behave if it
 770 receives a request for an attribute outside this set.

771 An IPP administrator MAY read all attributes.

772 **11 Security considerations**

773 **IPPFAX presents an interesting challenge of balancing security and openness.** Many of the envisaged uses
 774 of IPPFAX require confidentiality of the data – at the same time the Receiver typically has no prior

775 knowledge of the Sender or the Sending User. This last point will normally rule out all user-based
776 authentication and access control. This is the reason for the restrictions placed on querying and canceling
777 IPPFAX Jobs.

778 **11.1 Data Integrity and authentication**

779 Any exchange between a Sender and a Receiver **MUST** be carried using the data integrity mechanism
780 specified in IPP/1.1 namely TLS/1.0 [RFC2246] or later versions of TLS.

781 A Receiver **MUST** have a TLS certificate and be authenticated by the sender.

782 A Sender **MAY** have a TLS certificate for client authentication. A Receiver **MAY** decide to reject
783 requests that come from Senders that do not have a TLS certificate and return the 'client-error-not-
784 authenticated' status code.

785 A Sender **MAY** use its own TLS certificate or it can use one associated with the Sending User.

786 A Receiver **MUST** have a TLS certificate, and the Send **MUST** have the public keys of the top level public
787 key Certificate Authorities (as current browsers do). If a Sender gets a public key from a Receiver that is
788 doesn't recognize, the Sender **MUST** resolve the unrecognized key or inform the Sending User that data
789 integrity has been lost and **MUST** abort the job.

790 The distribution of private keys to Senders or Receivers is outside the scope of this document, but if it is
791 done over the network, it **MUST** be over a secure channel. See Internet Key Exchange (IKE) [RFC2409].

792 **11.2 Data Privacy (encryption)**

793 A Sender **MAY** chose use data privacy (encryption) as defined in TLS/1.0 [RFC2246].

794 **11.3 uri-authentication-supported (1setOf type2 keyword) ([RFC2911] section 4.4.2)**

795 This attribute (see [RFC2911] section 4.4.2) identifies the Client Authentication mechanism associated
 796 with each URI listed in the “printer-uri-supported” attribute (see section 6.1).

797 **Table 8 - Authentication Requirements**

| “uri-authentication-supported” keyword | Sender support and usage | Receiver support and usage |
|--|---|--|
| none | MAY support and MAY use | MAY support and MAY use. If the ‘none’ value is supported by an implementation, then the administrator MUST be able to configure the Printer to not support the ‘none’ value (by means outside the scope of this document) |
| requesting-user-name | MUST NOT | MUST NOT |
| basic | MAY support and MAY use when the TLS channel is secured with Data Privacy using the cipher suites indicated below* or stronger | MAY support and MAY use when the TLS channel is secured with Data Privacy using the cipher suites indicated below* or stronger |
| digest | MUST support and MUST use, including the MD5 and MD5-sess algorithms and Message Integrity, unless using ‘certificate’ or ‘negotiate’ | MUST support and MAY use, including the MD5 and MD5-sess algorithms and Message Integrity |
| certificate | SHOULD support and MAY use when not using any of the above | MUST support and MAY use. For this value, the Receiver MUST validate the certificate for all client requests |

798 * TLS_DHE_DSS_WITH_3DES_EDE_CBC_SHA mandated by [RFC2246].

799 Table 9 compares the Digest Authentication requirements for IPP/1.1 clients, IPP/1.1 Printers, IPPFAX
800 Senders, and IPPFAX Receivers.

801 **Table 9 - Digest Authentication Conformance Requirements**

| Feature | IPP/1.1 Client | IPP/1.1 Printer | IPPFAX Sender | IPPFAX Receiver |
|-------------------------------|--------------------------|------------------------------|--------------------------|--------------------------|
| MD5 and MD5-sess | must support must use | should support should use | MUST support MUST use | MUST support MUST use |
| The Message Integrity feature | must support may use | should support may use | MUST support MUST use | MUST support MUST use |

802

803 **11.4 uri-security-supported (1setOf type2 keyword) ([RFC2911] section 4.4.3)**

804 This attribute (see [RFC2911] section 4.4.3) identifies the security (Integrity and Privacy) mechanisms
805 used for each URI listed in the “printer-uri-supported” attribute (see section 6.1).

806 **Table 10 - Security (Integrity and Privacy) Requirements**

| uri-security-supported | Sender support and usage | Receiver support and usage |
|------------------------|--|----------------------------|
| none | MUST NOT | MUST NOT |
| ssl2 | MUST NOT | MUST NOT |
| ssl3 | MUST NOT | MUST NOT |
| tls | TLS Data Integrity - MUST support and MUST use | MUST support and MUST use |
| | TLS Data Privacy - MUST support and MAY use. The Sender (device) MUST query the Sending User (human) before omitting Privacy (encryption). | MUST support and MAY use |

807

808 Table 11 compares the TLS conformance requirements for IPP/1.1 clients, IPP/1.1 Printers, IPPFAX
809 Senders, and IPPFAX Receivers.

810 **Table 11 - Transport Layer Security (TLS) Conformance Requirements**

| TLS Feature | IPP/1.1 Client | IPP/1.1 Printer | IPPFAX Sender | IPPFAX Receiver |
|------------------------|----------------------------|------------------------------|----------------------------|-------------------------|
| Server Authentication | must support should use | should support may use | MUST use | MUST support |
| Client Authentication* | may support may use | may support may use | SHOULD support | MUST support MAY use |
| Data Integrity | may support may use | should support should use | MUST use | MUST support |
| Data Privacy | may support may use | should support may use | MUST support MAY** use. | MUST support |

811 * The 'certificate' keyword value for the "uri-authentication-supported" attribute [RFC2911].

812 ** The Sender MUST query the Sending User before omitting the Data Privacy encryption.

813 Senders and Receivers MUST support the TLS_DHE_DSS_WITH_3DES_EDE_CBC_SHA cipher suite as
814 mandated by RFC 2246 [RFC2246]. All stronger cipher suites are OPTIONAL; weaker cipher suites
815 MUST NOT be supported or used by Senders or Receivers.

816 A Receiver MAY support Basic Authentication (described in HTTP/1.1 [RFC2617]) for Client
817 Authentication if the TLS channel is secured with Data Privacy. TLS with the above mandated cipher suite
818 or stronger can provide such a secure channel.

819 **11.5 Using IPPFAX with TLS**

820 The Sender MUST use only TLS for all IPPFAX operations on the IPPFAX URL. The client MUST start
821 the transaction in TLS, rather than using HTTP upgrade requests. The following paragraph of [RFC2818]
822 further explains:

823 The agent acting as the HTTP client should also act as the TLS client. It should initiate a
824 connection to the server on the appropriate port and then send the TLS ClientHello to begin the TLS
825 handshake. When the TLS handshake has finished. The client may then initiate the first HTTP
826 request. All HTTP data MUST be sent as TLS "application data". Normal HTTP behavior,
827 including retained connections should be followed.

828 Contrast this IPPFAX requirement with the IPP requirement in section 8.2 of [RFC2910]. The following
829 client actions compare IPP with IPPFAX from a client's point of view:

- 830 IPP/1.1 sequence:
- 831 1. Start TCP connection
 - 832 2. Zero or more HTTP/IPP requests
 - 833 3. HTTP/IPP request with Upgrade to TLS header
 - 834 4. TLS handshake
 - 835 5. Finish the HTTP/IPP request securely
 - 836 6. Send more HTTP/IPP requests securely ...

- 837
- 838 IPPFAX sequence:
- 839 1. Start TCP connection
 - 840 2. Send TLS ClientHello
 - 841 3. Rest of TLS handshake
 - 842 4. Send HTTP/IPPFAX requests securely ... (which usually will be a Get-Printer-Attributes,
 - 843 followed by the Print-Job operation).
 - 844

845 **11.6 Access control**

846 **Needs re-writing**

847 It is expected that the majority of IPPFAX Receivers will operate in a public mode when operating on the
848 Internet, so that anonymous users can send documents without requiring client authentication
849 (corresponding to the 'none' value for the "uri-authentication-supported" attribute - see section 11.3).
850 However a Receiver MAY protect itself using any Client Authentication method specified in [RFC2911]
851 (digest authentication [RFC2069] for example) to restrict access to any or all of its functionality.

852 However, the primary intent of IPPFAX is to create a controlled public access mode. It therefore does not
853 really make much sense to combine IPPFAX and user authentication; they are achieving the same thing.

854 **11.7 Reduced feature set**

855 **Needs re-writing**

856 An administrator or device implementer MAY choose to setup up a Print Service so that it only works as an
857 IPPFAX Receiver (i.e., offers no 'native' IPP operations and does not accept IPP Jobs). In this mode it
858 offers a restricted set of features and MAY be more safely connected to the Internet.

859 A Receiver that is operating in this mode MUST do so by rejecting any non-IPPFAX request and return a
860 'client-error-attributes-or-values-not-supported' error status code as indicated in section 4.1 for an
861 unsupported value of the "printer-uri" operation attribute. For job operations attempted on IPPFAX Jobs,

862 the Receiver MUST return the ‘client-error-not-authorized’ error status code, unless the Sender is
863 authenticated as the system administrator and the Receiver supports such access.

864 **12 Attribute Syntaxes**

865 No new attribute syntaxes are defined.

866 **13 Status codes**

867 No new Status codes are defined and semantics for existing status codes have not been modified.

868 .

869 **14 Conformance Requirements**

870 **Need to be re-worked.**

871 This section summarizes the conformance requirements for Senders and Receivers that are defined
872 elsewhere in this document.

- 873 1. A Sender and Receiver MUST observe the attribute name space conventions specified in section 1.
- 874 2. The Sender MUST supply and the Receiver MUST support (1) the “printer-uri” operation attribute
875 with the ‘ippfax’ scheme, (2) the “version-number” parameter with the IPP/1.1 ‘1.1’ (or higher
876 minor version) value, and (3) the “ippfax-version” operation attribute with the IPPFAX/1.0 ‘1.0’
877 keyword value in all operations to get the IPPFAX semantics as described in section 4.
- 878 3. The Receiver MUST support the Get-Printer-Attributes operation as described in sections 5.
- 879 4. The Receiver MUST support the Printer Description attributes as specified in section 6.
- 880 5. The Sender MUST validate that the target Printer is IPPFAX-capable using the Get-Printer-
881 Attributes operation and validate that the Receiver supports the job using the Validate-Job operation
882 as specified in section 7.
- 883 6. The Sender MUST supply and the Receiver MUST support the operation/Job Description attributes
884 for Identify Exchange as described in section 8.
- 885 7. The Sender MUST support submitting and the Receiver MUST accept IPPFAX Jobs as defined in
886 section 9.

- 887 8. The Sender MUST place the Sender's identity in the document according to section **Error!**
888 **Reference source not found.**
- 889 9. The Sender and Receiver MUST support the operations as indicated in section 10.
- 890 10. The Sender and Receiver MUST support the security mechanisms indicated in section 11, including
891 TLS.
- 892 The [set-ops], enable-printer and disable-printer operations MUST only be performed on a connection that
893 has been authenticated by TLS and the user has the rights to perform them.

894 **15 IPPFAX URL Scheme**

895 **Need to be re-worked to be consistent RFC 3510**

896 **Need to register a port with IANA for IPPFax.**

897 This section is intended for use in registering the 'ippfax' URL scheme with IANA and fully conforms to
898 the requirements in [RFC2717].

899 **15.1 IPPFAX URL Scheme Applicability and Intended Usage**

900 This document defines the 'ippfax' URL (Uniform Resource Locator) scheme for specifying the location of
901 an IPPFAX Receiver which implements the IPPFAX Protocol specified in this document.

902 The 'ippfax' URL scheme defined in this document is based on the ABNF for the basic hierarchical URL
903 syntax in [RFC2396]; however relative URL forms, parameters, and/or query parts are NOT allowed in an
904 IPPFAX URL. The 'ippfax' URL scheme is case-insensitive in the host name or host address part;
905 however the path part is case-sensitive, as in [RFC2396]. Codepoints outside [US-ASCII] MUST be hex
906 escaped by the mechanism defined in [RFC2396].

907 The intended usage of the 'ippfax' URL scheme is COMMON.

908 **15.2 IPPFAX URL Scheme Associated IPPFAX Port**

909 All IPPFAX URLs which do NOT explicitly specify a port MUST be used over IANA-assigned well-
910 known port **xxx [TBA by IANA]** for the IPPFAX Protocol.

911 See: IANA Port Numbers Registry [IANA-PORTREG].

912 **15.3 IPPFAX URL Scheme Associated MIME Type**

913 All IPPFAX protocol operations (requests and responses) MUST be conveyed in an ‘application/ipp’
 914 MIME media type [RFC2910] as registered in [IANA-MT]. IPPFAX URLs MUST refer to IPPFAX
 915 Receivers which support this ‘application/ipp’ operation encoding.

916 See: IANA MIME Media Types Registry [IANA-MT].

917 **15.4 IPPFAX URL Scheme Character Encoding**

918 The IPPFAX URL scheme defined in this document is based on the ABNF for the HTTP URL scheme
 919 defined in HTTP/1.1 [RFC2616], which is derived from the URI Generic Syntax [RFC2396] and further
 920 updated by [RFC2732] and [RFC2373] (for IPv6 addresses in URLs). The IPPFAX URL scheme is case-
 921 insensitive in the ‘scheme’ and ‘host’ (host name or host address) part; however, the ‘abs_path’ part is
 922 case-sensitive, as in [RFC2396]. Code points outside [US-ASCII] MUST be hex escaped by the
 923 mechanism specified in [RFC2396].

924 **15.5 IPPFAX URL Scheme Syntax in ABNF**

925 The IPP protocol places a limit of 1023 octets (NOT characters) on the length of a URI (see section 4.1.5
 926 ‘uri’ in [RFC2911]). An IPPFAX Receiver MUST return ‘client-error-request-value-too-long’ (see section
 927 13.1.4.10 in [RFC2911]) when a URI received in a request is too long.

928 Note: IPPFAX Receivers ought to be cautious about depending on URI lengths above 255 bytes, because
 929 some older client or proxy implementations might not properly support these lengths.

930 IPPFAX URLs MUST be represented in absolute form. Absolute URLs always begin with a scheme name
 931 followed by a colon. For definitive information on URL syntax and semantics, see “Uniform Resource
 932 Identifiers (URI): Generic Syntax and Semantics” [RFC2396]. This specification adopts the definitions of
 933 “port”, “host”, “abs_path”, and “query” from [RFC2396], as updated by [RFC2732] and [RFC2373] (for
 934 IPv6 addresses in URLs).

935 The IPPFAX URL scheme syntax in ABNF is as follows:

```
936   ippfax_URL = "ippfax:" "//" host [ ":" port ] [ abs_path [ "?" query ] ]
937
```

938 If the port is empty or not given, the IANA-assigned port as defined in section 15.2 is assumed. The
 939 semantics are that the identified resource (see section 5.1.2 of [RFC2616]) is located at the IPPFAX
 940 Notification Recipient listening for HTTP connections on that port of that host, and the Request-URI for
 941 the identified resource is ‘abs_path’.

942 Note: The use of IP addresses in URLs SHOULD be avoided whenever possible (see [RFC1900]).

943 If the 'abs_path' is not present in the URL, it MUST be given as "/" when used as a Request-URI for a
 944 resource (see section 5.1.2 of [RFC2616]). If a proxy receives a host name which is not a fully qualified
 945 domain name, it MAY add its domain to the host name it received. If a proxy receives a fully qualified
 946 domain name, the proxy MUST NOT change the host name.

947 15.6 IPPFAX URL Examples

948 The following are examples of valid IPPFAX **URLs for Notification Recipient** objects (using DNS host
 949 names):

```
950     ippfax://abc.com
951     ippfax://abc.com/listener
```

952
 953 Note: The use of IP addresses in URLs SHOULD be avoided whenever possible (see [RFC1900]).

954 The following literal IPv4 addresses:

```
955     192.9.5.5           ; IPv4 address in IPv4 style
956     186.7.8.9          ; IPv4 address in IPv4 style
```

957
 958 are represented in the following example IPPFAX URLs:

```
959     ippfax://192.9.5.5/listener
960     ippfax://186.7.8.9/listeners/tom
```

961
 962 The following literal IPv6 addresses (conformant to [RFC2373]):

```
963     ::192.9.5.5         ; IPv4 address in IPv6 style
964     ::FFFF:129.144.52.38 ; IPv4 address in IPv6 style
965     2010:836B:4179::836B:4179 ; IPv6 address per RFC 2373
```

966
 967 are represented in the following example IPPFAX URLs:

```
968     ippfax://[::192.9.5.5]/listener
969     ippfax://[::FFFF:129.144.52.38]/listener
970     ippfax://[2010:836B:4179::836B:4179]/listeners/tom
```

971

972 15.7 IPPFAX URL Comparisons

973 When comparing two IPPFAX URLs to decide if they match or not, the comparer MUST use the same
974 rules as those defined for HTTP URI comparisons in [RFC2616], with the sole following exception:

- 975 • A port that is empty or not given MUST be treated as equivalent to the port as defined in section
976 15.2 for that IPPFAX URL;

977 16 IANA Considerations

978 IANA shall register the ippfax URL scheme as defined in section 15 according to the procedures of
979 [RFC2717] and assign a well known port.

980 Operation Attributes:

981 ippfax-version (type2 keyword) IEEE-ISTO 510n.y 4.3

982

983 Operation/Job Description attributes:

984 sending-user-vcard (text(MAX)) IEEE-ISTO 510n.y 8.1

985 receiving-user-vcard (text(MAX)) IEEE-ISTO 510n.y 8.2

986 sender-uri (uri) IEEE-ISTO 510n.y 8.3

987

988 Printer Description Attributes:

989 ippfax-versions-supported (1setOf type2 keyword) IEEE-ISTO 510n.y 6.3

990 17 References

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1004 **17.2 Informative**

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1025 obsolete RFC 3196 [RFC3196], October 8, 2001.

1026 [RFC 3381]

1027 Hastings, T., Bergman, R., Lewis, H., "Internet Printing Protocol (IPP): Job Progress Attributes",
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1096

1097 Contact Information:

1098

1099 IPPFAX Web Page: <http://www.pwg.org/qualdocs/>1100 IPPFAX Mailing List: ifx@pwg.org

1101

1102 To subscribe to the IPPFAX mailing list, send the following email:

1103 1) send it to majordomo@pwg.org

1104 2) leave the subject line blank

1105 3) put the following two lines in the message body:
 1106 subscribe ifx
 1107 end

1108
 1109 Implementers of this specification document are encouraged to join the IPPFAX Mailing List in order
 1110 to participate in any discussions of clarification issues and review of registration proposals for
 1111 additional attributes and values. In order to reduce spam the mailing list rejects mail from non-
 1112 subscribers, so you must subscribe to the mailing list in order to send a question or comment to the
 1113 mailing list.

1114
 1115 Other Participants:

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1116
 1117 1. Appendix A:

1118 **19 Appendix B: vCard Example**1119 **Update the example**

1120 The following ASCII text is a complete vCard v3.0 [RFC2426, RFC2425] example:

```

1121 BEGIN:VCARD
1122 VERSION:3.0
1123 N:Moore;Paul
1124 FN:Paul Moore
1125 ORG:Netreon
1126 TEL;CELL;VOICE:1+206-251-7008
1127 ADR;WORK;;;10900 NE 8th St,Bellvue;WA;98004;United States of America
1128 EMAIL;PREF;INTERNET:pmoore@netreon.com
1129 REV:19991207T215341Z
1130 END:VCARD

```

1131
11321133 **20 Revision History (to be removed when standard is approved)**

| Revision | Date | Author | Notes |
|----------|---------|---|--|
| 1 | 1/16/01 | Paul Moore, Netreon | Initial version |
| 2 | 2/27/01 | Paul Moore, Gail Songer, Netreon | Specify TLS as MUST Removed Cover page and combined device Added need for big text types |
| 3 | 4/11/01 | Gail Songer, Netreon | Move attribute definition to first reference |
| 4 | 5/24/01 | Tom Hastings | Editorially updated the document to follow the style of the IPP standard documents. Added 23 issues to be reviewed. Capitalized the special terms throughout without showing revisions in order to make the document with revisions more readable. |
| 5 | 5/21/01 | Tom Hastings, John Pulera, Ira McDonald | Updated from the 6/6/01 telecon agreements on most of the 23 issues. There are 20 issues remaining, mostly new. |
| 6 | 7/27/01 | Tom Hastings, Ira McDonald | Updated from the 6/29/01 telecon. There are 41 issues remaining, mostly new. |
| 7 | 10/8/01 | Tom Hastings, Ira McDonald | Updated with all the resolutions to the 41 ISSUES from the August 1, 2001 IPPFAX WG meeting in |

| | | | |
|----|----------------------|----------------------------------|---|
| | | | Toronto, and the subsequent telecons: August, 9, 14, and 17, 2001. There are 4 (new) issues remaining. |
| 8 | 11/17/01 | Tom Hastings | Updated with the agreements from the IPPFAX WG meeting, 10/24/01, Texas. See minutes. There are 5 issues remaining. |
| 9 | 12/31/01 | Tom Hastings | Updated with the agreements reached at the 12/14/01 telecon. |
| 10 | 2/19/02 | Tom Hastings | Updated with the agreements reached as the 2/5/02 IPPFAX WG meeting. There are no remaining issues. |
| 11 | 9/20/02 | Tom Hastings | Replaced all occurrences of UIF with PDFax and uif with PDFax. |
| 12 | 10/16/02 10/24/02 | Rick Seeler Gail Songer | Updated to reflect PDF/is as file format. Replace CONNEG with UPDF. Attributes for OPTIONAL PDF/is functionality. |
| 13 | 11/22/02 | Rick Seeler | Replaced 'PDFax' with 'PDF/is' or 'pdfis'. Updated spec to match 0.3 PDF/is specification. |
| 14 | 03/18/03 | Gail Songer | Removed pdfis-profile-requested and pdfis-profile-supported and pdfis-profiles; all image formats are required Removed pdfis-cache-size-k-octets (now fixed value) Removed pdfis-banding-direction-supported Started to split references into two sections, "normative" and "informative" and update descriptions to references Other editorial changes |
| 15 | 03/24/03 | Gail Songer | Added digital-signatures-supported. Added pdf-format and pdf-format supported. Put "coloring" back to optional. Removed PDF data encryption (leave for a future version of PDF/is and IPPFax) |
| 16 | | Gail Songer Dennis Carney | Remove all references to coloring Changed pdf-format to document-format-version Remove the requirement that [set-ops] supports document-format coloring (we only allow document-format==PDF) ALL admin operations require TLS to have authenticated the user and the user has admin rights Other editorial changes |
| 17 | 05/21/03 | Dennis Carney | Editorial updates |

| | | | |
|----|----------------|--------------|---|
| | 05/28/03 | Tom Hastings | Added new 'choice_iso_a4_210x297mm_na_letter_8.5x11in' value for "media" and a reference to [jobx]. Fixed conformance for "media-ready". |
| 18 | 10/03 11/03 | Gail Songer | Reviewed in light of the Requirements specification. Noted lots of places in which the document MUST be changed. |

1134

1135 **Allow Cancel-job for Administrators.**