IPP Fax Protocol

IEEE-ISTO Printer Working Group
Draft Standard D0.4

May 24, 2001

ftp://ftp.pwg.org/pub/pwg/QUALDOCS/ifx-spec-04.pdf, .doc, .rtf

Abstract

This standard specifies the IPP Fax (IPPFAX) protocol. The IPPFAX requirements [15] are derived from the requirements for Internet Fax [1].

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 store and forward fax-like protocol specified in [2] and [3] that uses the SMTP mail protocol as a transport.

The IPPFAX protocol uses an extended version of IPP/1.1 [4], [5] and REQUIRES that the IPPFAX Receiver support at least the Universal Interchange Format (UIF) [14] document format.

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58

58   Table of Contents

109   **Table of Tables**

115

116

116

1   Introduction

This standard specifies the IPP Fax (IPPFAX) protocol. The IPPFAX requirements [15] are derived from
the requirements for Internet Fax [1].

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

The IPPFAX protocol uses an extended version of IPP/1.1 [4], [5] and REQUIRES that the IPPFAX
Receiver support at least the Universal Interchange Format (UIF) [14] document format. Note - It is
assumed that the reader is familiar with IPP[4],[5],[6].

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 store and forward fax-like protocol specified in [2] and [3] that
uses the SMTP mail protocol as a transport.

1.1   Namespace used

The extension specified in this standard uses the prefix 'ippfax-' for all new IPP attributes defined.

2   Terminology

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

2.1   Conformance Terminology

Capitalized terms, such as **MUST, MUST NOT, REQUIRED, SHOULD, SHOULD NOT, MAY,
NEED NOT,** and **OPTIONAL**, have special meaning relating to conformance to this specification. These
terms are defined in [RFC2911] section 13.1 on conformance terminology, most of which is taken from RFC
2119 [RFC2119].

2.2   Model

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

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144 **Sender** This is the agent (software, hardware or some combination) that is used to transmit a Document to a
145 Receiver.

146 **Receiver** This is the agent (IPP Printer object which can be software, hardware or some combination) that
147 receives the Document sent by the Sender.

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

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

151 **Receiving User** The intended human recipient of the Document being sent.

152 **IPPFAX Job** An IPP job submitted by a Sender.

153 **Delivered** The Receiver has either printed the Document or has forwarded it to some other system.

154 The terminology defined in [5], such as **attribute**, **operation**, **request, response**, **operation attribute**,
155 **Printer Description attribute**, and **Job Description attribute** is also used in the standard with the same
156 capitalization conventions.

2.3   Typical exchange

158 The Sending User determines the address of the Receiver – see section 6.1. This standard does not specify
159 how the Sending User does this. Possible methods include directory lookup, search engines, business cards,
160 network enumeration protocols such as SLP, etc.

161 1. The Sending User either (1) loads the Document into the Sender or (2) causes the Sender to generate the
162   Document data by means outside the scope of this standard, indicates the Receiver's address and starts
163   the exchange.

164 2. The Sender determines whether or not the Receiver is a IPPFAX capable device – see section 3.

165 3. The following identities are determined and exchanged: Sender, Sending User, Receiver and Receiving
166   User – see section 5.

167 4. The Sender decide on the most appropriate data format depending on the Receiver's capabilities. This is
168   described in detail in the UIF specification [14].

169 5. The Sender SHOULD validate whether or not the Receiver will accept the IPPFAX Job from this
170   Sending User using Validate-Job. See section 6.2. ISSUE 01: Ok that I added the Validate-Job step,
171   since Validate-Job is REQUIRED for an IPPFAX Receiver to support?

172 6. The Sender either (1) scans the Document and converts it into an acceptable data format or (2) generates
173   the Document representation in an acceptable data format – see section 4.

174 7. This data is transmitted to the Receiver – see section 6.3.

175 8. The Sending User receives a confirmation that the Receiver received the Document – see section 6.4.

176 9. In addition the Sender MAY choose to receive notification that the Document has been successfully
177   Delivered – see section 6.5

178 If the Sender is unable to initiate or complete the exchange then it is assumed that the Sender will perform
179 some form of retry. The mechanisms used and the user-visible behavior in this case is an implementer's choice
180 and beyond the scope of this standard.

2.4   Gateways

182 The IPPFAX protocol MAY be used as a gateway protocol to or from other image transmission systems. See
183 section 9.

3   IPPFAX detection

185 A Sender needs to determine whether or not the destination URL it has represents:

186   a) A valid IPP destination

187   b) A IPPFAX Receiver (not all IPP destinations are IPPFAX Receivers)

188 This standard does not specify how to perform the first validation. Refer to the IPP implementer's guide [6].

3.1   ippfax-receiver (integer(0:MAX)) Printer Description attribute

190 ISSUE 02: Wouldn't "ippfax-version" (integer(0:MAX)) make a better Printer Description attribute name for
191 the "ippfax-receiver (integer(0:MAX)), especially since we already have an "ippfax-receiver-identify
192 (name(MAX)) Printer Description attribute?

193 The Sender SHOULD read this Printer Description attribute using the Get-Printer-Attributes operation; the
194 Receiver MUST support this Printer Description attribute. This attribute identifies the Printer object as an
195 IPPFAX Receiver. If this attribute is not returned, then the Printer is NOT an IPPFAX Receiver. If the value
196 of this attribute is 0 then the Printer object is not currently operating as an IPPFAX Receiver. Any other value
197 indicates the version of IPPFAX supported. This specification defines the support REQUIRED for version 1.

198 ISSUE 03: Why not REQUIRE an IPPFAX Sender to validate that the Receiver is an IPPFAX Receiver?
199 Otherwise, the Sending User isn't guaranteed reliable exchange.

200   If the IPP printer supports this attribute and returns a value greater than 0, then Sender can be sure that it is an
201   IPPFAX Receiver. If either the attribute is not returned or the value is 0, then the Sender MAY choose to
202   abandon the exchange or to enter degraded mode (see section 3.2).

203   ISSUE 04: When the IPP Printer isn't an IPPFAX Printer (either doesn't support the "ippfax-receiver"
204   attribute or returns a 0 value, why not REQUIRE the Sender to query the Sending User as to whether to
205   abandon the exchange or do it in Degraded Mode? Currently, the Sender can do whatever it wants without
206   the Sending User being involved.

207   ISSUE 05: Can a Receiver support a remote administrator changing the value of the ippfax-receiver
208   (integer(0:MAX)) Printer Description attribute using the Set-Printer-Attributes operation or should we define
209   two OPTIONAL operations to set the level to 0 or back to its supported level?

210   ISSUE 06: If we want two operations, should they be new operations or a new operation attribute for the
211   existing OPTIONAL Disable-Printer and Enable-Printer operations?

3.2   Degraded Mode

213   IPPFAX describes a variation of IPP – it is perfectly possible for a complete ippfax-like exchange to take
214   place between a IPPFAX client and an IPP printer.

215   From the viewpoint of IPPFAX this is a degraded mode of operation. The main features that will be missing
216   are:

217   -   Guaranteed exchange: Since IPP does not mandate any data formats it is possible that the Sender
218   MAY not be able to discover a common data format that both it and the printer support.

219   -   Identity exchange: IPP does not provide the definitive identity exchange that IPPFAX does. In
220   many cases however this is acceptable

4   Data formats

222   In order to usefully exchange Documents between arbitrary IPPFAX end points there MUST be some
223   agreement on what formats are used to represent the data. To this end an IPPFAX Receiver MUST support
224   UIF[14]. The UIF format is identified using the MIME type: 'application/vnd.pwg-UIF' (ISSUE 07: Or use
225   'image/tiff; application=uif' or 'image/tiff; application=faxbw or 'image/tiff; application=faxcolor' instead?).

226   A Receiver MAY support other formats.

227   Note that a Sender MAY use any means it chooses to determine what format to send. It MAY have a-priori
228   knowledge of the Receiver, it MAY read the IPP "document-format-supported" Printer Description attribute
229   or determine that it can support other data formats using some other mechanism (for example it can read the
230   Receiver's manufacturer and model and therefore determine the formats supported). The Sender SHOULD

231 NOT send any data format that the Receiver does not support. If it does so the Receiver will reject it (IPP
232 conformance).

233 The Sender MAY send any supported format to the Receiver. It is the Sender's choice; the Receiver has no
234 way of indicating preferred formats from amongst the formats that the Receiver supports.

235 The Sender MUST specify the data format being sent by including the "document-format" operation attribute
236 in the Print-Job request (OPTIONAL for a client to supply in IPP/1.1).

237 5   Identity exchange

238 This section defines the attributes used by the Sender and the Recipient to identify the other.

239 *5.1   ippfax-sending-user-identity (text(MAX)) operation/Job*
240   *Description attribute*

241 The Sender SHOULD send this operation attribute in the Print-Job operation; a Receiver MUST support this
242 Print-Job and Validate-Job operation attribute. This attribute identifies the Sending User in MIME vCard
243 [10] format. For a sample vCard see section 13. If the Sender supplies the attribute, then the Receiver
244 MUST use its value to populate the Job object's "ippfax-sending-user-identity" Job Description attribute of
245 the same name.

246 ISSUE 08: Ok to change the attribute syntax of the "ippfax-sending-user-identity" operation attribute from
247 octetString32k(MAX) to text(MAX), since the value is a vCard string and 1023 characters seem plenty?

248 *5.2   ippfax-receiving-user-identity (text(MAX)) operation/Job*
249   *Description attribute*

250 The Sender SHOULD send this operation attribute in a Print-Job operation; a Receiver MUST support this
251 Print-Job operation attribute. This attribute identifies the intended Receiving User in MIME vCard
252 format[10]. For a sample vCard see section 13. If the Sender supplies the attribute, then the Receiver
253 MUST use its value to populate the Job object's "ippfax-sending-user-identity" Job Description attribute of the
254 same name.

255 ISSUE 09: Ok to change the attribute syntax of the "ippfax-receiving-user-identity" operation attribute from
256 octetString32k(MAX) to text(MAX), since the value is a vCard string and 1023 characters seem plenty?

257 *5.3   ippfax-sender-identity (name(255)) operation/Job Description*
258   *attribute*

259 The Sender MUST send this operation attribute in a Print-Job operation; a Receiver MUST support this
260 Print-Job operation attribute. This attribute identifies the Sender in the same way that a fax machine has a
261 sending station ID. The Receiver MUST use its value to populate the Job object's "ippfax-sender-identity"
262 Job Description attribute of the same name. The presence of the attribute also marks the job as an IPPFAX
263 Job.

264 The value of this identity is not specified but MUST uniquely identify the device. A value derived from the
265 MAC address would be a reasonable starting point but it MUST be human readable text.

266 *5.4   ippfax-receiver-identity (name(255)) Printer Description attribute*

267 The Sender MAY read this Printer Description attribute using the Get-Printer-Attributes operation; the
268 Receiver MUST support this Printer Description attribute. This attribute identifies the Receiver.

269 The value of this identity is not specified but MUST uniquely identify the device. A value derived from the
270 MAC address would be a reasonable starting point but it MUST be human readable text.

271 6   Data Exchange

272 *6.1   Addressing*

273 In each operation, the IPP Target, i.e., the "printer-uri" (uri) operation attribute, MUST be the Receiver's
274 address which MUST be an IPP/1.1 URL using the 'ipp' scheme. See [12].

275 Example: <ipp://www.acme.com/ipp/print5>

276 *6.2   Validating the Job using the Validate-Job operation*

277 The Sender SHOULD validate the job attributes using the Validate-Job operation (that doesn't include any
278 Document data) before sending the IPPFAX Job with the same attributes using the Print-Job operation that
279 includes the Document data. The Sender SHOULD supply all the same operation and Job Template
280 attributes in the Validate-Job request as it will supply in the Print-Job request.

281 *6.3   Transmission using the Print-Job operation*

282 Documents MUST be sent using the IPP Print-Job operation. There is no requirement for an IPPFAX
283 Receiver to support any other IPP job submission operations or to support the Validate-Job operation.

284   The Sender MAY include any valid operation attributes or Job Template attributes.

285   ISSUE 10: We need to define which Print-Job operation attributes and Job Template attributes are required
286   for the Receiver to support.

6.4   Confirmation using the Print-Job response

288   The Sender knows when the Receiver has successfully received the entire Document when the Receiver
289   returns the 'successful-ok' status code in the Print-Job response; the Sender can then inform the Sending
290   User.

291   ISSUE 11: MUST the Sender inform the Sending User that the Document as been received successfully?

292   The Sender SHOULD use the successful end of the print-job operation as an indication that the Receiver has
293   received the Document.

6.5   Notification using the "notification-recipient-uri" operation attribute and the Get-Notifications operation

296   A Sender MAY use Notification to determine when the Document has been Delivered; A Receiver MUST
297   support the IPP Notification specification [16] and the 'ippget' notification delivery method [11]. The
298   Receiver MUST support the 'job-progress' event (which is OPTIONAL in [16]) and the 'job-completed'
299   event (which is a subset of the required events in [16]). The Receiver MUST support the Get-Notifications
300   operation as defined in [11]. If the Sender subscribes to the 'job-progress' event, the Receiver MUST
301   generate an event for every sheet, as moderated by the Printer's "notify-time-interval" attribute, which the
302   Sender can obtain using the Get-Notifications request.

303   ISSUE 12: Why not REQUIRE the Sender to support Get-Notifications and subscribing to at least the 'job-
304   complete' event?

305   ISSUE 13: Ok to allow a Receiver to support a subset ('job-progress' and 'job-complete') of the
306   REQUIRED events that IPP Notification requires?

307   A Sender MAY use the "notification-recipient" Print-Job operation attribute [16] to request that the Receiver
308   send it notifications regarding the delivery of the Document. The Receiver MUST support Subscription
309   Creation for the IPP Print-Job operation, but NEED NOT support any other notification operations, such as
310   Create-Job-Subscriptions, Create-Printer-Subscriptions, Get-Subscription-Attributes, Get-Subscription-
311   Attributes, Renew-Subscription, or Cancel-Subscription, even though [16] requires them.

312   ISSUE 14: Ok to allow a Receiver to subset the REQUIRED operations of the IPP Notification specification
313   and not support: Create-Job-Subscriptions, Create-Printer-Subscriptions, Get-Subscription-Attributes, Get-
314   Subscription-Attributes, Renew-Subscription, or Cancel-Subscription, even though the IPP Notification spec
315   requires them?

316 If a Receiver chooses to allow other IPP notification operations then it SHOULD provide a method of
317 restricting all other notification operations to authenticated administrators.

318 ISSUE 15: Should we forbid a Receiver to support the additional IPP Notification operations: Create-Job-
319 Subscriptions, Create-Printer-Subscriptions, Get-Subscription-Attributes, Get-Subscription-Attributes,
320 Renew-Subscription, or Cancel-Subscription?

321 For the purposes of IPPFAX 'job-completed' event notifications means that the Receiver has delivered the
322 IPPFAX Job somewhere; either actually printed it or forwarded it to some other system.

6.6   Identity Stamping

324 The Sender MUST place the Sender's identity, date and time at the top of every page of the sent Document.
325 The Sender MAY include additional data (Sending User, Receiver identity, etc.)

326 ISSUE 16: Why are we requiring that the Sender put the identity at top of every page? Isn't that more
327 stringent than PSTN FAX and Internet FAX? I thought that a Sender could do that, but that putting it on the
328 first page was sufficient?

6.7   ippfax-return-uri (uri) operation and Job Description attribute

330 The Sender MAY include this Print-Job operation attribute; the Printer MUST support this operation
331 attribute. This attribute identifies the IPPFAX URI of the Receiver component in every request. If supplied,
332 then Receiver MUST use this value to populate the Job's "ippfax-return-uri" (uri) Job Description attribute of
333 the same name.

334 ISSUE 17: Why do we have this ippfax-return-uri which is the URI of the Receiver? Any IPP client MUST
335 always put this same URI into the "printer-uri" (uri) operation attribute of the Print-Job operation which the
336 IPP/1.1 Printer MUST copy to the "job-printer-uri" Job Description attribute. So I suggest we delete the
337 "ippfax-return-uri" (uri) operation and Job Description attribute.

7   IPP Implementation

339 IPPFAX restricts the use of IPP in certain cases in order to make attaching a Receiver to the Internet a safe
340 option – see section 8.

341 The Receiver MUST fully support the Print-Job, Validate-Job, and Get-Printer-Attributes operations, as
342 defined by IPP/1.1 [4] and the Get-Notifications operation as defined in [11]. The following subsections
343 define restrictions placed the IPP/1.1 Cancel-Job, Get-Job-Attributes, and Get-Jobs operations. In a strict
344 IPPFAX implementation, all other IPP/1.1 operations are forbidden except if the issuer of the operation can
345 be identified as an administrator. There is no requirement for the Receiver to implement any of the
346 OPTIONAL features of IPP unless explicitly stated elsewhere in this standard. If a Receiver is not a strict

347 IPPFAX implementation and it chooses to allow other IPP operations, for example, IPP operations such as
348 Print-Uri, Create-Job, Create-Printer-Subscriptions, etc., then it MUST provide a method of restricting
349 available operations for non-authorized clients to the operations specified herein.

7.1   Canceling jobs

351 It is inappropriate for a Sender to transmit a Document, receive confirmation of its arrival and then cancel it.
352 Therefore:

353 The Sender SHOULD NOT attempt to cancel the print job once it has been sent to the Receiver.

354 The Receiver MUST reject cancel job operations not issued by an administrator targeted at IPPFAX Jobs.
355 (The Receiver can determine that this is an IPPFAX Job by the presence of the mandatory "ippfax-sender-
356 identity" job attribute). The Cancel-Job operation therefore becomes a privileged operation on all IPPFAX
357 Jobs. This is a change to the IPP behavior.

358 If the issuer of the operation can be identified as an administrator, then the operation SHOULD behave as
359 defined in [4].

360 ISSUE 18: MUST a Receiver support this restricted form of the Cancel-Job operation or MAY it omit
361 support all together?

7.2   Querying jobs using Get-Job-Attributes and Get-Jobs
operations

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

366 The Receiver MUST restrict the job attributes that any Sender can request for any IPPFAX Job in a Get-
367 Jobs or a Get-Job-Attributes operation to the following Job attributes:

368   job-id, job-uri
369   job-k-octets, job-k-octets-completed
370   job-media-sheets, job-media-sheets-completed,
371   time-at-creation, time-at-processing
372   job-state, job-state-reasons
373   number-of-intervening-jobs
374
375 This attribute set allows a client to determine the load on a Receiver (and perhaps choose an alternative
376 destination or warn the Sending User).

377 See the discussion in section 8.4 of [4] for a description of how a Receiver MUST behave if it receives a
378 request for an attribute outside this set.

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379   An IPP administrator MAY read all attributes.

380   ISSUE 19: MUST a Receiver support this restricted form of the Get-Job-Attributes operation or MAY it
381   omit support all together?

382   ISSUE 20: MUST a Receiver support this restricted form of the Get-Jobs operation or MAY it omit support
383   all together?

7.3   Job submission

385   The Sender MUST send IPPFAX Jobs to the Receiver using the Print-Job operation which MUST include
386   the "ippfax-sender-identity" operation attribute.

8   Security considerations

388   IPPFAX presents an interesting challenge of balancing security and openness. Many of the envisaged uses of
389   IPPFAX require confidentiality of the data – at the same time the Receiver typically has no prior knowledge of
390   the Sender or the Sending User. This last point will normally rule out all user-based authentication and access
391   control. This is the reason for the restriction placed on querying and canceling IPPFAX Jobs.

8.1   Privacy

393   Any exchange between a Sender and a Receiver MUST be carried using the privacy mechanism specified in
394   IPP/1.1 namely TLS [9]. In some cases this will also result in mutual authentication of the Sender and Receiver
395   (in the case where both sides have certificates).

396   The Receiver MUST have a TLS certificate.

397   The Sender MAY have a certificate. A Receiver MAY decide to reject requests that come from Senders that
398   do not have a certificate.

399   A Sender can either use its own certificate or it can use one associated with the Sending User.

8.2   ippfax-sending-user-certificate (octetString32k(MAX)) operation/Job Description attribute

402   The Sender MAY supply this operation attribute in a Print-Job or Validate-Job operation; the Receiver
403   MUST support this operation attribute. The use of TLS assures the Sender and the Sending User that the
404   Receiver is what it claims to be.

405   The use of sending side certificates can assure the Receiver that the Sender is who it claims to be (if the
406   Receiver chooses to enforce the requirement that the Sender MUST have a certificate). This operation

407 attribute is only valid on the Print-Job and Validate-Job operations. A Receiver MUST support this attribute
408 and MAY require this attribute so it MAY positively identify the Sender. If REQUIRED but not supplied then
409 the Receiver MUST reject the request and return the 'client-error-ippfax-user-certificate-required' (see
410 section 11.1). If supplied then this attribute MUST contain the TLS certificate as defined by X.509V3[13].

411 ## *8.3   Access control*

412 It is expected that the majority of IPPFAX Receivers will operate in a public mode. However a Receiver
413 MAY protect itself using any method specified in [4] (digest authentication [9] for example) to restrict access
414 to any or all of its functionality.

415 However the primary intent of IPP Fax is to create a controlled public access mode. It therefore does not
416 really make much sense to combine IPPFAX and user authentication there are achieving the same thing.

417 ## *8.4   Reduced feature set*

418 An administrator or device implementer MAY choose to setup up a device so that it only works as a IPPFAX
419 Receiver (i.e., offers no 'native' IPP features). In this mode it offers a restricted set of features and MAY be
420 more safely connected to the Internet.

421 A Receiver that is operating in this mode SHOULD do so by rejecting any non-IPPFAX request with a '401
422 not authorized' error code.

423 ISSUE 21: Which IPP/1.1 status code to use when the IPP Printer is configured to only accept IPPFAX
424 operations and reject other IPP operations: client-error-forbidden (0x0401) or client-error-not-authorized
425 (0x0403)? Here are their IPP/1.1 descriptions;

426 **13.1.4.2 client-error-forbidden (0x0401)**

427 The IPP object understood the request, but is refusing to fulfill it. Additional authentication information or
428 authorization credentials will not help and the request SHOULD NOT be repeated. This status code is
429 commonly used when the IPP object does not wish to reveal exactly why the request has been refused or
430 when no other response is applicable.

431 **13.1.4.4 client-error-not-authorized (0x0403)**

432 The requester is not authorized to perform the request. Additional authentication information or authorization
433 credentials will not help and the request SHOULD NOT be repeated. This status code is used when the IPP
434 object wishes to reveal that the authentication information is understandable, however, the requester is
435 explicitly not authorized to perform the request. This status codes reveals more information than "client-error-
436 forbidden" and "client-error-not-authenticated".

9   Gateways to other systems

A common scenario will be where IPPFAX acts as an on-ramp or off-ramp to other Document transmission systems.

9.1   Off-Ramps

In the IPPFAX 'Off-ramp' scenario the user with a Document to send uses an IPPFAX Sender to transmit a Document to an IPPFAX Receiver within a gateway that in turn transmits it to some other destination, i.e. PSTN FAX.

9.1.1 ippfax-destination-scheme-supported (1setOf type2 keyword) Printer Description attribute

The Sender SHOULD read this Printer Description attribute using the Get-Printer-Attributes operation if it is going to send the IPPFAX Job to an IPPFAX Receiver acting as an Off-Ramp Gateway; if the Receiver supports acting as an Off-Ramp Gateway, the Receiver MUST support this Printer Description attribute. This attribute identifies the list of URI destination scheme names that the Receiver supports for forwarding Documents to final Destinations. If the Receiver does not act as an Off-Ramp Gateway, then this attribute MUST NOT be supported, i.e., the Receiver does not return this attribute in the Get-Printer-Attributes response.

From the list of supported schemes, the user selects the desired scheme with which it then populates the "ippfax-destination-uri" (uri) operation attribute on Print-Job or Validate-Job requests.

9.1.2 ippfax-destination-uri (uri) operation attribute and Job Description attribute

If the Sender is sending the IPPFAX Job to an Off-Ramp Receiver, the Sender MUST supply this operation attribute; if the Receiver supports acting as an Off-Ramp Gateway, the Receiver MUST support this Print-Job and Validate-Job operation attribute.

If the Sender supplies the attribute, the Receiver MUST use its value to populate the Job object's "ippfax-destination-uri" (uri) Job Description attribute of the same name.

9.2   On-Ramps

In the IPPFAX On-Ramp scenario the user originally sent the Document using some other mechanism to some intermediate agent. The intermediate agent, acting as an IPPFAX Sender, then uses the IPPFAX protocol to transmit the Document to an IPPFAX Receiver which MAY be either a final destination or an Off-Ramp. IPPFAX has no specific support for on-ramps.

466 # 10   Attribute Syntax

467 This section defines additional attribute syntaxes defined for use in IPPFAX.

468 ## 10.1   'octetString32k'

469 The 'octetString32k' attribute syntax is a sequence of octets encoded in a maximum of 32,767 octets which is
470 indicated in sub-section headers using the notation: octetString32k(MAX). This syntax type is used for
471 opaque data. Both the Sender and Receiver MUST support this attribute syntax.

472 # 11   New status codes

473 ## 11.1   'client-error-ippfax-user-certificate-required' (0x00TBD)

474 The policy of the Receiver is to require that the Sender supply the "ippfax-sending-user-certificate" operation
475 attribute with a valid certificate in the Print-Job and Validate-Job operations, but the client omitted it. This
476 status code MUST be supported if the Receiver requires the Sender to supply a certificate.

477 ISSUE 22: Why not use the existing IPP/1.1 status code: client-error-not-authenticated (0x0402) for when
478 the client doesn't include a certificate? Here is the complete IPP/1.1 description:

479 **13.1.4.3 client-error-not-authenticated (0x0402)**

480 The request requires user authentication. The IPP client may repeat the request with suitable authentication
481 information. If the request already included authentication information, then this status code indicates that
482 authorization has been refused for those credentials. If this response contains the same challenge as the prior
483 response, and the user agent has already attempted authentication at least once, then the response message
484 may contain relevant diagnostic information. This status codes reveals more information than "client-error-
485 forbidden".

486 # 12   Conformance Requirements

487 This section summarizes the conformance requirements for IPPFAX Senders and IPPFAX Receivers that are
488 defined elsewhere in this document.

489 ISSUE 23: Do the conformance tables look ok?

490 ## 12.1   Operation Requirements

491 Table 1 lists the conformance requirements for IPP operations for the IPPFAX Sender and IPPFAX
492 Receiver. Any other operations are OPTIONAL for an IPPFAX Sender or an IPPFAX Receiver to support.

493   **Table 1 - Operation Requirements**

Operation	IPP/1.1 Printer	IPPFAX Sender	IPPFAX Receiver	Section
Print-Job	MUST	MUST	MUST	6.3
Validate-Job	MUST	MUST??	MUST	6.2
Cancel-Job	MUST	MAY	MUST??	7.1
Get-Job-Attributes	MUST	MAY	MUST??	7.2
Get-Jobs	MUST	MAY	MUST??	7.2
Get-Printer-Attributes	MUST	MUST	MUST	5
Get-Notifications	MAY	MAY	MUST	6.5

494

495   Table 2 lists the conformance requirements for Operation attributes on the Print-Job and Validate-Job
496   operations and the corresponding Job Description attributes. Any other Print-Job and Validate-Job operation
497   attribute has the same conformance as in IPP/1.1 [4].

498   **Table 2 - Print-Job/Validate-Job operation attributes and Job Description attributes**

Attribute Name (attribute syntax)	Sender Conformance in Print-Job	Receiver Conformance	Section
document-format (mimeMediaType) *	MUST	MUST	See [4]
notification-recipients	MAY	MUST	6.5
ippfax-sending-user-identity (text(MAX))	SHOULD	MUST	5.1
ippfax-receiving-user-identity (text(MAX))	SHOULD	MUST	5.2
ippfax-sending-user-certificate octetString32k(MAX) *	MAY	MUST	8.2
ippfax-sender-identity (name(MAX))	MUST	MUST	5.3
ippfax-destination-uri (uri)	MAY	MUST **	9.1.2
ippfax-return-uri (uri)	MAY	MUST	6.7

499   *This attribute is NOT a Job Description attribute, only an Operation attribute for the Print-Job and Validate-Job operations.

500   ** Only an Off-Ramp Receiver MUST support this attribute.

501   Table 3 lists the conformance requirements for Subscription attributes on the Print-Job and Validate-Job
502   operations.

503   **Table 3 - Subscription Template attributes**

Attribute Name (attribute syntax)	Sender Conformance in Print-Job	Receiver Conformance	Section
notify-recipient-uri (uri)	MAY *	MUST	6.5
notify-events (1setOf type2 keyword)	MAY	MUST	6.5
notify-attributes (1setOf type2 keyword)	MAY	MAY	6.5
notify-user-data (octetString(63))	MAY	MUST	6.5
notify-charset (charset)	MAY	MUST	6.5
notify-natural-language (naturalLanguage)	MAY	MUST	6.5
notify-lease-duration (integer(0:67108863))	MAY	MUST	6.5
notify-time-interval (integer(0:MAX))	MAY	MUST	6.5

504   * The Sender MUST supply at least this attribute in order to use Notification.

505

506   Table 4 lists the conformance requirements for Printer Description attributes. The other Printer Description
507   attributes defined in IPP/1.1 [4] or IPP Notifications [16] have the same conformance requirements for
508   IPPFAX.

509   **Table 4 - Printer Description attributes**

Attribute Name (attribute syntax)	Sender Conformance for Get-Printer-Attributes	Receiver Conformance	Section
ippfax-receiver-identity (name(255))	MAY	MUST	5.4
ippfax-destination-scheme-supported (1setOf type2 keyword)	MAY	MUST **	9.1.1
ippfax-receiver (integer(0:MAX))	SHOULD	MUST	3.1

510   ** Only an Off-Ramp Receiver MUST support this attribute.

511   Table 5 lists the

512 **Table 5 - Notification Events**

Event	Sender Conformance for Print-Job	Receiver Conformance	Section
job-complete	MAY	MUST	6.5
job-progress	MAY	MUST	6.5

513

13   Appendix B: vCard Example

515   The following ASCII text is a complete vCard example:

516   BEGIN:VCARD
517   VERSION:2.1
518   N:Moore;Paul
519   FN:Paul Moore
520   ORG:Peerless Systems Networking
521   TEL;CELL;VOICE:(206) 251-7008
522   ADR;WORK:;;10900 NE 8th St;Bellvue;WA;98004;United States of America
523   EMAIL;PREF;INTERNET:pmoore@peerless.com
524   REV:19991207T215341Z
525   END:VCARD
526

14   References

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551 ## 15   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.

552