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Internet Printing Protocol/1.1: Requirements for IPP Notifications
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ABSTRACT

This document is one of a set of documents which together describe all aspects of a new Internet Printing
Protocol (IPP). IPP is an application level protocol that can be used for distributed printing on the Internet.
There are multiple parts to IPP, but the primary architectural components are the Model, the Protocol and
an interface to Directory Services. This document provides a statement of the requirements for notifications
as part of an IPP Service. Some ISSUES are indicated in the text.

35   The full set of IPP documents include:
36
37   Design Goals for an Internet Printing Protocol [RFC2567]
38   Rationale for the Structure and Model and Protocol for the Internet Printing Protocol [RFC2568]
39   Internet Printing Protocol/1.0: Model and Semantics [RFC2566]
40   Internet Printing Protocol/1.0: Encoding and Transport [RFC2565]
41   Internet Printing Protocol/1.0: Implementer's Guide [RFC 2639ipp-iig]
42   Mapping between LPD and IPP Protocols [RFC2569]
43
44   The 'Design Goals for an Internet Printing Protocol' document takes a broad look at distributed printing
45   functionality, and it enumerates real-life scenarios that help to clarify the features that need to be included
46   in a printing protocol for the Internet. It identifies requirements for three types of users: end users,
47   operators, and administrators. It calls out a subset of end user requirements that are satisfied in IPP/1.0.
48   Operator and administrator requirements are out of scope for version 1.0.
49
50   The 'Rationale for the Structure and Model and Protocol for the Internet Printing Protocol' document
51   describes IPP from a high level view, defines a roadmap for the various documents that form the suite of
52   IPP specifications, and gives background and rationale for the IETF working group's major decisions.
53
54   The 'Internet Printing Protocol/1.0: Encoding and Transport' document is a formal mapping of the abstract
55   operations and attributes defined in the model document onto HTTP/1.1. It defines the encoding rules for a
56   new Internet media type called 'application/ipp'.
57
58   The 'Internet Printing Protocol/1.0: Implementer's Guide' document gives insight and advice to
59   implementers of IPP clients and IPP objects. It is intended to help them understand IPP/1.0 and some of the
60   considerations that may assist them in the design of their client and/or IPP object implementations. For
61   example, a typical order of processing requests is given, including error checking. Motivation for some of
62   the specification decisions is also included.
63
64   The 'Mapping between LPD and IPP Protocols' document gives some advice to implementers of gateways
65   between IPP and LPD (Line Printer Daemon) implementations.
66
67
68   **Table of Contents**
69

79

1   Scope

The scope of this requirements ~~statement~~ document covers functionality used by the following kinds of IPP Users: ~~is for~~ End Users, Print Administrators and Operators.

2   Terminology

It is necessary to define a set of terms in order to be able to clearly express the requirements for notification services in an IPP System.

2.1 Job Submitting End User

A human end user who submits a print job to an IPP Printer. This person may or may not be within the same security domain as the Printer. This person may or may not be geographically near the printer.

2.2 Administrator

A human user who established policy for and configures the print system.

2.3 Operator

A human user who carries out the policy established by the Administrator and controls the day to day running of the print system.

2.4 Job Submitting Application

An application (for example, a batch application), acting on behalf of ~~an end user~~a Job Submitting End User, which submits a print job to an IPP Printer. The application may or may not be within the same security domain as the Printer. This application may or may not be geographically near the printer.

2.5 Security Domain

For the purposes of this discussion, the set of network components which can communicate without going through a proxy or firewall. A security domain may be geographically very large, for example - anyplace within IBM.COM.

2.6 IPP Client

The software component that sends IPP requests to an IPP Printer object and accepts IPP responses from an IPP Printer~~on the client system which implements the IPP protocol~~.

2.7 Job Recipient

A human who is the ultimate consumer of the print job. In many cases this will be the same person as the Job Submitting End User, but this need not always be the case. For example, if I use IPP to print a

125 document on a printer in a business partner's office, I am the Job Submitting End User, while the person I
126 intend the document for in my business partner's office is the Job Recipient. Since one of the goals of IPP
127 is to be able to print near the ~~ultimate~~ Job Recipient of the printed output, we would normally expect that
128 person ~~the Job Recipient~~ to be in the same security domain as, and geographically near, the Printer.
129 However, this may not always be the case. For example, I submit a print job across the Internet to a Kinko's
130 print shop. I am both the Submitting end User and the Job Recipient, but I am neither near nor in the same
131 security domain as the Printer.
132
133 2.8 Job Recipient Proxy
134
135 A person acting on behalf of the Job Recipient. In particular, the Job Recipient Proxy physically picks up
136 the printed document from the Printer, if the Job Recipient cannot perform that function. The Proxy is **by**
137 **definition** geographically near and in the same security domain as the printer. For example, I submit a print
138 job from home to be printed on a printer at work. I'd like my secretary to pick up the print job and put it on
139 my desk. In this case, I am acting as both Job Submitting End User and Job Recipient. My secretary is
140 acting as a Job Recipient Proxy.
141
142 2.9 Notification Subscriber
143
144 A client that requests the IPP Printer to send Event ~~reports~~ Notifications to one or more Notification
145 Recipients. A Notification Subscriber may be a Job Submitting End User or an End User, an Operator, or
146 an Administrator that is not submitting a job.
147
148 2.10 Notification Source
149
150 The entity that sends Event Notification ~~event~~s.
151
152 2.11 Notification Recipient
153
154 The entity that receives IPP Notifications about Job and/or Printer events. A Notification Recipient may be
155 a~~ny of~~: Job Submitting End User, Job Submitting Application, Job Recipient, ~~or~~ Job Recipient Proxy,
156 Operator, or Administrator, etc., ~~folks~~ and their representatives or log file or ~~accounting/audit~~usage
157 statistics gathering application or other active or passive entities ~~or President Clinton~~. ~~Or Monica.~~
158
159 2.12 Notification Recipient Agent
160
161 A program which receives Event Notifications on behalf of the Notification Recipient. The agent may take
162 some action on behalf of the recipient, forward the notification to the recipient via some alternative means
163 (for example, page the recipient), or queue the notification for later retrieval by the recipient.
164
165 2.13 Event
166
167 A Event is some occurrence (either expected or unexpected) within the printing system of a change of state,
168 condition, or configuration of a Job or Printer object.
169

170   2.14 Event reportNotification
171
172   When an event occurs, an Event reportNotification is generated that fully describes the event (what the
173   event was, where it occurred, when it occurred, etc.). Event reportNotifications are delivered to all the
174   Notification Recipients that are subscribed to that Event, if any. The Event reportNotification is delivered
175   to the address of the Notification Recipient using the notification delivery method defined in the
176   subscription. However, an Event ReportNotification is sent ONLY if there is a corresponding subscription.
177
178   2.15 Notification Subscription
179
180   A Notification Subscription is a request by a Notification Subscriber to the IPP Printer to send Event
181   Notifications to specified Notification Recipient(s) when the event occur.
182   It should be possible for end users and operators to 'subscribe' for notifications of certain types of Events,
183   independent of Job Submission. An end user or operator may subscribe for
184
185   —All Job Traps
186   —All Traps (Job and Printer)
187   —None (Reserves a slot in some limited stable of 'notification hosts')
188   ISSUE: Need to discuss granularity and categorization in the context of anticipated event frequency
189
190   2.16 Notification Attributes
191
192   IPP Objects (for example, a print job) from which notification are being sent may have attributes associated
193   with them. A user may want to have one or more of these associated attributes returned along with a
194   particular notification. In general, these may include any attribute associated with the object emitting the
195   notification. Examples include:
196
197   number-of-intervening jobs
198   job-k-octets
199   job-k-octets processed
200   job impressions
201   job-impressions-interpreted
202   job-impressions-completed
203   impressionsCompletedCurrentCopy (job MIB)
204   sheetCompletedCopyNumber (job MIB)
205   sheetsCompletedDocumentNumber (job MIB)
206   Copies-requested
207   Copy-type
208   Output-destination
209   Job-state-reasons
210   Job ID
211   Printer URI
212   Subscription ID (for job independent subscription)
213
214   2.17 Notification Delivery Method (or Delivery Method for short)

215
216   Event ~~report~~Notifications are delivered using a method, such as email, TCP/IP, etc.
217
218   2.18 Immediate Notification
219
220   Notifications sent to the Notification Recipient or the Notification Recipient's agent in such a way that the
221   notification arrives immediately , within the limits of common addressing, routing, network congestion and
222   quality of service.
223
224   2.19 ~~Queued~~ Store and Forward Notification
225
226   Notifications which are not necessarily ~~sent~~ delivered to Notification Recipients immediately, but are
227   queued for delivery by some intermediate network application, ~~or~~ for later retrieval. Email ~~with store and~~
228   ~~forward~~ is an example of ~~a queued~~store and forward notification delivery method.
229
230   2.20 Reliable Delivery of Notification~~s~~ ~~over Reliable Transport~~
231
232   Notifications which are delivered by a reliable, ~~sequenced~~ delivery of packets or character stream, with
233   acknowledgment and retry, such that delivery of the notification is guaranteed within some ~~reasonable~~
234   determinate time limits. For example, if the Notification Recipient has logged off and gone home for the
235   day, an immediate notification cannot be guaranteed to be delivered, even when sent over a reliable
236   transport, because there is nothing there to catch it. Guaranteed delivery requires both ~~queued~~store and
237   forward notification and a reliable transport. ~~If delivery of the notification requires process to process~~
238   ~~communications, each session is managed in a reliable manner, assuring fully ordered, end-to-end delivery.~~
239
240   2.21 Notification over Unreliable Transport
241
242   Notifications are delivered via the fundamental transport address and routing framework, but no
243   acknowledgment or retry is required. Process to process communications, if involved, are unconstrained.
244
245
246   2.22 Human Consumable Notification
247
248   Notifications which are intended to be consumed by human end users only. ~~They contain no machine~~
249   ~~readable encoding of the event.~~ Email would be an example of a Human consumable notification, though it
250   could also contain Machine Consumable Notification.
251   ~~ISSUE: Do we need both human and machine or is machine sufficient? There is no intent to attempt to~~
252   ~~standardize human readable strings.~~
253   ~~Human readable is intended for certain protocols, like e-mail, though email can also convey machine~~
254   ~~readable MIME types as well using multipart/report.~~
255   ~~ISSUE: Is e-mail the only, or most likely, means of conveying the notification through the firewall (which~~
256   ~~would drive a requirement for mixed text, binary content).~~
257
258   2.23 Machine Consumable Notification
259

260 Notifications which are intended for consumption by a program **only**, such as an IPP Client. Machine
261 Consumable notifications may not contain human readable information. Do we need both human and
262 machine? Machine readable is intended for application to application only. The Notification Recipient
263 could process the machine readable Event ~~report~~Notification into human readable format.
264
265 2.24 Mixed Notification
266
267 A mixed notification ~~may~~ contains both Human ~~readable~~ Consumable and ~~human~~ Machine ~~readable~~
268 Consumable information.
269 ~~ISSUE: Do we need mixed?~~
270
271 ~~Mail Services, DNS, Instant Messaging, Distributions lists etc.?~~
272
273 **3   Scenarios**
274
275 1. I am sitting in my office and submit a print job to the printer down the hall. I am in the same security
276   domain as the printer and of course, geographically near. I want to know immediately when my print
277   job will be completed (or if there is a problem) because the document I am working on is urgent. I
278   submit the print job with the following attributes:
279
280   −   Notification Recipient - me
281   −   Notification Events - all
282   −   Notification Attributes - job-state-reason
283   −   Notification Type - immediate
284
285 2. I am working from home and submit a print job to the same printer as in the previous example.
286   However, since I am not at work, I cannot physically get the print file or do anything with it. It can wait
287   until I get to work this afternoon. However, I'd like my secretary to pick up the output and put it on my
288   desk so it doesn't get lost or miss-filed. I'd also like a ~~queued~~store and forward notification sent to my
289   email so that when I get to work I can tell if there was a problem with the print job. I submit a print job
290   with the following attributes:
291
292   −   Notification Recipient - my secretary
293   −   Notification Events - print complete
294   −   Notification Type - immediate
295
296   −   Notification Recipient - me
297   −   Notification Events - print complete
298   −   Notification Attributes - impressions completed
299   −   Notification Type - ~~queued~~store and forward
300
301 3. I am sitting in my office and submit a print job to a client at an engineering firm we work with on a
302   daily basis. The engineering ~~form~~ firm is in Belgium. I would like my client to know when the print job
303   is complete, so that she can pick it up from the printer in her building. It is important that she review it
304   right away and get her comments back to me. I submit the print job with the following attributes:

305
306   −   Notification Recipient - client at engineering firm
307   −   Notification Events - print complete
308   −   Notification Type - immediate
309   −   Notification Language - French
310
311 4. I am in a hotel room and send a print job to a Kinko's store in the town I am working in, in order to get a
312   printed report for the meeting I am attending in the morning. Since I'm going out to dinner after I get
313   this job submitted, an immediate notification won't do me much good. However, I'd like to check in the
314   morning before I drive to the Kinko's store to see if the file has been printed. An email notification is
315   sufficient for this purpose. I submit the print job with the following attributes:
316
317   −   Notification Recipient - me
318   −   Notification Events - print complete
319   −   Notification Type - ~~email~~store and forward
320
321 5. I am printing a large, complex print file. I want to have some immediate feedback on the progress of the
322   print job as it prints. I submit the print job with the following attributes:
323
324   −   Notification Recipient - me
325   −   Notification Type - immediate
326   −   Notification Events - all state transitions
327   −   Notification Attributes - impression completed
328
329 6. I am an operator and my duties is to keep the printer running. I subscribe independently from a job
330   submission so that my subscription outlasts any particular job. I subscribe with the following attributes:
331
332   −   Notification Recipient - me
333   −   Notification Type - immediate
334   −   Notification Events - all Printer state transitions
335   −   Notification Attributes - Printer state, printer state reasons, device powering up, device powering
336   down.
337
338 7. I am a~~n~~ usage statistics gathering~~accounting or audit~~ application. I subscribe independently from a job
339   submission so that my subscription outlasts any particular job. My subscription may persists across
340   power cycles. I subscribe with the following attributes:
341
342   −   Notification Recipient - me
343   −   Notification Type - immediate
344   −   Notification Events - job completion
345   −   Notification Attributes - impression completed, sheets completed, time submitted, time started, time
346   completed, job owner, job size in octets, etc.
347

348 8. I am a client application program that displays a list of jobs currently queued for printing on a printer. I
349   display the "job-name", "job-state", "job-state-reasons", "page-count", and "intervening-jobs" either for
350   the user's jobs or for all jobs. The window displaying the job list remains open for an independent
351   amount of time, and it is desired that it represent the current state of the queue. It is desired that the
352   application only need to perform a slow poll in order to recover from any missed notifications. So the
353   event delivery mechanism provides the means to update the screen on all needed changes, including
354   querying for some attributes that may not be delivered in the Notification.
355
356 9. I am a client application program that displays a list of printers. For each Printer I display the current
357   state and configuration. The window displaying the printer list remains open for an independent
358   amount of time, and it is desired that it represent the current state of each printer. It is desired that the
359   application only need to perform a slow poll in order to recover from any missed notifications. So the
360   event delivery mechanism provides the means to update the screen on all needed changes, including
361   querying for some attributes that may not be delivered in the Notification.
362
363 10. I am an IPP Server that controls one or more devices and implements an IPP Printer object to represent
364   each device. I want to support IPP Notification for each of the IPP Printer objects that I implement.
365   Many of these devices do not support notification (or IPP). So I need to support the IPP Notification
366   semantics specified for each IPP Printer object myself on behalf of each of the devices that each of the
367   IPP Printer objects represent. When I accept IPP job creation requests, I convert the request to what the
368   device will accept. In some cases, I must poll the devices in order to be informed of their job and
369   device state and state changes in order to be able to send IPP Notifications to subscribed Notification
370   Recipients.
371
372 11. I am an IPP Server that controls one or more devices and implements an IPP Printer object to represent
373   each device. I want to support IPP Notification for each of the IPP Printer objects that I implement.
374   These devices all support IPP, including IPP Notification. I would like the design choice for supporting
375   IPP Notification for these IPP Printer objects that I implement either (1) by forwarding the notification
376   to the IPP Printers that I alone control and have them send the notifications to the intended Notification
377   Recipients without my involvement or (2) replace the notification submitted with the Job to indicate me
378   as the Notification Recipient and I will in turn forward Notifications to the Notification Recipients
379   requested by my clients. Most of the rest of the contents of the IPP Job that I send to the IPP Printers
380   that I control will be the same as the IPP Job that I receive from my IPP clients.
381
382 12. I am an IPP Server that controls one or more devices and implements an IPP Printer object to represent
383   each device. I want to support IPP Notification for each of the IPP Printer objects that I implement.
384   These devices all support IPP, including IPP Notification. Because these IPP Printers MAY also be
385   being controlled by other servers (using IPP or other protocols), I only want job events for the jobs that I
386   send, but do want Printer events all the time, so that I can show proper Printer state to my clients. So I
387   subscribe to these IPP Printers for Printer events with a long standing subscription with myself to as the
388   Notification Recipient. When I get a Job Creation request, I decide to which IPP Printer to send the job.
389   When I do so, I also add a job subscription for Job events with me as the Notification Recipient to the
390   job's job subscriptions supplied by my clients (this usage is called "piggy-backing"). These IPP Printers
391   automatically remove their job subscriptions when the job completes as for all job subscriptions so that
392   I no longer get Job events when my jobs are completed.

393
394   **4   Requirements**
395
396   The following requirements are intended to be met by the IPP Notification specification (not the
397   implementation). The resulting IPP Notification Specification document:
398
399   1.   The Specification must indicate which of these requirements are MANDATORY REQUIRED and
400   which are OPTIONAL for a conforming implementation to support.
401
402   2.   It must be designed to that an IPP Printer can *transparently* possible to support the IPP Notification
403   semantics interface using third party notification services that exist today or that may be standardized in
404   the future.
405
406   3.   must define means for a Job Submitting End User must be able to specify zero or more Notification
407   Recipients when submitting a print job. But don't expect A Submitter to will not be able to circumvent
408   prevent out of band subscriptions from authorized persons, such as Operators.
409
410   4.   must define means when specifying a Notification Recipient, for a Notification Subscriber must to be
411   able to specify one or more notification events for that Notification Recipient, subject to administrative
412   and security policy restrictions. Any of the following constitute Job or Printer Events that a Job
413   Submitting End User can specify notifications be sent for:
414   •   Any standard Printer MIB alert (i.e. device alerts) (critical and warning?) (state change
415   notifications)?
416   •   Job Created Received (transition from Unknown to Pending)
417   •   Job Started (Transition from Pending to Processing)
418   •   Page Complete (Page is stacked)
419   •   Collated Copy Complete (last sheet of collated copy is stacked)
420   •   Job Complete (transition from Processing or Processing-stopped to Completed)
421   •   Job aborted (transition from Pending, Pending-held, Processing, or Processing-stopped to
422   Aborted)
423   •   Job canceled (transition from Pending, Pending-held, Processing, or Processing-held to
424   Canceled)
425   •   Other job state changes like 'paused', purged?
426   •   Device problems on for which the job is destined for
427   •   Job (interpreter) issues
428
429   5.   must define how an End User or Operator subscribes for:
430   •   Any set of Job Events for a specific job.
431   •   Any set of Printer Events while a specific job is not complete.
432
433   6.   must define how an End User or Operator subscribes for the following without having to submit a Job:
434   •   Any set of Printer Events for a defined period.
435   •   Any set of Job Events for all jobs with no control over which jobs.

436 ISSUE - Ok if there isn't a way for an End-User to submit an empty Per-Printer Subscription, in case such a
437 Subscription slot is a scarce commodity, and then enable the Per-Printer Subscription when the data arrives
438 and disable later without deleting the subscription?
439
440 6.7.   must define howWhen specifying a Notification Recipient, the Notification Subscriber must beis able
441   to specify either immediate or queuedstore and forward notification independently for that each
442   Notification Recipient. This The means may be explicit, or implied by the method of delivery chosen
443   by the Job Submitting End User.
444
445 6.When specifying a notification event, a Notification Subscriber must be able to specify that zero or more
446   notification attributes (or attribute categories) be sent along with the notification, when that event
447   occurs.
448
449 7.8.   must define common delivery methods, e.g. email, must be supporteddefined.
450
451 8.9.   must define how an IPP Printer validates its ability to deliver an Event using the specified delivery
452   scheme. If it does not support the specified scheme, or the specified scheme is invalid for some reason,
453   then the IPP Printer accepts and performs the request anyway and responds indicating the unsupported
454   attribute values. There is no requirement for the IPP Printer receiving the print request to validate the
455   identity of an Event Notification Recipient, nor the ability of the system to deliver an event to that
456   recipient as requested (for example, if the Event Notification Recipient is not at work today).
457
458 8.However, an IPP Printer must validate its ability to deliver an event using the specified delivery scheme.
459   If it does not support the specified scheme, or the specified scheme is invalid for some reason, then it
460   should respond to the print request with an error condition.
461
462 9.10. There must be define a class of IPP event notification schemes ordelivery methods which can flow
463   through corporate firewalls. However, an IPP printer need not test to guarantee delivery of the
464   notification through a firewall before accepting a print job.
465
466 10.11. A mechanism must may be provided define means for delivering a notification to the submitting
467   client when the delivery of an event notification to a specified Notification Recipient fails. (Optional?
468   Or not necessary?) Fall back means of subscribers determining if notifications have failed,. i.e. polling,
469   may be provided.?
470
471 11.12. There must be define a mechanism for localizing Human Consumable notifications by the
472   Notification Source.
473
474 12.13. There mustmay define be a way to specify whether or not event delivery requires acknowledgement
475   back to the Event Notification Source.
476 ISSUE - Ok if spec doesn't have means for a Notification Recipient acknowledging receipt of a notification
477 to the Notification Source?
478
479 13.There must be a mechanism to indicate the quality of service for delivery of Event reports. The policy
480   must include stopping the Printer and allowing the Printer to continue, when delivery of the Event

481 ~~report is not acknowledged.   ISSUE: Should that policy be specified by the Notification Subscriber~~
482 ~~(and authorized by the Printer) or by the administrator in configuring the Printer?~~

484 14. There must be a mechanism defined so that job independent subscriptions do not become stale and do
485   not require human intervention to remove stale subscriptions. However, stale must not be the inability
486   to deliver an Event Notification ~~report~~, since temporary ~~event~~ Notification delivery problems must be
487   tolerated.

489 15. A mechanism must be defined so that an Event Subscriber is able to add an Event Subscription to a Job
490   after the Job has been submitted.

492 16. A mechanism must be defined so that a client is able to cancel an Event Subscription on a job or printer
493   after the job has been submitted.

495 17. A mechanism must be defined so that a client can obtain the set of current Subscriptions.

497 **5   Security considerations for IPP Notifications requirements**

499 By far the biggest security concern is the abuse of notification: sending unwanted notifications to third
500 parties (i.e., spam). The problem is made worse by notification addresses that may be redistributed to
501 multiple parties (e.g. mailing lists). There exist scenarios where third party notification is required (see
502 Scenario #2 and #3). The fully secure solution would require active agreement of all recipients before
503 sending out anything. However, requirement #9 ("There is no requirement for IPP Printer receiving the
504 print request to validate the identity of an event recipient") argues against this. Certain systems may decide
505 to disallow third party notifications (a traditional fax model).

507 Clients submitting notification requests to the IPP Printer has the same security issues as submitting an
508 IPP/1.1 print job request. The same mechanisms used by IPP/1.1 can therefore be used by the client
509 notification submission. Operations that require authentication can use the HTTP authentication.
510 Operations that require privacy can use the HTTP/TLS privacy.

512 The notification access control model should be similar to the IPP access control model. Creating a
513 notification subscription is associated with a user. Only the creator or an operator can cancel the
514 subscription. The system may limit the listing of items to only those items owned by the user. Some
515 subscriptions (e.g. those that have a lifetime longer than a job) can be done only by privileged users
516 (operators and/or administrators), if that is the authorization policy.

518 The standard security concerns (delivery to the right user, privacy of content, tamper proof content) apply to
519 the notification delivery. IPP should use the security mechanism of the delivery method used. Some
520 delivery mechanisms are more secure than others. Therefore, sensitive notifications should use the delivery
521 method that has the strongest security.

523 **6   Internationalization Considerations**

The Human Consumable notification must be localized to the natural language and charset that Notification Subscriber specifies within the choice of natural languages and charsets that the IPP Printer supports.

The Machine Consumable notification data uses the 'application/ipp' MIME media type. It contains some attributes whose text values are required to be in the natural language and charset that the Notification Subscriber specifies within the choice of natural languages and charsets that the IPP Printer supports. See [RFC2566].

7   IANA Considerations

There will be some notification delivery methods registered with IANA for use in URLs.

8   References

[ipp-mod]
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