

1 Updates: [get-method]

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The Printer Working Group Standard for Internet Printing Protocol (IPP): Distributed Notification Service and IPPGET Client Behavior

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October 10, 2002

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The Printer Working Group Standard for Internet Printing Protocol (IPP): Distributed Notification Service and IPPGET Client Behavior

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Abstract: This document specifies an OPTIONAL IPP Distributed Notification Service for use with the “Internet Printing Protocol (IPP): Event Notifications and Subscriptions” specification (ipp-ntfy). This IPP Distributed Notification Service enables multiple trusted IPP Printers to off-load IPP Event Notification Delivery to a shared Notification Server for any Event Delivery Method. The Notification Server (instead of the Printer) deals with the burden of delivering Event Notifications. For the IPPGET Delivery Method (get-method), the Notification Server, rather than the IPP Printer, takes over the burden of keeping a large number of long duration connections open for outstanding Get-Notifications operations.

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This document also specifies additional REQUIRED behavior for *any* client supporting the IPPGET Delivery Method.

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Conformance: This extension is REQUIRED for *all* IPP clients that support the IPPGET Event Notification Delivery Method. This extension is OPTIONAL for IPP Printers that support the IPPGET or any other Event Notification Delivery Method.

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This document is available electronically at:

ftp://ftp.pwg.org/pub/pwg/ipp/new_NOT/ipp-dist-not-service.pdf, .doc, .rtf

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110 Contact information:

111 IPP Web Page: <http://www.pwg.org/ipp/>

112 IPP Mailing List: ipp@pwg.org

113 To subscribe to the ipp mailing list, send the following email:

114 1) send it to majordomo@pwg.org

115 2) leave the subject line blank

116 3) put the following two lines in the message body:

117 subscribe ipp

118 end

119 Implementers of this specification are encouraged to join the IPP Mailing List in order to participate in any
120 discussions of clarifications or review of registration proposals for additional names. Requests for additional
121 media names, for inclusion in this specification, should be sent to the IPP Mailing list for consideration.

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156 **1 Introduction**

157 This document specifies an OPTIONAL IPP Distributed Notification Service for use with the “Internet Printing
158 Protocol (IPP): Event Notifications and Subscriptions” specification [ipp-ntfy]. This IPP Distributed Notification
159 Service enables multiple trusted IPP Printers to off-load IPP Event Notification Delivery to a shared Notification
160 Server for any Event Delivery Method. The Notification Server (instead of the Printer) deals with the burden
161 delivering Event Notifications. For the IPPGET Delivery Method [get-method], the Notification Server, rather
162 than the IPP Printer, takes over the burden of keeping a large number of long duration connections open for
163 use with the outstanding Get-Notifications operations that are using Event Wait Mode (see [get-method]).

164 For Push Delivery Methods, the use of a Notification Server by a Printer is transparent to the IPP Client and to
165 the IPP Notification Recipient. However, for the IPPGET Pull Delivery Method, the client implementation MUST
166 be prepared to receive the redirection on a Get-Notifications response and re-issue the Get-Notifications
167 request to the redirected site. Therefore, this document also specifies additional REQUIRED behavior for *any*
168 client supporting the IPPGET Delivery Method in order to be able to interoperate with any Printer that is
169 implemented as part of a Distributed Notification Service.

170 Conformance: This extension is REQUIRED for *all* IPP clients that support the IPPGET Event Notification
171 Delivery Method [get-method]. This extension is OPTIONAL for IPP Printers that support the IPPGET or any
172 other Event Notification Delivery Method.

173 Note: This extension using a Notification Server was envisioned in [ipp-ntfy] in an Informative appendix.

174 **1.1 Scope**

175 This specification defines the following:

- 176 1. The “**printer-notify-server-uri**” Printer Description attribute configured to specify one or more
177 Notification Servers that, in combination with the Printer, provides a Distributed Notification Service.
- 178 2. The ‘**redirection-other-site**’ status code returned in a Get-Notifications operation response.
- 179 3. The “**redirect-uri**” operation attribute returned in a Get-Notifications operation response to indicate the
180 site to which the client is to redirect subsequent Get-Notifications operation requests (see [get-method]).
- 181 4. The **conformance requirements** for: (1) clients that support the IPPGET Delivery Method, (2) Printers
182 that use a Notification Server to delivery Events Notifications with any Delivery Method, (3) Printers that
183 support the IPPGET Delivery Method with redirection to such Notification Servers, and (4) Notification
184 Servers that, in combination with a Printer, provides a Distributed Notification Service.

185 The Informative Appendix in section 15 summarizes IPP extensions for a protocol between a trusted IPP Printer
186 and a Notification Server, called Printer to Notification Server (PNSP) [pnsp]. A Printer that supports PNSP
187 forwards Subscription operations and Events to a Notification Server which delivers the Event Notifications to
188 Notifications Recipients. A Printer and Notification Server that support PNSP meet the conformance
189 requirements for a Distributed Notification Service specified in this document.

190 2 Terminology

191 This section defines the following terms that are used throughout this document.

192 2.1 Conformance Terminology

193 Capitalized terms, such as **MUST**, **MUST NOT**, **REQUIRED**, **SHOULD**, **SHOULD NOT**, **MAY**, **NEED NOT**, and
194 **OPTIONAL**, have special meaning relating to conformance as defined in RFC 2119 [RFC2119] and [RFC2911]
195 section 12.1. If an implementation supports the extension defined in this document, then these terms apply;
196 otherwise, they do not. For example, statements of the form “the Printer **MUST** ...” only apply if the Printer
197 conforms to this document, since this extension is **OPTIONAL** for Printers to support. Statement of the form
198 “the IPP Client **MUST** ...” apply if the client supports the IPPGET Event Delivery Method, since this extension is
199 **REQUIRED** if the client supports the IPPGET Delivery Method.

200 2.2 Other Terminology

201 This document uses the same terminology as [RFC2911], such as “**client**”, “**Printer**”, “**attribute**”, “**attribute**
202 **value**”, “**keyword**”, “**operation**”, “**request**”, “**response**”, “**status code**”, and “**support**” with the same meaning.

203 This document also uses the same terminology as [ipp-ntfy], such as “**Subscription (object)**”, “**Job Creation**
204 **operation**”, “**Notification Recipient**”, “**Event**”, “**Event Notification**”, “**Event Wait Mode**”, “**Pull Delivery**
205 **Method**”, and “**Push Delivery Method**” with the same meanings.

206 This document introduces the following terms:

207 **IPPGET Client** - any client that supports the IPPGET Delivery method, that is, any client that requests **Event**
208 **Notifications** by sending the Get-Notifications operation request (see [get-method]).

209 **Notification Server** - the network entity that delivers IPP **Event Notifications** on behalf of a trusted Printer in
210 which the **Events** occurred.

211 **Distributed Notification Service** - the combination of an IPP Printer and one or more **Notification Servers**
212 that the Printer is configured to use to deliver **Event Notifications**.

213 3 Model and Operation

214 See [ipp-ntfy] section 2 “Models for Notification” and [get-method] section 3 “Model and Operation”. In
215 particular, [ipp-ntfy] section 2.3 “Distributed Model for Notification” and [ipp-ntfy] Section 17 “Appendix B -
216 Distributed Model for Notification” covers the use of a Notification Server.

217 4 Printer Description attributes

218 This section defines Printer Description attributes.

219 4.1 printer-notify-server-uri (1setOf uri)

220 The “printer-notify-server-uri” Printer Description attribute contains one or more URIs of Notification Servers that
221 this Printer is currently configured to use. The Printer **MUST** support this attribute. The Printer **MUST NOT**
222 change these values to indicate the current Notification Server(s) being used even if the Printer is currently
223 unable to contact them. The values of this attribute **MUST** be an ‘ipp’ schemed URL according to [uri-scheme].
224 The values **MUST NOT** be any of the URIs of the Printer itself, that is, **MUST NOT** be any of the values of the
225 Printer’s “printer-uri-supported” Printer Description attribute (see [RFC2911] section 4.4.1).

226 The Printer MUST support this Printer Description attribute with at least one value. Note: According to
227 [RFC2911] section 4.1, if the administrator has not configured the value of this attribute, the Printer returns a
228 'no-value' out-of-band value.

229 **5 Redirect extension to the IPP Get-Notification operation**

230 This section defines the redirection extension to the IPP Get-Notifications operation which the Printer MAY
231 support and the IPPGET client MUST support.

232 **5.1 Get-Notifications operation response - redirect**

233 In any Get-Notifications operation response, the Printer or the Notification Server MAY redirect the client. In
234 order to redirect the IPPGET Client, the Printer or Notification Server MUST return in Group 1 both (1) the
235 'redirection-other-site' status code (see section 6.1) and (2) the "redirect-uri" operation attribute (see section
236 5.2). The Printer or the Notification Server SHOULD return the "notify-get-interval" operation attribute (see [get-
237 method]) with a zero value in the redirect response.

238 A Printer MAY redirect the client in a Get-Notifications operation response to a Notification Server for any
239 implementation defined reason. For example, the number of connections currently in use or the authenticated
240 identify of the client. A Notification Server MAY redirect the client in a Get-Notifications operation response to
241 another Notification Server or back to the original Printer. Note: redirecting back to the original Printer supports
242 a flexible redirection lifetime without imposing any additional burden on the IPPGET Client.

243 **5.2 redirect-uri (uri) operation attribute**

244 The "redirect-uri" operation attribute contains the URI of another target for the Get-Notifications operation. If the
245 Printer returns this operation attribute, the value MUST contain a copy of one of the values of the Printer's
246 "printer-notify-server-uri" Printer Description attribute. If the Notification Server returns this operation attribute,
247 the value MUST be either the URI of another Notification Server or the original Printer.

248 A Printer or Notification Server MAY return this operation attribute in a Get-Notifications response or in a new
249 operation suitably defined in the future. A Printer or Notification Server MUST NOT return this operation
250 attribute in any other operation response that has been previously defined unless a new IPP specification has
251 been published with the minor version number of the protocol incremented (see [RFC2911] section 3.1.8).
252 Otherwise, existing clients would be adversely affected and would not operate as expected by the Printer.

253 Note: Currently, the "redirect-uri" operation attribute is only defined for use in a Get-Notifications operation
254 response.

255 **5.3 Client behavior on receiving a Get-Notifications operation response redirect**

256 An IPPGET Client that receives the 'redirection-other-site' status code in a Get-Notifications operation
257 response:

- 258 (1) MUST disconnect from the Printer or Notification Server; and
- 259 (2) MUST use the value of the "redirect-uri" operation attribute returned in the response as the Target in the
260 next and subsequent Get-Notifications request for this Subscription, until redirected otherwise.

261 Note: According to [RFC2910], the Printer disconnects, in case the client does not disconnect.

262 **6 Status Codes**

263 The section defines status codes as IPP extensions.

264 **6.1 redirection-other-site (0x0300)**

265 This status code means that the Printer or Notification Server supports this operation by redirection to another
266 site indicated in an operation attribute defined for this operation response. The Printer returns this status code
267 to indicate that the client is to retry the operation at the site indicated in the operation attribute returned in the
268 same response.

269 A Printer or Notification Server MAY return this status code in a Get-Notifications response or in a new
270 operation suitably defined in the future. A Printer or Notification Server MUST NOT return this status code in
271 any other operation response that has been previously defined unless a new IPP specification has been
272 published with the minor version number of the protocol incremented (see [RFC2911] section 3.1.8).
273 Otherwise, existing clients would be adversely affected and would not operate as expected by the Printer.

274 Note: Currently, the 'redirection-other-site' status code is only defined for use in a Get-Notifications operation
275 response.

276 **7 Conformance Requirements**

277 This section specifies the conformance requirements for Printers, IPP Clients, and Notification Servers.

278 **7.1 Printer conformance requirements**

279 In order to conform to this specification, a Printer:

- 280 1. MUST meet the conformance requirements for Printers specified in [RFC2911], [ipp-ntfy], and [get-
281 method] including support of all of the Subscription operations REQUIRED for Printers.
- 282 2. MUST support the "printer-notify-server-uri" (1setOf uri) Printer Description attribute as defined in
283 Section 4.1.
- 284 3. MUST support Get-Notifications operation responses as defined in section 5.1.

285 **7.2 Client conformance requirements**

286 In order to conform to this specification, an IPP Client:

- 287 1. MUST meet the conformance requirements for clients specified in [RFC2911], [ipp-ntfy], and [get-
288 method].
- 289 2. MUST act on receiving the 'redirection-other-site' status code as defined in section 5.3.

290 **7.3 Notification Server conformance requirements**

291 In order to conform to this specification, a Notification Server in combination with a Printer that forms a
292 Distributed Notification Service:

- 293 1. SHOULD support multiple trusted Printers concurrently.
- 294 2. MUST authenticate each Printer as a trusted Printer

- 295 3. MUST accept the trusted Printer's identification of the original requesting user in any forwarded
296 operation.
- 297 4. MUST support means for each trusted Printer to create corresponding Job and Printer Subscription
298 objects on the Notification Server with the same Subscriptions Ids as each Printer uses for its own
299 corresponding Job and Printer Subscription objects.
- 300 5. MUST support means for the trusted Printer to renew and cancel its corresponding Subscription objects
301 on the Notification Server.
- 302 6. MAY support additional Subscription object operations from clients that are not a trusted Printer,
303 provided that the Notification server sends corresponding operations to the trusted Printer that keep the
304 Printer's parallel Subscription objects in synchronization with those kept by the Notification Server.

305 Note: This specification does not define a protocol between the Printer and the Notification Server. However,
306 see Section 15 "Appendix A: Summary of the Printer to Notification Server Protocol (PNSP) (Informative)" for a
307 summary of such a protocol and [pnsp] for a specification of such a protocol.

308 8 Normative References

- 309 [get-method]
310 Herriot, R., Hastings, T., and H. Lewis, "Internet Printing Protocol (IPP): The 'ippget' Delivery Method
311 for Event Notifications", <draft-ietf-ipp-notify-get-08.txt>, September 10, 2002.
- 312 [ipp-ntfy]
313 Herriot, R., and T. Hastings, "Internet Printing Protocol/1.1: Event Notifications and Subscriptions",
314 <draft-ietf-ipp-not-spec-10.txt>, September 10, 2002.
- 315 [RFC2119]
316 S. Bradner, "Key words for use in RFCs to Indicate Requirement Levels", RFC 2119 , March 1997
- 317 [RFC2910]
318 Herriot, R., Butler, S., Moore, P., Tuner, R., "Internet Printing Protocol/1.1: Encoding and Transport",
319 RFC 2910, September 2000.
- 320 [RFC2911]
321 Hastings, T., Herriot, R., deBry, R., Isaacson, S., and P. Powell, "Internet Printing Protocol/1.1: Model
322 and Semantics", RFC 2911, September 2000.
- 323 [uri-scheme]
324 Herriot, R., and I. McDonald, "IPP URL Scheme", <draft-ietf-ipp-url-scheme-05.txt>, work in progress,
325 May 20, 2002.

326 9 Informative References

- 327 [indp-method]
328 Parra, H., and T. Hastings, "Internet Printing Protocol (IPP): The 'indp' Delivery Method for Event
329 Notifications and Protocol/1.0", <draft-ietf-ipp-indp-method-06.txt>, work in progress, July 17, 2001.

- 330 [notify-req]
331 Hastings, T., deBry, R., and H. Lewis, "Internet Printing Protocol (IPP): Requirements for IPP
332 Notifications", <draft-ietf-ipp-not-06.txt>, work in progress, July 17, 2001.
- 333 [pnsp]
334 McDonald, I., and T. Hastings, "Internet Printing Protocol (IPP): Printer to Notification Server Protocol
335 (PNSP)", <draft-mcdonald-ipp-dist-not-00.txt>, work in progress, September 13, 2002.
- 336 [RFC2565]
337 Herriot, R., Butler, S., Moore, P., and R. Turner, "Internet Printing Protocol/1.0: Encoding and
338 Transport", RFC 2565, April 1999.
- 339 [RFC2566]
340 R. deBry, T. Hastings, R. Herriot, S. Isaacson, and P. Powell, "Internet Printing Protocol/1.0: Model
341 and Semantics", RFC 2566, April 1999.
- 342 [RFC2567]
343 Wright, D., "Design Goals for an Internet Printing Protocol", RFC 2567, April 1999.
- 344 [RFC2568]
345 Zilles, S., "Rationale for the Structure and Model and Protocol for the Internet Printing Protocol", RFC
346 2568, April 1999.
- 347 [RFC2569]
348 Herriot, R., Hastings, T., Jacobs, N., Martin, J., "Mapping between LPD and IPP Protocols", RFC 2569,
349 April 1999.
- 350 [RFC2616]
351 R. Fielding, J. Gettys, J. Mogul, H. Frystyk, L. Masinter, P. Leach, T. Berners-Lee, "Hypertext
352 Transfer Protocol - HTTP/1.1", RFC 2616, June 1999.
- 353 [RFC3196]
354 Hastings, T., Manros, C., Zehler, P., Kugler, C., and H. Holst, "Internet Printing Protocol/1.1:
355 Implementer's Guide", RFC 3196, November 2001.

356 **10 IANA Considerations**

357 This section contains the exact information for IANA to add to the IPP Registry according to the procedures
358 defined in RFC 2911 [RFC2911] section 6. The resulting registrations will be published in the
359 <http://www.iana.org/assignments/ipp-registrations> registry.

360 **10.1 Attribute Registrations**

361 The following table lists the attributes defined in this document. These attributes are to be registered according
362 to the procedures in RFC 2911 [RFC2911] section 6.2.

363 Printer Description attributes:	Reference	Section:
364 printer-notify-server-uri (1setOf uri)	IEEE-ISTO 5101.6	4.1
365		
366 Operation attributes:	Reference	Section:
367 redirect-uri (uri)	IEEE-ISTO 5101.6	5.2
368		

369 10.2 Status code Registrations

370 The following table lists the status code defined in this document. This status code is to be registered
371 according to the procedures in RFC 2911 [RFC2911] section 6.6.

372	Status codes:	Reference	Section:
373	redirection-other-site (0x0300)	IEEE-ISTO 5101.6	6.1
374			

375 11 Internationalization Considerations

376 The internationalization considerations for Printers and clients are the same as those described in [get-method]
377 section 16.

378 12 Security Considerations

379 The security considerations for Printers and clients are the same as those described in [get-method] section 17.
380 In addition, the extension described in this document requires that the Printer be a trusted network entity of the
381 Notification Server, since the Printer has to convey the ownership of Subscription objects that it creates to the
382 Notification Server in such a way that the Notification Server can perform the same access control as the
383 Printer would have performed. In addition, the Printer has to forward additional information and Subscription
384 operations to the Notification Server (see section 15).

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413 **15 Appendix A: Summary of the Printer to Notification Server Protocol (PNSP)** 414 **(Informative)**

415 This appendix summarizes the extensions to the IPP protocol necessary for the Printer to Notification Server
416 Protocol (PNSP). PNSP allows a trusted Printer to interoperate with a Notification Server to provide the
417 Distributed Notification Service specified in this document. See [pns] for a complete specification of PNSP.
418 Using the PNSP protocol:

- 419 1. The Printer (acting in the role of a operator) registers once at its startup time with the Notification Server
420 as a trusted Printer using a new register operation.
- 421 2. The Printer supports all of the Subscription object operations as specified in [ipp-ntfy].
- 422 3. The Printer implements the following Subscription object operations locally: Get-Subscription-Attributes
423 and Get-Subscriptions according to [ipp-ntfy].
- 424 4. The Printer accepts and forwards to the Notification Server the following Subscription object operation
425 requests: Create-Job-Subscription, Create-Printer-Subscription, Renew-Subscription, and Cancel-
426 Subscription.
- 427 5. The Printer accepts Job Creation operation requests and submits corresponding Create-Job-
428 Subscription operations to the Notification Server for any Subscriptions supplied by the client in the Job
429 Creation request. Note: [ipp-ntfy] defines Job Creation operations as: Print-Job, Print-URI, and Create-
430 Job.
- 431 6. When forwarding the Subscription operations, the Printer copies the following Subscription Description
432 attributes from its Subscription object and passes them in the Subscription Attributes group (along with
433 the original Subscription Template attributes supplied by the client). The Notification Server accepts the
434 values of these Subscription Description attributes since the Printer is a trusted Printer:
 - 435 a. Create-Job-Subscription: "notify-printer-uri", "notify-job-id", and "notify-subscriber-user-name".
 - 436 b. Create-Printer-Subscription: "notify-printer-uri", and "notify-subscriber-user-name".
 - 437 c. Renew-Subscription: "notify-subscriber-user-name"
 - 438 d. Cancel-Subscription: "notify-subscriber-user-name"
- 439 7. When an Event occurs, the Printer forwards the Event to the Notification Server, using another new
440 operation. See the Send-Notifications operation defined for the INDP Delivery Method [indp-method].
441 The Notification Server scans its Subscription objects and delivers the Events appropriate for the
442 Delivery Method indicated in each Subscription object, including responding to Get-Notifications
443 requests for the IPPGET Event Delivery Method [get-method].

444 8. The Printer can omit sending events to the Notification Server when they occur if the Printer knows that
445 none of its outstanding Subscription objects are subscribed to that event. Since the Printer must
446 maintain each Subscription object in order to support all Subscription operations (except Get-
447 Notifications), keeping the union of the events of interest isn't too difficult for the Printer. Such a filter
448 would be more important for a high end Printer that generates Events at a high rate, such as page
449 completion events.

450 **16 Appendix B: Description of Base IPP documents (Informative)**

451 The base set of IPP documents includes:

452 Design Goals for an Internet Printing Protocol [RFC2567]
453 Rationale for the Structure and Model and Protocol for the Internet Printing Protocol [RFC2568]
454 Internet Printing Protocol/1.1: Model and Semantics [RFC2911]
455 Internet Printing Protocol/1.1: Encoding and Transport [RFC2910]
456 Internet Printing Protocol/1.1: Implementer's Guide [RFC3196]
457 Mapping between LPD and IPP Protocols [RFC2569]

458
459 The "Design Goals for an Internet Printing Protocol" document takes a broad look at distributed printing
460 functionality, and it enumerates real-life scenarios that help to clarify the features that need to be included in a
461 printing protocol for the Internet. It identifies requirements for three types of users: end users, operators, and
462 administrators. It calls out a subset of end user requirements that are satisfied in IPP/1.0. A few OPTIONAL
463 operator operations have been added to IPP/1.1.

464 The "Rationale for the Structure and Model and Protocol for the Internet Printing Protocol" document describes
465 IPP from a high level view, defines a roadmap for the various documents that form the suite of IPP specification
466 documents, and gives background and rationale for the IETF working group's major decisions.

467 The "Internet Printing Protocol/1.1: Model and Semantics" document describes a simplified model with abstract
468 objects, their attributes, and their operations that are independent of encoding and transport. It introduces a
469 Printer and a Job object. The Job object optionally supports multiple documents per Job. It also addresses
470 security, internationalization, and directory issues.

471 The "Internet Printing Protocol/1.1: Encoding and Transport" document is a formal mapping of the abstract
472 operations and attributes defined in the model document onto HTTP/1.1 [RFC2616]. It defines the encoding
473 rules for a new Internet MIME media type called "application/ipp". This document also defines the rules for
474 transporting over HTTP a message body whose Content-Type is "application/ipp". This document defines the
475 'ipp' scheme for identifying IPP printers and jobs.

476 The "Internet Printing Protocol/1.1: Implementer's Guide" document gives insight and advice to implementers of
477 IPP clients and IPP objects. It is intended to help them understand IPP/1.1 and some of the considerations that
478 may assist them in the design of their client and/or IPP object implementations. For example, a typical order of
479 processing requests is given, including error checking. Motivation for some of the specification decisions is
480 also included.

481 The "Mapping between LPD and IPP Protocols" document gives some advice to implementers of gateways
482 between IPP and LPD (Line Printer Daemon) implementations

483 **17 Appendix C: Change Log (to be removed when this document is published)**

484 The following changes have been made (in reverse chronological order):

485 **17.1 Changes from [get-method] to make version 0.1**

- 486 1. Invented the title: "The Printer Working Group Standard for Internet Printing Protocol (IPP): Distributed
487 Notification Service and IPPGET Client Behavior"
- 488 2. Removed this redirection functionality from the IETF IPPGET [get-method] specification and put it in this
489 document.
- 490 3. Section 2.2: Defined "IPPGET Client", "Notification Server", and "Distributed Notification Service" terms.
- 491 4. Clarified that this specification is the Interface between an IPP Client and a Distributed Notification
492 Service, in case the IPP Printer exercises the option of using a Notification Server to deliver Event
493 Notifications.
- 494 5. Section 5.3: Maintained the client requirement to support the redirection for *any* client that supports the
495 IPPGET Event Delivery Method (see [get-method]). In other words, *any* client that supports the Get-
496 Notifications operation is required to support the redirection in case the Printer exercises this option.
- 497 6. Clarified that this Notification Server may deliver Event Notifications for any Push Delivery Method and
498 for the IPPGET Pull Delivery Method.
- 499 7. Section 4.1: Added the "printer-notify-server-uri" (1setOf uri) Printer Description attribute so that the
500 Printer could be configured for none ('no-value' out-of-band value), one, or more than one Notification
501 Server.
- 502 8. Sections 5.2 and 6.1: Clarified that the "redirect-uri" (uri) operation attribute and the 'redirection-other-
503 site' status code are for use with the Get-Notifications operation response only, but could be used by
504 operations defined in the future or existing operations if the IPP protocol minor version number
505 incremented.
- 506 9. Section 5.1: Clarified that the Printer MAY return the "redirect-uri" (uri) operation attribute depending on
507 any implementation-defined reasons which could be dynamically varying. Gave examples, such as on
508 the number of open channels and the authorization of the user.
- 509 10. Section 7.3: Added conformance requirements for a Notification Server, acting in combination with a
510 Printer, to provide a Distributed Notification Service.
- 511 11. Section 15: Added the Informative Appendix that describes PNSP.