

1 INTERNET-DRAFT **There are 4 issues highlighted like this.**
2 <draft-ietf-ipp-indp-method-01.txt>

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8 Internet Printing Protocol (IPP):

9 **The ~~INDP~~'indp' Notification Delivery Method**

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21 **Abstract**

22 The IPP Event Notification specification [ipp-ntfy] is an OPTIONAL extension to IPP/1.0, IPP/1.1, and
23 future versions. [ipp-ntfy] requires the definition of one or more ~~d~~Delivery ~~m~~Methods in separate Delivery
24 Method Documents for the Printer to dispatching Event Notifications to Notification Recipients. This
25 Delivery Method dDocument ~~describes~~ defines the semantics and syntax of the ~~INDP~~'indp' Notification
26 Delivery Method ~~that is itself a request/response protocol~~. For this ~~d~~Delivery ~~m~~Method, an IPP Printer
27 sends (pushes) an IPP eEvent Notifications request to the Notification Recipients using the Send-
28 Notifications operation defined in this document. The Notification Recipient returns a response to the
29 Printer. The Send-Notifications operation uses the same Encoding and Transport as IPP itself. IPP
30 Notification Delivery Protocol (INDP) defined in [indp]. The Notification Recipient can either be the
31 Ultimate Recipient of the Notification or can be a Notification Service that forwards the Notification to the
32 Ultimate Recipient.

33 The full set of IPP documents includes:

- 34 Design Goals for an Internet Printing Protocol [RFC2567]
- 35 Rationale for the Structure and Model and Protocol for the Internet Printing Protocol [RFC2568]
- 36 Internet Printing Protocol/1.1: Model and Semantics [ipp-mod]
- 37 Internet Printing Protocol/1.1: Encoding and Transport [ipp-pro]
- 38 Internet Printing Protocol/1.1: Implementer's Guide [ipp-iig]
- 39 Mapping between LPD and IPP Protocols [RFC2569]
- 40 [Internet Printing Protocol \(IPP\): IPP Event Notification Specification \[ipp-ntfy\]](#)

41

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

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

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

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

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

63 [The "Internet Printing Protocol \(IPP\): IPP Event Notification Specification" document defines the](#)
64 [semantics for Subscription Creation Operations and the requirements for other Delivery Method documents](#)
65 [to define a Delivery Method to carry an Event Notifications to a Notification Recipient.](#)

66

67

Table of Contents

68	1	Introduction	5
69	2	Terminology	5
70	3	Model and Operation	6
71	4	Summary of the 'indp' Delivery Method.....	7
72	5	Subscription object attributes	8
73	5.1	SUBSCRIPTION TEMPLATE ATTRIBUTE CONFORMANCE.....	9
74	5.2	SUBSCRIPTION DESCRIPTION ATTRIBUTE CONFORMANCE.....	9
75	6	Printer Description Attribute Conformance	9
76	7	New Values for Existing Printer Description Attributes	9
77	7.1	NOTIFY-SCHEMES-SUPPORTED (1SETOF URIScheme).....	9
78	7.2	OPERATIONS-SUPPORTED (1SETOF TYPE2 ENUM).....	9
79		0x001D	9
80	8	Attributes Only in Event Notifications	10
81	9	Operations for Notification.....	10
82	9.1	SEND-NOTIFICATIONS OPERATION.....	10
83	9.1.1	<i>Send-Notifications Request</i>	11
84	9.1.2	<i>Send-Notifications Response</i>	14
85	9.2	NOTIFICATION PROTOCOL URI SCHEME	16
86	10	Status Codes	16
87	10.1	ADDITIONAL STATUS CODES	16
88	10.1.1	<i>successful-ok-ignored-notifications (0x0004)</i>	16
89	10.2	STATUS CODES RETURNED IN EVENT NOTIFICATION ATTRIBUTES GROUPS.....	17
90	10.2.1	<i>client-error-not-found (0x0406)</i>	17
91	10.2.2	<i>successful-ok-but-cancel-subscription (0x0006)</i>	17
92	11	Encoding and Transport.....	17
93	11.1	ENCODING OF THE OPERATION LAYER	17
94	11.2	ENCODING OF TRANSPORT LAYER.....	18
95	12	IANA Considerations	18
96	13	Internationalization Considerations.....	18
97	14	Security Considerations.....	18

98 14.1 SECURITY CONFORMANCE.....18

99 15 References 19

100 16 Author's Addresses 19

101 17 Full Copyright Statement.....20

102

103

Tables

104 Table 1 - Summary of the 'indp' Delivery Method..... 7

105 Table 2 – Operation-id assignments..... 9

106 Table 3 – Attributes in Event Notification Content 12

107 Table 4 – Additional Attributes in Event Notification Content for Job Events..... 13

108 Table 5 – Combinations of Events and Subscribed Events for “job-impressions-completed” 13

109 Table 6 – Additional Attributes in Event Notification Content for Printer Events..... 13

110

111 1 Introduction

112 The notification extension document [ipp-ntfy] defines operations that a client can perform in order to
113 create *Subscription Objects* in a Printer and carry out other operations on them. A Subscription Object
114 represents a Subscription abstraction. The Subscription Object specifies that when one of the specified
115 Events occurs, the Printer sends an asynchronous *Event Notification* to the specified *Notification Recipient*
116 via the specified *Delivery Method* (i.e., protocol).

117 The notification extension document [ipp-ntfy] specifies that each *Delivery Method* is defined in another
118 document. This document is one such document, and it specifies the 'indp' *Delivery Method*.

119 For the 'indp' *Delivery Method*, an IPP Printer sends (pushes) a *Send-Notifications* operation request
120 containing one or more *Event Notifications* to a *Notification Recipient*. The *Notification Recipient* returns
121 a response to the Printer. The *Send-Notifications* operation uses the same *Encoding and Transport as IPP*
122 itself.

123 ~~An IPP Printer that supports the OPTIONAL IPP Event Notification extension [ipp-ntfy] is called a~~
124 ~~Notification Source which sends Event Notifications to Notification Recipients. As such, a Printer either a)~~
125 ~~accepts, stores, and uses notification Subscription objects to generate Event Notification and implements~~
126 ~~one or more delivery methods for notifying interested parties, or b) supports a subset of these tasks and~~
127 ~~farms out the remaining tasks to a Notification Delivery Service. The INDP Notification Delivery Method~~
128 ~~specified in this document employs a request/response protocol, which is a subset of the IPP Notification~~
129 ~~Delivery Protocol (INDP), defined in [indp]. A Notification Source may implement the INDP Notification~~
130 ~~Delivery Method to send (push) Event Notifications to Notification Recipients using the INDP Send-~~
131 ~~Notifications operation (see section 4.1) over HTTP.~~

132 2 Terminology

133 This document uses terms such as "attributes", "keywords", and "support". These terms have special
134 meaning and are defined in the model terminology [ipp-mod] section 12.2.

135 Capitalized terms, such as MUST, MUST NOT, REQUIRED, SHOULD, SHOULD NOT, MAY, NEED
136 NOT, and OPTIONAL, have special meaning relating to conformance. These terms are defined in [ipp-
137 mod] section 12.1 on conformance terminology, most of which is taken from RFC 2119 [RFC2119].

138 This document uses the capitalized terms, such as *Notification Recipient*, *Event Notification*, *Printer*, etc.,
139 that are defined in [ipp-ntfy] with the same meanings and are not reproduced here.

140 This section defines the following additional terms that are used throughout this document:

141 **Event Notification Attributes Group** – The attributes group in a request that contains *Event*
142 *Notification Attributes* in a request or response.

143 ~~REQUIRED: if an implementation supports the extensions described in this document, it MUST~~
144 ~~support a REQUIRED feature.~~
145 ~~OPTIONAL: if an implementation supports the extensions described in this document, it MAY support~~
146 ~~an OPTIONAL feature.~~
147 ~~Event Notification (Notification for short) — See [ip-ntfy]~~
148 ~~Notification Source — See [ipp-ntfy]~~
149 ~~Notification Recipient — See [ipp-ntfy]~~
150 ~~Subscription object — See [ipp-ntfy]~~
151 ~~Ultimate Notification Recipient — See [ipp-ntfy]~~

152 3 Model and Operation

153 ~~See [ipp-ntfy] for the description of the Event Notification Model and Operation. This Delivery Method~~
154 ~~takes advantage of combining several Event Notifications into a single Compound Event Notification that~~
155 ~~is delivery by a single Send-Notification operation to a single Notification Recipient. In the IPP~~
156 ~~Notification Model [ipp-ntfy], a client is able to:~~

- 157 ~~1. supply one or more Per Job Subscriptions in the Job Creation operation~~
- 158 ~~2. OPTIONALLY supply Per Job Subscriptions as subsequent Create Job Subscription operations~~
- 159 ~~3. Supply one Per Printer Subscription in the Create Printer Subscription operation.~~

160 ~~The client that creates these Subscription objects becomes the owner of the Subscription object.~~

161 When creating each Subscription object, the client supplies the "notify-recipient" (uri) Subscription
162 Template attribute. The "notify-recipient" attribute specifies both a single Notification Recipient that is to
163 receive the Notifications when subsequent events occur and the method for notification delivery that the
164 IPP Printer is to use. For the Notification Delivery Method defined in this document, the notification
165 method is 'indp' and the rest of the URI is the address of the Notification Recipient to which the IPP Printer
166 will send the INDP Send-Notifications operation.

167 The INDP 'indp' Notification Delivery Method defined in this document ~~also~~ uses a client/server protocol
168 paradigm. The "client" in this HTTP relationship is the Notification SourcePrinter described in [ipp-ntfy]
169 while the "server" is the Notification Recipient. The Notification SourcePrinter invokes the Send-
170 Notifications operation ~~supported in INDP~~ to communicate IPP Event Notification contents to the
171 Notification Recipient. The Notification Recipient only conveys information to the Notification
172 SourcePrinter in the form of responses to the operations initiated by the Notification SourcePrinter.

173 Notification SourcePrinters that implement the INDP 'indp' Notification Delivery Method will need to
174 include an INDP client stack (and hence an HTTP client stack) while Notification Recipients that
175 implement this Delivery Method will need to support an INDP server stack (and hence an HTTP server
176 stack). See section 11.2 for more details.

177 **4 Summary of the 'indp' Delivery Method**

178 Column 1 of Table 1 lists the conformance requirements for Delivery Method Documents as specified in
 179 [ipp-ntfy]. Column 2 indicates how this Delivery Method Document meets each requirement:

180 **Table 1 - Summary of the 'indp' Delivery Method**

<u>Document Method conformance requirement</u>	<u>'indp' realization</u>
1. <u>MUST define a URL scheme name for the Delivery Method.</u>	<u>indp</u>
2. <u>MUST indicate whether the delivery method is REQUIRED or OPTIONAL for an IPP Printer to support if it supports Event Notification.</u>	<u>OPTIONAL</u>
3. <u>MUST define the transport and delivery protocol for the Event Notification content that a Printer MUST use, i.e., the entire network stack.</u>	<u>a complete HTTP stack [rfc2616]</u>
4. <u>MUST indicate whether or not several Event Notifications can be combined into a compound Event Notification.</u>	<u>yes, see section 9.1.1</u>
5. <u>MUST describe how the Delivery Method is initiated, i.e., is it initiated by the receiving user (pull), or is it initiated by the Printer (push).</u>	<u>initiated by the Printer (push)</u>
6. <u>MUST indicate whether the Delivery Method is Machine Consumable or Human Consumable.</u>	<u>Machine Consumable with the "notify-text" attribute being Human Consumable</u>
7. <u>MUST define the representation and encoding that a Printer MUST use for each value or piece of information listed in [ipp-ntfy] section 9 (9.1 for Machine Consumable Event Notification and/or section 9.2 for Human Consumable Event Notification).</u>	<u>The representation and encoding is the same as IPP. See section 9.1.1</u>
8. <u>MUST specify for each attribute in [ipp-ntfy] section 9 whether a Printer MUST, SHOULD, MAY, MUST NOT, SHOULD</u>	<u>See the Send-Notifications Request defined in section 9.1.1</u>

<u>Document Method conformance requirement</u>	<u>'indp' realization</u>
<u>NOT or NEED NOT send the attribute in an Event Notification content.</u>	
9. <u>MUST define what frequently occurring Events MUST be moderated, if any, and whether the moderation mechanism is configurable. Also whether Events are moderated by sending one per time unit or one per number of Events.</u>	<u>Frequently occurring Events NEED NOT be moderated because the Delivery Method is an efficient one and because the Printer can group multiple Event Notifications for the same Notification Recipient into a single Send-Notifications operations.</u>
10. <u>MUST discuss the latency and reliability of the transport and delivery protocol.</u>	<u>Same as for IPP/1.0 or IPP/1.1 itself (see [ipp-mod]).</u>
11. <u>MUST discuss the security aspects of the transport and delivery protocol, e.g., how it is handled in firewalls.</u>	<u>See section 14</u>
12. <u>MUST identify content length restrictions, if any.</u>	<u>They are the same as for IPP/1.0 and IPP/1.1 itself (see [ipp-mod]).</u>
13. <u>MAY define additional values or pieces of information that a Printer MUST, SHOULD or MAY send in a Notification content.</u>	<u>A new Event Notifications attribute group (see section 11.1) and additional status codes for use in the response (see section 10)</u>
14. <u>MAY define additional Subscription Template and/or Subscription Description attributes and the conformance requirements thereof.</u>	<u>none defined</u>
15. <u>MAY define additional Printer Description attributes and the conformance requirements thereof.</u>	<u>none defined</u>

181 The remaining sections of this document parallel the sections of [ipp-ntfy].

182 **5 Subscription object attributes**

183 This section defines the Subscription object conformance requirements for Printers.

184 **5.1 Subscription Template Attribute Conformance**

185 The 'indp' Delivery Method has the same conformance requirements for Subscription Template attributes as
186 defined in [ipp-ntfy]. The 'indp' Delivery Method does not define any addition Subscription Template
187 attributes.

188 **5.2 Subscription Description Attribute Conformance**

189 The 'indp' Delivery Method has the same conformance requirements for Subscription Description attributes
190 as defined in [ipp-ntfy]. The 'indp' Delivery Method does not define any addition Subscription Description
191 attributes.

192 **6 Printer Description Attribute Conformance**

193 The 'indp' Delivery Method has the same conformance requirements for Printer Description attributes as
194 defined in [ipp-ntfy]. The 'indp' Delivery Method does not define any addition Printer Description
195 attributes.

196 **7 New Values for Existing Printer Description Attributes**

197 This section defines additional values for existing Printer Description attributes.

198 **7.1 notify-schemes-supported (1setOf uriScheme)**

199 The following “notify-schemes-supported” value is added in order to support the new Delivery Method
200 defined in this document:

201 'indp': - The IPP Notification Delivery Method defined in this document.

202 **7.2 operations-supported (1setOf type2 enum)**

203 Table 2 lists the “operation-id” value added in order to support the new operation defined in this document.
204 The operation-id is assigned in the same name space as other operations that a Printer supports. However, a
205 Printer MUST NOT include this value in its "operations-supported" attribute unless it can accept the Send-
206 Notifications request.

207 **Table 2 – Operation-id assignments**

<u>Value</u>	<u>Operation Name</u>
<u>0x001D</u>	<u>Send-Notifications</u>

208

209 **8 Attributes Only in Event Notifications**

210 No additional attributes are defined only for use in Event Notifications besides those defined in [ipp-ntfy].

211 **9 Operations for Notification**

212 This section defines the operation for Event Notification using the 'indp' Delivery Method.

213 There is only one operation defined: Send-Notifications. Section 7.2 assigns of the “operation-id” for the
214 Send-Notifications operation and the following section defined the operation.

215 **9.1 Send-Notifications operation**

216 This REQUIRED operation allows a Notification SourcePrinter to send one or more Event Notifications to
217 a Notification Recipient using HTTP.

218 The Notification SourcePrinter composes the information defined for an IPP Notification [ipp-ntfy] and
219 sends it using the Sent-Notifications operation to the Notification Recipient supplied in the Subscription
220 object.

221 ~~INDP makes extensive use of~~ The Send-Notifications operations uses the operations model defined by IPP
222 [rfc2566]. This includes, the use of a URI as the identifier for the target of each operation, the inclusion of
223 a version number, operation-id, and request-id in each request, and the definition of attribute groups. The
224 Send-Notifications operation uses the Operation Attributes group, but currently has no need for the
225 Unsupported Attributes, Printer Object Attributes, and Job-Object Attributes groups. However, it uses a
226 new attribute group, the Event Notification Attributes group ~~(see [indp]).~~

227 **5.1 Send-Notifications Operation**

228 ~~This REQUIRED operation allows a Notification Source to send one or more Notifications to a Notification~~
229 ~~Recipient using HTTP. The operation has been tailored to accommodate the current definition of IPP~~
230 ~~Notification [ipp-ntfy].~~

231 ~~Both Machine Consumable and Human Consumable notifications may be sent to a Notification Recipient~~
232 ~~through this operation.~~

233 The Notification Recipient MUST accept the request in any state. There is no state defined for the
234 Notification Recipient for this Delivery Method.

235 Access Rights: To send Event Notifications to a Notification Recipient, the authenticated user (see [IPP-
236 MOD] section 8.3) performing this operation MUST be the Printer that accepted a previous Subscription
237 Creation operation (see [ipp-ntfy]). Otherwise the Notification Recipient MUST reject the operation and
238 return: the ‘client-error-forbidden’, ‘client-error-not-authenticated’, or ‘client-error-not-authorized’ status
239 code as appropriate.

240 **ISSUE 01: Is this what the Access Rights section should say for a Send-Notifications request?**

241 **5.1.19.1.1 Send-Notifications Request**

242 Every operation request **MUST** contains the following ~~REQUIRED~~ parameters (see [ipp-mod] section
243 3.1.1):

- 244 - a "version-number" **ISSUE 02: What version number goes here?**
- 245 - an "operation-id" - the value defined in Table 2
- 246 - a "request-id" - the contents of the Subscription object's "notify-sequence-number" after
247 incrementing for the first try (see [ipp-ntfy]).

248 The following groups of attributes ~~are~~ **MUST be** part of the Send-Notifications Request:

249 Group 1: Operation Attributes

250 Natural Language and Character Set:

251 The "attributes-charset" and "attributes-natural-language" attributes ~~ads~~ defined in [~~rfe~~
252 ~~2566~~ipp-mod] section 3.1.4.1.

253

254 Target:

255 A copy of the Subscription object's ~~The~~ "notification-recipient-uri" (uri) ~~operation~~ attribute
256 which is the target of this operation as described in [ipp-mod] section 3.1.5, i.e., the URI of
257 the 'indp' Notification Recipient (see section 9.2).

258

259 **Requesting User Name:**

260 Unlike the other IPP operations, the "requesting-user-name" attribute SHOULD NOT be supplied
261 by the client as described in [ipp-mod] section 8.3.

262 **ISSUE 03: Ok that "requesting-user-name" SHOULD NOT be send in Send-Notifications?**

263 Group 2 to N: **Event** Notification Attributes

264 In each group 2 to N, each attribute is encoded using the IPP rules for encoding attributes [ipp-pro]
265 and may be encoded in any order. Note: the Get-Jobs response in [ipp-mod] acts as a model for
266 encoding multiple groups of attributes.

267

268 Each Event Notification Group MUST contain all of attributes specified in [ipp-ntfy] section 9.1
269 ("Content of Machine Consumable Event Notifications") with exceptions denoted by asterisks in
270 the tables below.

271

272 The tables below are copies of the tables in [ipp-ntfy] section 9.1 ("Content of Machine Consumable
273 Event Notifications") except that each cell in the "Sends" column is a "MUST".

274

275 For an Event Notification for all Events, the Printer sends the following attributes.

276

Table 3 – Attributes in Event Notification Content

<u>Source Value</u>	<u>Sends</u>	<u>Source Object</u>
<u>notify-subscription-id (integer(1:MAX))</u>	<u>MUST</u>	<u>Subscription</u>
<u>notify-printer-uri (uri)</u>	<u>MUST</u>	<u>Subscription</u>
<u>notify-subscribed-event (type2 keyword)</u>	<u>MUST</u>	<u>Event Notification</u>
<u>printer-up-time (integer(MIN:MAX))</u>	<u>MUST</u>	<u>Printer</u>
<u>printer-current-time (dateTime) *</u>	<u>MUST</u>	<u>Printer</u>
<u>notify-sequence-number (integer (0:MAX))</u>	<u>MUST</u>	<u>Subscription</u>
<u>notify-charset (charset)</u>	<u>MUST</u>	<u>Subscription</u>
<u>notify-natural-language (naturalLanguage)</u>	<u>MUST</u>	<u>Subscription</u>
<u>notify-user-data (octetString(63)) **</u>	<u>MUST</u>	<u>Subscription</u>
<u>notify-text (text)</u>	<u>MUST</u>	<u>Event Notification</u>
<u>attributes from the “notify-attributes” attribute ***</u>	<u>MUST</u>	<u>Printer</u>
<u>attributes from the “notify-attributes” attribute ***</u>	<u>MUST</u>	<u>Job</u>
<u>attributes from the “notify-attributes” attribute ***</u>	<u>MUST</u>	<u>Subscription</u>

277

278

ISSUE 04: Ok that "notify-text" has been changed from MAY to MUST?

279

280

* The Printer MUST send “printer-current-time” if and only if it supports the “printer-current-time” attribute on the Printer object.

281

282

283

** If the associated Subscription Object does not contain a “notify-user-data” attribute, the Printer MUST send an octet-string of length 0.

284

285

286

*** If the “notify-attributes” attribute is present on the Subscription Object, the Printer MUST send all attributes specified by the “notify-attributes” attribute. Note: if the Printer doesn’t support the “notify-attributes” attribute, it is not present on the associated Subscription Object.

287

288

289

290

For Event Notifications for Job Events, the Printer sends the following additional attributes shown in Table 4.

291

292

Table 4 – Additional Attributes in Event Notification Content for Job Events

<u>Source Value</u>	<u>Sends</u>	<u>Source Object</u>
<u>job-id (integer(1:MAX))</u>	<u>MUST</u>	<u>Job</u>
<u>job-state (type1 enum)</u>	<u>MUST</u>	<u>Job</u>
<u>job-state-reasons (1setOf type2 keyword)</u>	<u>MUST</u>	<u>Job</u>
<u>job-impressions-completed (integer(0:MAX)) *</u>	<u>MUST</u>	<u>Job</u>

293

294

295

296

* The Printer MUST send the “job-impressions-completed” attribute in an Event Notification only for the combinations of Events and Subscribed Events shown in Table 5.

297

Table 5 – Combinations of Events and Subscribed Events for “job-impressions-completed”

<u>Job Event</u>	<u>Subscribed Job Event</u>
<u>‘job-progress’</u>	<u>‘job-progress’</u>
<u>‘job-completed’</u>	<u>‘job-completed’</u>
<u>‘job-completed’</u>	<u>‘job-state-changed’</u>

298

299

300

For Event Notification for Printer Events, the Printer sends the following additional attributes shown in Table 6.

301

Table 6 – Additional Attributes in Event Notification Content for Printer Events

<u>Source Value</u>	<u>Sends</u>	<u>Source Object</u>
<u>printer-state (type1 enum)</u>	<u>MUST</u>	<u>Printer</u>
<u>printer-state-reasons (1setOf type2 keyword)</u>	<u>MUST</u>	<u>Printer</u>
<u>printer-is-accepting-jobs (boolean)</u>	<u>MUST</u>	<u>Printer</u>

302

~~“human-readable-report” (text)~~

303

304

305

306

307

~~The ‘indp’ Notification Source OPTIONALLY supports this attribute. This attribute is a text string generated by the IPP printer or Notification Delivery Service from the contents of the IPP Notification suitable for human consumption. If the Notification Source supports this attribute, it MUST supply this attribute if the Subscription object contains the “notify-text-format” (mimeType) attribute. The text value of this attribute MUST be localized in the charset~~

308 identified by the "notify-charset" (charset) attribute and the natural language identified by the notify-
309 natural-language" (naturalLanguage) attribute supplied in the associated Subscription object that
310 generates this Event Notification. The format of the text value is specified by the value of the
311 "notify-text-format" (mimeType) supplied in the associated Subscription object.

312

313 "~~human-readable-report-format" (mime)~~

314 This attribute ~~MUST~~ be supplied by the Notification Source whenever the "human-readable-report"
315 attribute is present. It indicates the format, e.g., text/plain, text/html, etc. of the "human-readable-
316 report" attribute.

317

318 All of the ~~REQUIRED~~ attributes and any of the ~~OPTIONAL~~ attributes indicated in [ipp-ntfy] for a Push
319 Event Notification, including "notify-text-format-type" (mimeType), if the "human-readable-
320 report" (text) attribute is included, so that the Notification Recipient will know the text format of the
321 "human-readable-report" (text) attribute value.

322 These attributes communicate the same information as the notification attributes by the same name
323 described in sections 7.4, 7.5, and 7.6 of [ipp-ntfy]. The rules that govern when each individual attribute
324 ~~MUST~~ or ~~MAY~~ be included in this operation precisely mirror those specified in [ipp-ntfy].

325 **5.1.29.1.2 Send-Notifications Response**

326 The Notification Recipient MUST return (to the client which is the Printer) the following sets of attributes
327 as part of a Send-Notifications response:

328 Every operation response contains the following ~~REQUIRED~~ parameters (see [ipp-mod] section 3.1.1):

- 329 - a "version-number"
- 330 - a "status-code"
- 331 - the "request-id" that was supplied in the corresponding request

332

333 Group 1: Operation Attributes

334 Status Message:

335 As defined in [ipp-mod].

336

337 The Notification Recipient can return any status codes defined in [ipp-mod] and section 10.1 that
338 applies to all of the Event Notification Attribute groups. The following is a description of the
339 important status codes:

340

341 'successful-ok': the Notification Recipient received all of the Event Notification Attribute
342 Groups and was expecting each of them.

343 'successful-ok-ignored-notifications': the Notification Recipient was able to consume some,
344 but not all of the Event Notification Attributes Groups sent. The Event Notification
345 Attributes Groups with a "notify-status-code" attribute are the ones that were ignored or are
346 to be canceled.

347 'client-error-ignored-all-notifications': the Notification Recipient was unable to consume any
348 of the Event Notification Attributes Groups sent. The Event Notification Attributes Groups
349 with a "notify-status-code" attribute are the ones that were ignored or are to be canceled.
350

351 Natural Language and Character Set:

352 The "attributes-charset" and "attributes-natural-language" attributes as defined in [ipp-mod] section
353 3.1.4.1.
354

~~The 'indp' Notification Recipient returns a status code for the entire operation and one for each
Notification Report in the request if the operation's status code is other than "successful-ok". If the
'indp' Notification Recipient receives a Notification report that it can't pair up with a Subscription it
knows about, it can return a 'client_error_unknown_subscription' error status code to indicate that
events associated with that subscription should no longer be sent to it. Alternatively, the
Notification Recipient can return the 'successful-ok-but-cancel-subscription' to the Notification
Source and cancel a Subscription that is no longer wanted.~~

362 ~~The status code can take any of the following standard IPP values (as defined in [ipp-mod]):~~

363 ~~'successful-ok'~~
364 ~~'client_error_bad_request'~~
365 ~~'client_error_not_found'~~
366 ~~'client_error_request_entity_too_large'~~
367 ~~'client_error_request_value_too_long'~~
368 ~~'server_error_version_not_supported'~~
369 ~~'server_error_temporary_error'~~

371 ~~or one of the following INDP status code extensions:~~

372 ~~———'successful-ok-partial-notification' (0x0004)~~
373

374 ~~The 'successful-ok-partial-notification' indicates that at least one notification was received and process~~
375 ~~successfully and that errors were encountered with one or more notifications. If this status code is returned,~~
376 ~~then Group 2 below MUST be present in the response with one status code per notification.~~
377

378 ~~Group 1: Operation Attributes~~

379 ~~Natural Language and Character Set:~~

380 ~~The "attributes-charset" and "attributes-natural-language" attributes ads defined in [rfe-2566] section~~
381 ~~3.1.4.1.~~
382

383 ~~Group 2 to N: Notification Attributes~~

384 These groups MUST be returned if and only if the "status-code" parameter returned in Group 1 is
385 anything but the 'successful-ok' status code.

386 "notification-~~report~~-status-code" (type2 enum)
387 Indicates whether the '~~ipp-notify-send~~'-Notification Recipient was able to consume the n-th
388 Notification Report as follows:-
389

390 **The following standard IPP status codes, defined in [ipp-mod], may be returned:**

391 **'successful-ok' - this Event Notification Attribute Group was consumed**

392 **'client-error-not-found' - this Event Notification Attribute Group was not able to be consumed.**
393 **The Printer MUST cancel the Subscription and MUST NOT attempt to send any further Event**
394 **Notifications from the associated Subscription object.**

395 **'successful-ok-but-cancel-subscription' - the Event Notification Attribute Group was consumed,**
396 **but the Notification Recipient wishes to cancel the Subscription object. The Printer MUST**
397 **cancel the Subscription and MUST NOT attempt to send any further Event Notifications from**
398 **the associated Subscription object.**
399

400 9.2 Notification Protocol URI Scheme

401 The INDP Notification Delivery Method uses the 'indp://' URI scheme in the "notify-recipients" attribute in
402 the Subscription object in order to indicate the notification Delivery Method defined in this document. The
403 remainder of the URI indicates the host and address of the Notification Recipient that is to receive the
404 Send-Notification operation.

405 10 Status Codes

406 This section lists status codes whose meaning have been extended and/or defined for returning in Event
407 Notification Attribute Groups as the value of the "notification-status-code" operation attribute. The code
408 values are allocated in the same space as the status codes in [ipp-mod].

409 10.1 Additional Status Codes

410 The following status codes are defined as extensions for Notification and are returned as the value of the
411 "status-code" parameter in the Operation Attributes Group of a response (see [ipp-mod] section 3.1.6.1).
412 Operations in this document can also return the status codes defined in section 13 of [ipp-mod]. The
413 'successful-ok' status code is an example of such a status code.

414 10.1.1 successful-ok-ignored-notifications (0x0004)

415 The Notification Recipient was able to consume some, but not all, of the Event Notifications Attributes
416 Groups sent by the Printer in the Send-Notifications request. See section 9.1.2 for further details.

417 **4.210.2 Status Codes returned in Event Notification Attributes Groups**

418 This section contains values of the “notify-status-code” attribute that the Notification Recipient returns in a
 419 Event Notification Attributes Group in a response when the corresponding Event Notification Attributes
 420 Group in the request:

421 1. was not consumed OR

422 2. was consumed, but the Notification Recipient wants to cancel the corresponding Subscription object

423 The following sections are ordered in decreasing order of importance of the status-codes.

424 **10.2.1 client-error-not-found (0x0406)**

425 This status code is defined in [ipp-mod]. This document extends its meaning and allows it to be returned in
 426 an Event Notification Attributes Group of a response.

427 The Notification Recipient was unable to consume this Event Notification Attributes Group because it was
 428 not expected. See section 9.1.2 for further details.

429 **10.2.2 successful-ok-but-cancel-subscription (0x0006)**

430 The Notification Recipient was able to consume this Event Notification Attributes Group that the Printer
 431 sent, but wants the corresponding Subscription object to be canceled none-the-less. See section 9.1.2 for
 432 further details.

433 **11 Encoding and Transport**

434 This section defines the encoding and transport used by the 'indp' Delivery Method.

435 **611.1 Encoding of the Operation Layer**

436 The ~~INDP 'indp' Notification~~ Delivery Method uses the ~~INDP-IPP~~ operation layer encoding described in
 437 ~~[indpipp-pro]~~; and the following Event Notification Attributes Group tag allocated by [ipp-ntfy]:

Tag Value (Hex)

0x07

Meaning

“event-notification-attributes-tag”

438

439 ~~7~~11.2 Encoding of Transport Layer

440 The ~~INDP~~'indp' Notification Delivery Method uses the ~~INDP-IPP~~ transport layer encoding described in
441 [indpipp-pro].

442 It is REQUIRED that an 'indp' Notification Recipient implementation support HTTP over the IANA
443 assigned Well Known Port ~~XXX~~ (~~assigned to the INDP 'indp' Delivery Method as its~~ default port by IANA
444 (see section 12), though a Notification Recipient implementation MAY support HTTP over some other port
445 as well.

446 ~~8~~12 IANA Considerations

447 The 'indp://' URL scheme for the 'indp' Delivery Method and the IDNP default port will be registered with
448 IANA. IANA will assign a default port to use with the 'indp' Delivery Method.

449 ~~9~~13 Internationalization Considerations

450 When the client requests Human Consumable form by supplying the "notify-text-format" operation attribute
451 (see [ipp-ntfy]), the IPP Printer (or any Notification Service that the IPP Printer might be configured to use)
452 supplies and localizes the text value of the "human-readable-report" attribute in the Notification according
453 to the charset and natural language requested in the notification subscription.

454 ~~10.1~~14 Security Considerations

455 The IPP Model and Semantics document [ipp-mod] discusses high level security requirements (Client
456 Authentication, Server Authentication and Operation Privacy). Client Authentication is the mechanism by
457 which the client proves its identity to the server in a secure manner. Server Authentication is the mechanism
458 by which the server proves its identity to the client in a secure manner. Operation Privacy is defined as a
459 mechanism for protecting operations from eavesdropping.

460 The Notification Recipient can cancel unwanted Subscriptions created by other parties without having to be
461 the owner of the subscription by returning the 'successful-ok-but-cancel-subscription' status code in the
462 Send-Notifications response returned to the ~~Notification Source~~Printer.

463 ~~10.1.14.1~~ Security Conformance

464 ~~Notification Source~~Printers (client) MAY support Digest Authentication [rfc2617]. If Digest
465 Authentication is supported, then MD5 and MD5-sess MUST be supported, but the Message Integrity
466 feature NEED NOT be supported.

467 Notification Recipient (server) MAY support Digest Authentication [rfc2617]. If Digest Authentication is
468 supported, then MD5 and MD5-sess MUST be supported, but the Message Integrity feature NEED NOT be
469 supported.

470 Notification Recipients MAY support TLS for client authentication, server authentication and operation
471 privacy. If a Notification Recipient supports TLS, it MUST support the
472 TLS_DHE_DSS_WITH_3DES_EDE_CBC_SHA cipher suite as mandated by RFC 2246 [rfc2246]. All
473 other cipher suites are OPTIONAL. Notification recipients MAY support Basic Authentication (described
474 in HTTP/1.1 [rfc2616]) for client authentication if the channel is secure. TLS with the above mandated
475 cipher suite can provide such a secure channel.

476 **4115 References**

477

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