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17
18 Internet Printing Protocol/1.0 & 1.1: **Job Independent Subscriptions**

19 Version 0.5

20 **Abstract**

21 This document describes an extension to the IPP Event Notification Proposal [ipp-not]. Three new
22 Printer operations are specified: Subscribe, Renew-Subscription, and Unsubscribe. The semantics of the
23 two subscription Operation attributes ("notify-events" and "notify-recipients") used in create operations
24 is preserved. These two subscription attributes are supplied by the client as operation attributes in this
25 new Subscribe operation, along with a new "notify-lease-time" operation attribute.

26 A client can remove a subscription explicitly using the Unsubscribe operation or can let the lease time
27 expire. A client can extend the lease time for a subscription using the Renew-Subscription.

28 Subscriptions sent to the IPP object using a job submission operation are called "Job Submission
29 Subscriptions." Subscriptions sent to the IPP object using the new "Subscribe" operation are called "Job
30 Independent Subscriptions". The semantic differences between job submission subscriptions and job
31 independent subscriptions are presented.

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57

58 **1 Summary of the proposal**

- 59 1. If this "Job Independent Subscription" specification is supported, the IPP Printer MUST support
60 three new Printer operations: Subscribe, Renew-Subscription, and Unsubscribe. These operations
61 allow a client that is not submitting a job to subscribe, renew a subscription, and to unsubscribe
62 independently from job submission.
- 63
- 64 2. The Subscribe operation uses the following two REQUIRED subscription operation attributes:
65 "notify-recipients" (1setOf uri)
66 "notify-events" (1setOf type2 keyword)
67 These are the same operation attributes used to subscribe for notifications in the create operations
68 [ipp-not].
- 69
- 70 3. A third REQUIRED operation attribute, "notify-lease-time", specifies the length of time in seconds
71 that the subscription is to be in effect, after which the subscription is automatically canceled.
- 72
- 73 4. A fourth REQUIRED operation attribute, "subscription-id", allows a client to maintain a reference to
74 the applicable subscriptions made and know which event report were generated as a result of this
75 subscription.
- 76
- 77 5. The subscription created by a Subscribe operation is called a "Job Independent Subscription". Just
78 like Job Submission Subscriptions, this subscription can include job and/or device events.
79 Subscriptions for Job Events in this type apply to all jobs. For these types of subscriptions, it is most
80 likely that the subscribing entity is either a server-based device management application submitting
81 jobs to a device which has IPP embedded in it or an accounting application collecting accounting
82 data.
- 83

135 **3 Job Independent Subscription Semantics**

136 There are semantic differences between job submission subscriptions and job independent subscriptions.
137 A "Job Submission Subscription" is established between the client and the device when a job create
138 request is made. The attributes as specified in [ipp-not] are sent to the device and the response includes
139 attributes telling the client if the subscription was successful or not. A "Job Independent Subscription"
140 is established between a client and a device using the three new operations defined herein. Some
141 specific differences are:

- 142 1. Either type of subscription can register for job events, printer events, or both.
- 143 2. For "Job Submission Subscriptions", the subscription is only valid while the job is "not-complete"
144 (see [ipp-not] section 4).
- 145 3. For "Job Independent Subscriptions", the subscription is valid until it is explicitly canceled with an
146 Unsubscribe operation or the time (in seconds) that was specified in the "notify-lease-time"
147 operation attribute expires, whichever occurs first.
- 148 4. Job Events in a "Job Submission Subscription" apply only to "this job" (the Job object created
149 because of the job create operation).
- 150 5. Job Events in a "Job Independent Subscription" apply to ALL jobs contained in the IPP Printer
151 object. There is no way to use a Job Independent Subscription to subscribe to job events on a
152 specific job. Only a "Job Submission Subscription" applies to a specific job (the submitted job).
- 153 6. Printer Events in both "Job Submission Subscriptions" and "Job Independent Subscriptions" apply
154 no matter which job is being processed.

155 **4 The Subscribe, Renew-Subscription, and Unsubscribe Operations**

156 The Subscribe, Renew-Subscription, and Unsubscribe operations are like any other IPP operation with
157 respect to common operation attributes (target, charset, "requesting-user-name", natural language,
158 unsupported attributes, etc.).

159 **4.1 Subscribe Operation**

160 If Job Independent Subscription is implemented, this operation is REQUIRED to be supported by the
161 device. This operation allows a client to receive event reports from a specified device regarding it's own
162 events and all the jobs associated with it. If a notification recipient has already done a subscribe
163 operation, a subsequent subscribe will renew his subscription and update the events list and lease-time.

164 **ISSUE 1: Who filters out duplicate subscriptions? Client or Printer? If it is the client, then the**
165 **Subscription list needs to be made available to it. If it is the Printer, how are duplicate subscriptions**
166 **defined? If a Subscribe operation is performed and the "notify-recipient" and "notify-events" match a**
167 **subscription already granted (whose lease time has not expired), does the IPP Printer just update the**
168 **subscription's "notify-events" and "lease-time"? How defend against malicious clients? If the Printer**
169 **filters out duplicates, then can we get rid of the Renew-Subscription operation?**

170 If the Printer has a bounded set of concurrent subscriptions (for the specified events or any events), it
171 rejects the operation and returns the 'server-error-too-many-subscriptions' status code. The client
172 SHOULD try again later.

173 **4.1.1 Subscribe Request**

174 The following groups of attributes are part of the Subscribe Request:

175 Group 1: Operation Attributes

176 Natural Language and Character Set:

177 The "attributes-charset" and "attributes-natural-language" attributes as described in [ipp-mod]
178 section 3.1.4.1.

179 Target:

180 The "printer-uri" (uri) operation attribute which is the target for this operation as described in
181 [ipp-mod] section 3.1.5.

182 Requesting User Name:

183 The "requesting-user-name" (name(MAX)) attribute SHOULD be supplied by the client as
184 described in [ipp-mod] section 8.3.

185

186 "notify-recipients" (1setOf uri):

187 The client MUST supply this attribute. If Job Independent Subscription is implemented, the
188 printer object MUST support this attribute. It describes both where (the address) and how (the
189 delivery method) event reports are to be delivered when any of the events specified in the
190 "notify-events" attribute occur. See [ipp-not] section 4.1.1.

191

192 "notify-events" (1setOf type2 keyword):

193 The client OPTIONALLY supplies this attribute. If Job Independent Subscription is
194 implemented, the printer object MUST support this attribute. If the client does not supply the
195 attribute, then the Printer object uses its "notify-events-default" attribute value. See [ipp-not]
196 section 4.1.3.

197

198 "notify-lease-time" (integer(0:MAX)):

199 The client OPTIONALLY supplies this attribute. If Job Independent Subscription is
200 implemented, the printer object MUST support this attribute. This attribute requests a lease time
201 for the subscription, i.e., the number of seconds before the subscription expires.

202

203 There is no way to query the outstanding subscriptions. Instead, every subscription has a lease
204 time, so that no subscription can be carried too long and become a dead subscription because the
205 Notification Recipient has gone away.

206

207 If the client does not supply this attribute in the request, the Printer object uses its "notify-lease-
208 time-default" attribute value.

209 **4.1.2 Subscribe Response**

210 The following groups of attributes are part of the Subscribe Response:

211 Group 1: Operation Attributes

212 Status Message:
213 In addition to the REQUIRED status code returned in every response, the response
214 OPTIONALLY includes a "status-message" (text) operation attribute as described in [ipp-mod]
215 section 3.1.6.
216
217 Natural Language and Character Set:
218 The "attributes-charset" and "attributes-natural-language" attributes as described in [ipp-mod]
219 section 3.1.4.1.
220
221
222 "subscription-id" (integer(1:MAX)):
223 The Printer object MUST support this attribute and return it in the response. It contains an
224 integer subscription identifier assigned by the Printer object for use in event reports and Renew-
225 Subscription/Unsubscribe operations.
226
227 "notify-lease-time" (integer(0:MAX)):
228 The Printer object MUST support this attribute and return it in the response. It contains the
229 actual lease time granted, which MUST be in the range specified by the Printer's "notify-lease-
230 time-supported" attribute. If the client supplied a value that is less than the minimum or greater
231 than the maximum, the Printer sets the actual lease time to the minimum or maximum value,
232 respectively, but otherwise accepts and performs the operation normally and no special status
233 code is returned. It is up to the client to check this returned value, if it cares.
234
235 Group 2: Unsupported Attributes
236 See section 3.1.7 for details on returning Unsupported Attributes.

237 **4.2 Renew-Subscription**

238 If Job Independent Subscriptions is implemented, this operation is REQUIRED to be supported by the
239 device. This operation allows a client to renew the lease time on an already established subscription.
240 The client supplies the "subscription-id" for this operation.

241

242 **4.2.1 Renew-Subscription Request**

243 The following groups of attributes are part of the Subscribe Request:

244 Group 1: Operation Attributes

245 Natural Language and Character Set:

246 The "attributes-charset" and "attributes-natural-language" attributes as described in [ipp-mod]
247 section 3.1.4.1.

248

249 Target:

250 The "printer-uri" (uri) operation attribute which is the target for this operation as described in
251 [ipp-mod] section 3.1.5.

252

253 Requesting User Name:

254 The "requesting-user-name" (name(MAX)) attribute SHOULD be supplied by the client as
255 described in [ipp-mod] section 8.3.

256
257 "subscription-id" (integer(1:MAX)):

258 The client MUST supply this attribute. The printer object MUST support this attribute. It
259 identifies the subscription to be renewed, i.e., it is the integer subscription identifier returned by
260 the Printer object in a previous Subscribe or Renew-Subscription operation.

261
262 The Printer returns a 'client-error-not-found' status code, if the subscription id is not found (or
263 has expired).

264
265 "notify-lease-time" (integer(0:MAX)):

266 See the description of "notify-lease-time" for the Subscribe operation request in Section .4.1.1.

267
268

269 4.2.2 Renew-Subscription Response

270 The following groups of attributes are part of the Subscribe Response:

271 Group 1: Operation Attributes

272 Status Message:

273 In addition to the REQUIRED status code returned in every response, the response
274 OPTIONALLY includes a "status-message" (text) operation attribute as described in [ipp-mod]
275 section 3.1.6.

276
277 Natural Language and Character Set:

278 The "attributes-charset" and "attributes-natural-language" attributes as described in [ipp-mod]
279 section 3.1.4.1.

280
281 "subscription-id" (integer(1:MAX)):

282 See the description of "subscription-id" for the Subscribe operation response in Section 4.1.2.
283 The value returned in the response MAY be different than the value supplied in the request, i.e.,
284 the implementation MAY assign a new subscription ID to the renewed subscription.

285
286 **ISSUE 2 - Ok to permit an implementation to assign a new Subscription ID on a Renew-**
287 **Subscription or should we require the ID to remain the same (and not be returned in the**
288 **response)?**

289
290 "notify-lease-time" (integer(0:MAX)):

291 See the description of "notify-least-time" for the Subscribe operation response in Section 4.1.2.

292
293

Group 2: Unsupported Attributes

294 See section 3.1.7 for details on returning Unsupported Attributes.

295

296 **4.3 Unsubscribe**

297 If Job Independent Subscription is implemented, this operation is REQUIRED to be supported by the
298 device. This operation allows a client to unsubscribe from the notification service. The "subscription-
299 id" is required to perform this operation. Once a client performs an Unsubscribe operation, the printer
300 immediately stops sending event reports to the associated Notification Recipient(s) for that subscription.

301

302 **4.3.1 Unsubscribe Request**

303 The following groups of attributes are part of the Subscribe Request:

304 Group 1: Operation Attributes

305 Natural Language and Character Set:

306 The "attributes-charset" and "attributes-natural-language" attributes as described in [ipp-mod]
307 section 3.1.4.1.

308

309 Target:

310 The "printer-uri" (uri) operation attribute which is the target for this operation as described in
311 [ipp-mod] section 3.1.5.

312

313 Requesting User Name:

314 The "requesting-user-name" (name(MAX)) attribute SHOULD be supplied by the client as
315 described in [ipp-mod] section 8.3.

316

317 "subscription-id" (integer(1:MAX)):

318 The client MUST supply this attribute. The printer object MUST support this attribute. It
319 identifies the subscription to be removed, i.e., it is the integer subscription identifier returned by
320 the Printer object in a previous Subscribe or Renew-Subscription operation.

321

322 The Printer returns a 'client-error-not-found' status code, if the subscription id is not found (or
323 has expired).

324

325 **4.3.2 Unsubscribe Response**

326 The following groups of attributes are part of the Subscribe Response:

327 Group 1: Operation Attributes

328 Status Message:

329 In addition to the REQUIRED status code returned in every response, the response
330 OPTIONALLY includes a "status-message" (text) operation attribute as described in [ipp-mod]
331 section 3.1.6.

332

333 Natural Language and Character Set:

334 The "attributes-charset" and "attributes-natural-language" attributes as described in [ipp-mod]
335 section 3.1.4.1.

336

337 Group 2: Unsupported Attributes

338 See section 3.1.7 for details on returning Unsupported Attributes.

339

340

341 **5 Printer Description Attributes**

342 The following Printer Description attributes are defined for use with job independent subscriptions for
343 notification:

344 **5.1 *notify-lease-time-supported (rangeOfInteger(0:MAX))***

345 This REQUIRED Printer attribute specifies the range of values in seconds that are supported for the
346 "notify-lease-time" operation attribute. See section 4.1.2 for the behavior if the client-supplied value is
347 outside this range.

348 **5.2 *notify-lease-time-default (integer(0:MAX))***

349 This REQUIRED Printer attribute specifies the value of the lease time that the Printer object has been
350 configured to assume if the client does not supply a "notify-lease-time" operation attribute in the
351 Subscribe or Renew-Subscription operations.

352 **5.3 *subscription-expire-warning-time (integer(0:MAX))***

353 This CONDITIONAL Printer attribute specifies the amount of time in seconds ahead of the subscription
354 expiration time that the Printer will send a 'subscription-about-to-expire' event. This attribute MUST be
355 supported if the 'subscription-about-to-expire' event is supported.

356

357 **6 References**

358 [ipp-mod]

359 R. deBry, T. Hastings, R. Herriot, S. Isaacson, P. Powell, "Internet Printing Protocol/1.1: Model
360 and Semantics", <draft-ietf-ipp-model-v11-02.txt>, work in progress, May, 1999.

361 See also "Internet Printer Protocol/1.0: Model and Semantics", RFC 2566, April 1999.

362 [ipp-not]

363 Isaacson, S., Martin, J., deBry, R., Hastings, T., Shepherd, M., " Internet Printing Protocol/1.0 &
364 1.1: IPP Event Notifications ", <draft-ietf-ipp-notifications-00.doc>, work in progress, May 17,
365 1999.

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412

413 **8 Other Open ISSUES**

414 The following issues need to be addressed:

- 415 3. If the IPP Printer is forwarding Subscribe operations to a notification service which rejects the
416 subscription, is there any way the IPP Printer can return that implementation specific error condition
417 back to the client? Or is it better for the IPP Printer to map the error codes to standard IPP error
418 status codes for interoperability?
- 419 4. Should we allow for an "Unsubscribe ALL" feature in some operation?
- 420 5. Should we define subscription service events? Such as: "subscription-about-to-expire",
421 "subscription-expired", "are-you-alive" notification events? The Notification Recipient would have
422 to know to issue the Renew-Subscription operation, (not the original client). These events would be
423 ones that are available with the Subscribe operation, but not create operations, correct?
- 424 6. What happens when a printer crashes or reboots? Are the subscriptions lost or are they required to be
425 retained or does that depend on implementation? How does rebooting affect lease times?
- 426 7. Jini defines a sequence number for events so that clients can re-order the events if they are received
427 out-of-order. IPP should support this too.
- 428 8. Section 8: Security Considerations of [ipp-mod] needs to be updated to reflect the use of these new
429 operations related to security, especially regarding section 8.5: Operations performed by operators
430 and system administrators. Also malicious clients renewing or unsubscribing subscriptions that do
431 not belong to them.

432 **9 Change History**

433 The following changes were made from the July 7, 1998 to create the May 19, 1999 version:

- 434 1. Added the lease time concept from Jini and SLP event notification mechanisms, where the client
435 requests a lease, but may be granted more or less, depending on the "notify-lease-time-supported
436 (rangeOfInteger) attribute.
- 437 2. Added "notify-lease-time-default" so that the client can request the "usual", if it doesn't care.
- 438 3. Added returning the subscription ID in the Renew-Subscription response in case the implementation
439 needs to change the ID.
- 440 4. Added some issues.

441 **10 Appendix A: Full Copyright Statement**

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