1 PWG DRAFT STANDARD
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13   Internet Printing Protocol/1.0: Additional Optional Operations - Set 1

14

15 Status of this Memo

19   **Abstract**

20 This document specifies six OPTIONAL operations for use with the Internet Printing Protocol/1.0 (IPP)
21 [ipp-mod, ipp-pro]. The defined Set 1 operations are 3 Job object operations that end-users may perform
22 on their jobs and operators/administrators may perform on any job:

23   Hold-Job
24   Release-Job
25   Restart-Job

26 and 3 Printer object operations that operators/administrators may perform on a Printer object:

27   Pause-Printer
28   Resume-Printer
29   Purge-Jobs

30

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53

54   1   Summary of Set 1 and Operation-Id Assignments

55   The Set 1 operations are summarized in the following table:

Operation Name	Operation-Id	Brief description
Hold-Job	0x000C	Holds a pending job so that it cannot be scheduled for processing
Release-Job	0x000D	Allows a previously held job to be scheduled for processing
Restart-Job	0x000E	Restarts a job as the same job on the same Printer object
	0x000F	Reserved for the future.
Pause-Printer	0x0010	Stops the device(s) as soon as possible from processing jobs
Resume-Printer	0x0011	Resumes the device(s) processing jobs
Purge-Jobs	0x0012	Removes all jobs from the Printer regardless of job state

56   All of the operations in Set 1 are OPTIONAL for an IPP object to support. Unless the specification of
57   an OPTIONAL operation requires support of another OPTIONAL operation, conforming
58   implementations may support any combination of these operations.

59   2   Job Operations

60   The job operations in Set 1 are for use by end users on their jobs and by operators and administrators on
61   any jobs. The operation attributes in requests and responses for the job operations are the same as the
62   standard Cancel-Job operation (see [model] 3.3.3). Additional operation attributes are specified that the
63   client MAY supply in a request.

64   2.1   Hold-Job Operation

65   This operation allows a client to hold a pending job in the queue so that it is not eligible for scheduling.
66   If the Hold-Job operation is supported, then the Release-Job operation MUST be supported, and vice-
67   versa. The OPTIONAL "job-hold-until" operation attribute allows a client to specify whether to hold the
68   job indefinitely or until a specified time period, if supported.

69   The IPP object MUST accept or reject the request based on the job's current state, transition the job to
70   the indicated new state as follows:

Current "job-state"	New "job-state"	IPP object's response status code and action:
'pending'	'pending-held'	'successful-ok' See Note 1
'pending'	'pending'	'successful-ok' See Note 2
'pending-held'	'pending-held'	'successful-ok' See Note 1

'pending-held'	'pending'	'successful-ok' See Note 2
'processing'	'processing'	'client-error-not-possible'
'processing-stopped'	'processing-stopped'	'client-error-not-possible'
'completed'	'completed'	'client-error-not-possible'
'canceled'	'canceled'	'client-error-not-possible'
'aborted'	'aborted'	'client-error-not-possible'

71 Note 1: If the OPTIONAL "job-state-reasons" attribute is supported and if the implementation supports
72 multiple reasons for a job to be in the 'pending-held' state, the IPP object MUST add the 'job-hold-until-
73 specified' value to the job's "job-state-reasons" attribute.

74 Note 2: If the IPP object supports the "job-hold-until" operation attribute, but the specified time period
75 has already started (or is the 'no-hold' value) and there are no other reasons to hold the job, the IPP object
76 MUST make the job be a candidate for processing immediately (see [ipp-mod] Section 4.2.2) by putting
77 the job in the 'pending' state.

78 Note: In order to keep the Hold-Job operation simple, such a request is rejected when the job is in the
79 'processing' or 'processing-stopped' states. If an operation is needed to hold jobs while in these states, it
80 will be added as an additional operation, rather than overloading the Hold-Job operation. Then it is clear
81 to clients by querying the Printer object's "operations-supported" [ipp-mod 4.4.13] and the Job object's
82 "job-state" [ipp-mod 4.3.7] attributes which operations are possible.

83 *Access Rights:* The requesting user must either be the submitter of the job or an operator or administrator
84 of the Printer object (see [ipp-mod] Section 1). Otherwise, the IPP object MUST reject the operation
85 and return: 'client-error-forbidden', 'client-error-not-authenticated', or 'client-error-not-authorized' as
86 appropriate.

87 2.1.1   Hold-Job Request

88 The groups and operation attributes are the same as for a Cancel-Job request (see [ipp-mod] section
89 3.3.3.1), with the addition of the following Group 1 Operation attribute:

90   "job-hold-until" (type3 keyword | name(MAX)) operation attribute:
91   The client OPTIONALLY supplies this Operation attribute. The IPP object MUST support this
92   operation attribute in a Hold-Job request, if it supports the "job-hold-until" Job template attribute
93   in create operations. See [ipp-mod] section 4.2.2. The IPP object SHOULD support the "job-
94   hold-until" Job Template attribute for use in job create operations with at least the 'indefinite'
95   value, if it supports the Hold-Job operation. Otherwise, a client cannot create a job and hold it
96   immediately (without picking some supported time period in the future).

97   Otherwise, the IPP object NEED NOT support the "job-hold-until" operation attribute in a Hold-
98   Job request. If supplied and supported as specified in the Printer's "job-hold-until-supported"
99   attribute, the IPP object copies the supplied attribute to the Job object, replacing the job's
100   previous "job-hold-until" attribute, if present, and makes the job a candidate for scheduling
101   during the supplied named time period.

102 If supplied, but either the "job-hold-until" Operation attribute itself or the value supplied is not
103 supported, the IPP object accepts the request, returns the unsupported attribute or value in the
104 Unsupported Attributes Group according to [ipp-mod] section 3.2.1.2, returns the 'successful-ok-
105 ignored-or-substituted-attributes, and holds the job indefinitely until a client performs a
106 subsequent Release-Job operation. As with all operations, if the client supplies the "job-hold-
107 until" (or any OPTIONAL) Operation attribute that is unknown or unsupported or the value is
108 unsupported, the IPP object MUST accept and perform the operation, ignoring the unknown or
109 unsupported operation attribute and returning the ignored or unsupported attributes and/or values
110 in Group 2 Unsupported Attributes (see [ipp-mod] sections 3.3.3.2 and 16.3.6).

111 If the client (1) supplies a value that specifies a time period that has already started or the 'no-
112 hold' value [ipp-mod 4.2.2] (meaning don't hold the job) and (2) the IPP object supports the "job-
113 hold-until" operation attribute and there are no other reasons to hold the job, the IPP object
114 MUST accept the operation and make the job be a candidate for processing immediately (see
115 [ipp-mod] Section 4.2.2).

116 The following new keyword value is defined for use with the "job-hold-until" Job Template
117 attribute in job create operations and the "job-hold-until" operation attribute in Hold-Job and
118 Restart-Job operations:

119   'indefinite': - the job is held indefinitely, until a client performs a Release-Job or Restart-
120   Job operation

121 If the client does not supply a "job-hold-until" operation attribute in the request, the IPP object
122 MUST populate the job object with a "job-hold-until" attribute with the 'indefinite' value (if IPP
123 object supports the "job-hold-until" attribute) and hold the job indefinitely, until a client performs
124 a Release-Job or Restart-Job operation.

125 The IPP object SHOULD support the "job-hold-until" Job Template attribute for use in job create
126 operations with at least the 'indefinite' value, if it supports the Hold-Job operation. Otherwise, a
127 client cannot create a job and hold it immediately (without picking some supported time period
128 in the future).

2.1.2   Hold-Job Response

130 The groups and attributes are the same as for a Cancel-Job response (see [ipp-mod] section 3.3.3.2).

2.2   Release-Job Operation

132 This operation allows a client to release a previously held job so that it is again eligible for scheduling.
133 If the Hold-Job operation is supported, then the Release-Job operation MUST be supported, and vice-
134 versa.

135 This operation removes the "job-hold-until" job attribute, if present, from the job object that had been
136 supplied in the create or most recent Hold-Job or Restart-Job operation and removes its effect on the job.
137 If the OPTIONAL "job-state-reasons" attribute is supported, the IPP object MUST remove the 'job-hold-
138 until-specified' value from the job's "job-state-reasons" attribute, if present. See [ipp-mod] 4.3.8.

139 The IPP object MUST accept or reject the request based on the job's current state, and transition the job
140 to the indicated new state as follows:

Current "job-state"	New "job-state"	IPP object's response status code and action:
'pending'	'pending'	'successful-ok' No effect on the job.
'pending-held'	'pending-held'	'successful-ok' See Note 1
'pending-held'	'pending'	'successful-ok'
'processing'	'processing'	'successful-ok' No effect on the job.
'processing-stopped'	'processing-stopped'	'successful-ok' No effect on the job.
'completed'	'completed'	'client-error-not-possible'
'canceled'	'canceled'	'client-error-not-possible'
'aborted'	'aborted'	'client-error-not-possible'

141 Note 1: If there are other reasons to keep the job in the 'pending-held' state, such as 'resources-are-not-
142 ready', the job remains in the 'pending-held' state. Thus the 'pending-held' state is not just for jobs that
143 have the 'job-hold-until' applied to them, but are for any reason to keep the job from being a candidate
144 for scheduling and processing, such as 'resources-are-not-ready'. See the "job-hold-until" attribute ([ipp-
145 mod] Section 4.2.2).

146 *Access Rights:* The requesting user must either be the submitter of the job or an operator or administrator
147 of the Printer object. Otherwise, the IPP object MUST reject the operation and return: 'client-error-
148 forbidden', 'client-error-not-authenticated', or 'client-error-not-authorized' as appropriate.

149 The Release-Job Request and Release-Job Response have the same attribute groups and attributes as the
150 Cancel-Job operation (see [ipp-mod] section 3.3.3.1 and 3.3.3.2).

151 **2.3   Restart-Job Operation**

152 This operation allows a client to restart a job that is retained in the queue after processing has completed
153 (see section 3.1). As an implementation option, a job in the 'processing' and/or 'processing-stopped'
154 states MAY be restarted.

155 The job is moved to the 'pending' job state and restarts at the beginning on the same IPP Printer object
156 with the same attribute values. The Job Description attributes that accumulate job progress, such as
157 "job-impressions-completed", "job-media-sheets-completed", and "job-k-octets-processed", MUST be
158 reset to 0 so that they give an accurate record of the job from its restart point. The job object MUST
159 continue to use the same "job-uri" and "job-id" attribute values.

160 Note: If in the future an operation is needed that does not reset the job progress attributes, then a new
161 operation will be defined which makes a copy of the job, assigns a new "job-uri" and "job-id" to the copy
162 and resets the job progress attributes in the new copy only.

163 The IPP object MUST accept or reject the request based on the job's current state, transition the job (or
164 new job, depending on implementation) to the indicated new state as follows:

Current "job-state"	New "job-state"	IPP object's response status code and action:
'pending'	'pending'	'client-error-not-possible'.
'pending-held'	'pending-held'	'client-error-not-possible'.
~~'processing'~~	~~'pending'~~	~~OPTION 1: 'successful-ok' - job is started over. See Note 1.~~
'processing'	'processing'	~~OPTION 2:~~ 'client-error-not-possible'.
~~'processing-stopped'~~	~~'pending'~~	~~OPTION 1: 'successful-ok' - job is started over. See Note 1~~
'processing-stopped'	'processing-stopped'	~~OPTION 2:~~ 'client-error-not-possible'.
'completed'	'pending'	'successful-ok' - job is started over.
'completed'	'completed'	'client-error-not-possible' - see Note 1
'canceled'	'pending'	'successful-ok' - job is started over.
'canceled'	'canceled'	'client-error-not-possible' - see Note 1
'aborted'	'pending'	'successful-ok' - job is started over.
'aborted'	'aborted'	'client-error-not-possible' - see Note 1

165

166 Note 1: If the Job Retention Period has expired for the job in this state, then the IPP object rejects the
167 operation. See section 3.1.

168 ~~Note 1: For OPTION 1, the IPP object SHOULD indicate to clients that a Restart-Job operation is~~
169 ~~possible while the job is in the 'processing' and/or 'processing-stopped' states, by populating the job's~~
170 ~~"job-state-reasons" attribute with the 'job-restartable' value.~~

171 Note: In order to prevent a user from inadvertently restarting a job in the middle, the Restart-Job request
172 is rejected when the job is in the 'processing' or 'processing-stopped' states. If in the future an operation
173 is needed to hold or restart jobs while in these states, it will be added as an additional operation, rather
174 than overloading the Restart-Job operation, so that it is clear that the user intended that the current job
175 not be completed.

176 *Access Rights:* The requesting user must either be the submitter of the job or an operator or administrator
177 of the Printer object. Otherwise, the IPP object MUST reject the operation and return: 'client-error-
178 forbidden', 'client-error-not-authenticated', or 'client-error-not-authorized' as appropriate.

2.3.1   Job-Restart Request

The groups and attributes are the same as for a Cancel-Job request (see [ipp-mod] section 3.3.3.1), with the addition of the following Group 1 Operation attribute:

"job-hold-until" (type3 keyword | name(MAX)) operation attribute
The client OPTIONALLY supplies this attribute. The IPP object MUST support this operation attribute in a Restart-Job request, if it supports the "job-hold-until" Job Template attribute in create operations. See [ipp-mod] section 4.2.2. Otherwise, the IPP object NEED NOT support the "job-hold-until" operation attribute in a Restart-Job request.

If supplied and supported as specified in the Printer's "job-hold-until-supported" attribute, the IPP object copies the supplied Operation attribute to the Job object, replacing the job's previous "job-hold-until" attribute, if present, and makes the job a candidate for scheduling during the supplied named time period.

See Section 2.1.1 for the common semantics of the "job-hold-until" operation attribute for the Hold-Job operation and Restart-Job operation.

If supplied, but the value is not supported, the IPP object accepts the request, returns the unsupported attribute or value in the Unsupported Attributes Group according to section **Error! Reference source not found.**, returns the 'successful-ok-ignored-or-substituted-attributes' status code, and holds the job indefinitely until a client performs a subsequent Release-Job operation.

If supplied, but the "job-hold-until" Operation attribute itself is not supported, the IPP object accepts the request, returns the unsupported attribute with the out-of-band 'unsupported' value in the Unsupported Attributes Group according to [ipp-mod] section 3.2.1.2, returns the 'successful-ok-ignored-or-substituted-attributes' status code, and restarts the job, i.e., ignores the "job-hold-until" attribute.

If the client (1) supplies a value that specifies a time period that has already started or the 'no-hold' value (meaning don't hold the job) and (2) the IPP object supports the "job-hold-until" operation attribute and there are no other reasons to hold the job, the IPP object makes the job a candidate for processing immediately (see [ipp-mod] Section 4.2.2).

If the client does not supply a "job-hold-until" operation attribute in the request, the IPP object removes the "job-hold-until" attribute, if present, from the job. If there are no other reasons to hold the job, the Restart-Job operation makes the job a candidate for processing immediately (see [ipp-mod] Section 4.2.2).

2.3.1.1   Restart-Job Response

The groups and attributes are the same as for a Cancel-Job response (see [ipp-mod] section 3.3.3.2).

212 Note: In the future an OPTIONAL Modify-Job operation may be specified that allows the client to
213 modify other attributes before releasing the restarted job.

214 3   The Job History concept and additional "job-state-reasons"

215 This section partitions the 7 job states into phases: Job Not Completed, Job Retention, Job History, and
216 Job Removalexplains the so-called Printer object's "job-history" that contains the recently completed,
217 canceled, and aborted jobs. This section also specifies the 'job-restartable' value of the "job-state-
218 reasons" Job Description attribute for use with the Restart-Job operations.

219 3.1   The "job history" conceptPartioning of Job States

220 The 7 job states are partitioned into the following phases:

221 Job Not Completed: When a job is in the 'pending', 'pending-held', 'processing', or 'processing-stopped'
222 states, the job is not completed.

223 Job Retention: When a job enters one of the three terminal job states: is 'completed', 'canceled', or
224 'aborted', the IPP Printer object MAY "retain" the job with its document data in a restartable condition
225 using the Restart-Job operation for an implementation-defined time period.   which This time period
226 MAY be zero seconds and MAY depend on the terminal job state. This phase is called Job Retention.
227 While in the Job Retention phase, the job's document data is retained and a client may restart the job
228 using the Restart-Job operation. If the IPP object supports the "job-state-reasons" attribute and the
229 Restart-Job operation, then it SHOULD indicate that such the jobs are is restartable by adding the 'job-
230 restartable' value to the job's "job-state-reasons" attribute (see Section **Error! Reference source not
231 found.**3.2) during the Job Retention phasethat implementation-defined time period.

232 Job History: After the Job Retention phase implementation-defined restartable time period expires for
233 the job, the Printer object deletes the document data for the job and the job becomes part of the "Job
234 History". The Print object MAY also delete any number of the job attributes. Since the job is no longer
235 restartable, the Printer object MUST remove the 'job-restartable' value from the job's "job-state-reasons"
236 attribute, if supported. Clients are able to query jobs in the Printer object's "job history" using Get-Job-
237 Attributes and Get-Jobs operations.

238 Job Removal: After the job has remained in the Job History forSubsequently, the IPP Printer removes
239 jobs from its "job history" in an implementation-defined mannertime, such as after a fixed time period
240 (which MAY be zero seconds) or when the number of jobs exceeds a fixed number or after a fixed time
241 period (which MAY be zero seconds), the IPP Printer removes the job from the system.

242 Using the Get-Jobs operation and supplying the 'not-completed' value for the "which-jobs" operation
243 attribute, a client is requesting jobs in the Job Not Completed phase. Using the Get-Jobs operation and
244 supplying the 'completed' value for the "which-jobs" operation attribute, a client is requesting jobs in the
245 Job Retention and Job History phases. Using the Get-Job-Attributes operation, a client is requesting a
246 job in any phase except Job Removal. After Job Removal, the Get-Job-Attributes and Get-Jobs
247 operations no longer are capable of returning any information about a job. Thereupon, the job can no

248 longer be queried using the Get-Job-Attributes and Get-Jobs operations and the IPP object returns the
249 'client-error-not-found' or 'client-error-gone' as appropriate.

250 **1.23.2   Add a new 'job-restartable' value to the "job-state-reasons" attribute**

251 The following new keyword value is specified for use with the "job-state-reasons" Job Description
252 attribute and the Restart-Job operation (see Section 02.3):

253   'job-restartable' - This job is retained (see section 3.1) and is currently able to be restarted using the
254   Restart-Job operation (see section 2.3). With which job states this values is used depends on
255   implementation, i.e., OPTION 1 vs. OPTION 2 in the job state transition table in Section 2.3.   If
256   'job-restartable' is a value of the job's 'job-state-reasons' attribute, then the IPP object MUST
257   accept a Restart-Job operation for that job. Whenever the IPP object will reject a Restart-Job
258   operation for the job with the 'client-error-not-possible' error status code because the job is not
259   restartable, the IPP object MUST remove this value from the job's "job-state-reasons" attribute.

260

261   For example, after a job is completed (job state is 'completed', 'aborted', or 'canceled), the
262   implementation MAY retain the job in a restartable condition for an implementation-defined
263   time period. When that time elapses, an implementation MAY delete the document data, but
264   MAY retain some or all of the job attributes as a "Job History" for an additional implementation-
265   defined time period. During this second time period, the implementation removes the 'job-
266   restartable' value from the job's "job-state-reasons" attribute, since the job can no longer be
267   restarted.

268

269 **4   Printer operations**

270 The printer operations in Set 1 are for use by operators and administrators of each Printer object. The
271 following figure is copied from [ipp-mod] with the addition of the following arrow:
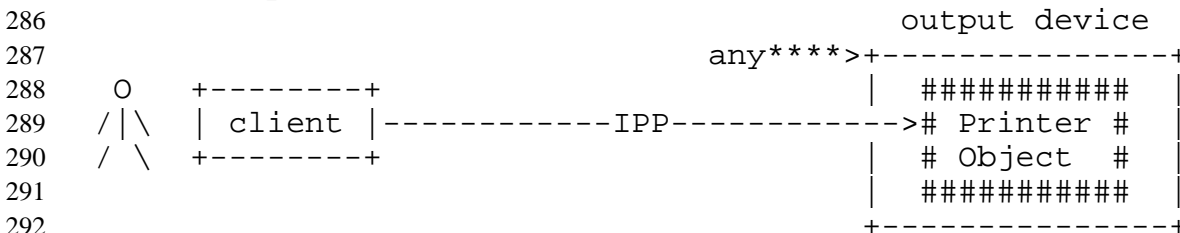
272   any****>

273 indicating an additional source of job submission using IPP or any other job submission protocol that
274 passes to the device but does NOT pass through the IPP Printer object in question.
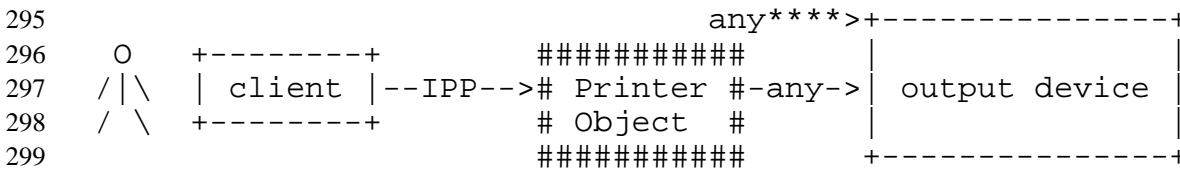
```
275 Legend:
276
277 ##### indicates a Printer object which is
278        either embedded in an output device or is
279        hosted in a server.  The Printer object
280        might or might not be capable of queuing/spooling.
281
282 any    indicates any network protocol or direct
283        connect, including IPP
284
285 embedded printer:
286                                               output device
287                                     any****>+---------------+
288  O    +--------+                            | ########## |
289 /|\   | client |-----------IPP------------># Printer # |
290 / \   +--------+                            | # Object  # |
291                                             | ########## |
292                                             +---------------+
293
294 hosted printer:
295                                     any****>+---------------+
296  O    +--------+         ##########         |               |
297 /|\   | client |--IPP-># Printer #-any->| output device |
298 / \   +--------+         # Object  #      |               |
299                          ##########       +---------------+
300
301
302                                     any****>+---------------+
303 fan out:                                    |               |
304                                      +-->| output device |
305                                     any/     |               |
306  O    +--------+      ##########   /      +---------------+
307 /|\   | client |-IPP># Printer #--*
308 / \   +--------+      # Object  #   \     +---------------+
309                       ########## any\      |               |
310                                      +-->| output device |
311                                             |               |
312                                             +---------------+
```
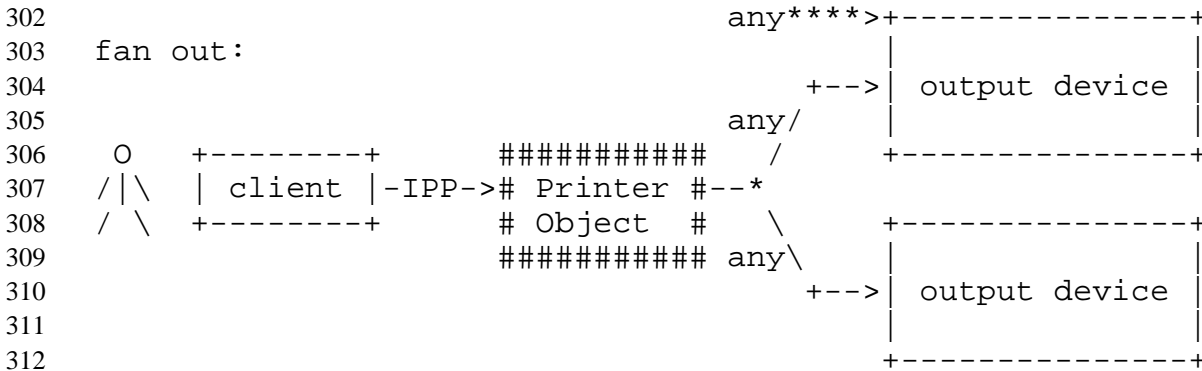
313 The operation attributes for the Printer operation requests are as follows:-

314 Group 1: Operation Attributes

315   Natural Language and Character Set:
316   The "attributes-charset" and "attributes-natural-language" attributes as described in section
317   3.1.4.1 of [ipp-mod].
318

319   Target:
320   The "printer-uri" (uri) operation attribute which is the target for this operation as described in
321   section 3.1.5 of [ipp-mod].
322

323   Requesting User Name:
324   The "requesting-user-name" (name(MAX)) attribute SHOULD be supplied by the client as
325   described in section 8.3 of [ipp-mod].

326 The operation attributes for the Printer operation responses are as follows:

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 section
331   3.1.6 of [ipp-mod].
332

333   Natural Language and Character Set:
334   The "attributes-charset" and "attributes-natural-language" attributes as described in section
335   3.1.4.2 of [ipp-mod].
336

337 Group 2: Unsupported Attributes

338   This is a set of Operation attributes supplied by the client (in the request) that are not supported
339   by the Printer object or that conflict with one another (see sections 3.2.1.2 and 16).
340
341

342 **4.1 Pause-Printer Operation**

343 This operation allows a client to stop the Printer object from scheduling jobs on all its devices.
344 Depending on implementation, the Pause-Printer operation MAY also stop the Printer from processing
345 the current job or jobs. Any job that is currently being printed is either stopped as soon as the
346 implementation permits or is completed, depending on implementation. The Printer object MUST still
347 accept create operations to create new jobs, but MUST prevent any jobs from entering the 'processing'
348 state.

349 If the Pause-Printer operation is supported, then the Resume-Printer operation MUST be supported, and
350 vice-versa.

351 The IPP Printer stops the current job(s) on its device(s) that were in the 'processing' or 'processing-
352 stopped' states as soon as the implementation permits. If the implementation supports the "printer-state-
353 reasons" attribute and the devices will take appreciable time to stop, the IPP Printer adds the 'moving-to-
354 paused' value to the Printer object's "printer-state-reasons" attribute. When the device(s) have all
355 stopped, the IPP Printer transitions the Printer object to the 'stopped' state, removes the 'moving-to-
356 paused' value, if present, and adds the 'paused' value to the Printer object's "printer-state-reasons"
357 attribute.

358 When the current job(s) complete that were in the 'processing' state, the IPP Printer transitions them to
359 the 'completed' state. When the current job(s) stop in mid processing that were in the 'processing' state,
360 the IPP Printer transitions them to the 'processing-stopped' state and, if the "job-state-reasons" attribute is
361 supported, adds the 'printer-stopped' value to the job's "job-state-reasons" attribute.

362 Note: for any jobs that are 'pending' or 'pending-held', the 'printer-stopped' value of the jobs' "job-state-
363 reasons" attribute also applies. However, the IPP Printer NEED NOT update those job's "job-state-
364 reasons" attributes and only need return the 'printer-stopped' value when those jobs are queried (so-called
365 "lazy evaluation").

366 Whether the Pause-Printer operation affects jobs that were submitted to the device from other sources
367 than the IPP Printer object (see the any***> arrow in the figure above) in the same way that the
368 Pause-Printer operation affects jobs that were submitted to the IPP Printer object using IPP, depends on
369 implementation, i.e., on whether the IPP protocol is being used as a universal management protocol or
370 just to manage IPP jobs, respectively.

371 The IPP Printer MUST accept the request in any state, and transition the Printer to the indicated new
372 "printer-state" before returning as follows:

Current "printer-state"	New "printer-state"	"printer-state-reasons"	IPP Printer's response status code and action:
'idle'	'stopped'	'paused'	'successful-ok'
'processing'	'processing'	'moving-to-paused'	OPTION 1: 'successful-ok'; Later, when all output has stopped, the "printer-state" becomes 'stopped', and the 'paused' value replaces the 'moving-to-paused' value in the "printer-state-reasons" attribute
'processing'	'stopped'	'paused'	OPTION 2: 'successful-ok'; all output stopped immediately
'stopped'	'stopped'	'paused'	'successful-ok'

373 *Access Rights:* The requesting user must be an operator or administrator of the Printer object.
374 Otherwise, the IPP Printer MUST reject the operation and return: 'client-error-forbidden', 'client-error-
375 not-authenticated', or 'client-error-not-authorized' as appropriate.

4.1.1   Add a new 'moving-to-paused' value to the "printer-state-reasons" attribute

The following new keyword value is specified for use with the "printer-state-reasons" Printer Description attribute:

'moving-to-paused': Someone has paused the Printer object using the Pause-Printer operation (see section **Error! Reference source not found.**) or other means, but the device(s) are taking an appreciable time to stop. Later, when all output has stopped, the "printer-state" becomes 'stopped', and the 'paused' value replaces the 'moving-to-paused' value in the "printer-state-reasons" attribute. ~~The Printer object's operator or administrator has paused the Printer object using the Pause-Printer operation or other means, but it has not yet stopped producing output. When all the devices stop producing output, the Printer object MUST replace this value with the 'paused' value.~~

4.2   Resume-Printer Operation

This operation allows a client to resume the Printer object scheduling jobs on all its devices. If the Printer object supports the "printer-state-reasons" attribute, it MUST remove the 'paused' and 'moving-to-paused' values from the Printer object's "printer-state-reasons" attribute, if present. If there are no other reasons to keep a device paused (such as media-jam), the IPP Printer transitions itself to the 'processing' or 'idle' states, depending on whether there are jobs to be processed or not, respectively, and the device(s) resume processing jobs.

If the Pause-Printer operation is supported, then the Resume-Printer operation MUST be supported, and vice-versa.

The IPP Printer removes the 'printer-stopped' value from any job's "job-state-reasons" attributes contained in that Printer.

The IPP Printer MUST accept the request in any state, and transition the Printer object to the indicated new state as follows:

Current "printer-state"	New "printer-state"	IPP Printer's response status code and action:
'idle'	'idle'	'successful-ok'
'processing'	'processing'	'successful-ok'
'stopped'	'processing'	'successful-ok'; when there are jobs to be processed
'stopped'	'idle'	'successful-ok'; when there are no jobs to be processed.

Access Rights: The requesting user must be an operator or administrator of the Printer object. Otherwise, the IPP Printer MUST reject the operation and return: 'client-error-forbidden', 'client-error-not-authenticated', or 'client-error-not-authorized' as appropriate.

403   **4.3   Purge-Jobs Operation**

404   This operation allows a client to remove all jobs from an IPP Printer object, regardless of their job states,
405   including jobs in the Printer object's ~~"job-history"~~Job History (see Section **Error! Reference source not**
406   **found.**3.1). After a Purge-Jobs operation has been performed, a Printer object MUST return no jobs in
407   subsequent Get-Job-Attributes and Get-Jobs responses (until new jobs are submitted).

408   Whether the Purge-Jobs (and Get-Jobs) operation affects jobs that were submitted to the device from
409   other sources than the IPP Printer object (see the any***> arrow in the figure in Section 4) in the
410   same way that the Purge-Jobs operation affects jobs that were submitted to the IPP Printer object using
411   IPP, depends on implementation, i.e., on whether the IPP protocol is being used as a universal
412   management protocol or just to manage IPP jobs, respectively.

413   Note: if an operator wants to cancel all jobs without clearing out the Job History, the operator uses the
414   Cancel-Job operation on each job instead of using the Purge-Job operation.

415   The Printer object MUST accept this operation in any state and transition the Printer object to the 'idle'
416   state.

417   *Access Rights:* The requesting user must be an operator or administrator of the Printer object.
418   Otherwise, the IPP object MUST reject the operation and return: client-error-forbidden, client-error-not-
419   authenticated, and client-error-not-authorized as appropriate.

5   Security Considerations

421   For the job operations in Set 1 (Section 2), the requesting user must either be the submitter of the job or
422   an operator or administrator of the Printer object (see [ipp-mod] Section 1). Otherwise, the IPP object
423   MUST reject the operation and return: 'client-error-forbidden', 'client-error-not-authenticated', or 'client-
424   error-not-authorized' as appropriate. See [ipp-mod] Section 8.3 on the two ways that the client MUST
425   specify the user who is performing each IPP operation.

426   For the printer operations in Set 1 (Section 4), the requesting user must by an operator or administrator
427   of the Printer object (see [ipp-mod] Section 1). The means for authorizing an operator or administrator
428   of the Printer object are not specified in either [ipp-mod] or this document.

6   References

430   [ipp-mod]
431   Isaacson, S., deBry, R., Hastings, T., Herriot, R., Powell, P., "Internet Printing Protocol/1.0:
432   Model and Semantics" draft-ietf-ipp-mod-1~~1~~0.txt, ~~June~~November, 1998.

433   [ipp-pro]
434   Herriot, R., Butler, S., Moore, P., Tuner, R., "Internet Printing Protocol/1.0: Encoding and
435   Transport", draft-ietf-ipp-pro-0~~7~~6.txt, ~~June~~November, 1998.

7   Change History

437   This section lists the changes.

7.1   Changes to November 9, 1998 to make February 21, 1999

The following changes were made to the November 9, 1998 to make February 21, 1999 version in order to keep the Set 1 operations aligned with IPP/1.1 Model and Semantics:

1. Clarified Hold-Job, if the client supplies the OPTIONAL "hold-job-until" Operation attribute and the Printer doesn't support that attribute or the supplied value, ignore the attribute, accept the request and hold the job (indefinitely until Release-Job), returning the 'successful-ok-ignored-attributes-or-values' status code, rather than rejecting the request, since the results are not too different from what the user requested.

2. Clarified Restart-Job, if the client supplies the OPTIONAL "hold-job-until" Operation attribute and the Printer doesn't support that attribute, ignore the attribute, accept the request and restart the job returning the 'successful-ok-ignored-attributes-or-values' status code, rather than rejecting the request, since the results are not too different from what the user requested.

3. Clarified Restart-Job, if the client supplies the OPTIONAL "hold-job-until" Operation attribute and the Printer doesn't support that attribute value, ignore the value, accept the request and hold the job indefinitely returning the 'successful-ok-ignored-attributes-or-values' status code, rather than rejecting the request, since the results are not too different from what the user requested.

4. Eliminate OPTION 1 in the Restart-Job operation so that Restart-Job is like Hold-Job in that neither operation can be done when the job is in the 'processing' or 'processing-stopped' states. Add new operations for that functionality if and when needed.