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13 Internet Printing Protocol/1.0: Additional Optional Operations - Set 1  
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26 **Abstract**

27 This document specifies seven OPTIONAL operations for use with the Internet Printing  
28 Protocol/1.0 (IPP) [ipp-mod, ipp-pro]. The defined Set 1 operations are:

29 Hold-Job  
30 Release-Job  
31 Restart-Job  
32 Reprocess-Job  
33 Pause-Printer  
34 Resume-Printer  
35 Purge-Jobs

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37

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**Table of Contents**

39 1 Summary of Set 1 and Operation-Id Assignments ..... 3

40 2 Job Operations ..... 3

41 2.1 Hold-Job ..... 3

42 2.1.1 "job-hold-until" (type3 keyword | name(MAX)) operation attribute ..... 4

43 2.2 Release-Job ..... 5

44 2.3 Restart-Job ..... 6

45 2.4 Reprocess-Job ..... 7

46 3 Printer operations ..... 8

47 3.1 Pause-Printer ..... 9

48 3.1.1 Add a new 'moving-to-paused' value to the "printer-state-reasons" attribute ..... 10

49 3.2 Resume-Printer ..... 10

50 3.3 Purge-Jobs ..... 11

51 4 References ..... 11

52

## 53 1 Summary of Set 1 and Operation-Id Assignments

54 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 completed job as the same job on the same Printer object
Reprocess-Job	0x000F	Reprocesses a completed job as a new copy of the job on the same Printer object
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

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

## 58 2 Job Operations

59 The operation attributes and responses for the job operations are the same as the standard Cancel-  
 60 Job operation (see [model] 3.3.3). Additional operation attributes are specified that the client  
 61 MAY supply in a request. In addition, the IPP object MUST return the "job-state" [ipp-mod  
 62 4.3.7] attribute and, if supported, the "job-state-reasons" [ipp-mod 4.3.8] attribute in the response  
 63 in order to indicate the effect of the operation on the job object.

64 Note: In order to keep the operations in Operation Set 1 simple, they are rejected when the job is  
 65 in the 'processing' or 'processing-stopped' states. If operations are needed to affect jobs while in  
 66 these states, they will be added as additional operations, rather than overloading these operations.  
 67 Then it is clear to clients by querying the Printer object's "operations-supported" [ipp-mod  
 68 4.4.13] what the behavior is.

### 69 2.1 Hold-Job

70 This operation allows a client to hold a pending job in the queue so that it is not eligible for  
 71 scheduling. If the Hold-Job operation is supported, then the Release-Job operation MUST be  
 72 supported, and vice-versa.

73 **2.1.1 "job-hold-until" (type3 keyword | name(MAX)) operation attribute**

74 The client **OPTIONALLY** supplies this attribute. The IPP object **MUST** support this operation  
 75 attribute, if it supports the "job-hold-until" Job template attribute. See [ipp-mod] section 4.2.2.  
 76 If supplied and supported, the IPP object copies the attribute to the Job object, replacing the  
 77 previous attribute, if present, and makes the job a candidate for scheduling during the supplied  
 78 named time period.

79 As with all operations, if the client supplies the "job-hold-until" (or any **OPTIONAL**) Operation  
 80 attribute that is unknown or unsupported or the value is unsupported, the IPP object **MUST**  
 81 accept and perform the operation, ignoring the operation attribute and returning the ignored or  
 82 unsupported attributes and/or values (see [ipp-mod] sections 3.3.3.2 and 16.3.6).

83 If the client supplies the 'no-hold' value [ipp-mod 4.2.2] (meaning don't hold the job) and the IPP  
 84 object supports the "job-hold-until" operation attribute, the IPP object **MUST** reject the operation  
 85 and return the 'client-error-bad-syntax' error status code.

86 The following new keyword value is defined for use with the "job-hold-until" Job Template  
 87 attribute in job create operations and the "job-hold-until" operation attribute in Hold-Job  
 88 operations:

89 'indefinite': - the job is held indefinitely, until a client performs a Release-Job operation

90 If the client does not supply a "job-hold-until" operation attribute in the Hold-Job operation, the  
 91 IPP object **MUST** populate the job object with a "job-hold-until" attribute with the 'indefinite'  
 92 value (if IPP object supports the "job-hold-until" attribute) and hold the job indefinitely, until a  
 93 client performs a Release-Job operation.

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

98 The IPP object **MUST** accept or reject the request based on the job's current state, transition the  
 99 job to the indicated new state, and return the indicated new "job-state" attribute and status code  
 100 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-held'	'pending-held'	'successful-ok' See Note 1
'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'

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

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

## 107 2.2 Release-Job

108 This operation allows a client to release a previously held job so that it is again eligible for  
 109 scheduling. This operation removes the "job-hold-until" job attribute, if present, from the job  
 110 object that had been supplied in the create or most recent Hold-Job operation and remove its  
 111 effect on the job.

112 If the Hold-Job operation is supported, then the Release-Job operation MUST be supported, and  
 113 vice-versa.

114 If the OPTIONAL "job-state-reasons" attribute is supported, the IPP object MUST remove the  
 115 'job-hold-until-specified' value from the job's "job-state-reasons" attribute, if present.

116 The IPP object MUST accept or reject the request based on the job's current state, transition the  
 117 job to the indicated new state, and return the indicated new "job-state" attribute and status code  
 118 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 job.
'completed'	'completed'	'client-error-not-possible'
'canceled'	'canceled'	'client-error-not-possible'
'aborted'	'aborted'	'client-error-not-possible'

119 Note 1: If there are other reasons to keep the job in the 'pending-held' state, such as 'resources-  
 120 are-not-ready', the job remains in the 'pending-held' state. Thus the 'pending-held' state is not just  
 121 for jobs that have the 'job-hold-until' applied to them, but are for any reason to keep the job from  
 122 being a candidate for scheduling and processing, such as 'resources-are-not-ready'.

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

126 **2.3 Restart-Job**

127 This operation allows a client to restart a job that is retained in the queue after processing has  
 128 completed. The job restarts at the beginning on the same IPP Printer object with the same  
 129 attribute values. The Job Description attributes that accumulate job progress, such as "job-  
 130 impressions-completed", "job-media-sheets-completed", and "job-k-octets-processed", **MUST** be  
 131 reset to 0 so that they give an accurate record of the job from its restart point. The job object  
 132 **MUST** continue to use the same "job-uri" and "job-id" attribute values.

133 The IPP object **MUST** accept or reject the request based on the job's current state, transition the  
 134 job to the indicated new state, and return the indicated new "job-state" attribute and status code  
 135 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'	'processing'	'client-error-not-possible'.
'processing-stopped'	'processing'	'client-error-not-possible'.
'completed'	'pending'	'successful-ok' - job is started over
'canceled'	'pending'	'successful-ok' - job is started over
'aborted'	'pending'	'successful-ok' - job is started over

136  
 137 Note: Resetting the job progress attributes, allows job monitoring applications to function  
 138 unchanged for a job that has been restarted. However, there is a problem for accounting  
 139 applications that "pull" the job accounting data from the IPP object after the job completes using  
 140 the Get-Job-Attributes or Get-Jobs operations (or SNMP MIBs). Since the "job-id" and "job-uri"  
 141 for the restarted job are the same as the original job and the accounting attributes are reset, the  
 142 accounting program may not be able to detect that the job was restarted and is using additional  
 143 resources. It is recommended that the Reprocess-Job operation (see section 2.4) be used when  
 144 accurate accounting data is desired to be made available to accounting programs that pull the data  
 145 from the IPP Printer after the job completes, since a new job with a new "job-id" and "job-uri" is  
 146 created while the old job remains for the accounting program to query accounting attributes. On  
 147 the other hand, if an IPP object "pushes" the accounting data to the accounting application when  
 148 the job completes, say, using event notification [ipp-not], then support of the Restart-Job  
 149 operation is not in conflict with such "pull" accounting.

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

153 **2.4 Reprocess-Job**

154 This operation allows a client to reprocess a copy of the job that is retained in the queue after  
 155 processing is completed. A copy of the job restarts at the beginning on the same IPP Printer  
 156 object with possibly different Job Template attributes supplied by the client in the request. Thus  
 157 the Reprocess-Job operation is another create job operation and all of the semantics that [ipp-  
 158 mod] specifies for "create job operations" also apply to the Reprocess-Job operation.

159 The client **MAY** supply any Job Template attributes as in a create job operation whether they  
 160 were originally supplied in the job create operation or not. The Printer object performs a  
 161 validation as in a create operation of the job that would be made up of any supplied attributes  
 162 replacing the corresponding job's attributes in combination with any of the job's remaining Job  
 163 Template attributes. If the Printer object supports the new combination of Job Template  
 164 attributes, the Printer object accepts the Reprocess-Job operation, creates a new job, assigns new  
 165 "job-id" and "job-uri" values, and makes a copy of the job attributes with their new values.

166 The IPP object initializes the Job Description attributes of the new job as in a create job  
 167 operation, so that attributes such as "media-sheets-completed", and "job-k-octets-processed" start  
 168 at 0 and the new job enters the 'pending' or 'pending-held' state, as after a job create operation.  
 169 The returned groups are the same as for the Print-Job operation including the "job-id" and "job-  
 170 uri" attributes with the new values assigned by the Printer object, whether the job has one or  
 171 multiple documents.

172 The Printer object leaves the old 'completed', 'canceled', or 'aborted' job as is and does not change  
 173 any of its attributes. Therefore, the Job Description attributes are preserved for job monitoring  
 174 and accounting purposes for the specified (old) job. Whether the document data is copied or  
 175 shared between the old and the new job, depends on implementation, and cannot be detected by  
 176 the client. Either the old job or the new job may be the target of subsequent Reprocess-Job  
 177 operations.

178 The IPP object **MUST** accept or reject the request based on the job's current state, transition the  
 179 job to the indicated new state, and return the indicated new job's new "job-state" attribute and  
 180 status code as follows:

Old job's current "job-state"	New job's new "job-state"	IPP object's response status code and action:
'pending'	n/a	'client-error-not-possible'.
'pending-held'	n/a	'client-error-not-possible'.
'processing'	n/a	'client-error-not-possible'.
'processing-stopped'	n/a	'client-error-not-possible'.

'completed'	'pending' or 'pending-held'	'successful-ok'
'canceled'	'pending' or 'pending-held'	'successful-ok'
'aborted'	'pending' or 'pending-held'	'successful-ok'

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

184 **3 Printer operations**

185 The operation attributes for the Printer operation requests are as follows:-

186 Group 1: Operation Attributes

187 Natural Language and Character Set:

188 The "attributes-charset" and "attributes-natural-language" attributes as described in  
 189 section 3.1.4.1 of [ipp-mod].

190

191 Target:

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

194

195 Requesting User Name:

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

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

199 Group 1: Operation Attributes

200 Status Message:

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

204

205 Natural Language and Character Set:

206 The "attributes-charset" and "attributes-natural-language" attributes as described in  
 207 section 3.1.4.2 of [ipp-mod].

208

209 "printer-state" and "printer-state-reasons:

210 The Printer object **MUST** return the "printer-state" [ipp-mod 4.4.10] and, if supported, the  
 211 "printer-state-reasons" [ipp-mod 4.4.11] attributes in order to indicate the effect of the  
 212 operation on the Printer object.

213 **3.1 Pause-Printer**

214 This operation allows a client to stop the Printer object from scheduling jobs on all its devices  
 215 and to stop the Printer from processing the current job or jobs, if supported. Any job that is  
 216 currently being printed is either stopped as soon as the implementation permits or is completed,  
 217 depending on implementation. The Printer object MUST still accept create operations to create  
 218 new jobs, but MUST prevent any jobs from entering the 'processing' state.

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

221 The IPP Printer stops the current job(s) on its device(s) that were in the 'processing' or  
 222 'processing-stopped' states as soon as the implementation permits. If the implementation  
 223 supports the "printer-state-reasons" attribute and the devices will take appreciable time to stop,  
 224 the IPP Printer adds the 'moving-to-paused' value to the Printer object's "printer-state-reasons"  
 225 attribute. When the device(s) have all stopped, the IPP Printer transitions the Printer object to the  
 226 'stopped' state, removes the 'moving-to-paused' value, if present, and adds the 'paused' value to  
 227 the Printer object's "printer-state-reasons" attribute.

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

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

237 The IPP Printer MUST accept the request in any state, transition the Printer to the indicated new  
 238 "printer-state" before returning, and return the indicated "printer-state", "printer-state-reasons",  
 239 and status code as follows:

Current "printer-state"	New "printer-state" returned	"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'
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240 *Access Rights:* The requesting user must be an administrator of the printer. Otherwise, the IPP  
 241 Printer MUST reject the operation and return: 'client-error-forbidden', 'client-error-not-  
 242 authenticated', or 'client-error-not-authorized' as appropriate.

243 **3.1.1 Add a new 'moving-to-paused' value to the "printer-state-reasons" attribute**

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

246 'moving-to-paused': Someone has paused the Printer object, but it has not yet stopped  
 247 producing output. When all the devices stop producing output, the Printer object MUST  
 248 replace this value with the 'paused' value.

249 **3.2 Resume-Printer**

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

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

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

260 The IPP Printer MUST accept the request in any state, transition the Printer object to the  
 261 indicated new state, and return the indicated "printer-state" and status code as follows:

Current "printer-state"	New "printer-state" returned	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.

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

### 265 **3.3 Purge-Jobs**

266 This operation allows a client to remove all jobs from an IPP Printer object, regardless of their  
267 job states. The Printer object **MUST** accept this operation in any state and transition the Printer  
268 object to the 'idle' state.

269 *Access Rights:* The requesting user must be an administrator of the printer. Otherwise, the IPP  
270 object **MUST** reject the operation and return: client-error-forbidden, client-error-not-  
271 authenticated, and client-error-not-authorized as appropriate.

## 272 **4 References**

273 [ipp-mod]

274 Isaacson, S., deBry, R., Hastings, T., Herriot, R., Powell, P., "Internet Printing  
275 Protocol/1.0: Model and Semantics" draft-ietf-ipp-mod-10.txt, June, 1998.

276 [ipp-not]

277 Isaacson, S., Martin, J., deBry, R., Hastings, T., "IPP Event Notifications (Very Short)"  
278 <ipp-notifications-very-short-980701.doc>, work in progress, July 1, 1998.

279 [ipp-pro]

280 Herriot, R., Butler, S., Moore, P., Tuner, R., "Internet Printing Protocol/1.0: Encoding  
281 and Transport", draft-ietf-ipp-pro-06.txt, June, 1998.

282 [ISO-10175]

283 ISO/IEC 10175 Document Printing Application (DPA), June 1996.

284