

1 PWG-DRAFT - 13 ISSUES are numbered and highlighted like this
2 ipp-ops-admin-99063025.txt

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7 Internet Printing Protocol/1.0 & 1.1: Additional Administrative Operations

9 Status of this Memo

10 This document is a PWG-Draft. It is intended for registration following the registration procedures of
11 IPP/1.0 [RFC2566] and IPP/1.1 [ipp-mod]. This version includes the comments discussed at the IPP
12 telecon, on 6/23/1999 and 6/30/1999.

13 Abstract

14 This document specifies eight-15 additional OPTIONAL administrative operations for use with the Internet
15 Printing Protocol/1.0 (IPP) [RFC2565, RFC2566] and IPP/1.1 [ipp-mod, ipp-pro]. These operations are 74
16 Printer object operations that operators/administrators may perform on a Printer object:

17 Set-Printer-Attributes
18 Enable-Printer
19 Disable-Printer
20 Reset-Printer
21 Restart-Printer
22 Space-Printer
23 Shutdown-Printer

24 and 84 Job object operations that end-users may perform on their jobs and operators/administrators may
25 perform on any job:

26 Set-Job-Attributes
27 Reprocess-Job
28 Cancel-Current-Job (though the target is the Printer object)
29 Pause-Job
30 Pause-Current-Job (though the target is the Printer object)
31 Resume-Job
32 Promote-Job
33 Space-Current-Job (though the target is the Printer object)

34 In addition, two operation attributes are defined: "job-message-from-operator" and "printer-message-from-
35 operator" are included to set the corresponding Job and Printer Description attributes with the same names.
36 And the "when" operation attribute is added to the Pause-Printer operation.

37 Finally, a new 'client-error-attributes-not-settable' is defined for use with the two Set operations.

38 The full set of IPP documents includes:

- 39 Design Goals for an Internet Printing Protocol [RFC2567]
- 40 Rationale for the Structure and Model and Protocol for the Internet Printing Protocol [RFC2568]
- 41 Internet Printing Protocol/1.1: Model and Semantics (this document)
- 42 Internet Printing Protocol/1.1: Encoding and Transport [IPP-PRO]
- 43 Internet Printing Protocol/1.1: Implementer's Guide [IPP-IIG]
- 44 Mapping between LPD and IPP Protocols [RFC2569]

45

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

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

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

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

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

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102 1. Introduction

103 The Internet Printing Protocol (IPP) is an application level protocol that can be used for distributed printing
104 using Internet tools and technologies. IPP version 1.1 (IPP/1.1) focuses only on end user functionality with
105 a few administrative operations included. This document defines additional OPTIONAL end user and
106 administrative operations used to control Jobs and Printers. This document is a registration proposal for an
107 extension to IPP/1.0 and IPP/1.1 following the registration procedures in those documents.

108 2. New Operation attributes

109 This section defines the new "printer-message-from-operation" and "job-message-from-operator" operation
110 attributes that set the corresponding Printer and Job Description attributes.

111 2.1 New operation attribute: "printer-message-from-operator" (text(127))

112 Type of registration: attribute

113 Proposed keyword name of this attribute: "printer-message-from-operator"

114 Types of attribute (Operation, Job Template, Job Description, Printer Description): Operation

115 Operations to be used with if the attribute is an operation attribute: See below

116 Object (Job, Printer, etc. if bound to an object): Printer (already in IPP/1.0 and IPP/1.1)

117 Attribute syntax(es) (include 1setOf and range as in Section 4.2): text(127)

118

119 Specification of this attribute (follow the style of IPP Model Section 4.2):

120

121 "printer-message-from-operator" (text(127))

122 The client OPTIONALLY supplies this attribute. The Printer object SHOULD supports this
123 operation attribute if it supports the corresponding Printer Description attribute. The value of this
124 attribute is a message from the operator about the Printer object on which the operator has just
125 performed an operation. If supported, the Printer copies the value to the Printer's "printer-message-
126 from-operator" Printer Description attribute (see [ipp-mod] section 4.4.25), automatically sets the
127 value of the Printer's "printer-message-date-time to the current date and time, and automatically sets
128 the value of the Printer's "printer-message-operation" to the operation-id value of this operation. If
129 the client omits this attribute, the Printer does not change the value of its "printer-message-from-
130 operator", "printer-message-date-time", and "printer-message-operation" Printer Description
131 attributes either removes the attribute from the Printer or sets the attribute to the zero length string,
132 depending on implementation.

133

134 This operation attribute is defined for use with the following operator operations on the Printer object:

135 Pause-Printer - see [ipp-mod] section 3.2.7

136 Resume-Printer - see [ipp-mod] section 3.2.8

137 Purge-Jobs - see [ipp-mod] section 3.2.9

138 Disable-Printer - see section 6.1.2

139 Enable-Printer - see section 6.1.3

- 140 [Reset-Printer - see section 6.1.4](#)
- 141 [Restart-Printer - see section 6.1.5](#)
- 142 [Space-Printer - see section 6.1.6](#)
- 143 Shutdown-Printer - see section 6.1.7
- 144

145 The "printer-message-from-operator" operation attribute MUST NOT be supported as an operation attribute
146 for the Set-Printer-Attributes operation. If the operator wants to set the Printer's "printer-message-from-
147 operator" Printer Description attribute when issuing the Set-Printer-Attributes operation, the client supplies
148 the "printer-message-from-operator" with its new value as one of the Printer Description attributes in Group
149 2 in the request. Otherwise the Printer leaves the value of the Printer's "printer-message-from-operator"
150 Printer Description attribute unchanged by not explicitly setting the attribute.

151 2.2 New operation attribute: "job-message-from-operator" (text(127))

152 Type of registration: attribute

153 Proposed keyword name of this attribute: "job-message-from-operator"

154 Types of attribute (Operation, Job Template, Job Description, Printer Description): Operation

155 Operations to be used with if the attribute is an operation attribute: See below

156 Object (Job, Printer, etc. if bound to an object): Job (already in IPP/1.0 and IPP/1.1)

157 Attribute syntax(es) (include 1setOf and range as in Section 4.2): text(127)

158

159 Specification of this attribute (follow the style of IPP Model Section 4.2):

160

161 "job-message-from-operator" (text(127))

162 The client OPTIONALLY supplies this attribute. The Printer object SHOULD supports this
163 operation attribute if it supports the corresponding Job Description attribute. The value of this
164 attribute is a message from the operator about the Job object on which the operator has just
165 performed an operation. If supported, the Printer copies the value to the Job's "job-message-from-
166 operator" Job Description attribute (see [ipp-mod] section 4.3.16). If the client omits this attribute,
167 the Printer [does not change the value of its "printer-message-from-operator" Job Description](#)
168 [attribute either removes the attribute from the Job object or sets the attribute to the zero length](#)
169 [string, depending on implementation.](#)

170

171 [Note: There are no corresponding "job-message-date-time" and "job-message-operation" Job](#)
172 [Description attributes, since the usual lifetime of a job is limited.](#)

173

174 This operation attribute is defined for use with the following operator operations on the Job object:

175 Cancel-Job - see [ipp-mod] section 3.2.4

176 Hold-Job - see [ipp-mod] section 3.3.5

177 Release-Job - see [ipp-mod] section 3.3.6

178 Restart-Job - see [ipp-mod] section 3.3.7

179 Reprocess-Job - see section 6.2.2

180 Cancel-Current-Job - see section 6.2.3

181 Pause-Job - see section 6.2.4
182 Pause-Current-Job - see section 6.2.5
183 Resume-Job - see section 6.2.6
184 Promote-Job - see section 6.2.7
185 Space-Current-Job - see section 6.2.8
186

187 The "job-message-from-operator" operation attribute MUST NOT be supported as an operation attribute for
188 the Set-Job-Attributes operation. If the operator wants to set the Job's "job-message-from-operator" Job
189 Description attribute when issuing the Set-Job-Attributes operation, the client supplies the "job-message-
190 from-operator" with its new value as one of the Job Description attributes in Group 2 in the request.
191 Otherwise the Printer leaves the value of the Job's "job-message-from-operator" Job Description attribute
192 unchanged by not explicitly setting the attribute.

193 2.3 New operation attribute for Pause-Printer: "when" (type2 keyword)

194 Type of registration: attribute

195 Proposed keyword name of this attribute: "when"

196 Types of attribute (Operation, Job Template, Job Description, Printer Description): Operation

197 Operations to be used with if the attribute is an operation attribute: Pause-Printer, Reset-Printer, Shutdown-
198 Printer

199 Object (Job, Printer, etc. if bound to an object): Job (already in IPP/1.0 and IPP/1.1)

200 Attribute syntax(es) (include 1setOf and range as in Section 4.2): type2 keyword
201

202 Specification of this attribute (follow the style of IPP Model Section 4.2):

203 "when" (type2 keyword)

204 The client OPTIONALLY supplies this attribute. The Printer object MUST support this attribute, if
205 it supports this operation. The value of this attribute indicates when to shutdown the printer. If the
206 client omits this attribute, the Printer assumes the 'after-current-job' value.

207

208 Standard keyword values are:

209 'now' - cancel the currently printing job(s) and shut down the Printer. Jobs in the 'held' and
210 'pending' state remain in those states.

211 'after-current-copy' - shutdown the Printer after the current job finishes printing its current
212 copy. Jobs in the 'held' and 'pending' state remain in those states.

213 'after-current-job' - shutdown the Printer after the current job finishes printing (all its copies).
214 Jobs in the 'held' and 'pending' state remain in those states.

215 'after-all' - shutdown the Printer after all 'pending' jobs finish printing. Jobs in the 'held' state
216 remain in the 'held' state.

217 **ISSUE 1: Which values of the "when" operation attribute are required to be supported?**
218

219 3. New Attributes

220 The following new attributes are needed to support the new operations defined in this document.

221 3.1 New Printer Description attribute: "printer-message-date-time" (dateTime)

222 Type of registration: attribute

223 Proposed keyword name of this attribute: printer-message-date-time

224 Types of attribute (Operation, Job Template, Job Description, Printer Description):

225 Operations to be used with if the attribute is an operation attribute: N/A

226 Object (Job, Printer, etc. if bound to an object): Printer

227 Attribute syntax(es) (include 1setOf and range as in Section 4.2): dateTime

228 If attribute syntax is 'keyword' or 'enum', is it type2 or type3: N/A

229 If this is a Printer attribute, MAY the value returned depend on "document-format" (See Section 6.2): No

230 If this is a Job Template attribute, how does its specification depend on the value of the "multiple-
231 document-handling" attribute: N/A

232 Specification of this attribute (follow the style of IPP Model Section 4.2):

233 4.2.? printer-message-date-time (dateTime)

234 The date and time that the Printer's "printer-message-from-operator" was changed by the operator using any
235 operation where the client supplied the "printer-message-from-operator" operation attribute (see section 2.1)
236 or was explicitly set using the Set-Printer-Attributes operation (see section 6.1.1). This attribute allows the
237 users to know when the "printer-message-from-operator" attribute was last set.

238 Note: This attribute helps users better understand the context for the "printer-message-from-operator"
239 message.

240 3.2 New Printer Description attribute: "printer-message-operation" (type2 keyword)

241 Type of registration: attribute

242 Proposed keyword name of this attribute: printer-message-operation

243 Types of attribute (Operation, Job Template, Job Description, Printer Description):

244 Operations to be used with if the attribute is an operation attribute: N/A

245 Object (Job, Printer, etc. if bound to an object): Printer

246 Attribute syntax(es) (include 1setOf and range as in Section 4.2): type2 enum

247 If attribute syntax is 'keyword' or 'enum', is it type2 or type3: type2

248 If this is a Printer attribute, MAY the value returned depend on "document-format" (See Section 6.2): No

249 If this is a Job Template attribute, how does its specification depend on the value of the "multiple-
250 document-handling" attribute: N/A

251 Specification of this attribute (follow the style of IPP Model Section 4.2):

252 4.2.? printer-message-attribute (type2 enum)

253 The operation that was used to changed the Printer's "printer-message-from-operator" by the operator using
254 any operation where the client supplied the "printer-message-from-operator" operation attribute (see section

255 2.1) or explicitly set using the Set-Printer-Attributes operation (see section 6.1.1). This attribute allows the
256 users to know which operation was used to change the "printer-message-from-operator" attribute when it
257 was last set.

258 Note: This attribute helps users better understand the context for the "printer-message-from-operator"
259 message.

260 4. Additional values for "printer-state-reasons" and "job-state-reasons" attributes

261 The following values are added to the "printer-state-reasons" and "job-state-reasons" for use with the
262 operations defined in this document.

263 4.1 Value for "printer-state-reasons": 'standby'

264 Type of registration: type2 keyword attribute value

265 Name of attribute to which this keyword specification is to be added: printer-state-reasons

266 Proposed keyword name of this keyword value: standby

267 Specification of this keyword value (follow the style of IPP Model Section 4.1.2.3):

268 'standby': The Printer has been shutdown in standby mode. Only Restart-Printer and Get-Printer-
269 Attributes operations are accepted in this state; all other operations are rejected with the 'server-
270 error-printer-is-in-standby-mode'.

271 4.2 Value for "job-state-reasons": 'job-paused'

272 Type of registration: type2 keyword attribute value

273 Name of attribute to which this keyword specification is to be added: job-state-reasons

274 Proposed keyword name of this keyword value: job-paused

275 Specification of this keyword value (follow the style of IPP Model Section 4.1.2.3):

276 'job-paused': The job has been paused while processing using the Pause-Job or Pause-Current-Job
277 operations and other jobs can be processed on the Printer. The Job can be resumed using the
278 Resume-Job operation which removes this value.

279 4.3 Value for "job-state-reasons": 'process-next'

280 Type of registration: type2 keyword attribute value

281 Name of attribute to which this keyword specification is to be added: job-state-reasons

282 Proposed keyword name of this keyword value: process-next

283 Specification of this keyword value (follow the style of IPP Model Section 4.1.2.3):

284 'process-next': The job has been promoted to be the next job processed using the Promote-Job operation
285 (see section 6.2.7).

286

287 5. [New status codes](#)288 [This section defines new status codes used by the operations defined in this document.](#)

289 5.1 New status code: 'client-error-attributes-not-settable'

290 Type of registration: status code

291 Keyword symbolic name of this status code value: 'client-error-attributes-not-settable'

292 Numeric value (to be assigned by the IPP Designated Expert in consultation with IANA):

293 Operations that this status code may be used with: Set-Printer-Attributes, Set-Job-Attributes

294 Specification of this status code (follow the style of IPP Model Section 13 APPENDIX B: Status Codes
295 and Suggested Status Code Messages):

296 13.1.4.20 client-error-attributes-not-settable (0x0413)

297 In a Set-Printer-Attributes or Set-Job-Attributes request, if the Printer object does not support one or more
298 attributes as settable, and the client supplied the "ipp-attributes-fidelity" operation attribute with the 'true'
299 value, the Printer object MUST return this status code. The Printer object MUST also return in the
300 Unsupported Attributes Group all the attributes and/or values supplied by the client that are not settable.
301 See [ipp-mod] section 3.1.7. For example, if the request indicates 'job-state', all implementations MUST
302 reject the request. As another example, if the request indicates an attribute that is supported, but not
303 settable by this implementation, such as, say, "printer-name", the implementation rejects the request. If the
304 "ipp-attribute-fidelity" attribute is 'false', the Printer MUST ignore attributes that are not settable, rather
305 than reject the request and return this status code.

306 5.2 [New status code: 'server-error-printer-is-in-standby-mode'](#)307 [Type of registration: status code](#)308 [Keyword symbolic name of this status code value: 'server-error-printer-is-in-standby-mode'](#)309 [Numeric value \(to be assigned by the IPP Designated Expert in consultation with IANA\):](#)310 [Operations that this status code may be used with: Shutdown-Printer](#)311 [Specification of this status code \(follow the style of IPP Model Section 13 APPENDIX B: Status Codes
312 and Suggested Status Code Messages\):](#)313 [13.1.5.8 server-error-printer-is-in-standby-mode](#)

314 [The Printer has been shutdown and is only accepting the Restart-Printer \(see section 6.1.5\) and Get-Printer-
315 Attributes operations. An operator can perform the Restart-Printer operation to allow the Printer to accept
316 other operations.](#)

317 6. Summary of Administrative operations and Operation-Id Assignments

318 The Administrative operations are summarized in the following table:

Operation Name	Operation-Id	Brief description

Operation Name	Operation-Id	Brief description
Set-Printer-Attributes	0x??	Sets attribute values of the <u>target</u> Printer object
Enable-Printer	0x??	Allows the <u>target</u> Printer to accept create job operations
Disable-Printer	0x??	Prevents the <u>target</u> Printer from accepting create job operations
<u>Reset-Printer</u>	<u>0x??</u>	<u>Resets the target Printer to one of several indicated ways</u>
<u>Restart-Printer</u>	<u>0x??</u>	<u>Restarts the target Printer from a standby shutdown mode</u>
<u>Space-Printer</u>	<u>0x??</u>	<u>Skips or repeats the specified number of impressions for the target job</u>
Shutdown-Printer	0x??	Shuts <u>down</u> the <u>target</u> Printer <u>down</u> in several ways
Set-Job-Attributes	0x??	Sets attribute values of the <u>target</u> Job object
Reprocess-Job	0x??	Creates a copy of a completed <u>target</u> job with a new Job ID and processes it
Cancel-Current-Job	0x??	Cancels the current job on the <u>target</u> Printer
<u>Pause-Job</u>	<u>0x??</u>	<u>Pauses the indicated processing job, allowing other jobs to be processed instead</u>
<u>Pause-Current-Job</u>	<u>0x??</u>	<u>Pauses the current processing job on the target Printer</u>
<u>Resume-Job</u>	<u>0x??</u>	<u>Resume the paused target job</u>
<u>Promote-Job</u>	<u>0x??</u>	<u>Promote the pending target job to be next after the current job(s) complete</u>
Space-Current-Job <u>ISSUE 1: better name?</u>	0x??	Skips or repeats some number of impressions for <u>the</u> current job on the <u>target</u> Printer

319 All of the operations in this registration proposal specification are OPTIONAL for an IPP object to support.
 320 Unless the specification of an OPTIONAL operation requires support of another OPTIONAL operation,
 321 conforming implementations may support any combination of these operations.

322 6.1 Printer Operations

323 All Printer operations are directed at Printer objects. A client MUST always supply the "printer-uri"
 324 operation attribute in order to identify the correct target of the operation. These descriptions assume all of
 325 the common semantics of IPP/1.1 Model and Semantics document [ipp-mod] section 3.1.

326 6.1.1 Set-Printer-Attributes Operation

327 Type of registration: operation
 328 Proposed name of this operation: Set-Printer-Attributes
 329 Object Target: Printer
 330 Specification of this operation:

331 This OPTIONAL operation allows a client to set the values of the attributes of a Printer object. In the
 332 request, the client supplies the set of Printer attribute names and values that are to be set. In the response,
 333 the Printer object returns success or rejects the request with indications of which attribute or attributes
 334 could not be set.

335 How the Printer object validates the client-supplied attributes in the Set-Printer-Attributes request is
336 implementation-dependent, since there are no corresponding Printer attributes that specify the allowed
337 values that may be set on the Printer object.

338 The Printer **MUST** accept this operation in any state, i.e., for any of the values of the Printer object's
339 "printer-state" attribute.

340 For Printer attributes that are supported, some **MUST** be settable, some **SHOULD** be settable, some **MAY**
341 be settable, and some **MUST NOT** be settable as indicated in the following table:

IPP Printer Attributes	Settable?
all Job Template Default attributes ("xxx-default" [ipp-mod] section 4.2 and extensions)	SHOULD if attribute supported
all Job Template Supported attributes ("xxx-supported" [ipp-mod] section 4.2 and extensions)	SHOULD if attribute supported
all Job Template Ready attributes ("xxx-ready" [ipp-mod] section 4.2 and extensions)	SHOULD if attribute supported
printer-uri-supported	SHOULD
uri-security-supported	SHOULD
uri-authentication-supported	SHOULD
printer-name	MAY
printer-location	SHOULD if attribute supported
printer-info	SHOULD if attribute supported
printer-driver-installer	SHOULD if attribute supported
printer-make-and-model	MAY
printer-more-info-manufacturer	MAY
printer-state	MUST NOT
printer-state-reasons	MUST NOT
printer-state-message	MUST NOT if attribute supported
ipp-versions-supported	MAY
operations-supported	SHOULD
ipp-multiple-document-jobs-supported	MUST NOT if attribute supported
charset-configured	SHOULD
charset-supported	MAY
natural-language-configured	SHOULD
generated-natural-language-supported	MAY
document-format-default	SHOULD
document-format-supported	SHOULD
printer-is-accepting-jobs	MUST NOT - see Enable-Printer/Disable-Printer
queued-job-count	MUST NOT
printer-message-from-operator	MUST <u>if attribute supported</u>
	<u>Note: There is no "printer-message-from-operator" operation attribute for the Set-Printer-Attributes operation. NOT see "printer-message-from-operator" operation attribute</u>
	<u>ISSUE 2: Better to set explicitly in Set-Printer-Attributes? If yes, change to "MUST if attribute supported". Operation attribute in the other admin operations only.</u>
<u>printer-message-date-time</u>	<u>MUST NOT if attribute supported</u>
<u>printer-message-operation</u>	<u>MUST NOT if attribute supported</u>
color-supported	MAY if attribute supported
reference-uri-schemes-supported	MAY if attribute supported
pdl-override-supported	MUST NOT
printer-up-time	MUST NOT
printer-current-time	MAY if attribute supported
multiple-operation-time-out	SHOULD if attribute supported
compression-supported	MAY
job-k-octets-supported	SHOULD if attribute supported
job-impressions-supported	SHOULD if attribute supported

job-media-sheets-supported
 pages-per-minute
 pages-per-minute-color

SHOULD if attribute supported
 MAY if attribute supported
 MAY if attribute supported

342 *Access Rights:* The authenticated user (see [ipp-mod] section 8.3) performing this operation must be an
 343 operator or administrator of the Printer object (see [ipp-mod] sections 1 and 8.5). Otherwise, the IPP
 344 Printer **MUST** reject the operation and return: 'client-error-forbidden', 'client-error-not-authenticated', or
 345 'client-error-not-authorized' as appropriate.

346 Most Printer attributes will require administrator privileges to set, such as "xxx-supported", while some will
 347 require operator privileges only, such as "media-ready" and "printer-message-from-operator". Which
 348 attributes require which privileges depends on implementation and MAY depend on site policy.

349 6.1.1.1 Set-Printer-Attributes Request

350 The following sets of attributes are part of the Set-Printer-Attributes Request:

351 Group 1: Operation Attributes

352 Natural Language and Character Set:

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

356 Target:

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

360 Requesting User Name:

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

364 "ipp-attribute-fidelity" (boolean):

365 The client **OPTIONALLY** supplies this attribute. The Printer object **MUST** support this attribute.
 366 This operation attribute is used to specify whether or not the sets are to be atomic. If 'false', or not
 367 present, Printer sets what it can and returns the unset attribute/value pairs in the Unsupported
 368 Attributes group. If 'true', either all supplied attributes **MUST** be set or the operation **MUST** be
 369 rejected. All Printer objects **MUST** support both types of setting.

371 "document-format" (mimeMediaType):

372 The client **SHOULD** supply this attribute. The Printer object **MUST** support this attribute. This
 373 attribute is useful for a client to select the interpreter to which the attribute modification should be
 374 applied. See [ipp-mod] section 3.2.5.1 "Get-Printer-Attributes Request".

375
 376 If the Printer object does not distinguish between different sets of supported values for each
 377 different document format when validating jobs in the create and Validate-Job operations, it **MUST**
 378 **NOT** distinguish between different document formats in the Set-Printer-Attributes operation. If the
 379 Printer object does distinguish between different sets of supported values for each different

380 document format specified by the client, this specialization applies only to the same Printer
381 attributes as the Get-Printer-Attributes operation (see [ipp-mod] section 3.2.5.1).

382
383 If the client omits this "document-format" operation attribute, the Printer object MUST respond as if
384 the attribute had been supplied with the value of the Printer object's "document-format-default"
385 attribute. It is recommended that the client always supply a value for "document-format", since the
386 Printer object's "document-format-default" may be 'application/octet-stream', in which case the set
387 attributes and values are for the union of the document formats that the Printer can automatically
388 sense. For more details, see the description of the 'mimeType' attribute syntax in [ipp-mod]
389 section 4.1.9.

390
391 If the client supplies a value for the "document-format" Operation attribute that is not supported by
392 the Printer, i.e., is not among the values of the Printer object's "document-format-supported"
393 attribute, the Printer object MUST reject the operation and return the 'client-error-document-format-
394 not-supported' status code.
395

396 Group 2: Printer Attributes

397 The client MUST supply a set of Printer attributes as defined in [ipp-mod] section 4.2 Job Template
398 Attributes ("xxx-default", "xxx-supported", and "xxx-ready" attributes) and section 4.4 Printer
399 Description Attributes. Each Printer attribute supplied in Group 2 replaces the value(s) of the
400 corresponding Printer attribute on the target Printer object. If a Printer object attribute had not been
401 configured yet and so had the 'no-value' out-of-band value (see [ipp-mod] 4.1), the supplied value(s)
402 replace the 'no-value' value. For attributes that can have multiple values (1setOf), all values
403 supplied by the client replace all values of the corresponding Printer object attribute.
404

405 6.1.1.2 Set-Printer-Attributes Response

406 The Printer object returns the following sets of attributes as part of the Get-Printer-Attributes Response:

407 Group 1: Operation Attributes

408 Status Message:

409 In addition to the REQUIRED status code returned in every response, the response OPTIONALLY
410 includes a "status-message" (text(255)) and/or a "detailed-status-message" (text(MAX)) operation
411 attribute as described in [ipp-mod] sections 13 and 3.1.6.

412 Natural Language and Character Set:

413 The "attributes-charset" and "attributes-natural-language" attributes as described in [ipp-mod]
414 section 3.1.4.2.
415
416

417 Group 2: Unsupported Attributes

418 See [ipp-mod] section 3.1.7 for details on returning Unsupported Attributes.
419

420 In the case of attributes that are supported, but are not settable by the implementation (see table
421 above), the Printer object returns the client-supplied attribute(s) with a substituted value of 'not-
422 settable'. This value's syntax type is "out-of-band" and its encoding is defined by special rules for
423 "out-of-band" values in the "Encoding and Transport" document [IPP-PRO]. Its value indicates that
424 the attribute is not settable. Group 2 is returned independent of the value for the "ipp-attribute-
425 fidelity" attribute supplied by the client.

426
427 ~~ISSUE 3: Should we add a Group 3: Printer Object Attributes which returns the previous values for any~~
428 ~~attributes set?~~

429 6.1.2 Disable-Printer Operation

430 Type of registration: operation

431 Proposed name of this operation: Disable-Printer

432 Object Target: Printer

433 Specification of this operation:

434 This OPTIONAL operation allows a client to stop the Printer object from accepting jobs, i.e., cause the
435 Printer to reject subsequent create job operations (Print-Job, Print-URI, and Create-Job operation) and
436 return the 'server-error-not-accepting-jobs' status code. The Printer still accepts all other operations. All
437 previously submitted Jobs and currently processing Jobs continue unaffected. The Printer sets the value of
438 its "printer-is-accepting-jobs" read-only Printer Description attribute to 'false' (see [ipp-mod] section
439 4.4.20), no matter what the previous value was. This operation has no immediate effect on the Printer's
440 "printer-state" and "printer-state-reasons" attributes.

441 Note: Use the Enable-Printer operation (section 6.1.3) to enable a Printer to accept Jobs again.

442 If the Disable-Printer operation is supported, then the Enable-Printer operation MUST be supported, and
443 vice-versa.

444 Note: Use the Enable-Printer and Disable-Printer operations to allow or prevent input to a Printer. Use the
445 Pause-Printer and Resume-Printer operations to prevent or allow output from the Printer.

446 Whether or not the Disable-Printer operation stops jobs that are submitted using job submission protocols
447 other than IPP, depends on implementation, i.e., on whether the IPP protocol is being used as a universal
448 management protocol or just to manage IPP jobs, respectively.

449 *Access Rights:* The authenticated user (see [ipp-mod] section 8.3) performing this operation must be an
450 operator or administrator of the Printer object (see [ipp-mod] Sections 1 and 8.5). Otherwise, the IPP
451 Printer MUST reject the operation and return: 'client-error-forbidden', 'client-error-not-authenticated', or
452 'client-error-not-authorized' as appropriate.

453 The Disable-Printer Request and Disable-Printer Response have the same attribute groups and attributes as
454 the Pause-Printer operation (see [ipp-mod] sections 3.2.7.1 and 3.2.7.2), including the new "printer-
455 message-from-operator" operation attribute (see section 2.1).

456 6.1.3 Enable-Printer Operation

457 Type of registration: operation

458 Proposed name of this operation: Enable-Printer

459 Object Target: Printer

460 Specification of this operation:

461 This OPTIONAL operation allows a client to start the Printer object accepting jobs, i.e., cause the Printer to
462 accept subsequent create job operations (Print-Job, Print-URI, and Create-Job operation). The Printer still
463 accepts all other operations. All previously submitted Jobs and currently processing Jobs continue
464 unaffected. The Printer sets the value of its "printer-is-accepting-jobs" read-only Printer Description
465 attribute to 'true' (see [ipp-mod] section 4.4.20), no matter what the previous value was. This operation has
466 no immediate effect on the Printer's "printer-state" and "printer-state-reasons" attributes.

467 Note: Use the Disable-Printer operation (section 6.1.2) to stop a Printer from accepting Jobs.

468 If the Enable-Printer operation is supported, then the Disable-Printer operation MUST be supported, and
469 vice-versa.

470 Note: Use the Enable-Printer and Disable-Printer operations to allow or prevent input to a Printer. Use the
471 Pause-Printer and Resume-Printer operations to prevent or allow output from the Printer.

472 Whether or not the Enable-Printer operation allows acceptance of jobs that are submitted using job
473 submission protocols other than IPP, depends on implementation, i.e., on whether the IPP protocol is being
474 used as a universal management protocol or just to manage IPP jobs, respectively.

475 *Access Rights:* The authenticated user (see [ipp-mod] section 8.3) performing this operation must be an
476 operator or administrator of the Printer object (see [ipp-mod] Sections 1 and 8.5). Otherwise, the IPP
477 Printer MUST reject the operation and return: 'client-error-forbidden', 'client-error-not-authenticated', or
478 'client-error-not-authorized' as appropriate.

479 The Enable-Printer Request and Enable-Printer Response have the same attribute groups and attributes as
480 the Pause-Printer operation (see [ipp-mod] sections 3.2.7.1 and 3.2.7.2), including the new "printer-
481 message-from-operator" operation attribute (see section 2.1).

482 6.1.4 Reset-Printer operation

483 Type of registration: operation

484 Proposed name of this operation: Reset-Printer

485 Object Target: Printer

486 Specification of this operation:

487 This OPTIONAL operation allows a client to reset the Printer in a number of ways, depending on the
488 "reset-function" operation attribute. The keyword values of this attribute map one-to-one to the enum
489 values that the NMS writes into the prtGeneralReset object in the Printer MIB [RFC1759] to affect a reset
490 operation. As in the Printer MIB, the 'reset-to-nvram' (soft reset) value MUST be supported, if this
491 operation is supported. The other values are OPTIONAL.

492 As is says in the Printer MIB specification, if a device does not have NVRAM (non-volatile RAM), the
493 device MUST none-the-less respond to this operation for the 'reset-to-nvram' value with some sort of warm
494 reset that resets the device to some implementation-defined state that is preferably under control of the
495 system administrator by some means outside the scope of the Printer MIB and this document.

496 The effect of this operation on the currently processing job(s), if any, is not specified by this document.
497 Note: If this operation does affect the current job(s), it is expected that the operator would issue this
498 operation on a Printer in the 'idle' state after disabling the Printer with the Disable operation in order to
499 prevent a job from inadvertently being affected by this operation.

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

502 Access Rights: The authenticated user (see [ipp-mod] section 8.3) performing this operation must be an
503 operator or administrator of the Printer object (see [ipp-mod] sections 1 and 8.5). Otherwise, the IPP object
504 MUST reject the operation and return: client-error-forbidden, client-error-not-authenticated, and client-
505 error-not-authorized as appropriate.

506 The Reset-Printer Request and Reset-Printer Response have the same attribute groups and attributes as the
507 Pause-Printer operation (see [ipp-mod] sections 3.2.7.1 and 3.2.7.2), including the new "printer-message-
508 from-operator" operation attribute (see section 2.1), the new "when" operation attribute (see section 2.3),
509 and with the addition of the following Group 1 operation attributes in the request:

510 "reset-function" (type3 keyword)

511 The client OPTIONALLY supplies this attribute. The Printer object MUST support this attribute, if
512 it supports this operation. The value of this attribute indicates the reset function to be performed. If
513 the client omits this attribute, the Printer assumes the 'reset-to-nvram' value.

514
515 Standard keyword values are:

516 'power-cycle-reset' - Cold start, i.e., to the state when the device is powered up.

517 'reset-to-nvram' - Warm start.

518 'reset-to-factory-defaults' - reset NVRAM to factory defaults.

519
520 non-process-run-out" (boolean):

521 The client OPTIONALLY supplies this operation attribute. The IPP object OPTIONALLY supports
522 this operation attribute, if it is able to perform a non-process-run-out, i.e., remove the last few
523 printed sheets of a job that is finished printing on a continuous-forms printer. Normally, on such a
524 printer, the last sheets of a job remain in the printer and are forced out by the next job, thereby
525 saving time when printing one job after another. This attribute indicates whether or not the printer
526 is to perform "non-process run-out", i.e., move the last printed sheet to the stacker, before resetting
527 the Printer.

528
529 If the client does not supply this attribute and the attribute is supported, the Printer does not perform
530 non-process run-out ('false' behavior). If the Printer does not support this attribute, the Printer is
531 assumed to perform non-process run-out ('true' behavior). ISSUE 2: Is the "non-process-run-out"

532 operation attribute really needed at all or can the default behavior for Reset-Printer be defined to be
533 to perform non-process run out (for continuous and cut sheet printers)?

534 6.1.5 Restart-Printer operation

535 Type of registration: operation

536 Proposed name of this operation: Restart-Printer

537 Object Target: Printer

538 Specification of this operation:

539 This OPTIONAL operation allows a client to restart a Printer that has previously been shutdown in standby
540 mode (see section 6.1.7). Standby mode is indicated by the Printer's "printer-state" being 'idle' and its
541 "printer-state-reasons" including the 'standby' value. If the Printer is not in standby mode, the Printer
542 MUST reject this operation and return the 'client-error-not-possible' status code.

543 Access Rights: The authenticated user (see [ipp-mod] section 8.3) performing this operation must be an
544 operator or administrator of the Printer object (see [ipp-mod] sections 1 and 8.5). Otherwise, the IPP object
545 MUST reject the operation and return: client-error-forbidden, client-error-not-authenticated, and client-
546 error-not-authorized as appropriate.

547 The Restart-Printer Request and Restart-Printer Response have the same attribute groups and attributes as
548 the Pause-Printer operation (see [ipp-mod] sections 3.2.7.1 and 3.2.7.2), including the new "printer-
549 message-from-operator" operation attribute (see section 2.1) and the following Group 1 operation attribute:

550 "non-process-run-out" (boolean):

551 The client OPTIONALLY supplies this operation attribute. The IPP object OPTIONALLY supports
552 this operation attribute, if it is able to perform a non-process-run-out, i.e., remove the last few
553 printed sheets of a job that is finished printing on a continuous-forms printer. Normally, on such a
554 printer, the last sheets of a job remain in the printer and are forced out by the next job, thereby
555 saving time when printing one job after another. This attribute indicates whether or not the printer
556 is to perform "non-process run-out", i.e., move the last printed sheet to the stacker, as part of
557 restarting the Printer.

558 If the client does not supply this attribute and the attribute is supported, the Printer does not perform
559 non-process run-out ('false' behavior). If the Printer does not support this attribute, the Printer is
560 assumed to perform non-process run-out ('true' behavior). ISSUE 3: Is the "non-process-run-out"
561 operation attribute really needed at all or can the default behavior for Restart-Printer be defined to
562 be to perform non-process run out (for continuous and cut sheet printers)?

563 6.1.6 Space-Printer operation

564 Type of registration: operation

565 Proposed name of this operation: Space-Printer

566 Object Target: Printer

567 Specification of this operation:

568 This OPTIONAL operation allows a client to repeat or skip a specified number of impressions on the target
569 Printer. The Printer repeats or skips the indicated number of impressions specified by the "back-space" or

570 "forward-space" operation attribute, respectively. This operation is typically supported in a continuous
571 forms implementation for synchronizing the web after forms run out or media change.

572 The Printer MUST accept this request in any state and whether or not there is a current job.

573 Access Rights: The authenticated user (see [ipp-mod] section 8.3) performing this operation must be an
574 operator or administrator of the Printer object (see [ipp-mod] sections 1 and 8.5). Otherwise, the IPP object
575 MUST reject the operation and return: client-error-forbidden, client-error-not-authenticated, and client-
576 error-not-authorized as appropriate.

577 The Reset-Printer Request and Reset-Printer Response have the same attribute groups and attributes as the
578 Pause-Printer operation (see [ipp-mod] sections 3.2.7.1 and 3.2.7.2), including the new "printer-message-
579 from-operator" operation attribute (see section 2.1), and with the addition of the following Group 1
580 operation attributes in the request:

581 "back-space" (integer(1:MAX)):

582 The client OPTIONALLY supplies this Operation attribute. The IPP object OPTIONALLY
583 supports this operation attribute, if it is able to repeat impressions.

584 If the client supplies a value that specifies more impressions than the job has performed, the job is
585 positioned at the beginning without any indication.

586 "forward-space" (integer(1:MAX)):

587 The client OPTIONALLY supplies this Operation attribute. The IPP object OPTIONALLY
588 supports this operation attribute, if it is able to skip impressions.

589 If the client supplies a value that specifies more impressions than remain in the job, the job is
590 positioned at the end without any indication.

591 "non-process-run-out" (boolean):

592 The client OPTIONALLY supplies this operation attribute. The IPP object OPTIONALLY supports
593 this operation attribute, if it is able to perform a non-process-run-out, i.e., remove the last few
594 printed sheets of a job that is finished printing on a continuous-forms printer. Normally, on such a
595 printer, the last sheets of a job remain in the printer and are forced out by the next job, thereby
596 saving time when printing one job after another. This attribute indicates whether or not the printer
597 is to perform "non-process run-out", i.e., move the last printed sheet to the stacker, after spacing the
598 Printer.

599
600 If the client does not supply this attribute and the attribute is supported, the Printer does not perform
601 non-process run-out ('false' behavior). If the Printer does not support this attribute, the Printer is
602 assumed to perform non-process run-out ('true' behavior). ISSUE 4: Is the "non-process-run-out"
603 operation attribute really needed at all or can the default behavior for Space-Printer be defined to be
604 to perform non-process run out (for continuous and cut sheet printers)?

605 4.1.4.6.1.7 Shutdown-Printer Operation

606 Type of registration: operation

607 Proposed name of this operation: ~~Enable~~Shutdown-Printer

608 Object Target: Printer

609 Specification of this operation:

610 This OPTIONAL operation allows a client to shut down a Printer, i.e., stop processing jobs ~~and terminating~~
 611 ~~all communications with the Printer.~~ Whether the device is powered down or put into standby mode,
 612 depends on the value of the "shutdown-function" operation attribute. If the value is 'power-off', or the
 613 "shutdown-function" attribute is omitted, the Printer adds the 'shutdown' value (see [ipp-mod] section
 614 4.4.11) to its "printer-state-reasons" Printer Description attribute immediately. If the value is 'standby', the
 615 Printer adds the 'standby' value to its "printer-state-reasons" Printer Description attribute immediately. The
 616 execution of the rest of the operation is the same for either value: The Printer is disabled immediately (see
 617 the Disable-Printer operation in section 6.1.2). The "when" operation attribute specifies how much
 618 processing occurs before the shutdown takes place. All other requests continue to be accepted until the
 619 printer is ~~shutdown~~powered down or enters standby mode. In standby mode, the Printer MUST continue to
 620 accept the Restart-Printer and Get-Printer-Attribute requests.

621 Whether or not the Shutdown-Printer operation affects jobs that were submitted to the device using job
 622 submission protocols other than IPP, depends on implementation, i.e., on whether the IPP protocol is being
 623 used as a universal management protocol or just to manage IPP jobs, respectively.

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

626 *Access Rights:* The authenticated user (see [ipp-mod] section 8.3) performing this operation must be an
 627 operator or administrator of the Printer object (see [ipp-mod] sections 1 and 8.5). Otherwise, the IPP object
 628 MUST reject the operation and return: client-error-forbidden, client-error-not-authenticated, and client-
 629 error-not-authorized as appropriate.

630 The Shutdown-Printer Request and Shutdown-Printer Response have the same attribute groups and
 631 attributes as the Pause-Printer operation (see [ipp-mod] sections 3.2.7.1 and 3.2.7.2), including the new
 632 "printer-message-from-operator" operation attribute (see section 2.1), the new "when" operation attribute
 633 (see section 2.3), and with the addition of the following Group 1 operation attributes in the request:

634 ~~"when" (type2 keyword)~~

635 ~~The client OPTIONALLY supplies this attribute. The Printer object MUST support this attribute, if~~
 636 ~~it supports this operation. The value of this attribute indicates when to shutdown the printer. If the~~
 637 ~~client omits this attribute, the Printer assumes the 'after-current' value.~~

638
 639 ~~Standard keyword values are:~~

640 ~~'now'—cancel the currently printing job(s) and shut down the Printer. Jobs in the 'held' and~~
 641 ~~'pending' state remain in those states.~~

642 ~~'after-current'—shutdown the Printer after the current job finishes printing. Jobs in the 'held'~~
 643 ~~and 'pending' state remain in those states.~~

644 ~~'after-all'—shutdown the Printer after all 'pending' jobs finish printing. Jobs in the 'held' state~~
 645 ~~remain in the 'held' state.~~

646 ~~ISSUE 4: Which values are required to be supported?~~

647

"non-process-run-out" (boolean)

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"synchronize" (boolean)

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The client OPTIONALLY supplies this attribute. The Printer object OPTIONALLY supports this attribute, if it is able to perform a non-process-run-out, i.e., remove the last few printed sheets of a job that is finished printing on a continuous-forms printer. Normally, on such a printer, the last sheets of a job remain in the printer and are forced out by the next job, thereby saving time when printing one job after another. This attribute indicates whether or not the printer is to perform "non-process run-out", i.e., move the last printed sheet to the stacker, before shutting down.

If the client does not supply this attribute and the attribute is supported, the Printer does not perform non-process run-out ('false' behavior). If the Printer does not support this attribute, the Printer is assumed to perform non-process run-out ('true' behavior).

ISSUE 5: Is the "non-process-run-out" operation attribute really needed at all or can the default behavior for Shutdown-Printer be defined to be to perform non-process run out (for continuous and cut sheet printers)?

~~ISSUE 4: What behavior if the client omits this attributes?~~

~~ISSUE 5: What behavior if the implementation does not support this attribute?~~

"synchronize" (boolean)

The client OPTIONALLY supplies this attribute. The Printer object OPTIONALLY supports this attribute. This attribute indicates whether or not the printer is to synchronize the checkpoint data for the current job ("when" = 'now') with the pages that have actually printed. If the value of the "when" attribute is not 'now' or the "when" attribute is not supplied, then the "synchronize" attribute has no meaning and the Printer MUST ignore it. If this attribute is supported, then a value of 'true' implies that the Printer will be able to resume the job at the point of synchronization when the Printer is restarted.

If the client does not supply this attribute and the attribute is supported, the Printer does not perform synchronization ('false' behavior). If the Printer does not support this attribute, the Printer is assumed to not synchronize ('false' behavior).

ISSUE 6: Do we really need the "synchronize" operation attribute or can synchronization be the default behavior of the Shutdown-Printer operation?

ISSUE 7: Is the current job automatically restarted when the Printer is restarted? Or does some client have to issue a Restart-Job operation?

680

6.2 Job Operations

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All Job operations are directed at Job objects. A client MUST always supply some means of identifying the Job object in order to identify the correct target of the operation. That job identification MAY either be a single Job URI or a combination of a Printer URI with a Job ID. The IPP object implementation MUST support both forms of identification for every job.

685

6.2.1 Set-Job-Attributes

686

687

Type of registration: operation

Proposed name of this operation: Set-Job-Attributes

688 Object Target: Job
 689 Specification of this operation:

690 This OPTIONAL operation allows a client to set the values of the attributes of a Job object. In the request,
 691 the client supplies the set of Job attribute names and values that are to be set. In the response, the IPP
 692 object returns success or rejects the request with indications of which attribute or attributes could not be set.

693 This operation is almost identical to the Set-Printer-Attributes operation (see section 6.1.1). The only
 694 differences are that the Set-Job-Attributes operation is directed at a Job object rather than a Printer object,
 695 there is no "document-format" operation attribute used when setting a Job object, and the validation is the
 696 same as the create job operations, i.e., depends on the "xxx-supported" Printer Description attributes.

697 The validation of the Set-Job-Attributes request is performed as if the job had been submitted originally
 698 with the new values. If such a create job operation would have been accepted, then the Set-Job-Attributes
 699 MUST be accepted. If such a create job operation would have been rejected, then the Set-Job-Attributes
 700 MUST be rejected and the Job MUST be unchanged.

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

Current "job-state"	New "job-state"	IPP object's response status code and action:
'pending'	'pending'	'successful-ok'
'pending'	'pending-held'	'successful-ok' - needed resources are not ready
'pending-held'	'pending-held'	'successful-ok'
'pending-held'	'pending'	'successful-ok' - needed resources are ready
'processing'	'processing'	'successful-ok' or 'client-error-not-possible' depending on the attributes being set, whether the job has started marking media, and/or implementation
'processing-stopped'	'processing-stopped'	'successful-ok' or 'client-error-not-possible' depending on the attributes being set, whether the job has started marking media, and/or implementation
'completed'	'completed'	'client-error-not-possible'
'canceled'	'canceled'	'client-error-not-possible'
'aborted'	'aborted'	'client-error-not-possible'

703 For Job attributes that are supported, some MUST be settable, some SHOULD be settable, some MAY be
 704 settable, and some MUST NOT be settable as indicated in the following table:

IPP Job Attributes	Settable?
all Job Template Job attributes ("xxx" [ipp-mod] section 4.2 and extensions)	SHOULD if attribute supported
job-uri	MUST NOT
job-id	MUST NOT
job-printer-uri	MUST NOT
job-more-info	MUST NOT if attribute supported
job-name	MUST - also set in create operation
job-originating-user-name	MUST NOT - set in create operation
job-state	MUST NOT
job-state-reasons	MUST NOT
job-state-message	MUST NOT if attribute supported
number-of-documents	MUST NOT
output-device-assigned	MUST NOT
time-at-creation	MUST NOT
time-at-processing	MUST NOT
time-at-completed	MUST NOT
job-printer-up-time	MUST NOT
date-time-at-creation	MUST NOT if attribute supported
date-time-at-processing	MUST NOT if attribute supported
date-time-at-completed	MUST NOT if attribute supported
number-of-intervening-jobs	MUST NOT if attribute supported
job-message-from-operator	MUST if attribute supported and if operator
	<u>Note: There is no "job-message-from-operator" operation attribute for the Set-Job-Attributes operation.</u>
job-k-octets	MUST NOT if attribute supported
job-impressions	MAY if attribute supported - see Rule 1
job-media-sheets	MAY if attribute supported - see Rule 1
job-k-octets-processed	MUST NOT if attribute supported
job-impressions-completed	MUST NOT if attribute supported
job-media-sheets-completed	MUST NOT if attribute supported
attributes-charset	MUST NOT - set in create operation
attributes-natural-language	MUST NOT - set in create operation

705 Rule 1 - However, an implementation MAY refuse to allow this Job Description attribute to be set, if it has
 706 determined a more reliable value from the document content.

707 Whether or not the Set-Job-Attributes operation affects jobs that are submitted using job submission
 708 protocols other than IPP, depends on implementation, i.e., on whether the IPP protocol is being used as a
 709 universal management protocol or just to manage IPP jobs, respectively.

710 *Access Rights:* The authenticated user (see [ipp-mod] section 8.3) performing this operation must either be
 711 the job owner or an operator or administrator of the Printer object (see [ipp-mod] sections 1 and 8.5).
 712 Otherwise, the IPP object MUST reject the operation and return: 'client-error-forbidden', 'client-error-not-
 713 authenticated', or 'client-error-not-authorized' as appropriate.

714 6.2.1.1 Set-Job-Attributes Request

715 The following sets of attributes are part of the Set-~~Printer~~Job-Attributes Request:

716 Group 1: Operation Attributes

717 Natural Language and Character Set:

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

720

721 Target:

722 Either (1) the "printer-uri" (uri) plus "job-id" (integer(1:MAX)) or (2) the "job-uri" (uri) operation
723 attribute(s) which define ~~The "printer-uri" (uri) operation attribute which is~~ the target for this
724 operation as described in [ipp-mod] section 3.1.5.

725

726 Requesting User Name:

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

729

730 "ipp-attribute-fidelity" (boolean):

731 The client OPTIONALLY supplies this attribute. The Printer object MUST support this attribute if
732 it supports this operation. This operation attribute is used to specify whether or not the sets are to be
733 atomic. If 'false', or not present, the Printer sets what it can and returns the unset attribute/value
734 pairs in the Unsupported Attributes group. If 'true', either all supplied attributes MUST be set or the
735 operation MUST be rejected. All Printer objects MUST support both types of setting. See [ipp-
736 mod] section 15 for a full description of "ipp-attribute-fidelity" and its relationship to other
737 attributes, especially the Printer object's "pdl-override-supported" attribute.

738

739 Group 2: ~~Printer Job~~ Attributes

740 The client MUST supply a set of Job attributes as defined in [ipp-mod] section 4.2 Job Template
741 Attributes ("xxx" attributes) and section 4.3 Job Description Attributes. Each Job attribute supplied
742 in Group 2 replaces the value(s) of the corresponding Job attribute on the target Job object. For
743 attributes that can have multiple values (1setOf), all values supplied by the client replace all values
744 of the corresponding ~~Printer Job~~ object attribute.

745

746 6.2.1.2 Set-Job-Attributes Response

747 The Printer object returns the following sets of attributes as part of the ~~GetSet~~-Job-Attributes Response:

748 Group 1: Operation Attributes

749 Status Message:

750 In addition to the REQUIRED status code returned in every response, the response OPTIONALLY
751 includes a "status-message" (text(255)) and/or a "detailed-status-message" (text(MAX)) operation
752 attribute as described in [ipp-mod] sections 13 and 3.1.6.

753

754 Natural Language and Character Set:

755 The "attributes-charset" and "attributes-natural-language" attributes as described in [ipp-mod]
756 section 3.1.4.2.

757

758 Group 2: Unsupported Attributes

759 See [ipp-mod] section 3.1.7 for details on returning Unsupported Attributes.

760

761 The attributes returned are the same as for the create operation with the same new attribute values.
762 However, in the case of attributes that are supported, but are not settable by the implementation (see
763 table above), the Printer object returns the client-supplied attribute(s) with a substituted value of
764 'not-settable'. This value's syntax type is "out-of-band" and its encoding is defined by special rules
765 for "out-of-band" values in the "Encoding and Transport" document [IPP-PRO]. Its value indicates
766 that the attribute is not settable.

767

768 Group 2 is returned independent of the value for the "ipp-attribute-fidelity" attribute supplied by the
769 client. However, if "ipp-attribute-fidelity" is 'true', the 'client-error-attributes-not-settable' status
770 code is returned. If "ipp-attribute-fidelity" is 'false', the 'successful-ok-ignored-or-substituted-
771 attributes' status code is returned.

772

773 ~~ISSUE 7: Should we add a Group 3: Printer Object Attributes which returns the previous values for any~~
774 ~~attributes set?~~

775 6.2.2 Reprocess-Job Operation

776 This OPTIONAL operation is a create job operation that allows a client to re-process a copy of a job that
777 had been retained in the queue after processing ~~has~~ completed, was canceled, or was aborted (see [ipp-
778 mod] section 4.3.7.2). This operation is the same as the Restart-Job operation (see [ipp-mod] section
779 3.3.7), except that the Printer creates a new job that is a copy of the ~~identified-target~~ job and the ~~identified~~
780 target job is unchanged. The new job is assigned new values to the "job-uri" and "job-id" attributes and the
781 new job's Job Description attributes that accumulate job progress, such as "job-impressions-completed",
782 "job-media-sheets-completed", and "job-k-octets-processed", are initialized to 0 as with any create job
783 operation. The ~~identified-target~~ job moves to the Job History after a suitable period, independent of
784 whether one or more Reprocess-Job operations have been performed on it.

785 If the Set-Job-Attributes operation is supported, then the "job-hold-until" operation attribute MUST be
786 supported with at least the 'indefinite' value, so that a client can modify the new job before it is scheduled
787 for processing using the Set-Job-Attributes operation. After modifying the job, the client can release the
788 job for processing, by using the Release-Job operation specifying the newly assigned "job-uri" or "job-id"
789 for the new job.

790 6.2.3 Cancel-Current-Job Operation

791 This OPTIONAL operation allows a client to cancel the current job on the target Printer. Since a Job might
792 already be marking by the time a Cancel-Current-Job is received, some media sheet pages might be printed
793 before the job is actually terminated.

794 If there are no jobs in the 'processing' or 'processing-stopped' states, the Printer rejects the request and
 795 returns the 'client-error-not-possible' status code. Otherwise, the Printer MUST perform the Cancel-
 796 Current-Job request, as if the client had supplied the "job-uri" or the "job-id" of the current job in a Cancel-
 797 Job operation. If more than one job is in the 'processing' or 'processing-stopped' states, the one that is
 798 marking is canceled and the others are unaffected.

799 Warning: On a shared printer, there is a race condition. Between the time that a user issues this operation
 800 and its acceptance, the current job might change to a different job. If the user is authenticated to cancel the
 801 new job, the wrong job is canceled. To prevent this race from canceling the wrong job, the client can
 802 supply the "job-id" operation attribute which is checked against the current job's job-id. If the job identified
 803 by the "job-id" attribute is not the current job on the Printer, the Printer MUST reject this operation and
 804 return the 'client-error-not-possible' status code.

805 *Access Rights:* The authenticated user (see [ipp-mod] section 8.3) performing this operation must either be
 806 the job owner of the current job or an operator or administrator of the Printer object (see [ipp-mod] sections
 807 1 and 8.5). Otherwise, the IPP object MUST reject the operation and return: 'client-error-forbidden', 'client-
 808 error-not-authenticated', or 'client-error-not-authorized' as appropriate.

809 The Cancel-Current-Job Request and Cancel-Current-Job Response have the same attribute groups and
 810 attributes as the Pause-Printer operation (see [ipp-mod] sections 3.2.7.1 and 3.2.7.2), including the new
 811 "job-message-from-operator" operation attribute (see ~~[ipp-mod]~~ section 2.22.2), with the addition of the
 812 following Group 1 Operation attributes in the request:

813 "job-id" (integer(1:MAX)):

814 The client OPTIONALLY supplies this Operation attribute in order to verify that the identified job
 815 is still the current job on the target Printer object. The IPP object MUST supports this operation
 816 attribute, if it supports this operation.

817 "non-process-run-out" (boolean):

818 The client OPTIONALLY supplies this Operation attribute. The IPP object OPTIONALLY
 819 supports this operation attribute, if it is able to perform a non-process-run-out, i.e., remove the last
 820 few printed sheets of a job that is finished printing on a continuous-forms printer. Normally, on
 821 such a printer, the last sheets of a job remain in the printer and are forced out by the next job,
 822 thereby saving time when printing one job after another. However, when ~~shutting down the~~
 823 ~~Printer~~ canceling the current job it is it desirable to remove the end of the last canceled job to the
 824 stacker. This attribute indicates whether or not the printer is to perform "non-process run-out", i.e.,
 825 move the last printed sheet to the stacker, after canceling the current job.

827 If the client does not supply this attribute and the attribute is supported, the Printer does not perform
 828 non-process run-out ('false' behavior). If the Printer does not support this attribute, the Printer is
 829 assumed to perform non-process run-out ('true' behavior).

830 ~~ISSUE 8: What behavior if the client omits this attributes?~~

831 ~~ISSUE 9: What behavior if the implementation does not support this attribute?~~

832 ISSUE 8: Why isn't non-process-run-out automatic on a continuous form printer? When would an
 833 operator want to cancel the job and NOT run out the last sheets.? It would be simpler to require
 834 process-run-out when canceling the current job (for continuous and cut sheet printers).

835 "synchronize" (boolean):

836 ~~The client OPTIONALLY supplies this Operation attribute. The IPP object OPTIONALLY~~
837 ~~supports this operation attribute, if it is able to synchronize the data, i.e., synchronize the checkpoint~~
838 ~~data for the current job with the pages that have actually printed. If this attribute is supported, a~~
839 ~~value of 'true' causes the Printer to resume the job at the point of synchronization when the Printer is~~
840 ~~restarted.~~

841 ~~ISSUE 11: Should we define a Restart Printer operation?~~

842 ~~ISSUE 12: What behavior if the client omits this attributes?~~

843 ~~ISSUE 13: What behavior if the implementation does not support this attribute?~~

844 ~~ISSUE 14: What does this attribute mean when the "when" attribute is 'after-current' or 'after-all'?~~
845 ~~Or should this be a new value for "when", i.e., 'after-synchronization' so it is only used when~~
846 ~~shutting down the Printer in the middle of the current job?~~

847 6.2.4 Pause-Job operation

848 This OPTIONAL operation allows a client to stop the target job and allow other jobs to be processed
849 instead. The Printer moves the target job to the 'pending-held' state and sets the 'job-paused' value in the
850 job's "job-state-reasons" attribute. ISSUE 9: Or should the job's state be 'processing-stopped' after a Pause-
851 Job or Pause-Current-Job operation in order to indicate that it has processed some with the 'job-paused'
852 value added to the job's "job-state-reasons" attribute? Then the 'pending-held' job state is not partitioned
853 into two parts depending on whether the Hold-Job or Pause-Job operation was performed.

854 If the target job is not in the 'processing' or 'processing-stopped' states, the Printer rejects the request and
855 returns the 'client-error-not-possible' status code. Otherwise, the Printer stops the target job and processes
856 other jobs.

857 The Printer MUST reject a Release-Job request (and return the 'client-error-not-possible') for a job that has
858 been paused, i.e., for a job in the 'pending-held' state, with the 'job-paused' value in its "job-state-reasons"
859 attribute.

860 If the Pause-Job operation is supported, then the Pause-Current-Job and Resume-Job operations MUST be
861 supported, and vice-versa.

862 Access Rights: The authenticated user (see [ipp-mod] section 8.3) performing this operation must either be
863 the job owner of the target job or an operator or administrator of the Printer object (see [ipp-mod] sections 1
864 and 8.5). Otherwise, the IPP object MUST reject the operation and return: 'client-error-forbidden', 'client-
865 error-not-authenticated', or 'client-error-not-authorized' as appropriate.

866 The Pause-Job Request and Pause-Job Response have the same attribute groups and attributes as the
867 Cancel-Job operation (see [ipp-mod] section 3.3.3.1), including the new "job-message-from-operator"
868 operation attribute (see section 2.2), the new "when" operation attribute (see section 2.3), with the addition
869 of the following Group 1 Operation attribute in the request:

870 "non-process-run-out" (boolean)

871 The client OPTIONALLY supplies this attribute. The Printer object OPTIONALLY supports this
872 attribute, if it is able to perform a non-process-run-out, i.e., remove the last few printed sheets of a
873 job that is finished printing on a continuous-forms printer. Normally, on such a printer, the last
874 sheets of a job remain in the printer and are forced out by the next job, thereby saving time when
875 printing one job after another. This attribute indicates whether or not the printer is to perform "non-
876 process run-out", i.e., move the last printed sheet to the stacker, as part of pausing the job.

877
878 If the client does not supply this attribute and the attribute is supported, the Printer does not perform
879 non-process run-out ('false' behavior). If the Printer does not support this attribute, the Printer is
880 assumed to perform non-process run-out ('true' behavior).

881 ISSUE 10: Is the "non-process-run-out" operation attribute really needed at all or can the default
882 behavior for Pause-Job be defined to be to perform non-process run out (for continuous and cut
883 sheet printers)?

884
885 "synchronize" (boolean)

886 The client OPTIONALLY supplies this attribute. The Printer object OPTIONALLY supports this
887 attribute. This attribute indicates whether or not the printer is to synchronize the checkpoint data for
888 the current job being paused with the pages that have actually printed. If this attribute is supported,
889 then a value of 'true' implies that the Printer will be able to resume the job at the point of
890 synchronization when the job is resumed.

891
892 If the client does not supply this attribute and the attribute is supported, the Printer does not perform
893 synchronization ('false' behavior). If the Printer does not support this attribute, the Printer is
894 assumed to not synchronize ('false' behavior).

895 ISSUE 11: Do we really need the "synchronize" operation attribute or can synchronization be the
896 default behavior of the Pause-Job operation?

897 6.2.5 Pause-Current-Job operation

898 This OPTIONAL operation allows a client to stop the current job on the target Printer and allow other jobs
899 to be processed instead. The Printer moves the current job to the 'pending-held' state and sets the 'job-
900 paused' value in the job's "job-state-reasons" attribute. ISSUE 12: Or should the job's state be 'processing-
901 stopped' after a Pause-Job or Pause-Current-Job operation in order to indicate that it has processed some?
902 Then the 'pending-held' job state is not partitioned into two parts depending on whether the Hold-Job or
903 Pause-Current-Job operation was performed.

904 If there are no jobs in the 'processing' or 'processing-stopped' states, the Printer rejects the request and
905 returns the 'client-error-not-possible' status code. Otherwise, the Printer stops the current job and processes
906 other jobs.

907 Warning: On a shared printer, there is a race condition. Between the time that a user issues this operation
908 and its acceptance, the current job might change to a different job. If the user is authenticated to pause the
909 new job, the wrong job is paused. To prevent this race from pausing the wrong job, the client can supply
910 the "job-id" operation attribute which is checked against the current job's job-id. If the job identified by the

911 "job-id" attribute is not the current job on the Printer, the Printer MUST reject this operation and return the
912 'client-error-not-possible' status code.

913 If the Pause-Current-Job operation is supported, then the Pause-Job and Resume-Job operations MUST be
914 supported, and vice-versa.

915 Access Rights: The authenticated user (see [ipp-mod] section 8.3) performing this operation must either be
916 the job owner of the current job or an operator or administrator of the target Printer object (see [ipp-mod]
917 sections 1 and 8.5). Otherwise, the IPP object MUST reject the operation and return: 'client-error-
918 forbidden', 'client-error-not-authenticated', or 'client-error-not-authorized' as appropriate.

919 The Pause-Current-Job Request and Pause-Current-Job Response have the same attribute groups and
920 attributes as the Pause-Job operation (see 6.2.4), including the new "job-message-from-operator" operation
921 attribute (see section 2.2), with the addition of the following Group 1 Operation attribute in the request, but
922 not including the new "when" operation attribute (see section 2.3):

923 "job-id" (integer(1:MAX)):

924 The client OPTIONALLY supplies this Operation attribute in order to verify that the identified job
925 is still the current job on the target Printer object. The IPP object MUST supports this operation
926 attribute, if it supports this operation.

927 6.2.6 Resume-Job operation

928 This OPTIONAL operation allows a client to stop the target job and allow other jobs to be processed
929 instead. The Printer moves the target job to the 'pending' state and removes the 'job-paused' value from the
930 job's "job-state-reasons" attribute. ISSUE 13: Or should the job's state be 'processing-stopped' after a
931 Pause-Job or Pause-Current-Job operation in order to indicate that it has processed some? Then the
932 'pending-held' job state is not partitioned into two parts depending on whether the Hold-Job or Pause-Job
933 operation was performed.

934 If the target job is not in the 'pending-held' state with the 'job-paused' value in the job's "job-state-reasons"
935 attribute, the Printer rejects the request and returns the 'client-error-not-possible' status code.

936 If the Resume-Job operation is supported, then the Pause-Job and Pause-Current-Job operations MUST be
937 supported, and vice-versa.

938 Access Rights: The authenticated user (see [ipp-mod] section 8.3) performing this operation must either be
939 the job owner of the target job or an operator or administrator of the Printer object (see [ipp-mod] sections 1
940 and 8.5). Otherwise, the IPP object MUST reject the operation and return: 'client-error-forbidden', 'client-
941 error-not-authenticated', or 'client-error-not-authorized' as appropriate.

942 The Resume-Job Request and Resume-Job Response have the same attribute groups and attributes as the
943 Cancel-Job operation (see [ipp-mod] section 3.3.3), including the new "job-message-from-operator"
944 operation attribute (see section 2.2).

945 6.2.7 Promote-Job operation

946 This OPTIONAL operation allows a client to make the pending target job be processed next after the
947 current job completes.

948 If the target job is in the 'pending' state, this operation does not change the job's state, but the Printer adds
949 the 'process-next' value to the job's "job-state-reasons" attribute. If the target job is not in the 'pending'
950 state, the Printer rejects the request and returns the 'client-error-not-possible' status code. The Printer
951 returns the target job immediately after the current job(s) in a Get-Jobs response (see [ipp-mod] section
952 3.2.6) for the 'not-completed' jobs.

953 When the current job completes, is canceled, paused, or aborted, the target of this operation is processed
954 next, at which time the Printer removes the 'process-next' value from the job's "job-state-reasons" attribute.

955 If a client issues this request (again) before the target of the operation of the original request started
956 processing, the target of this new request replaces the previous job that was to be processed next. The
957 Printer removes the 'process-next' from the previous job and adds the value to the target of the subsequent
958 request. In other words, only one job at a time has the property to be the next job and no more than one job
959 has the 'process-next' value in its "job-state-reasons" attribute at the same time.

960 If a client issues a Hold-Job operation with the target being the job that is to be processed next, the Printer
961 removes the 'process-next' value from the target job's "job-state-reasons" attribute and moves it to the 'held'
962 state.

963 Access Rights: The authenticated user (see [ipp-mod] section 8.3) performing this operation must be an
964 operator or administrator of the Printer object (see [ipp-mod] sections 1 and 8.5). Otherwise, the IPP object
965 MUST reject the operation and return: 'client-error-forbidden', 'client-error-not-authenticated', or 'client-
966 error-not-authorized' as appropriate.

967 The Promote-Job Request and Promote-Job Response have the same attribute groups and attributes as the
968 Cancel-Job operation (see [ipp-mod] section 3.3.3), including the new "job-message-from-operator"
969 operation attribute (see section 2.2).

970 ~~4.1.4~~6.2.8 Space-Current-Job operation

971 This OPTIONAL operation allows a client to repeat or skip a specified number of impressions for the
972 current job on the target Printer. This operation is typically supported in a continuous forms
973 implementation for synchronizing the web after forms run out or media change.

974 If there are no jobs in the 'processing' or 'processing-stopped' states, the Printer rejects the request and
975 returns the 'client-error-not-possible' status code. Otherwise, the Printer repeats or skips the indicated
976 number of impressions specified by the "back-space" or "forward-space" operation attribute, respectively.

977 Warning: On a shared printer, there is a race condition. Between the time that a user issues this operation
978 and its acceptance, the current job might change to a different job. If the user is authenticated to space the
979 new job, the wrong job is spaced. To prevent this race from spacing the wrong job, the client can supply

980 the "job-id" operation attribute which is checked against the current job's job-id. If the job identified by the
981 "job-id" attribute is not the current job on the Printer, the Printer MUST reject this operation and return the
982 'client-error-not-possible' status code.

983 *Access Rights:* The authenticated user (see [ipp-mod] section 8.3) performing this operation must either be
984 the job owner of the current job or an operator or administrator of the Printer object (see [ipp-mod] sections
985 1 and 8.5). Otherwise, the IPP object MUST reject the operation and return: 'client-error-forbidden', 'client-
986 error-not-authenticated', or 'client-error-not-authorized' as appropriate.

987 The Space-Current-Job Request and Space-Current-Job Response have the same attribute groups and
988 attributes as the ~~PauseSpace~~Printer operation (see ~~[ipp-mod] section 6.1.6s 3.2.7.1 and 3.2.7.2~~), including
989 the new "job-message-from-operator" operation attribute (see ~~[ipp-mod] section 2.22.2~~), with the addition
990 of the following Group 1 Operation attribute in the request:

991 "job-id" (integer(1:MAX)):

992 The client OPTIONALLY supplies this Operation attribute in order to verify that the identified job
993 is still the current job on the target Printer object. The IPP object MUST support this operation
994 attribute, if it supports this operation.

995 ~~"back-space" (integer(1:MAX)):~~

996 ~~The client OPTIONALLY supplies this Operation attribute. The IPP object OPTIONALLY~~
997 ~~supports this operation attribute, if it is able to repeat impressions.~~

998 ~~If the client supplies a value that specifies more impressions than the job has performed, the job is~~
999 ~~positioned at the beginning without any indication.~~

1000 ~~"forward-space" (integer(1:MAX)):~~

1001 ~~The client OPTIONALLY supplies this Operation attribute. The IPP object OPTIONALLY~~
1002 ~~supports this operation attribute, if it is able to skip impressions.~~

1003 ~~If the client supplies a value that specifies more impressions than remain in the job, the job is~~
1004 ~~positioned at the end without any indication.~~

1005 ~~"non-process-run-out" (boolean):~~

1006 ~~The client OPTIONALLY supplies this Operation attribute. The IPP object OPTIONALLY~~
1007 ~~supports this operation attribute, if it is able to perform a non-process run-out, i.e., remove the last~~
1008 ~~few printed sheets of a job that is finished printing on a continuous forms printer. Normally, on~~
1009 ~~such a printer, the last sheets of a job remain in the printer and are forced out by the next job,~~
1010 ~~thereby saving time when printing one job after another. However, when backspacing or advance~~
1011 ~~the Printer is it desirable to be able to specify whether or not to force out the most recently printed~~
1012 ~~sheets. **ISSUE 15: Correct?**~~

1013