

1 PWG-DRAFT - 20 ISSUES are numbered and highlighted like this
2 ipp-ops-admin-990719.txt

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3 4 5 6 7 Internet Printing Protocol/1.0 & 1.1: Additional Administrative Operations 8

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, 6/30/1999, at the IETF IPP WG meeting, 7/7/99-7/8/99, in Copenhagen, and the IPP
13 telecon, 7/17/1999. Unresolved ISSUES are highlighted like this in the .doc and .pdf files.

14 Abstract

15 This document specifies 15 additional OPTIONAL administrative operations for use with the Internet
16 Printing Protocol/1.0 (IPP) [RFC2565, RFC2566] and IPP/1.1 [ipp-mod, ipp-pro]. These operations are 6
17 Printer object operations that operators/administrators may perform on a Printer object:

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

24 and 7 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-Current-Job (though the target is the Printer object)
30 Resume-Job
31 Promote-Job
32 Space-Current-Job (though the target is the Printer object)

33 In addition, two operation attributes are defined: "printer-message-from-operator" and "job-message-from-
34 operator" are included to set the corresponding Printer and Job Description attributes with the same names.
35 And the "when" operation attribute is added to the IPP/1.1 Pause-Printer operation.

36 Finally, new status codes: 'client-error-attributes-not-settable' and 'server-error-printer-is-in-standby-mode'
37 are added.

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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108 1. Introduction

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

114 2. New Operation attributes

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

117 2.1 New operation attribute: "printer-message-from-operator" (text(127))

118 Type of registration: attribute

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

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

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

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

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

124

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

126

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

128 The client OPTIONALLY supplies this attribute. The Printer object SHOULD supports this
129 operation attribute if it supports the corresponding Printer Description attribute. The value of this
130 attribute is a message from the operator about the Printer object on which the operator is performing
131 the operation. If supported, the Printer copies the value to the Printer's "printer-message-from-
132 operator" Printer Description attribute (see [ipp-mod] section 4.4.25), automatically sets the value of
133 the Printer's "printer-message-time" with the current value of the Printer's "printer-up-time"
134 attribute, the value of the "printer-message-date-time" with the current value of the Printer's printer-
135 current-date-time" attribute, and the value of the Printer's "printer-message-operation" with the
136 operation-id value of this operation (see [ipp-mod] section 4.4.15).

137

138 If the client omits this attribute, the Printer does not change the value of its "printer-message-from-
139 operator", "printer-message-time", "printer-message-date-time", and "printer-message-operation"
140 Printer Description attributes.

141

142 If the client supplies this attribute with a zero-length text value or with a value consisting solely of
143 white space, the Printer copies that value as any other value to the Printer's "printer-message-from-
144 operator" and sets the "printer-message-time", "printer-message-date-time", and "printer-message-
145 operation" attributes. Supplying such a value is the way that the operator indicates that there is no
146 longer a printer message from the operator (rather than using the "out-of-band" 'no-value' value).

147

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

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

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

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

152 Disable-Printer - see section 6.1.2

153 Enable-Printer - see section 6.1.3

154 Reset-Printer - see section 6.1.4

155 Restart-Printer - see section 6.1.5

156 Shutdown-Printer - see section 6.1.6

157

158 The "printer-message-from-operator" operation attribute MUST NOT be supported as an operation attribute
159 for the Set-Printer-Attributes operation. If the operator wants to set the Printer's "printer-message-from-
160 operator" Printer Description attribute when issuing the Set-Printer-Attributes operation, the client supplies
161 the "printer-message-from-operator" with its new value as one of the Printer Description attributes in Group
162 2 in the request. The Printer also updates the Printer's "printer-message-date-time" and "printer-message-
163 operation" Printer Description attributes. If the client does not explicitly supply the "printer-message-from-
164 operator" with its new value, the Printer leaves the value of the Printer's "printer-message-from-operator"
165 Printer Description attribute unchanged.

166 2.2 New operation attribute: "job-message-from-operator" (text(127))

167 Type of registration: attribute

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

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

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

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

172 Attribute syntax(es) (include lsetOf and range as in Section 4.2): text(127)

173

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

175

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

177 The client OPTIONALLY supplies this attribute. The Printer object SHOULD supports this
178 operation attribute if it supports the corresponding Job Description attribute. The value of this
179 attribute is a message from the operator about the Job object on which the operator has just
180 performed an operation. If supported, the Printer copies the value to the Job's "job-message-from-
181 operator" Job Description attribute (see [ipp-mod] section 4.3.16).

182

183 If the client omits this attribute, the Printer does not change the value of its "printer-message-from-
184 operator" Job Description attribute.

185

186 If the client supplies this attribute with a zero-length text value or with a value consisting solely of
187 white space, the Printer copies that value as any other value to the job's "job-message-from-

188 operator". Supplying such a value is the way that the operator indicates that there is no longer a job
189 message from the operator (rather than using the "out-of-band" 'no-value' value).

190

191 Note: There are no corresponding "job-message-time", "job-message-date-time", and "job-message-
192 operation" Job Description attributes, since the usual lifetime of a job is limited.

193

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

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

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

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

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

199 Reprocess-Job - see section 6.2.2

200 Cancel-Current-Job - see section 6.2.3

201 Pause-Current-Job - see section **Error! Reference source not found.**

202 Resume-Job - see section 6.2.5

203 Promote-Job - see section 6.2.6

204 Space-Current-Job - see section 6.2.7

205

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

212 2.3 New operation attribute for Get-Printer-Attributes: "factory-settings" (boolean)

213 Type of registration: attribute

214 Proposed keyword name of this attribute: "factory-settings"

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

216 Operations to be used with if the attribute is an operation attribute: Get-Printer-Attributes

217 Object (Job, Printer, etc. if bound to an object): N/A

218 Attribute syntax(es) (include 1setOf and range as in Section 4.2): boolean

219

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

221 "factory-settings" (boolean)

222 The client OPTIONALLY supplies this attribute. The Printer object OPTIONALLY supports this
223 attribute, if it supports the Set-Printer-Attributes operation. If the client omits this attribute or
224 supplies the 'false' value, the Printer returns the current values of the requested attributes that are
225 settable, i.e., the values that have been set by previous Set-Printer-Attributes. If the client supplies
226 the 'true' value, the Printer returns the factory settings, i.e., the inherent values supported by the
227 implementation as shipped from the manufacturer or established at install time. This operation
228 attribute allows an operator to determine which values are supported in an implementation after

229 having modified a settable attribute. Attributes that are not settable are not affected by this
230 operation attribute, so that the Printer returns the same values for non-settable attribute when either
231 the 'true' or 'false' value has been supplied. If this operation attribute is supported, both values
232 MUST be supported.

233 2.4 New operation attribute for Pause-Printer: "when" (type2 keyword)

234 Type of registration: attribute

235 Proposed keyword name of this attribute: "when"

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

237 Operations to be used with if the attribute is an operation attribute: Pause-Printer, Reset-Printer, Shutdown-
238 Printer, and Pause-Current-Job

239 Object (Job, Printer, etc. if bound to an object): N/A

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

241

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

243 "when" (type2 keyword)

244 The client OPTIONALLY supplies this attribute. The Printer object OPTIONALLY supports this
245 attribute, if it supports this operation. The value of this attribute indicates when to pause, reset, or
246 shutdown the printer. If the client omits this attribute, the Printer assumes the 'after-current-job'
247 value. The 'after-current-job' value is REQUIRED to be supported if the "when" attribute is
248 supported; the remaining values are OPTIONAL.

249 **ISSUE 1: Can a client determine the values of "when" that are supported for operations (Pause-
250 Printer, Reset-Printer, Shutdown-Printer, and Pause-Current-Job)?**

251 We did not resolve this issue, since there could be different values of "when" for the four different
252 operations. Adding four "when-xxx" Printer Description attributes is a possibility, but does seem
253 overkill.

254

255 Standard keyword values are:

256 'now' - cancel the currently printing job(s) and shutdown the Printer. Jobs in the 'held' and
257 'pending' state remain in those states.

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

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

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

264

265

266 2.5 Summary of the operation attributes for the Printer operations

267 The following table shows the operation attributes for the Printer operations that a client MAY supply in a
268 request. Operation parameters and attributes that a client MUST supply are not shown. Also "requesting-
269 user-name" is not shown, though it is RECOMMENDED that a client supply it in every request.

270 Legend:

271 R - REQUIRED for a Printer to support

272 O - OPTIONAL for a Printer to support; the Printer ignores the attribute if not supported

Operation Attribute	Pause-Printer	Resume-Printer	Purge-Jobs	Get-Printer-Attributes	Set-Printer-Attributes	Enable-Print	Disable-Printer	Reset-Printer	Restart-Printer	Shut down-Printer
document-format				R	R					
factory-settings				O						
printer-message-from-operator	O	O	O			O	O	O	O	O
job-type						O	O			
when	O							O		O
reset-function								R		
non-process-run-out									O	O
synchronize										O
shutdown-function										R

273 2.6 Summary of the operation attributes for the Job operations

274 The following table shows the operation attributes for the Job operations that a client MAY supply in a
 275 request. Operation attributes that specify the Printer or Job object as the target are shown in the first two
 276 rows, respectively. Other operation attributes and parameters that a client MUST supply are not shown.
 277 Also "requesting-user-name" is not shown, though it is RECOMMENDED that a client supply it in every
 278 request.

279 Legend:

280 R - REQUIRED for a Printer to support

281 O - OPTIONAL for a Printer to support; the Printer ignores the attribute if not supported

Operation Attribute	Cancel-Job	Cancel-Current-Job	Hold-Job	Release-Job	Space-Current-Job	Pause-Current-Job	Resume-Job	Get-Job-Attributes	Set-Job-Attributes	Restart-Job	Reprocess-Job	Promote-Job
printer-uri		R			R	R						
printer-uri/job-id or job-uri	R		R	R			R	R	R	R	R	R
job-id		R			R	R						
requested-attributes								R				
back-space					O							
forward-space					O							
non-process-run-out		O			O	O						
synchronize					O	O						
when						O					O	
job-message-from-operator	O	O	O	O		O	O			O	O	O
message [to-operator]	O		O	O		O	O			O	O	O
job-hold-until			O*	O*							O**	

282 * The Printer MUST support the "job-hold-until" operation attribute if it supports the "job-hold-until" Job
283 Template attribute.

284 ** The Printer MUST support the "job-hold-until" operation attribute if it supports the Set-Job-Attributes
285 operation, so that the client can hold the job with the Reprocess-Job operation and the modify the job before
286 releasing it to be processed.

287 3. New Printer Description Attributes

288 The following new Printer Description attributes are needed to support the new operations defined in this
289 document.

290 3.1 settable-attributes (1setOf type2 keyword)

291 Type of registration: attribute

292 Proposed keyword name of this attribute: settable-attributes

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

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

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

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

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

298 If this is a Printer attribute, MAY the value returned depend on "document-format" (See Section 6.2): Yes

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

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

302 4.2.? settable-attributes (1setOf type2 keyword)

303 This READ-ONLY Printer attribute identifies the Printer and Job object attributes that are settable in this
304 implementation, i.e., that are settable using the Set-Printer-Attributes and Set-Job-Attributes operations,
305 respectively. This attribute MUST be supported if the Set-Printer-Attributes or Set-Job-Attributes
306 operations are supported. The Printer MUST reject attempts to set any Printer or Job attributes that are not
307 in this list, returning the 'client-error-attributes-not-settable' status code (see section 5.1). The value of this
308 attribute MAY depend on the value of the "document-format" operation attribute supplied in the Get-
309 Printer-Attributes operation (see [ipp-mod] section 3.2.5.1).

310 ISSUE 2: Can we add just one Printer Description attribute: "settable-attributes" or do we need a "printer-
311 settable-attributes" and a "job-settable-attributes" Printer Description attributes? What if the Interpreter
312 and/or the Document object become real objects, would we need to add "interpreter-settable-attributes" and
313 "document-settable-attributes" Printer Description attributes?
314

315 3.2 printer-controls-other-protocols (boolean)

316 Type of registration: attribute

317 Proposed keyword name of this attribute: printer-controls-other-protocols

318 Types of attribute (Operation, Job Template, Job Description, Printer Description): Printer Description
319 Operations to be used with if the attribute is an operation attribute: N/A
320 Object (Job, Printer, etc. if bound to an object): Printer
321 Attribute syntax(es) (include 1setOf and range as in Section 4.2): boolean
322 If attribute syntax is 'keyword' or 'enum', is it type2 or type3: N/A
323 If this is a Printer attribute, MAY the value returned depend on "document-format" (See Section 6.2): No
324 If this is a Job Template attribute, how does its specification depend on the value of the "multiple-
325 document-handling" attribute: N/A
326 Specification of this attribute (follow the style of IPP Model Section 4.2):
327 4.2.? printer-controls-other-protocols (boolean)

328 This Printer attribute indicates whether administrative operations, such as Disable-Printer, Pause-Printer,
329 etc., affect non-IPP protocols that may be supported. It is RECOMMENDED that IPP control other non-
330 IPP protocols. However, this attribute permits an implementation to indicate explicitly whether it does
331 affect other protocols or not.

332 A 'false' value indicates that IPP operations only affect jobs submitted by the IPP Protocol. For example, a
333 'true' value indicates that a Disable-Printer operation prevents all protocols from submitting jobs, not just
334 the IPP protocol. An another example, a 'true' value indicates that the Pause-Printer operation would pause
335 the current job, no matter what job submission protocol had submitted it.

336 **ISSUE 3: Ok that the "printer-controls-other-protocols" Printer Description attribute is just a boolean, or do**
337 **we need a list of operations that affect non-IPP protocols?**

338 As with any Printer Description attribute that this specification does not list as READ-ONLY, an
339 implementation MAY allow an administrator to change the value of this attribute using Set-Printer-
340 Attributes, thereby changing the way that the IPP operations affect other non-IPP protocols. An
341 implementation MAY also support other means to change the value of this attribute, such as via the console
342 or at installation time.

343 **ISSUE 4: Is IPP intended for printer management. The issue is still undetermined?**

344 3.3 printer-message-time (integer(MIN:MAX))

345 Type of registration: attribute
346 Proposed keyword name of this attribute: printer-message-time
347 Types of attribute (Operation, Job Template, Job Description, Printer Description): Printer Description
348 Operations to be used with if the attribute is an operation attribute: N/A
349 Object (Job, Printer, etc. if bound to an object): Printer
350 Attribute syntax(es) (include 1setOf and range as in Section 4.2): integer(MIN:MAX)
351 If attribute syntax is 'keyword' or 'enum', is it type2 or type3: N/A
352 If this is a Printer attribute, MAY the value returned depend on "document-format" (See Section 6.2): No
353 If this is a Job Template attribute, how does its specification depend on the value of the "multiple-
354 document-handling" attribute: N/A
355 Specification of this attribute (follow the style of IPP Model Section 4.2):

356 4.2.? printer-message-time (integer(MIN:MAX))

357 This READ-ONLY Printer Description attribute contains the time that the Printer's "printer-message-from-
358 operator" was changed by the operator using any operation where the client supplied the "printer-message-
359 from-operator" operation attribute (see section 2.1) or was explicitly set using the Set-Printer-Attributes
360 operation (see section 6.1.1). This attribute allows the users to know when the "printer-message-from-
361 operator" attribute was last set.

362 The Printer sets the value of this attribute by copying the value of the Printer's "printer-up-time" attribute
363 (see [ipp-mod] section 4.3.14). If the Printer resets its "printer-up-time" attribute to 1 on power-up, then it
364 MUST change the value of the "printer-message-time" to 0 or a negative number as specified in [ipp-mod]
365 section 4.3.14.

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

368 3.4 printer-message-date-time (dateTime)

369 Type of registration: attribute

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

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

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

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

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

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

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

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

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

380 4.2.? printer-message-date-time (dateTime)

381 This READ-ONLY Printer Description attribute contains the date and time that the Printer's "printer-
382 message-from-operator" was changed by the operator using any operation where the client supplied the
383 "printer-message-from-operator" operation attribute (see section 2.1) or was explicitly set using the Set-
384 Printer-Attributes operation (see section 6.1.1). This attribute allows the users to know when the "printer-
385 message-from-operator" attribute was last set. This attribute MUST be supported if the Printer supports
386 both the "printer-message-from-operator" and the "printer-current-date-time" attributes.

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

389 3.5 printer-message-operation (type2 keyword)

390 Type of registration: attribute

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

392 Types of attribute (Operation, Job Template, Job Description, Printer Description): Printer Description
393 Operations to be used with if the attribute is an operation attribute: N/A
394 Object (Job, Printer, etc. if bound to an object): Printer
395 Attribute syntax(es) (include 1setOf and range as in Section 4.2): type2 enum
396 If attribute syntax is 'keyword' or 'enum', is it type2 or type3: type2
397 If this is a Printer attribute, MAY the value returned depend on "document-format" (See Section 6.2): No
398 If this is a Job Template attribute, how does its specification depend on the value of the "multiple-
399 document-handling" attribute: N/A
400 Specification of this attribute (follow the style of IPP Model Section 4.2):
401 4.2.? printer-message-operation (type2 enum)

402 This READ-ONLY Printer Description attribute contains the operation that was used to changed the
403 Printer's "printer-message-from-operator" by the operator using any operation where the client supplied the
404 "printer-message-from-operator" operation attribute (see section 2.1) or explicitly set using the Set-Printer-
405 Attributes operation (see section 6.1.1). This attribute allows the users to know which operation was used
406 to change the "printer-message-from-operator" attribute when it was last set.

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

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

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

412 4.1 Value for "printer-state-reasons": 'standby'

413 Type of registration: type2 keyword attribute value
414 Name of attribute to which this keyword specification is to be added: printer-state-reasons
415 Proposed keyword name of this keyword value: standby
416 Specification of this keyword value (follow the style of IPP Model Section 4.1.2.3):
417 'standby': The Printer has been shutdown in standby mode. Only Restart-Printer and Get-Printer-
418 Attributes operations are accepted in this state; all other operations are rejected with the 'server-
419 error-printer-is-in-standby-mode'.

420 4.2 Value for "job-state-reasons": 'job-paused'

421 Type of registration: type2 keyword attribute value
422 Name of attribute to which this keyword specification is to be added: job-state-reasons
423 Proposed keyword name of this keyword value: job-paused
424 Specification of this keyword value (follow the style of IPP Model Section 4.1.2.3):

425 `job-paused`: The job has been paused while processing using the Pause-Current-Job operations and
426 other jobs can be processed on the Printer. The Job can be resumed using the Resume-Job operation
427 which removes this value.
428

429 5. New status codes

430 This section defines new status codes used by the operations defined in this document.

431 5.1 New status code: `client-error-attributes-not-settable`

432 Type of registration: status code

433 Keyword symbolic name of this status code value: `client-error-attributes-not-settable`

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

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

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

438 13.1.4.20 client-error-attributes-not-settable (0x0413)

439 In a Set-Printer-Attributes or Set-Job-Attributes request, if the Printer object does not support one or more
440 attributes as settable, the Printer object MUST return this status code. The Printer object MUST also return
441 in the Unsupported Attributes Group all the attributes and/or values supplied by the client that are not
442 settable. See [ipp-mod] section 3.1.7. For example, if the request indicates `job-state`, all implementations
443 MUST reject the request. As another example, if the request indicates an attribute that is supported, but not
444 settable by this implementation, such as, say, "printer-name", the implementation rejects the request.

445 5.2 New status code: `server-error-printer-is-in-standby-mode`

446 Type of registration: status code

447 Keyword symbolic name of this status code value: `server-error-printer-is-in-standby-mode`

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

449 Operations that this status code may be used with: Shutdown-Printer

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

452 13.1.5.8 server-error-printer-is-in-standby-mode

453 The Printer has been shutdown and is only accepting the Restart-Printer (see section 6.1.5) and Get-Printer-
454 Attributes operations. An operator can perform the Restart-Printer operation to allow the Printer to accept
455 other operations.

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

457 The Administrative operations are summarized in the following table:

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

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

461 6.1 Printer Operations

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

465 6.1.1 Set-Printer-Attributes Operation

466 Type of registration: operation
 467 Proposed name of this operation: Set-Printer-Attributes
 468 Object Target: Printer
 469 Specification of this operation:

470 This OPTIONAL operation allows a client to set the values of the attributes of a Printer object. In the
 471 request, the client supplies the set of Printer attribute names and values that are to be set. In the response,

472 the Printer object returns success or rejects the request with indications of which attribute or attributes
473 could not be set.

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

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

479 6.1.1.1 Settable and READ-ONLY Printer Description attributes

480 If the Printer supports the "printer-message-from-operator" Printer Description attribute (see [ipp-mod]
481 section 4.4.25) and the client explicitly supplies a new value for the "printer-message-from-operator" in the
482 request, then the Printer **MUST** set the "printer-message-from-operator" Printer attribute to this new value
483 and **MUST** also set the "printer-message-time", "printer-message-date-time", and "printer-message-
484 operation" attributes, if supported (see sections 3.3, 3.4, and 3.5).

485 If the Printer supports the Set-Printer-Attributes operation, then it **SHOULD** support setting of:

- 486 all Job Template Default ("xxx-default") attributes
- 487 all Job Template Supported ("xxx-supported") attributes
- 488 all Job Template Ready ("xxx-ready") attributes

489 that the implementation supports (see [ipp-mod] section 4.2 and extensions).

490 The following Printer Description attributes (see [ipp-mod] section 4.4) **MUST NOT** be settable, i.e., they
491 are READ-ONLY:

- 492 printer-state
- 493 printer-state-reasons
- 494 printer-state-message
- 495 printer-is-accepting-jobs - see Enable-Printer/Disable-Printer
- 496 queued-job-count
- 497 printer-message-time - see Set-Printer-Attributes when setting "printer-message-from-operator"
- 498 printer-message-date-time - see Set-Printer-Attributes when setting "printer-message-from-operator"
- 499 printer-message-operation - see Set-Printer-Attributes when setting "printer-message-from-operator"
- 500 printer-up-time
- 501 settable-attributes

502 The remaining Printer Description attributes **MAY** be settable using the Set-Printer-Attributes operation,
503 depending on implementation. If "xxx-supported" Printer Description attribute are settable, then they
504 **MUST** affect the behavior of the implementation. If they are READ-ONLY then they reflect the
505 implementation and cannot be changed using the Set-Printer-Attributes operation. Consider the following
506 examples:

507 For example, if the "operations-supported" Printer Description attribute (see [ipp-mod] section
508 4.4.15) is settable, then changing its value **MUST** affect the operations that the implementation

509 accepts or rejects. Such an implementation will need to be able to reject values for operations that it
510 contains no code support for.

511 As another example, if the "ipp-versions-supported" Printer Description attribute (see [ipp-mod]
512 section 4.4.14) is settable, then changing its value **MUST** affect the protocol versions that are
513 accepted or rejected. Such an implementation will need to be able to reject values for operations
514 that it contains no code support for.

515 See the "factory-settings" operation attribute (see section 2.3) for a way to query the implementation
516 supported values using the Get-Printer-Attributes operation. See the "reset-function" operation attribute of
517 the Reset-Printer operation (see section 6.1.4) for a way to restore the values to the factory settings.

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

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

525 6.1.1.2 Set-Printer-Attributes Request

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

527 Group 1: Operation Attributes

528 Natural Language and Character Set:

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

531

532 Target:

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

535

536 Requesting User Name:

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

539

540

541 "document-format" (mimeMediaType):

542 The client **SHOULD** supply this attribute. The Printer object **MUST** support this attribute. This
543 attribute is useful for a client to select the Interpreter object to which the attribute modification
544 should be applied. Each Printer object is modeled to contain one or more Interpreter objects. Those
545 Printer attributes whose values vary from Interpreter to Interpreter, are modeled as Interpreter
546 objects, while those that do not are Printer object attributes. Thus the target of a Get-Printer-

547 Attributes or Set-Printer-Attributes operation is either the Printer object or the Interpreter object
548 identified by the "document-format" operation attribute supplied by the client. Except for Get-
549 Printer-Attributes and Set-Printer-Attributes, there are no other operations with the Interpreter object
550 as a target. See [ipp-mod] section 3.2.5.1 "Get-Printer-Attributes Request".

551

552 If a client wants to set an attribute of all of the Interpreter objects to the same value, it can query the
553 Printer's "document-format-supported" Printer Description attribute and perform separate Set-
554 Printer-Attributes for each document format supported.

555

556 **ISSUE 5: Do we need a way to get and/or set the "xxx" attribute for all Interpreter objects in one
557 Get-Printer-Attributes or Set-Printer-Attributes operation? Or is it sufficient for a client to provide
558 the equivalent functionality by stepping through all the values of the "document-formats-supported"
559 with repeating the Get or Set operation?**

560

561 **ISSUE 6: Ok to add the Interpreter object, even though it doesn't solve all of the attribute constraint
562 problems. At least it gives us a more object-based description of the semantics. When we do add
563 some sort of Printer Description attribute that enumerates combinations of Job attribute values that
564 may not be used in combination (like PPD file constraints), it can include the "document-format"
565 attribute among them. So introducing the Interpreter object in no way precludes a complete
566 constraint description mechanism in the future.**

567

568 If the Printer object does not distinguish between different sets of supported values for each
569 different document format when validating jobs in the create and Validate-Job operations, it MUST
570 NOT distinguish between different document formats in the Set-Printer-Attributes operation. If the
571 Printer object does distinguish between different sets of supported values for each different
572 document format specified by the client, this specialization applies only to the same Printer
573 attributes as the Get-Printer-Attributes operation (see [ipp-mod] section 3.2.5.1).

574

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

582

583 If the client supplies a value for the "document-format" Operation attribute that is not supported by
584 the Printer, i.e., is not among the values of the Printer object's "document-format-supported"
585 attribute, the Printer object MUST reject the operation and return the 'client-error-document-format-
586 not-supported' status code.

587

588 Group 2: Printer Attributes

589 The client MUST supply a set of Printer attributes as defined in [ipp-mod] section 4.2 Job Template
590 Attributes ("xxx-default", "xxx-supported", and "xxx-ready" attributes) and section 4.4 Printer

591 Description Attributes. Each Printer attribute supplied in Group 2 replaces the value(s) of the
592 corresponding Printer attribute on the target Printer object. If a Printer object attribute had not been
593 configured yet and so had the 'no-value' out-of-band value (see [ipp-mod] 4.1), the supplied value(s)
594 replace the 'no-value' value. For attributes that can have multiple values (1setOf), all values
595 supplied by the client replace all values of the corresponding Printer object attribute.
596

597 6.1.1.3 Set-Printer-Attributes Response

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

599 Group 1: Operation Attributes

600 Status Message:

601 In addition to the REQUIRED status code returned in every response, the response OPTIONALLY
602 includes a "status-message" (text(255)) and/or a "detailed-status-message" (text(MAX)) operation
603 attribute as described in [ipp-mod] sections 13 and 3.1.6.
604

605 Natural Language and Character Set:

606 The "attributes-charset" and "attributes-natural-language" attributes as described in [ipp-mod]
607 section 3.1.4.2.
608

609 Group 2: Unsupported Attributes

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

611
612 In the case of attributes that are supported, but are not settable by the implementation, i.e., are not
613 among the values of the Printer's "settable-attributes" Printer Description attribute (see section 3.1),
614 the Printer object returns the client-supplied attribute(s) with a substituted value of 'not-supported'
615 (same out-of-band value as for attributes that are not supported). This value's syntax type is "out-of-
616 band" and its encoding is defined by special rules for "out-of-band" values in the "Encoding and
617 Transport" document [IPP-PRO]. Its value indicates that the attribute is either not settable or is not
618 supported at all.

619
620 **ISSUE 7: Why not have a separate out-of-band 'not-settable' value, so that the client can distinguish**
621 **between the cases of the attribute isn't supported versus the attribute is supported, but is not**
622 **settable? True, the client can query the "settable-attributes" to see which attributes can be set,**
623 **before or after issuing the Set-Printer-Attributes operation.**
624

625 6.1.2 Disable-Printer Operation

626 Type of registration: operation

627 Proposed name of this operation: Disable-Printer

628 Object Target: Printer

629 Specification of this operation:

630 This OPTIONAL operation allows a client to stop the Printer object from accepting jobs, i.e., cause the
631 Printer to reject subsequent create job operations (Print-Job, Print-URI, and Create-Job operation) and
632 return the 'server-error-not-accepting-jobs' status code. The Printer still accepts all other operations. All
633 previously submitted Jobs and currently processing Jobs continue unaffected. The Printer sets the value of
634 its "printer-is-accepting-jobs" READ-ONLY Printer Description attribute to 'false' (see [ipp-mod] section
635 4.4.20), no matter what the previous value was. This operation has no immediate effect on the Printer's
636 "printer-state" and "printer-state-reasons" attributes.

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

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

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

642 Whether or not the Disable-Printer operation stops jobs that are submitted using job submission protocols
643 other than IPP, depends on implementation, i.e., on whether the IPP protocol is being used as a universal
644 management protocol or just to manage IPP jobs, respectively. See "printer-controls-other-protocols"
645 (section 3.2).

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

650 The Disable-Printer Request and Disable-Printer Response have the same attribute groups and attributes as
651 the Resume-Printer operation (see [ipp-mod] sections 3.2.7.1 and 3.2.7.2), including the new "printer-
652 message-from-operator" operation attribute (see section 2.1), and with the addition of the following Group
653 1 operation attribute in the request:

654 "job-type" (type2 keyword):

655 The client OPTIONALLY supplies this attribute. The Printer object OPTIONALLY supports this
656 attribute. The value of this attribute indicates the type of job to be disabled. If the client omits this
657 attribute, the Printer assumes the 'network-jobs' value.

658

659 Standard keyword values are:

660 'network-jobs' - disable jobs submitted using the create job operations.

661 'walk-up-jobs' - disable jobs submitted locally, such as walkup copy jobs

662 'all-jobs' - disable all type of jobs

663 6.1.3 Enable-Printer Operation

664 Type of registration: operation

665 Proposed name of this operation: Enable-Printer

666 Object Target: Printer

667 Specification of this operation:

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

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

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

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

679 Whether or not the Enable-Printer operation allows acceptance of jobs that are submitted using job
680 submission protocols other than IPP, depends on implementation, i.e., on whether the IPP protocol is being
681 used as a universal management protocol or just to manage IPP jobs, respectively. See "printer-controls-
682 other-protocols" (section 3.2).

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

687 The Enable-Printer Request and Enable-Printer Response have the same attribute groups and attributes as
688 the Resume-Printer operation (see [ipp-mod] sections 3.2.8.1 and 3.2.8.2), including the new "printer-
689 message-from-operator" operation attribute (see section 2.1), and with the addition of the following Group
690 1 operation attribute in the request:

691 "job-type" (type2 keyword):

692 The client OPTIONALLY supplies this attribute. The Printer object OPTIONALLY supports this
693 attribute. The value of this attribute indicates the type of job to be enabled. If the client omits this
694 attribute, the Printer assumes the 'network-jobs' value.

695 Standard keyword values are:

696 'network-jobs' - enable jobs submitted using the create job operations.

697 'walk-up-jobs' - enable jobs submitted locally, such as walkup copy jobs

698 'all-jobs' - enable all types of jobs

700 6.1.4 Reset-Printer operation

701 Type of registration: operation

702 Proposed name of this operation: Reset-Printer

703 Object Target: Printer

704 Specification of this operation:

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

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

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

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

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

724 The Reset-Printer Request and Reset-Printer Response have the same attribute groups and attributes as the
725 Pause-Printer operation (see [ipp-mod] sections 3.2.7.1 and 3.2.7.2), including the new "printer-message-
726 from-operator" operation attribute (see section 2.1), the new "when" operation attribute (see section 2.4),
727 and with the addition of the following Group 1 operation attributes in the request:

728 "reset-function" (type3 keyword):

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

732

733 Standard keyword values are:

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

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

736 'reset-to-factory-defaults' - reset NVRAM to factory defaults, i.e. to factory settings and/or
737 values established at install time.

738

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

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

745 is to perform "non-process run-out", i.e., move the last printed sheet to the stacker, before resetting
746 the Printer.

747

748 If the client does not supply this attribute and the attribute is supported, the Printer does not perform
749 non-process run-out ('false' behavior). If the Printer does not support this attribute, the Printer is
750 assumed to perform non-process run-out ('true' behavior). **ISSUE 8: Is the "non-process-run-out"**
751 **operation attribute really needed at all or can the default behavior for Reset-Printer be defined to be**
752 **to perform non-process run out (for continuous and cut sheet printers)?**

753 6.1.5 Restart-Printer operation

754 Type of registration: operation

755 Proposed name of this operation: Restart-Printer

756 Object Target: Printer

757 Specification of this operation:

758 This OPTIONAL operation allows a client to restart a Printer that has previously been shutdown in standby
759 mode (see section 6.1.6). Standby mode is indicated by the Printer's "printer-state" being 'stopped' and its
760 "printer-state-reasons" including the 'standby' and 'paused' values. If the Printer is not in standby mode, the
761 Printer MUST reject this operation and return the 'client-error-not-possible' status code.

762 **ISSUE 9: What state does the Printer comes back up on Restart-Printer and how can the client control?**

763 **Possible alternatives:**

764 a. Restart-Printer always brings the Printer up Disabled ("printer-is-accepting-jobs" = 'false') and
765 Paused ("printer-state" = 'stopped', and "printer-state-reasons" = 'paused') which is the state that
766 Shutdown-Printer leaves the Printer in. Then the operator issues Enable-Printer and Resume-Printer
767 when want to restore normal operation. The client can automatically issues these addition 2
768 operations depending on GUI options. Advantages: This is the simplest to implement, allows new
769 states to be added without changing the Restart-Printer operation, and can have the same GUI
770 interface as b:

771 b. Add a REQUIRED operation attribute to Restart-Printer, something like "printer-condition" with
772 values: 'disabled-and-paused', 'enabled-and-paused', and 'enabled-and-idle'.

773

774 If the Restart-Printer operation is supported, then the Shutdown-Printer operation MUST be supported.

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

779 The Restart-Printer Request and Restart-Printer Response have the same attribute groups and attributes as
780 the Resume-Printer operation (see [ipp-mod] sections 3.2.8.1 and 3.2.8.2), including the new "printer-
781 message-from-operator" operation attribute (see section 2.1) and the following Group 1 operation attribute:

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

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

790 If the client does not supply this attribute and the attribute is supported, the Printer does not perform
791 non-process run-out ('false' behavior). If the Printer does not support this attribute, the Printer is
792 assumed to perform non-process run-out ('true' behavior). **ISSUE 10: Is the "non-process-run-out"**
793 **operation attribute really needed at all or can the default behavior for Restart-Printer be defined to**
794 **be to perform non-process run out (for continuous and cut sheet printers)?**

795 6.1.6 Shutdown-Printer Operation

796 Type of registration: operation

797 Proposed name of this operation: Shutdown-Printer

798 Object Target: Printer

799 Specification of this operation:

800 This OPTIONAL operation allows a client to shutdown a Printer, i.e., stop processing jobs. The purpose of
801 Shutdown-Printer is to shutdown the Printer for an extended period, not to reset the device(s) or modify a
802 Printer attribute. See Reset-Printer (section 6.1.4) for the way to reset the device(s).

803 Whether the device is powered down or put into standby mode, depends on the value of the "shutdown-
804 function" operation attribute. If the value is 'power-off', or the "shutdown-function" attribute is omitted, the
805 Printer adds the 'shutdown' value (see [ipp-mod] section 4.4.11) to its "printer-state-reasons" Printer
806 Description attribute immediately. If the value is 'standby', the Printer adds the 'standby' value to its
807 "printer-state-reasons" Printer Description attribute immediately. The execution of the rest of the operation
808 is the same for either value: The Printer is disabled immediately (see the Disable-Printer operation in
809 section 6.1.2). The "when" operation attribute specifies how much processing occurs before the Printer is
810 paused (see [ipp-mod] section 3.2.7) and the shutdown is complete. All other requests continue to be
811 accepted until the printer is powered down or enters standby mode. In standby mode, the Printer acts as if a
812 Pause-Printer had gone to completion, MUST continue to accept the Restart-Printer and Get-Printer-
813 Attribute requests, and MUST reject all other requests returning the 'server-error-printer-is-in-standby-
814 mode' status code.

815 **ISSUE 11 - Need to look at life cycle of the Printer versus standby/power-down and the other operations**
816 **that can be accepted. There can be appreciable time between acceptance of this operation and when the**
817 **final state of the printer, either standby or powered down is reached. Is it ok for non-submission operations**
818 **to continue to be accepted during this time? May need 'moving-to-shutdown'. What about 'moving-to-**
819 **standby'?**

820 Whether or not the Shutdown-Printer operation affects jobs that were submitted to the device using job
821 submission protocols other than IPP, depends on implementation, i.e., on whether the IPP protocol is being
822 used as a universal management protocol or just to manage IPP jobs, respectively. See "printer-controls-
823 other-protocols" (section 3.2).

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

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

830 The Shutdown-Printer Request and Shutdown-Printer Response have the same attribute groups and
831 attributes as the Pause-Printer operation (see [ipp-mod] sections 3.2.7.1 and 3.2.7.2), including the new
832 "printer-message-from-operator" operation attribute (see section 2.1), the new "when" operation attribute
833 (see section 2.4), and with the addition of the following Group 1 operation attributes in the request:

834 "shutdown-function" (type2 keyword)

835 The client OPTIONALLY supplies this attribute. The Printer object OPTIONALLY supports this
836 attribute. This attribute indicates which shutdown function is to be performed.

837
838 Standard keyword values are:

839 'standby' - shutdown the Printer, but leave it in standby-mode (disabled and paused), which
840 means that Get-Printer-Attributes and Restart-Printer operations are accepted.

841 'power-off' - shutdown the Printer and power it off. No operations are accepted after power
842 off.

843
844 "non-process-run-out" (boolean)

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

851
852 If the client does not supply this attribute and the attribute is supported, the Printer does not perform
853 non-process run-out ('false' behavior). If the Printer does not support this attribute, the Printer is
854 assumed to perform non-process run-out ('true' behavior).

855 **ISSUE 12: Is the "non-process-run-out" operation attribute really needed at all or can the default**
856 **behavior for Shutdown-Printer be defined to be to perform non-process run out (for continuous and**
857 **cut sheet printers)?**

858 "synchronize" (boolean)

859 The client OPTIONALLY supplies this attribute. The Printer object OPTIONALLY supports this
860 attribute. This attribute indicates whether or not the printer is to synchronize the checkpoint data for
861 the current job ("when" = 'now') with the pages that have actually printed. If the value of the "when"

862 attribute is not 'now' or the "when" attribute is not supplied, then the "synchronize" attribute has no
863 meaning and the Printer MUST ignore it. If this attribute is supported, then a value of 'true' implies
864 that the Printer will be able to resume the job at the point of synchronization when the Printer is
865 restarted. If the implementation does not support resuming a job (either automatically or with the
866 Resume-Job operation) after a Shutdown-Printer with "when" = 'now', then it does not implement
867 this attribute.

868 **ISSUE 13: It isn't clear which type of checkpointing is being suggested for synchronize: checkpoint**
869 **a stream or checkpoint in a job that is on a disk file in the printer.**

870

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

874 **ISSUE 14: Do we really need the "synchronize" operation attribute for the Shutdown-Printer**
875 **operation or can synchronization be the default behavior of the Shutdown-Printer operation? It is**
876 **not clear why this would ever be false? If it never makes sense to be 'false', can we remove it**
877 **altogether?**

878 **ISSUE 15: Is the current job automatically restarted when the Printer is restarted? Or does some**
879 **client have to issue a Restart-Job operation?**

880 6.2 Job Operations

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

885 6.2.1 Set-Job-Attributes

886 Type of registration: operation

887 Proposed name of this operation: Set-Job-Attributes

888 Object Target: Job

889 Specification of this operation:

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

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

897 The validation of the Set-Job-Attributes request is performed as if the job had been submitted originally
898 with the new values and with "ipp-attribute-fidelity" set to 'true', i.e., all modified attributes MUST be
899 supported along with the attributes not modified. If such a create job operation would have been accepted,

900 then the Set-Job-Attributes MUST be accepted. If such a create job operation would have been rejected,
 901 then the Set-Job-Attributes MUST be rejected and the Job MUST be unchanged.

902 The IPP object MUST accept or reject the request based on the job's current state and transition the job to
 903 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'

904 6.2.1.1 Settable and READ-ONLY Job Description attributes

905 If the Printer supports the "job-message-from-operator" Job Description attribute (see [ipp-mod] section
 906 4.3.16) and the client explicitly supplies a new value for the "job-message-from-operator" in the request,
 907 then the Printer MUST set the "job-message-from-operator" Job attribute to this new value.

908 If the Printer supports the Set-Job-Attributes operation, then it SHOULD support setting of:

909 all Job Template ("xxx") attributes (see [ipp-mod] section 4.2 and extensions)

910 that the implementation supports.

911 The following Job Description attributes (see [ipp-mod] section 4.3) MUST NOT be settable, i.e., they are
 912 READ-ONLY:

913 job-uri
914 job-id
915 job-printer-uri
916 job-more-info
917 job-originating-user-name - set in create operation
918 job-state
919 job-state-reasons
920 job-state-message
921 number-of-documents
922 output-device-assigned
923 time-at-creation
924 time-at-processing
925 time-at-completed
926 job-printer-up-time
927 date-time-at-creation
928 date-time-at-processing
929 date-time-at-completed
930 number-of-intervening-jobs
931 job-k-octets
932 job-k-octets-processed
933 job-impressions-completed
934 job-media-sheets-completed
935 attributes-charset - set in create operation
936 attributes-natural-language - set in create operation

937 The remaining Job Description attributes MAY be settable using the Set-Job-Attributes operation,
938 depending on implementation.

939 Whether or not the Set-Job-Attributes operation affects jobs that are submitted using job submission
940 protocols other than IPP, depends on implementation, i.e., on whether the IPP protocol is being used as a
941 universal management protocol or just to manage IPP jobs, respectively. See "printer-controls-other-
942 protocols" (section 3.2).

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

947 6.2.1.2 Set-Job-Attributes Request

948 The following sets of attributes are part of the Set-Job-Attributes Request:

949 Group 1: Operation Attributes

950 Natural Language and Character Set:

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

953

954 Target:

955 Either (1) the "printer-uri" (uri) plus "job-id" (integer(1:MAX)) or (2) the "job-uri" (uri) operation
956 attribute(s) which define the target for this operation as described in [ipp-mod] section 3.1.5.
957

958 Requesting User Name:

959 The "requesting-user-name" (name(MAX)) attribute SHOULD be supplied by the client as
960 described in [ipp-mod] section 8.3.
961
962

963 Group 2: Job Attributes

964 The client MUST supply a set of Job attributes as defined in [ipp-mod] section 4.2 Job Template
965 Attributes ("xxx" attributes) and section 4.3 Job Description Attributes. Each Job attribute supplied
966 in Group 2 replaces the value(s) of the corresponding Job attribute on the target Job object. For
967 attributes that can have multiple values (1setOf), all values supplied by the client replace all values
968 of the corresponding Job object attribute.
969

970 6.2.1.3 Set-Job-Attributes Response

971 The Printer object returns the following sets of attributes as part of the Set-Job-Attributes Response:

972 Group 1: Operation Attributes

973 Status Message:

974 In addition to the REQUIRED status code returned in every response, the response OPTIONALLY
975 includes a "status-message" (text(255)) and/or a "detailed-status-message" (text(MAX)) operation
976 attribute as described in [ipp-mod] sections 13 and 3.1.6.
977

978 Natural Language and Character Set:

979 The "attributes-charset" and "attributes-natural-language" attributes as described in [ipp-mod]
980 section 3.1.4.2.
981

982 Group 2: Unsupported Attributes

983 See [ipp-mod] section 3.1.7 for details on returning Unsupported Attributes.
984

985 The attributes returned are the same as for the create operation with the same new attribute values.
986 In the case of attributes that are supported, but are not settable by the implementation, i.e., are not
987 among the values of the Printer's "settable-attributes" Printer Description attribute (see section 3.1),
988 the Printer object returns the client-supplied attribute(s) with a substituted value of 'not-supported'
989 (same out-of-band value as for attributes that are not supported). This value's syntax type is "out-of-
990 band" and its encoding is defined by special rules for "out-of-band" values in the "Encoding and
991 Transport" document [IPP-PRO]. Its value indicates that the attribute is either not settable or is not
992 supported at all.
993

994 6.2.2 Reprocess-Job Operation

995 This OPTIONAL operation is a create job operation that allows a client to re-process a copy of a job that
996 had been retained in the queue after processing completed, was canceled, or was aborted (see [ipp-mod]
997 section 4.3.7.2). This operation is the same as the Restart-Job operation (see [ipp-mod] section 3.3.7),
998 except that the Printer creates a new job that is a copy of the target job and the target job is unchanged. The
999 new job is assigned new values to the "job-uri" and "job-id" attributes and the new job's Job Description
1000 attributes that accumulate job progress, such as "job-impressions-completed", "job-media-sheets-
1001 completed", and "job-k-octets-processed", are initialized to 0 as with any create job operation. The target
1002 job moves to the Job History after a suitable period, independent of whether one or more Reprocess-Job
1003 operations have been performed on it.

1004 If the Set-Job-Attributes operation is supported, then the "job-hold-until" operation attribute MUST be
1005 supported with at least the 'indefinite' value, so that a client can modify the new job before it is scheduled
1006 for processing using the Set-Job-Attributes operation. After modifying the job, the client can release the
1007 job for processing, by using the Release-Job operation specifying the newly assigned "job-uri" or "job-id"
1008 for the new job.

1009 6.2.3 Cancel-Current-Job Operation

1010 This OPTIONAL operation allows a client to cancel the current job on the target Printer or the specified job
1011 if it is the current job on the Printer. See [ipp-mod] section 3.3.3 for the semantics of canceling a job.
1012 Since a Job might already be marking by the time a Cancel-Current-Job is received, some media sheet
1013 pages might be printed before the job is actually terminated.

1014 If the client does not supply a "job-id" operation attribute, the Printer MUST accept the request and cancel
1015 the current job if there is a current job in the 'processing' or 'processing-stopped' state; otherwise, it MUST
1016 reject the request and return the 'client-error-not-possible' status code. If more than one job is in the
1017 'processing' or 'processing-stopped' states, the one that is marking is canceled and the others are unaffected.

1018 **Warning:** On a shared printer, there is a race condition. Between the time that a user issues this operation
1019 and its acceptance, the current job might change to a different job. If the user or operator is authenticated to
1020 cancel the new job, the wrong job is canceled. To prevent this race from canceling the wrong job, the client
1021 MAY supply the "job-id" operation attribute which is checked against the current job's job-id. If the job
1022 identified by the "job-id" attribute is not the current job on the Printer, i.e., is not in the 'processing' or
1023 'processing-stopped' states, the Printer MUST reject this operation and return the 'client-error-not-possible'
1024 status code. Otherwise, the Printer cancels the specified job.

1025 *Access Rights:* The authenticated user (see [ipp-mod] section 8.3) performing this operation must either be
1026 the job owner of the current job or an operator or administrator of the Printer object (see [ipp-mod] sections
1027 1 and 8.5). Otherwise, the IPP object MUST reject the operation and return: 'client-error-forbidden', 'client-
1028 error-not-authenticated', or 'client-error-not-authorized' as appropriate.

1029 The Cancel-Current-Job Request and Cancel-Current-Job Response have the same attribute groups and
1030 attributes as the Resume-Printer operation (see [ipp-mod] section 3.2.8), including the new "job-message-

1031 from-operator" operation attribute (see section 2.2), with the addition of the following Group 1 Operation
1032 attributes in the request:

1033 "job-id" (integer(1:MAX)):

1034 The client **OPTIONALLY** supplies this Operation attribute in order to verify that the identified job
1035 is still the current job on the target Printer object. The IPP object **MUST** supports this operation
1036 attribute, if it supports this operation.

1037 "non-process-run-out" (boolean):

1038 The client **OPTIONALLY** supplies this Operation attribute. The IPP object **OPTIONALLY**
1039 supports this operation attribute, if it is able to perform a non-process-run-out, i.e., remove the last
1040 few printed sheets of a job that is finished printing on a continuous-forms printer. Normally, on
1041 such a printer, the last sheets of a job remain in the printer and are forced out by the next job,
1042 thereby saving time when printing one job after another. However, when canceling the current job it
1043 is desirable to move the end of the canceled job to the stacker. This attribute indicates whether or
1044 not the printer is to perform "non-process run-out", i.e., move the last printed sheet to the stacker,
1045 after canceling the current job.

1046
1047 If the client does not supply this attribute and the attribute is supported, the Printer does not perform
1048 non-process run-out ('false' behavior). If the Printer does not support this attribute, the Printer is
1049 assumed to perform non-process run-out ('true' behavior).

1050 **ISSUE 16: Why isn't non-process-run-out automatic on a continuous form printer? When would an**
1051 **operator want to cancel the job and NOT run out the last sheets.? It would be simpler to require**
1052 **process-run-out when canceling the current job (for continuous and cut sheet printers).**

1053 6.2.4 Pause-Current-Job operation

1054 This **OPTIONAL** operation allows a client to stop the current job on the target Printer or the specified job if
1055 it is the current job on the Printer, and allow other jobs to be processed instead. The Printer moves the
1056 current job or the target job to the 'processing-stopped' state and sets the 'job-paused' value in the job's "job-
1057 state-reasons" attribute and processes other jobs.

1058 If the client does not supply a "job-id" operation attribute, the Printer **MUST** accept the request and pause
1059 the current job if there is a current job in the 'processing' or 'processing-stopped' state; otherwise, it **MUST**
1060 reject the request and return the 'client-error-not-possible' status code. If more than one job is in the
1061 'processing' or 'processing-stopped' states, all of them are paused.

1062 **Warning:** On a shared printer, there is a race condition. Between the time that a user issues this operation
1063 and its acceptance, the current job might change to a different job. If the user or operator is authenticated to
1064 pause the new job, the wrong job is paused. To prevent this race from pausing the wrong job, the client
1065 **MAY** supply the "job-id" operation attribute which is checked against the current job's job-id. If the job
1066 identified by the "job-id" attribute is not the current job on the Printer, i.e., is not in the 'processing' or
1067 'processing-stopped' states, the Printer **MUST** reject this operation and return the 'client-error-not-possible'
1068 status code. Otherwise, the Printer pauses the specified job and processed other jobs.

1069 A paused job is resumed using the Resume-Job operation (see section 6.2.5). If the Pause-Current-Job
1070 operation is supported, then the Resume-Job operation MUST be supported, and vice-versa.

1071 The Printer MUST reject a Release-Job request (and return the 'client-error-not-possible') for a job that has
1072 been paused , i.e., for a job in the 'processing-stopped' state, with the 'job-paused' value in its "job-state-
1073 reasons" attribute. The Hold-Job and Release-Job operations are for holding and releasing held jobs, not
1074 pausing and resuming paused jobs.

1075 *Access Rights:* The authenticated user (see [ipp-mod] section 8.3) performing this operation must either be
1076 the job owner of the target job or an operator or administrator of the Printer object (see [ipp-mod] sections 1
1077 and 8.5). Otherwise, the IPP object MUST reject the operation and return: 'client-error-forbidden', 'client-
1078 error-not-authenticated', or 'client-error-not-authorized' as appropriate.

1079 The Pause-Current-Job Request and Pause-Current-Job Response have the same attribute groups and
1080 attributes as the Resume-Printer operation (see [ipp-mod] section 3.2.8), including the new "job-message-
1081 from-operator" operation attribute (see section 2.2), the new "when" operation attribute (see section 2.4),
1082 with the addition of the following Group 1 Operation attributes in the request:

1083 "job-id" (integer(1:MAX)):

1084 The client OPTIONALLY supplies this Operation attribute in order to verify that the identified job
1085 is still the current job on the target Printer object. The IPP object MUST supports this operation
1086 attribute, if it supports this operation.

1087 "non-process-run-out" (boolean)

1088 The client OPTIONALLY supplies this attribute. The Printer object OPTIONALLY supports this
1089 attribute, if it is able to perform a non-process-run-out, i.e., remove the last few printed sheets of a
1090 job that is finished printing on a continuous-forms printer. Normally, on such a printer, the last
1091 sheets of a job remain in the printer and are forced out by the next job, thereby saving time when
1092 printing one job after another. This attribute indicates whether or not the printer is to perform "non-
1093 process run-out", i.e., move the last printed sheet to the stacker, as part of pausing the job.

1094
1095 If the client does not supply this attribute and the attribute is supported, the Printer does not perform
1096 non-process run-out ('false' behavior). If the Printer does not support this attribute, the Printer is
1097 assumed to perform non-process run-out ('true' behavior).

1098 **ISSUE 17: Is the "non-process-run-out" operation attribute really needed at all or can the default**
1099 **behavior for Pause-Current-Job be defined to be to perform non-process run out (for continuous and**
1100 **cut sheet printers)?**

1101
1102 "synchronize" (boolean)

1103 The client OPTIONALLY supplies this attribute. The Printer object OPTIONALLY supports this
1104 attribute. This attribute indicates whether or not the printer is to synchronize the checkpoint data for
1105 the current job being paused with the pages that have actually printed. If this attribute is supported,
1106 then a value of 'true' implies that the Printer will be able to resume the job at the point of
1107 synchronization when the job is resumed.

1108

1109 If the client does not supply this attribute and the attribute is supported, the Printer does not perform
1110 synchronization ('false' behavior). If the Printer does not support this attribute, the Printer is
1111 assumed to not synchronize ('false' behavior).

1112 **ISSUE 18: Do we really need the "synchronize" operation attribute or can synchronization be the**
1113 **default behavior of the Pause-Current-Job operation?**

1114 6.2.5 Resume-Job operation

1115 This OPTIONAL operation allows a client to stop the target job and allow other jobs to be processed
1116 instead. The Printer moves the target job to the 'pending' state and removes the 'job-paused' value from the
1117 job's "job-state-reasons" attribute.

1118 If the target job is not in the 'processing-stopped' state with the 'job-paused' value in the job's "job-state-
1119 reasons" attribute, the Printer rejects the request and returns the 'client-error-not-possible' status code, since
1120 the job was not paused.

1121 If the Resume-Job operation is supported, then the Pause-Current-Job operation MUST be supported, and
1122 vice-versa.

1123 *Access Rights:* The authenticated user (see [ipp-mod] section 8.3) performing this operation must either be
1124 the job owner of the target job or an operator or administrator of the Printer object (see [ipp-mod] sections 1
1125 and 8.5). Otherwise, the IPP object MUST reject the operation and return: 'client-error-forbidden', 'client-
1126 error-not-authenticated', or 'client-error-not-authorized' as appropriate.

1127 The Resume-Job Request and Resume-Job Response have the same attribute groups and attributes as the
1128 Release-Job operation (see [ipp-mod] section 3.3.6), including the new "job-message-from-operator"
1129 operation attribute (see section 2.2).

1130 6.2.6 Promote-Job operation

1131 This OPTIONAL operation allows a client to make the pending target job be processed next after the
1132 current job completes. This operation is specially useful in a production printing environment where the
1133 operator is involved in job scheduling.

1134 If the target job is in the 'pending' state, this operation does not change the job's state, but causes the job to
1135 be processed after the current job(s) complete. If the target job is not in the 'pending' state, the Printer
1136 rejects the request and returns the 'client-error-not-possible' status code. The Printer returns the target job
1137 immediately after the current job(s) in a Get-Jobs response (see [ipp-mod] section 3.2.6) for the 'not-
1138 completed' jobs.

1139 When the current job completes, is canceled, paused, or aborted, the target of this operation is processed
1140 next.

1141 If a client issues this request (again) before the target of the operation of the original request started
1142 processing, the target of this new request is scheduled before the previous job that was to be processed next.

1143 Note: IPP is specified not to require queues for job scheduling, since there are other implementations for
1144 scheduling multiple jobs. However, if an implementation does implement queues for jobs, then the
1145 Promote-Job puts the specified job at the front of the queue. A subsequent Promote-Job before the first job
1146 starts processing puts that specified job at the front of the queue, so that it is "in front" of the previously
1147 promoted job.

1148 *Access Rights:* The authenticated user (see [ipp-mod] section 8.3) performing this operation must be an
1149 operator or administrator of the Printer object (see [ipp-mod] sections 1 and 8.5). Otherwise, the IPP object
1150 MUST reject the operation and return: 'client-error-forbidden', 'client-error-not-authenticated', or 'client-
1151 error-not-authorized' as appropriate.

1152 The Promote-Job Request and Promote-Job Response have the same attribute groups and attributes as the
1153 Cancel-Job operation (see [ipp-mod] section 3.3.3), including the new "job-message-from-operator"
1154 operation attribute (see section 2.2).

1155 6.2.7 Space-Current-Job operation

1156 This OPTIONAL operation allows a client to repeat or skip a specified number of impressions for the
1157 current job on the target Printer or the specified job if it is the current job on the Printer. The Printer repeats
1158 or skips the indicated number of impressions specified by the "back-space" or "forward-space" operation
1159 attribute, respectively. This operation is typically supported in a continuous forms implementation for
1160 synchronizing the web after forms run out or media change.

1161 If the client does not supply a "job-id" operation attribute, the Printer MUST accept this request in any state,
1162 whether or not there is a current job, and advance or backspace the media the indicated number of
1163 impressions specified by the "back-space" or "forward-space" operation attribute, respectively. If more than
1164 one job is in the 'processing' or 'processing-stopped' states, the one that is marking is spaced and the others
1165 are unaffected.

1166 *Warning:* On a shared printer, there is a race condition. Between the time that a user issues this operation
1167 and its acceptance, the current job might change to a different job. If the user or operator is authenticated to
1168 space the new job, the wrong job is spaced. To prevent this race from spacing the wrong job, the client
1169 MAY supply the "job-id" operation attribute which is checked against the current job's job-id. If the job
1170 identified by the "job-id" attribute is not the current job on the Printer, i.e., is not in the 'processing' or
1171 'processing-stopped' states, or is not the job that has impressions in the media path even if the job has
1172 completed, the Printer MUST reject this operation and return the 'client-error-not-possible' status code.
1173 Otherwise, the Printer advances or backspaces the media the indicated number of impressions specified by
1174 the "back-space" or "forward-space" operation attribute, respectively.

1175 **ISSUE 19: Is the Space-Current-Job reasonable to perform when the current job is in the 'processing' state**
1176 **when paper is still moving?**

1177 *Access Rights:* The authenticated user (see [ipp-mod] section 8.3) performing this operation must either be
1178 the job owner of the current job or an operator or administrator of the Printer object (see [ipp-mod] sections
1179 1 and 8.5). Otherwise, the IPP object MUST reject the operation and return: 'client-error-forbidden', 'client-
1180 error-not-authenticated', or 'client-error-not-authorized' as appropriate.

1181 The Space-Current-Job Request and Space-Current-Job Response have the same attribute groups and
1182 attributes as the Resume-Printer operation (see [ipp-mod] section 3.2.8), including the new "job-message-
1183 from-operator" operation attribute (see section 2.2), with the addition of the following Group 1 Operation
1184 attributes in the request:

1185 "job-id" (integer(1:MAX)):

1186 The client OPTIONALLY supplies this Operation attribute in order to verify that the identified job
1187 is still the current job on the target Printer object. The IPP object MUST supports this operation
1188 attribute, if it supports this operation.

1189 "back-space" (integer(1:MAX)):

1190 The client OPTIONALLY supplies this Operation attribute. The IPP object OPTIONALLY
1191 supports this operation attribute, if it is able to repeat impressions.

1192 If the client supplies a value that specifies more impressions than the job has performed, the job is
1193 positioned at the beginning without any indication.

1194 "forward-space" (integer(1:MAX)):

1195 The client OPTIONALLY supplies this Operation attribute. The IPP object OPTIONALLY
1196 supports this operation attribute, if it is able to skip impressions.

1197 If the client supplies a value that specifies more impressions than remain in the job, the job is
1198 positioned at the end without any indication.

1199 "non-process-run-out" (boolean):

1200 The client OPTIONALLY supplies this operation attribute. The IPP object OPTIONALLY supports
1201 this operation attribute, if it is able to perform a non-process-run-out, i.e., remove the last few
1202 printed sheets of a job that is finished printing on a continuous-forms printer. Normally, on such a
1203 printer, the last sheets of a job remain in the printer and are forced out by the next job, thereby
1204 saving time when printing one job after another. This attribute indicates whether or not the printer
1205 is to perform "non-process run-out", i.e., move the last printed sheet to the stacker, after spacing the
1206 Printer.

1207
1208 If the client does not supply this attribute and the attribute is supported, the Printer does not perform
1209 non-process run-out ('false' behavior). If the Printer does not support this attribute, the Printer is
1210 assumed to perform non-process run-out ('true' behavior). **ISSUE 20: Is the "non-process-run-out"**
1211 **operation attribute really needed at all or can the default behavior for Space-Current-Job be defined**
1212 **to be to perform non-process run out (for continuous and cut sheet printers)?**

1213 7. References

1214 [ipp-mod]

1215 R. deBry, T. Hastings, R. Herriot, S. Isaacson, P. Powell, "Internet Printing Protocol/1.0: Model and
1216 Semantics", <draft-ietf-ipp-model-v11-03.txt>, June, 1999.

1217 [RFC2566]

1218 R. deBry, T. Hastings, R. Herriot, S. Isaacson, P. Powell, "Internet Printing Protocol/1.0: Model and
1219 Semantics", RFC 2566, April 1999.

1220 8. Change History

1221 This section summarizes the changes. Each sub-section is in reverse chronological order.

1222 8.1 Changes to the June 30, 1999 version to make the July 19, 1999 version

1223 The following changes to the June 30, 1999 version to make the July 19, 1999 version as a result of the IPP
1224 WG meeting in Copenhagen, 7/7/99-7/8/99, and the IPP telecon, 7/14/1999:

- 1225 1. Sections 2.1 and 2.2: Clarified that the way to remove a message from the operator was for the client to
1226 supply a zero-length or all white space text string which is copied as usual to the "xxx-message-from-
1227 operator" attribute.
- 1228 2. Section 2.3: Added "factory-settings" (boolean) operation attribute to the Get-Printer-Attributes
1229 operation.
- 1230 3. Section 2.4: Added the "when" operation attribute to the Pause-Current-Job operation.
- 1231 4. Section 2.4: Made the "when" operation attribute OPTIONAL for use in operations (Pause-Printer,
1232 Reset-Printer, Shutdown-Printer, and Pause-Current-Job operations).
- 1233 5. Sections 2.5: Added table of operation attributes for the Printer operations to make it easy to compare.
- 1234 6. Sections 2.6: Added table of operation attributes for the Job operations to make it easy to compare.
- 1235 7. Section 3.1: Added "settable-attributes" (1setOf type2 keyword) READ-ONLY Printer Description
1236 attribute.
- 1237 8. Section 3.2: Added "printer-controls-other-protocols" (boolean) Printer Description attribute
- 1238 9. Section 3.3: Added the READ-ONLY "printer-message-time" (integer(MIN:MAX)) Printer
1239 Description attribute to keep time message updated in time ticks.
- 1240 10. Section 4.2: Deleted the 'process-next' "job-state-reasons" value, so that repeated Promote-Job
1241 operations promote each job "to the front of the queue".
- 1242 11. Sections 6.1.1.1 and 6.2.1.1: Replaced the table that listed all attributes with one that lists only the
1243 attributes that MUST be READ-ONLY.

- 1244 12. Section 6.1.1.1: Indicated that attributes that are not specified as READ-ONLY in this document MAY
1245 be settable. If they control behavior, that changing their values MUST change the behavior.
- 1246 13. Section 6.1.1.2 and 6.2.1.2: Deleted the "ipp-attribute-fidelity" operation attribute from the Set-Printer-
1247 Attributes and Set-Job-Attributes operations. All set operations are atomic.
- 1248 14. Section 6.1.1.2: Add the concept of the Interpreter object to handle attributes whose values vary in the
1249 Set-Printer-Attributes and Get-Printer-Attributes, depending on the value of the "document-format"
1250 operation attribute.
- 1251 15. Sections 6.1.1.3 and 6.2.1.2: Changed the "out-of-band" 'not-settable' value back to the existing 'not-
1252 supported' value.
- 1253 16. Section 6.1.2 and 6.1.3: Added "job-type" operation attribute to Disable-Printer and Enable-Printer
1254 operations with values: 'network-jobs', 'walk-up-jobs', and 'all-jobs'.
- 1255 17. Section 6.1.5: Clarified that Restart-Printer brings up the Printer disabled and paused, since that is the
1256 eventual state that Shutdown-Printer leaves the printer in.
- 1257 18. Section 6.1.5: Indicated that if Restart-Printer is supported, then Shutdown-Printer MUST be
1258 supported.
- 1259 19. Section 6.1.6: Deleted Space-Printer operation. Keep Space-Current-Job operation only which has a
1260 "job-id" operation attribute that a client MAY supply.
- 1261 20. Section 6.1.6: Clarified that Shutdown-Printer is for a long period of time, not just to reset the device or
1262 change attribute values. Also that Shutdown performs an immediate Disable-Printer and an eventual
1263 Pause-Printer.
- 1264 21. Sections 6.2.3, 6.2.4, and 6.2.7 : Added a "job-id" operation attribute to Cancel-Current-Job, Pause-
1265 Current-Job, and Space-Current-Job that a client MAY supply to check for race condition where current
1266 job changes
- 1267 22. Section 6.2.4: Combined Pause-Job into Pause-Current-Job operation.
- 1268 23. Sections 6.2.4 and 6.2.5: Pause-Current-Job puts job in 'processing-stopped' state, not 'pending-held'
1269 state.
- 1270 24. Section 6.2.6: Simplified Promote-Job, so that it behaves as if the job were put at the front of the
1271 queue.