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Internet Printing Protocol/1.1: Set2 Operations

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Abstract

This document specifies 14 additional OPTIONAL operations for use with the Internet Printing Protocol/1.0 (IPP) [RFC2565, RFC2566] and IPP/1.1 [ipp-mod, ipp-pro]. These operations are 7 Printer object operations that operators/administrators may perform on a Printer object:

- Set-Printer-Attributes
- Enable-Printer
- Disable-Printer
- Reset-Printer
- Restart-Printer
- Non-Process-Run-Out
- Shutdown-Printer

and 7 Job object operations that end-users may perform on their jobs and operators/administrators may perform on any job, depending on circumstances:

- Set-Job-Attributes
- Reprocess-Job
- Cancel-Current-Job (though the target is the Printer object)
- Pause-Current-Job (though the target is the Printer object)

38 Resume-Job
39 Promote-Job
40 Space-Current-Job (though the target is the Printer object)

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

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

46 The scope of IPP, is characterized in RFC2526 "Design Goals for an Internet Printing Protocol". It is not
47 the intent of this document to revise or clarify this scope or conjecture as to the degree of industry adoption
48 or trends related to IPP within printing systems. It is the intent of this document to extend the original set
49 of operations - in a similar fashion to the Set1 extensions which referred to IPP/1.0 and were later
50 incorporated into IPP/1.1.

51 This document is intended for registration following the registration procedures of IPP/1.0 [RFC2566] and
52 IPP/1.1 [ipp-mod]. This version includes the comments discussed at the IPP telecon, on 6/23/1999,
53 6/30/1999, at the IETF IPP WG meeting, 7/7/99-7/8/99, in Copenhagen, and the IPP telecon, 7/17/1999, the
54 August, 1999 IPP meeting in Alaska and subsequent phone conferences and discussions. Specifically, the
55 9/16 update refers to this set of extensions simply as "Set2" rather than using the term "Administrative"
56 which was misleading, controversial and incorrect as an overall description. Also, two new attributes have
57 been proposed to clarify the intent of each operation in terms of its target, the Printer vs. the Print Job.
58 **Unresolved ISSUES are highlighted like this in the .doc and .pdf files.**

59 The full set of IPP documents includes:

- 60 Design Goals for an Internet Printing Protocol [RFC2567]
- 61 Rationale for the Structure and Model and Protocol for the Internet Printing Protocol [RFC2568]
- 62 Internet Printing Protocol/1.1: Model and Semantics (this document)
- 63 Internet Printing Protocol/1.1: Encoding and Transport [IPP-PRO]
- 64 Internet Printing Protocol/1.1: Implementer's Guide [IPP-IIG]
- 65 Mapping between LPD and IPP Protocols [RFC2569]

66

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

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

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

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

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

88

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147

148 1. Introduction

149 The Internet Printing Protocol (IPP) is an application level protocol that can be used for distributed printing
150 using Internet tools and technologies. IPP version 1.1 (IPP/1.1) focuses ~~only~~ on end user functionality with
151 a few administrative operations included. This document defines additional OPTIONAL end user,
152 operat~~or~~~~ion~~, and administrat~~or~~~~ive~~ operations used to control Jobs and Printers. This document is a
153 registration proposal for an extension to IPP/1.0 and IPP/1.1 following the registration procedures in those
154 documents.

155 2. New objects

156 This section defines the new Interpreter object.

157 2.1 Interpreter object

158 The Interpreter object models the document format interpreters that are contained in the Printer object. The
159 purpose of the Interpreter object is to model those Printer attributes whose value depends on which
160 interpreter is being used to process the document. Depending on implementation, the Printer object
161 attributes whose values ("xxx-supported" and "xxx-default") depend on the interpreter, i.e., on the
162 "document-format" of the document being processed, are considered to be Interpreter object attributes
163 instead. A Get-Printer-Attributes operations returns Printer and Interpreter objects as specified in the
164 "requested-attributes" supplied by the client. Depending on the value of the "document-format" attribute
165 supplied by the client in the Get-Printer-Attributes request (or the "document-format-default", if the client
166 omits the "document-format" attribute), selects the corresponding Interpreter object.

167 If an implementation does not make a distinction on the values of Printer attributes by document format,
168 say, for purposes of job validation (see [ipp-mod] Get-Printer-Attributes), there is no need to implement or
169 support the Interpreter object. The Interpreter object is introduced to provide a means to model an
170 implementation in which some attributes to depend on the document format. Those attributes are then sub-
171 classed to be Interpreter object attributes.

172 Note: the addition of the Interpreter object is completely compatible with IPP/1.0 and IPP/1.1 (see the
173 description of the "document-format" operation attribute in [ipp-mod] section 3.2.5.1 Get-Printer-Attributes
174 request). The protocol and semantics are the same whether or not the Interpreter object is used to
175 distinguish attributes that depend on the "document-format".

176 Note: The Interpreter object is really a sub-class of the Printer object, rather than being a full fledged object
177 in the sense that the Job and Printer objects are. There are no operations defined solely for the Interpreter
178 object. The Get-Printer-Attributes and Set-Printer-Attributes operations operate on the Interpreter object if
179 the implementation has the concept of an Interpreter object. However, if the IPP Printer implementation
180 does not contain Interpreter objects, the same Interpreter object attributes are considered Printer object
181 attributes, instead.

182 3. New Operation attributes

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

185 3.1 New operation attribute: "printer-message-from-operator" (text(127))

186 Type of registration: attribute

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

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

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

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

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

192

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

194

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

196 The client **OPTIONALLY** supplies this attribute. The Printer object **SHOULD** supports this
197 operation attribute if it supports the corresponding Printer Description attribute. The value of this
198 attribute is a message from the operator about the Printer object on which the operator is performing
199 the operation. If supported, the Printer copies the value to the Printer's "printer-message-from-
200 operator" Printer Description attribute (see [ipp-mod] section 4.4.25), automatically sets the value of
201 the Printer's "printer-message-time" with the current value of the Printer's "printer-up-time"
202 attribute, the value of the "printer-message-date-time" with the current value of the Printer's printer-
203 current-date-time" attribute, and the value of the Printer's "printer-message-operation" with the
204 operation-id value of this operation (see [ipp-mod] section 4.4.15).

205

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

209

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

215

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

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

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

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

220 Disable-Printer - see section 8.1.2

221 Enable-Printer - see section 8.1.3

222 Reset-Printer - see section 8.1.4

223 Restart-Printer - see section 8.1.5
224 Non-Process-Run-Out - see section 8.1.6
225 Shutdown-Printer - see section 8.1.7
226

227 The "printer-message-from-operator" operation attribute MUST NOT be supported as an operation attribute
228 for the Set-Printer-Attributes operation. If the operator wants to set the Printer's "printer-message-from-
229 operator" Printer Description attribute when issuing the Set-Printer-Attributes operation, the client supplies
230 the "printer-message-from-operator" with its new value as one of the Printer Description attributes in Group
231 2 in the request. The Printer also updates the Printer's "printer-message-date-time" and "printer-message-
232 operation" Printer Description attributes. If the client does not explicitly supply the "printer-message-from-
233 operator" with its new value, the Printer leaves the value of the Printer's "printer-message-from-operator"
234 Printer Description attribute unchanged.

235 3.2 New operation attribute: "job-message-from-operator" (text(127))

236 Type of registration: attribute

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

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

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

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

241 Attribute syntax(es) (include 1setOf and range as in Section 4.2): text(127)
242

243 Specification of this attribute (follow the style of IPP Model Section 4.2):
244

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

246 The client OPTIONALLY supplies this attribute. The Printer object SHOULD supports this
247 operation attribute if it supports the corresponding Job Description attribute. The value of this
248 attribute is a message from the operator about the Job object on which the operator has just
249 performed an operation. If supported, the Printer copies the value to the Job's "job-message-from-
250 operator" Job Description attribute (see [ipp-mod] section 4.3.16).
251

252 If the client omits this attribute, the Printer does not change the value of its "printer-message-from-
253 operator" Job Description attribute.
254

255 If the client supplies this attribute with a zero-length text value or with a value consisting solely of
256 white space, the Printer copies that value as any other value to the job's "job-message-from-
257 operator". Supplying such a value is the way that the operator indicates that there is no longer a job
258 message from the operator (rather than using the "out-of-band" 'no-value' value).
259

260 Note: There are no corresponding 'job-message-time', "job-message-date-time", and "job-message-
261 operation" Job Description attributes, since the usual lifetime of a job is limited.
262

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

264 Cancel-Job - see [ipp-mod] section 3.2.4
265 Hold-Job - see [ipp-mod] section 3.3.5
266 Release-Job - see [ipp-mod] section 3.3.6
267 Restart-Job - see [ipp-mod] section 3.3.7
268 Reprocess-Job - see section 8.2.2
269 Cancel-Current-Job - see section 8.2.3
270 Pause-Current-Job - see section 8.2.4
271 Resume-Job - see section 8.2.5
272 Promote-Job - see section 8.2.6
273 Space-Current-Job - see section 8.2.7
274

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

281 3.3 New operation attribute for Get-Printer-Attributes: "factory-settings" (boolean)

282 Type of registration: attribute

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

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

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

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

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

288

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

290 "factory-settings" (boolean)

291 The client OPTIONALLY supplies this attribute. The Printer object OPTIONALLY supports this
292 attribute, if it supports the Set-Printer-Attributes operation. If the client omits this attribute or
293 supplies the 'false' value, the Printer returns the current values of the requested attributes that are
294 settable, i.e., the values that have been set by previous Set-Printer-Attributes. If the client supplies
295 the 'true' value, the Printer returns the factory settings, i.e., the inherent values supported by the
296 implementation as shipped from the manufacturer or established at install time. This operation
297 attribute allows an operator to determine which values are supported in an implementation after
298 having modified a settable attribute. Attributes that are not settable are not affected by this
299 operation attribute, so that the Printer returns the same values for non-settable attribute when either
300 the 'true' or 'false' value has been supplied. If this operation attribute is supported, both values
301 MUST be supported.

302 3.4 New operation attribute for Pause-Printer: "when" (type2 keyword)

303 Type of registration: attribute

304 Proposed keyword name of this attribute: "when"

305 Types of attribute (Operation, Job Template, Job Description, Printer Description): Operation
 306 Operations to be used with if the attribute is an operation attribute: Pause-Printer, Reset-Printer, Non-
 307 Process-Run-Out, Shutdown-Printer, and Pause-Current-Job
 308 Object (Job, Printer, etc. if bound to an object): N/A
 309 Attribute syntax(es) (include 1setOf and range as in Section 4.2): type2 keyword

310
 311 Specification of this attribute (follow the style of IPP Model Section 4.2):

312 "when" (type2 keyword)

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

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

320 **TH> Just add a "when-values-supported" that applies to all of the
 321 four operations supported, with the exception of Pause-Current-Job.
 322 For Pause-Current-Job, only the 'now' and 'after-current-copy' have
 323 any meaning, so the other two values ('after-current-job' and
 324 'after-all') don't apply.**

325
 326 **HRL> Or, "just say NO". The client can't determine the values of
 327 "when" supported. The client may specify a value of when and the
 328 implementation will do it's best to deliver as close to the desired
 329 behavior as possible within the constraints of the device or
 330 environment. The client may determine the actual result based on
 331 final status and/or notification feedback.**

332

333

334 Standard keyword values are:

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

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

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

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

343

344 3.5 New OPTIONAL operation attribute for any Job or Printer operation: "device-name" (name(127))

345 Type of registration: attribute

346 Proposed keyword name of this attribute: "device-name"

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

348 Operations to be used with if the attribute is an operation attribute: all
349 Object (Job, Printer, etc. if bound to an object): N/A
350 Attribute syntax(es) (include 1setOf and range as in Section 4.2): name(127)

351

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

353 "device-name" (name(127))

354 This OPTIONAL Printer operation attribute contains the name of a device which is associated with
355 this Printer object. The named device is the actual target of the specified Printer operation, that is,
356 the Printer object MUST pass the operation through to the device rather than affecting the Printer
357 object specified by the "printer-uri" operation attribute. See the Job object attribute "output-device-
358 assigned" in [IPP-MOD] which identifies the named device that the job was assigned to by the
359 Printer object. See the Printer object attribute "device-names-supported" in section 4.9 of this
360 document.

361 ISSUE 2 - Shouldn't the Printer object also be affected? In other words, if the "device-name" is
362 supplied with the Pause-Printer operation to pause the actual device, shouldn't the Printer object also
363 enter the 'stopped' state with the 'paused' "printer-state-reasons" value set?

364 ISSUE 3 - From the Denver meeting, it was strongly urged that an IPP Printer implementation that
365 supports more than one device, i.e., fan-out, SHOULD support device name. Can we make "device-
366 name" REQUIRED if an IPP Printer supports more than one device? If not, can we make "device-
367 name" RECOMMEND if an IPP Printer supports more than one device?

368 ISSUE 4 - An implementation is free to support the "device-name" operation attribute on any
369 operation, but NEED NOT support it on all operations, if it supports it on some, correct?

370 ISSUE 5 - Could we specify a minimum set of operations which, if supported, MUST also support
371 the "device-name" operation attribute, if the implementation supports the "device-name" operation
372 attribute on any operation?

373 3.5.1 Revised text for [ipp-mod] for the "device-name" extension

374 The "device-name" extension recommends that the following text be added to the IPP-MOD document in
375 section 3.2, "Printer Operations":

376 All Printer operations are directed at Printer objects OR at named devices associated with Printer
377 objects. A client MUST always supply the "printer-uri" operation attribute in order to identify the
378 correct target of the operation. A client MAY also supply the "device-name" operation attribute in
379 order to pass the operation to the named device (rather than affecting the Printer object specified by
380 "printer-uri")."

381 ISSUE 6 (repeat of 2) - Shouldn't the Printer object also be affected? In other words, if the "device-
382 name" is supplied with the Pause-Printer operation to pause the actual device, shouldn't the Printer
383 object also enter the 'stopped' state with the 'paused' "printer-state-reasons" value set?

384 3.6 Summary of the operation attributes for the Printer operations

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

388 Legend:

389 R - REQUIRED for a Printer to support

390 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	Non-Process-Run-Out	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			
synchronize											O
shutdown-function											R
<u>device-name</u>	<u>O</u>	<u>O</u>	<u>O</u>	<u>O</u>	<u>O</u>	<u>O</u>	<u>O</u>	<u>O</u>	<u>O</u>	<u>O</u>	<u>O</u>

391 3.7 Summary of the operation attributes for the Job operations

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

397 Legend:

398 R - REQUIRED for a Printer to support

399 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							
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**	
<u>device-name</u>	<u>O</u>	<u>O</u>	<u>O</u>	<u>O</u>	<u>O</u>	<u>O</u>	<u>O</u>	<u>O</u>	<u>O</u>	<u>O</u>	<u>O</u>	<u>O</u>

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

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

405 4. New Printer Description Attributes

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

408 4.1 printer-settable-attributes (1setOf type2 keyword)

409 ISSUE 7 - Keep "printer-settable-attributes", "interpreter-settable-attributes", and "job-settable-attributes"
 410 so that a client can determine which subset of the Printer, Interpreter, and Job attributes are settable? The
 411 decision in Denver was to delete "printer-settable-attributes", "interpreter-settable-attributes", and "job-
 412 settable-attributes". However, how can the client display to the user what is possible? Just random trying
 413 seems completely contrary to the query for capabilities philosophy in IPP. Also the IPP Printer has to
 414 validate whether each Set operation is acceptable or not, so it may as well do such validation with a
 415 queriable attribute, rather than a hidden (and unconfigurable) mechanism.

416 ISSUE 8 - Because the Interpreter object is really a sub-class of the Printer object, maybe we don't need a
 417 separate "interpreter-settable-attributes" Printer attribute. In other words, for those implementations that do
 418 implement the Interpreter object, they would still indicate which interpreter attributes are settable by putting
 419 them in the "printer-settable-attributes" attribute.

420
 421 Type of registration: attribute
 422 Proposed keyword name of this attribute: printer-settable-attributes
 423 Types of attribute (Operation, Job Template, Job Description, Printer Description): Printer Description
 424 Operations to be used with if the attribute is an operation attribute: N/A
 425 Object (Job, Printer, etc. if bound to an object): Printer
 426 Attribute syntax(es) (include 1setOf and range as in Section 4.2): 1setOf type2 keyword
 427 If attribute syntax is 'keyword' or 'enum', is it type2 or type3: type2
 428 If this is a Printer attribute, MAY the value returned depend on "document-format" (See Section 6.2): Yes
 429 If this is a Job Template attribute, how does its specification depend on the value of the "multiple-
 430 document-handling" attribute: N/A
 431 Specification of this attribute (follow the style of IPP Model Section 4.2):

432 4.4.? printer-settable-attributes (1setOf type2 keyword)

433 This READ-ONLY Printer attribute identifies the Printer object attributes that are settable in this
434 implementation, i.e., that are settable using the Set-Printer-Attributes operations. This attribute MUST be
435 supported if the Set-Printer-Attributes operations is supported. The Printer MUST reject attempts to set any
436 Printer attributes that are not in this list, returning the 'client-error-attributes-not-settable' status code (see
437 section 6.1). The value of this attribute MAY depend on the value of the "document-format" operation
438 attribute supplied in the Get-Printer-Attributes operation (see [ipp-mod] section 3.2.5.1).

439 4.2 interpreter-settable-attributes (1setOf type2 keyword)

440 Type of registration: attribute

441 Proposed keyword name of this attribute: interpreter-settable-attributes

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

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

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

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

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

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

448 If this is a Job Template attribute, how does its specification depend on the value of the "multiple-

449 document-handling" attribute: N/A

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

451 4.4.? interpreter-settable-attributes (1setOf type2 keyword)

452 This READ-ONLY Printer attribute identifies the Interpreter object (see section 2.1) attributes that are
453 settable in this implementation, i.e., that are settable using the Set-Printer-Attributes operations. This
454 attribute MUST be supported if the Set-Printer-Attributes operations is supported. The Printer MUST
455 reject attempts to set any Printer or Interpreter attributes that are not in this list, returning the 'client-error-
456 attributes-not-settable' status code (see section 6.1). The value of this attribute MAY depend on the value
457 of the "document-format" operation attribute supplied in the Get-Printer-Attributes operation (see [ipp-
458 mod] section 3.2.5.1).

459 4.3 job-settable-attributes (1setOf type2 keyword)

460 Type of registration: attribute

461 Proposed keyword name of this attribute: job-settable-attributes

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

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

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

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

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

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

468 If this is a Job Template attribute, how does its specification depend on the value of the "multiple-

469 document-handling" attribute: N/A

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

471 4.4.? job-settable-attributes (1setOf type2 keyword)

472 This READ-ONLY Printer attribute identifies the Job object attributes that are settable in this
 473 implementation, i.e., that are settable using the Set-Job-Attributes operations. This attribute MUST be
 474 supported if the Set-Job-Attributes operations is supported. The Printer MUST reject attempts to set any
 475 Job attributes that are not in this list, returning the 'client-error-attributes-not-settable' status code (see
 476 section 6.1).

477 4.4 printer-controls-other-protocols (boolean)

478 Type of registration: attribute
 479 Proposed keyword name of this attribute: printer-controls-other-protocols
 480 Types of attribute (Operation, Job Template, Job Description, Printer Description): Printer Description
 481 Operations to be used with if the attribute is an operation attribute: N/A
 482 Object (Job, Printer, etc. if bound to an object): Printer
 483 Attribute syntax(es) (include 1setOf and range as in Section 4.2): boolean
 484 If attribute syntax is 'keyword' or 'enum', is it type2 or type3: N/A
 485 If this is a Printer attribute, MAY the value returned depend on "document-format" (See Section 6.2): No
 486 If this is a Job Template attribute, how does its specification depend on the value of the "multiple-
 487 document-handling" attribute: N/A
 488 Specification of this attribute (follow the style of IPP Model Section 4.2):

489 4.4.? printer-controls-other-protocols (boolean)

490 This Printer attribute indicates whether all IPP printer and job operations, such as Disable-Printer, Pause-
 491 Printer, Cancel-Job, etc., affect non-IPP protocols that may be supported. It is RECOMMENDED that IPP
 492 control other non-IPP protocols. However, this attribute permits an implementation to indicate explicitly
 493 whether it does affect other protocols or not.

494 A 'false' value indicates that IPP operations only affect jobs submitted by the IPP Protocol. For example, a
 495 'true' value indicates that a Disable-Printer operation prevents all protocols from submitting jobs, not just
 496 the IPP protocol. ~~An another example, a~~ 'true' value indicates that the Pause-Printer operation would pause
 497 the current job, no matter what job submission protocol had submitted it. A 'true' value indicates that the
 498 Cancel-Job operation will cancel the specified job even if it was submitted using a different job submission
 499 protocol, such as LPR.

500 ~~ISSUE 6—Ok that the "printer-controls-other-protocols" Printer Description attribute is just a boolean, or~~
 501 ~~do we need a list of operations that affect non-IPP protocols?~~

502 ~~TH> It would be more flexible to allow per-operation control, so change~~
 503 ~~from "printer-controls-other-protocols" Printer Description attribute to~~
 504 ~~"operations-affecting-other-protocols (1setOf type2 enum)". The values~~
 505 ~~are defined by the "operations-supported (1setOf type2 enum)" operation.~~

506
 507 ~~HRL> The situation is already complex in that SNMP or IPP (possibly~~
 508 ~~others?) may "compete" or "conflict" is managing the printer. Per-~~
 509 ~~operation control does nothing to alleviate this and may make the~~
 510 ~~situation even more complex. Suggest leave as is.~~

511 As with any Printer Description attribute that this specification does not list as READ-ONLY, an
 512 implementation MAY allow a client to change the value of this attribute ~~to change~~ using Set-Printer-
 513 Attributes, thereby changing the way that the IPP operations affect other non-IPP protocols. An
 514 implementation MAY also support other means to change the value of this attribute, such as via the console
 515 or at installation time.

516 ~~ISSUE 7 Is IPP intended for printer management. The issue is still undetermined?
 517 TH> I think it is natural and so far there is not much overlap with any
 518 MIB. If and when we do get overlap, we need to make sure that the
 519 semantics are the same.~~

520
 521 ~~HRL> I think it is clear that IPP is moving in this direction. I leave
 522 this issue open for further discussion, however, because I believe we
 523 need to be as clear as possible about the possible conflicts of two
 524 management protocols originating from one organization (SNMP and IPP)
 525 and provide some guidelines.~~

526 4.5 printer-message-time (integer(MIN:MAX))

527 Type of registration: attribute

528 Proposed keyword name of this attribute: printer-message-time

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

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

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

532 Attribute syntax(es) (include 1setOf and range as in Section 4.2): integer(MIN:MAX)

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

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

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

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

538 4.4.? printer-message-time (integer(MIN:MAX))

539 This READ-ONLY Printer Description attribute contains the time that the Printer's "printer-message-from-
 540 operator" was changed by the operator using any operation where the client supplied the "printer-message-
 541 from-operator" operation attribute (see section 3.1) or was explicitly set using the Set-Printer-Attributes
 542 operation (see section 8.1.1). This attribute allows the users to know when the "printer-message-from-
 543 operator" attribute was last set.

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

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

550 4.6 printer-message-date-time (dateTime)

551 Type of registration: attribute

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

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

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

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

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

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

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

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

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

562 4.4.? printer-message-date-time (dateTime)

563 This READ-ONLY Printer Description attribute contains the date and time that the Printer's "printer-
564 message-from-operator" was changed by the operator using any operation where the client supplied the
565 "printer-message-from-operator" operation attribute (see section 3.1) or was explicitly set using the Set-
566 Printer-Attributes operation (see section 8.1.1). This attribute allows the users to know when the "printer-
567 message-from-operator" attribute was last set. This attribute MUST be supported if the Printer supports
568 both the "printer-message-from-operator" and the "printer-current-date-time" attributes.

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

571 4.7 printer-message-operation (type2 keyword)

572 Type of registration: attribute

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

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

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

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

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

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

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

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

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

583 4.4.? printer-message-operation (type2 enum)

584 This READ-ONLY Printer Description attribute contains the operation that was used to changed the
585 Printer's "printer-message-from-operator" by the operator using any operation where the client supplied the
586 "printer-message-from-operator" operation attribute (see section 3.1) or explicitly set using the Set-Printer-

587 Attributes operation (see section 8.1.1). This attribute allows the users to know which operation was used
588 to change the "printer-message-from-operator" attribute when it was last set.

589 Note: This attribute helps users better understand the context for the "printer-message-from-operator"
590 [message](#).

591 4.8 when-values-supported (1setOf type2 keyword)

592 **ISSUE 9 - Keep "when-values-supported" Printer Description attribute in the spec? The decision in Denver**
593 **was to delete "when-values-supported". However, how does the client find out what choices to display to**
594 **the user? Also it really isn't a burden on the IPP Printer implementation since it has to valid the value**
595 **coming in anyway, so it may as well validate against a Printer attribute, rather than some hard coded**
596 **internal mechanism.**

597 Type of registration: attribute

598 Proposed keyword name of this attribute: when-values-supported

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

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

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

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

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

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

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

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

608 4.4.? when-values-supported (1setOf type2 keyword)

609 This READ-ONLY Printer Description attribute contains the supported values for the "when" operation
610 attribute in any operation. The operations include: Pause-Printer, Reset-Printer, Shutdown-Printer, and
611 Pause-Current-Job. For Pause-Current-Job, only the 'now' and 'after-current-copy' values are defined. So
612 the other values: 'after-current-job' and 'after-all', if present in this attribute, don't apply to Pause-Current-
613 Job).

614 4.9 device-names-supported (1setOf name(127))

615 **ISSUE 10 - For consistency with [ipp-mod], shouldn't this be singular even though it is multi-valued, i.e.,**
616 **device-name-supported (1setOf name(127))?**

617 This OPTIONAL Printer attribute contains at least one device name which is associated with this Printer
618 object. It OPTIONALLY contains more than one device name which is associated with this Printer object,
619 i.e., fan-out, see [ipp-mod] section 2.1. A Printer object which does not have an associated named device
620 MUST NOT support this attribute.

621 An Administrator determines device names and configures this attribute to contain those device names via
622 IPP Set-Printer-Attributes operation (see section 8.1.1) or by some means outside the scope of this
623 document. The precise format of these device names is implementation dependent and MAY depend on the
624 protocol stack and the directory namespace.

625 Note: The new attribute "device-names-supported" ~~will also~~ enhances the usefulness of the IPP/1.1 Job
626 object attribute "output-device-assigned" (see [ipp-mod] section 4.3.13). The "output-device-assigned" Job
627 attribute identifies the output device to which the Printer object has assigned a job, for example, when a
628 single Printer object is supporting multiple devices.

629 See also the operation attribute "device-name" in section 3.5 of this document.

630 5. Additional values for "printer-state-reasons" and "job-state-reasons" attributes

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

633 5.1 Value for "printer-state-reasons": 'standby'

634 Type of registration: type2 keyword attribute value

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

636 Proposed keyword name of this keyword value: standby

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

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

641 5.2 Value for "job-state-reasons": 'job-paused'

642 Type of registration: type2 keyword attribute value

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

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

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

646 'job-paused': The job has been paused while processing using the Pause-Current-Job operations and
647 other jobs can be processed on the Printer. The Job can be resumed using the Resume-Job operation
648 which removes this value.
649

650 6. New status codes

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

652 6.1 New status code: 'client-error-attributes-not-settable'

653 Type of registration: status code

654 Keyword symbolic name of this status code value: 'client-error-attributes-not-settable'
655 Numeric value (to be assigned by the IPP Designated Expert in consultation with IANA):
656 Operations that this status code may be used with: Set-Printer-Attributes, Set-Job-Attributes
657 Specification of this status code (follow the style of IPP Model Section 13 APPENDIX B: Status Codes
658 and Suggested Status Code Messages):

659 13.1.4.20 client-error-attributes-not-settable (0x0413)

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

666 6.2 New status code: 'server-error-printer-is-in-standby-mode'

667 Type of registration: status code

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

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

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

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

673 13.1.5.8 server-error-printer-is-in-standby-mode

674 The Printer has been shutdown and is only accepting the Restart-Printer (see section 8.1.5) and Get-Printer-
675 Attributes operations. An operator can perform the Restart-Printer operation to allow the Printer to accept
676 other operations.

677 7. New out-of-band values

678 This section defines additional out-of-band values that can be used with any attribute in principle. See the
679 beginning of [ipp-mod] section 4.1.

680 7.1 'not-settable' out of band value

681 The 'not-settable' out of band value is used by the IPP Printer in a Set-Job-Attributes or Set-Printer-
682 Attributes response to indicate an attribute that was supplied, but is not settable in that implementation or as
683 defined by the policy for that system, because it is not in the "job-settable-attributes" on the one hand, or the
684 "interpreter-settable-attributes" or "printer-settable-attributes", on the other hand.

685 8. Summary of Set 2 operations and Operation-Id Assignments

686 The Set 2 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
Non-Process-Run-Out	0x??	Moves the last printed sheet(s) to the exit or stacker
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

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

690 8.1 Printer Operations

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

694 8.1.1 Set-Printer-Attributes Operation

695 Type of registration: operation
696 Proposed name of this operation: Set-Printer-Attributes
697 Object Target: Printer
698 Specification of this operation:

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

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

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

708 8.1.1.1 Settable and READ-ONLY Printer Description attributes

709 If the Printer supports the "printer-message-from-operator" Printer Description attribute (see [ipp-mod]
710 section 4.4.25) and the client explicitly supplies a new value for the "printer-message-from-operator" in the
711 request, then the Printer MUST set the "printer-message-from-operator" Printer attribute to this new value
712 and MUST also set the "printer-message-time", "printer-message-date-time", and "printer-message-
713 operation" attributes, if supported (see sections 4.5, 4.6, and 4.7).

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

- 715 all Job Template Default ("xxx-default") attributes
- 716 all Job Template Supported ("xxx-supported") attributes
- 717 all Job Template Ready ("xxx-ready") attributes

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

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

- 721 printer-state
- 722 printer-state-reasons
- 723 printer-state-message
- 724 printer-is-accepting-jobs - see Enable-Printer/Disable-Printer
- 725 queued-job-count
- 726 printer-message-time - see Set-Printer-Attributes when setting "printer-message-from-operator"
- 727 printer-message-date-time - see Set-Printer-Attributes when setting "printer-message-from-operator"
- 728 printer-message-operation - see Set-Printer-Attributes when setting "printer-message-from-operator"
- 729 ~~when-values-supported~~
- 730 printer-up-time
- 731 ~~settable-attributes~~

732 The remaining Printer Description attributes MAY be settable using the Set-Printer-Attributes operation,
733 depending on implementation. If "xxx-supported" Printer Description attribute are settable, then they
734 MUST affect the behavior of the implementation. If they are READ-ONLY then they reflect the
735 implementation and cannot be changed using the Set-Printer-Attributes operation. Consider the following
736 examples:

737 For example, if the "operations-supported" Printer Description attribute (see [ipp-mod] section
738 4.4.15) is settable, then changing its value MUST affect the operations that the implementation
739 accepts or rejects. Such an implementation will need to be able to reject values for operations that it
740 contains no code support for.

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

745 See the "factory-settings" operation attribute (see section 3.3) for a way to query the implementation
746 supported values using the Get-Printer-Attributes operation. See the "reset-function" operation attribute of
747 the Reset-Printer operation (see section 8.1.4) for a way to restore the values to the factory settings.

748 *Access Rights:* Authentication and access control (see [ipp-mod] sections 1, 8.3, and 8.5) apply to this
749 operation.

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

753 8.1.1.2 Set-Printer-Attributes Request

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

755 Group 1: Operation Attributes

756 Natural Language and Character Set:

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

759 Target:

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

762 Requesting User Name:

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

765 "document-format" (mimeMediaType):

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

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

779
780 If a client wants to set an attribute of all of the Interpreter objects to the same value, it can query the
781 Printer's "document-format-supported" Printer Description attribute and perform separate Set-
782 Printer-Attributes for each document format supported.

783
784 ~~ISSUE 9: Do we need a way to get and/or set the "xxx" attribute for all Interpreter objects in one~~
785 ~~Get-Printer-Attributes or Set-Printer-Attributes operation? Or is it sufficient for a client to provide~~
786 ~~the equivalent functionality by stepping through all the values of the "document-formats-supported"~~
787 ~~with repeating the Get or Set operation?~~

788
789 ~~ISSUE 10: Ok to add the Interpreter object, even though it doesn't solve all of the attribute~~
790 ~~constraint problems. At least it gives us a more object-based description of the semantics. When~~
791 ~~we do add some sort of Printer Description attribute that enumerates combinations of Job attribute~~
792 ~~values that may not be used in combination (like PPD file constraints), it can include the~~
793 ~~"document-format" attribute among them. So introducing the Interpreter object in no way precludes~~
794 ~~a complete constraint description mechanism in the future.~~

795
796 If the Printer object does not distinguish between different sets of supported values for each
797 different document format when validating jobs in the create and Validate-Job operations, it MUST
798 NOT distinguish between different document formats in the Set-Printer-Attributes operation. If the
799 Printer object does distinguish between different sets of supported values for each different
800 document format specified by the client, this specialization applies only to the same Printer
801 attributes as the Get-Printer-Attributes operation (see [ipp-mod] section 3.2.5.1).

802
803 If the client omits this "document-format" operation attribute, the Printer object MUST respond as if
804 the attribute had been supplied with the value of the Printer object's "document-format-default"
805 attribute. It is recommended that the client always supply a value for "document-format", since the
806 Printer object's "document-format-default" may be 'application/octet-stream', in which case the set
807 attributes and values are for the union of the document formats that the Printer can automatically
808 sense. For more details, see the description of the 'mimeType' attribute syntax in [ipp-mod]
809 section 4.1.9.

810
811 If the client supplies a value for the "document-format" Operation attribute that is not supported by
812 the Printer, i.e., is not among the values of the Printer object's "document-format-supported"
813 attribute, the Printer object MUST reject the operation and return the 'client-error-document-format-
814 not-supported' status code.

815

816 Group 2: Printer Attributes

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

819 Description Attributes. Each Printer attribute supplied in Group 2 replaces the value(s) of the
820 corresponding Printer attribute on the target Printer object. If a Printer object attribute had not been
821 configured yet and so had the 'no-value' out-of-band value (see [ipp-mod] 4.1), the supplied value(s)
822 replace the 'no-value' value. For attributes that can have multiple values (1setOf), all values
823 supplied by the client replace all values of the corresponding Printer object attribute.
824

825 8.1.1.3 Set-Printer-Attributes Response

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

827 Group 1: Operation Attributes

828 Status Message:

829 In addition to the REQUIRED status code returned in every response, the response OPTIONALLY
830 includes a "status-message" (text(255)) and/or a "detailed-status-message" (text(MAX)) operation
831 attribute as described in [ipp-mod] sections 13 and 3.1.6.
832

833 Natural Language and Character Set:

834 The "attributes-charset" and "attributes-natural-language" attributes as described in [ipp-mod]
835 section 3.1.4.2.
836

837 Group 2: Unsupported Attributes

838 See [ipp-mod] section 3.1.7 for details on returning Unsupported Attributes.
839

840 In the case of attributes that are supported, but are not settable by the implementation, i.e., are not
841 among the values of the Printer's "settable-attributes" Printer Description attribute (see section 4.1),
842 the Printer object returns the client-supplied attribute(s) with a substituted value of 'not-supported'
843 (same out-of-band value as for attributes that are not supported). This value's syntax type is "out-of-
844 band" and its encoding is defined by special rules for "out-of-band" values in the "Encoding and
845 Transport" document [IPP-PRO]. Its value indicates that the attribute is either not settable or is not
846 supported at all.
847

848 ~~ISSUE 11: Why not have a separate out of band 'not settable' value, so that the client can~~
849 ~~distinguish between the cases of the attribute isn't supported versus the attribute is supported, but is~~
850 ~~not settable? True, the client can query the "settable-attributes" to see which attributes can be set,~~
851 ~~before or after issuing the Set Printer Attributes operation.~~

852 ~~TH> I think that providing a separate out of band code is useful, since~~
853 ~~a reply could contain both unsupported attributes and ones that were~~
854 ~~supported, but are not settable in this implementation.~~

855
856
857 ~~HRL> What's wrong with what's already described? How is the new proposal~~
858 ~~better?~~

859 8.1.2 Disable-Printer Operation

860 Type of registration: operation

861 Proposed name of this operation: Disable-Printer

862 Object Target: Printer

863 Specification of this operation:

864 This OPTIONAL operation allows a client to stop the Printer object from accepting jobs, i.e., cause the
865 Printer to reject subsequent create job operations (Print-Job, Print-URI, and Create-Job operation) and
866 return the 'server-error-not-accepting-jobs' status code. The Printer still accepts all other operations. All
867 previously submitted Jobs and currently processing Jobs continue unaffected. The Printer sets the value of
868 its "printer-is-accepting-jobs" READ-ONLY Printer Description attribute to 'false' (see [ipp-mod] section
869 4.4.20), no matter what the previous value was. This operation has no immediate effect on the Printer's
870 "printer-state" and "printer-state-reasons" attributes.

871 Note: Use the Enable-Printer operation (section 8.1.3) to enable a Printer to accept Jobs again.

872 If the Disable-Printer operation is supported, then the Enable-Printer operation MUST be supported, and
873 vice-versa.874 Note: Use the Enable-Printer and Disable-Printer operations to allow or prevent input to a Printer. Use the
875 Pause-Printer and Resume-Printer operations to prevent or allow output from the Printer.

876 Whether or not the Disable-Printer operation stops jobs that are submitted using job submission protocols
877 other than IPP, depends on implementation, i.e., on whether the IPP protocol is being used as a universal
878 management protocol or just to manage IPP jobs, respectively. See "printer-controls-other-protocols"
879 (section 4.4).

880 *Access Rights:* Authentication and access control (see [ipp-mod] sections 1, 8.3, and 8.5) apply to this
881 operation.

882 The Disable-Printer Request and Disable-Printer Response have the same attribute groups and attributes as
883 the Resume-Printer operation (see [ipp-mod] sections 3.2.7.1 and 3.2.7.2), including the new "printer-
884 message-from-operator" operation attribute (see section 3.1), and with the addition of the following Group
885 1 operation attribute in the request:

886 "job-type" (type2 keyword):

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

890

891 Standard keyword values are:

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

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

894 'all-jobs' - disable all type of jobs

895 8.1.3 Enable-Printer Operation

896 Type of registration: operation

897 Proposed name of this operation: Enable-Printer

898 Object Target: Printer

899 Specification of this operation:

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

906 Note: Use the Disable-Printer operation (section 8.1.2) to stop a Printer from accepting Jobs.

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

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

911 Whether or not the Enable-Printer operation allows acceptance of jobs that are submitted using job
912 submission protocols other than IPP, depends on implementation, i.e., on whether the IPP protocol is being
913 used as a universal management protocol or just to manage IPP jobs, respectively. See "printer-controls-
914 other-protocols" (section 4.4).

915 *Access Rights:* Authentication and access control (see [ipp-mod] sections 1, 8.3, and 8.5) apply to this
916 operation.

917 The Enable-Printer Request and Enable-Printer Response have the same attribute groups and attributes as
918 the Resume-Printer operation (see [ipp-mod] sections 3.2.8.1 and 3.2.8.2), including the new "printer-
919 message-from-operator" operation attribute (see section 3.1), and with the addition of the following Group
920 1 operation attribute in the request:

921 "job-type" (type2 keyword):

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

925
926 Standard keyword values are:

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

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

929 'all-jobs' - enable all types of jobs

930 8.1.4 Reset-Printer operation

931 Type of registration: operation

932 Proposed name of this operation: Reset-Printer

933 Object Target: Printer

934 Specification of this operation:

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

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

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

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

950 *Access Rights:* Authentication and access control (see [ipp-mod] sections 1, 8.3, and 8.5) apply to this
951 operation.

952 The Reset-Printer Request and Reset-Printer Response have the same attribute groups and attributes as the
953 Pause-Printer operation (see [ipp-mod] sections 3.2.7.1 and 3.2.7.2), including the new "printer-message-
954 from-operator" operation attribute (see section 3.1), the new "when" operation attribute (see section 3.4),
955 and with the addition of the following Group 1 operation attributes in the request:

956 "reset-function" (type3 keyword):

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

960

961 Standard keyword values are:

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

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

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

966

967 8.1.5 Restart-Printer operation

968 Type of registration: operation

969 Proposed name of this operation: Restart-Printer

970 Object Target: Printer

971 Specification of this operation:

972 This OPTIONAL operation allows a client to restart a Printer that has previously been shutdown in standby
973 mode (see section 8.1.7). Standby mode is indicated by the Printer's "printer-state" being 'stopped' and its
974 "printer-state-reasons" including the 'standby' and 'paused' values. If the Printer is not in standby mode, the
975 Printer MUST reject this operation and return the 'client-error-not-possible' status code.

976 **ISSUE 11: What state does the Printer comes back up on Restart-Printer and how can the client control?**
977 **Possible alternatives:**

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

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

987 **TH 7/26: Remove the Shutdown-Printer 'standby' mode concept.**
988 Shutdown-Printer always powers off eventually. Also remove
989 Restart-Printer operation all together. Instead change the
990 Disable-Printer and Enable-Printer operations to Disable-Operations
991 and Enable-Operations, so that individual operations are enabled
992 and disabled independent of the state of the Printer and don't
993 otherwise affect the state of the Printer.

994
995 **HRL 9/18: How can the state of the printer not be effected when you**
996 **disable or enable it? Don't understand 2nd half of this issue**
997 **resolution.**

998 **DENVER MEETING>** There was significant confusion as to the meaning of shutdown. If a shutdown
999 operation halts communications to the printer a restart is not possible. It was agreed to include restart
1000 attributes 'restart-to-standby' (requires a two step process), 'restart-fully', and 'restart-sync'.

1001 **ACTION ITEM (Harry Lewis): make a complete proposal and submit for approval.**

1002 If the Restart-Printer operation is supported, then the Shutdown-Printer operation MUST be supported,
1003 since the Restart-Printer operation is meaningful only after a Shutdown-Printer operation has been
1004 performed. However, if the Shutdown-Printer operation is supported, the Restart-Printer NEED NOT be
1005 supported.

1006 **Issue 12: Why? This is backward, if you ask me (HRL).**

1007 **Denver meeting>** Consider "shutdown-attributes" similar to Windows "shutdown". Like:

1008 – Completely power off (walk to printer to bring it back up

1009 – Power off but listen for "restart" - shutdown to standby

1010 Denver meeting> Also consider restart attributes.

1011 – Restart to Standby (disabled and paused) (two step bring up)

1012 – Restart (fully).

1013 – Restart sych

1014 *Access Rights:* Authentication and access control (see [ipp-mod] sections 1, 8.3, and 8.5) apply to this
1015 operation.

1016 The Restart-Printer Request and Restart-Printer Response have the same attribute groups and attributes as
1017 the Resume-Printer operation (see [ipp-mod] sections 3.2.8.1 and 3.2.8.2), including the new "printer-
1018 message-from-operator" operation attribute (see section 3.1) and the following Group 1 operation attribute:

1019 8.1.6 Non-Process-Run-Out Operation

1020 ISSUE 13 - Can we think of a name for Non-Process-Run-Out that follows the pattern of other IPP
1021 operations on Printers, namely Xxxx-Yxxx-Printer? How about Non-Process-Run-Out-Printer or more
1022 simply Run-Out-Printer?

1023 Type of registration: operation

1024 Proposed name of this operation: Non-Process-Run-Out

1025 Object Target: Printer

1026 Specification of this operation:

1027 This OPTIONAL operation effectively moves the last printed sheet to the exit or stacker. The terminology
1028 is common to long path continuous forms devices but may have applicability on shorter devices or in cut-
1029 sheet applications.

1030 *Access Rights:* Authentication and access control (see [ipp-mod] sections 1, 8.3, and 8.5) apply to this
1031 operation.

1032 The Non-Process-Run-Out Request and Non-Process-Run-Out Response have the same attribute groups
1033 and attributes as the Pause-Printer operation (see [ipp-mod] sections 3.2.7.1 and 3.2.7.2), including the new
1034 "printer-message-from-operator" operation attribute (see section 3.1) and the new "when" operation
1035 attribute (see section 3.4).

1036 8.1.7 Shutdown-Printer Operation

1037 Type of registration: operation

1038 Proposed name of this operation: Shutdown-Printer

1039 Object Target: Printer

1040 Specification of this operation:

1041 This OPTIONAL operation allows a client to shutdown a Printer, i.e., stop processing jobs and power off in
1042 some implementation-dependent manner. The purpose of Shutdown-Printer is to shutdown the Printer for
1043 an extended period, not to reset the device(s) or modify a Printer attribute. See Reset-Printer (section 8.1.4)

1044 for the way to reset the device(s). See the Disable-Printer operation (section 8.1.2) for a way for the client
1045 to stop the Printer from accepting Job Creation requests without stopping processing or shutting down.

1046 The Printer is disabled immediately (see the Disable-Printer operation in section 8.1.2). The Printer adds
1047 the 'shutdown' value (see [ipp-mod] section 4.4.11) to its "printer-state-reasons" Printer Description
1048 attribute. The "when" operation attribute specifies how much processing occurs before the Printer is paused
1049 (see [ipp-mod] section 3.2.7) and the shutdown is complete. All other requests continue to be accepted
1050 until the printer is powered down.

1051 ISSUE 14 - Need to look at life cycle of the Printer versus standby/power-down and the other operations
1052 that can be accepted. There can be appreciable time between acceptance of this operation and when the
1053 final state of the printer, either standby or powered down is reached. Is it ok for non-submission operations
1054 to continue to be accepted during this time? May need 'moving-to-shutdown'. What about 'moving-to-
1055 standby'?

1056 TH> Add 'moving-to-shutdown' which the Shutdown-Printer sets
1057 immediately (analogous to 'moving-to-paused'). Then the 'shutdown'
1058 values means that the shutdown has completed (and is only meaningful to
1059 a server implementation that hosts the Printer object). Thus the server
1060 can still respond to a Get-Printer-Attributes operation after the
1061 Printer is shutdown as stated in IPP/1.1.

1062
1063 HRL> Is this granularity really achievable enough of a wide enough
1064 variety of environments to be reliable or, in reality, will this be
1065 implementation dependent?

1066 Whether or not the Shutdown-Printer operation affects jobs that were submitted to the device using job
1067 submission protocols other than IPP, depends on implementation, i.e., on whether the IPP protocol is being
1068 used as a universal management protocol or just to manage IPP jobs, respectively. See "printer-controls-
1069 other-protocols" (section 4.4).

1070 The Printer object MUST accept this operation in any state and transition the Printer object to the 'idle'
1071 state.

1072 *Access Rights:* Authentication and access control (see [ipp-mod] sections 1, 8.3, and 8.5) apply to this
1073 operation.

1074 The Shutdown-Printer Request and Shutdown-Printer Response have the same attribute groups and
1075 attributes as the Pause-Printer operation (see [ipp-mod] sections 3.2.7.1 and 3.2.7.2), including the new
1076 "printer-message-from-operator" operation attribute (see section 3.1), the new "when" operation attribute
1077 (see section 3.4), and with the addition of the following Group 1 operation attributes in the request:

1078 "shutdown-function" (type2 keyword)

1079 The client OPTIONALLY supplies this attribute. The Printer object OPTIONALLY supports this
1080 attribute. This attribute indicates which shutdown function is to be performed.

1081

1082 Standard keyword values are:

1083 'standby' - shutdown the Printer, but leave it in standby-mode (disabled and paused), which
1084 means that Get-Printer-Attributes and Restart-Printer operations are accepted.
1085 'power-off' - shutdown the Printer and power it off. No operations are accepted after power
1086 off.

1087 **ISSUE 15 - Should we separate setting the device's power saver mode from shutting the**
1088 **power off? We could have a separate operation, say, Set-Power-Saver-Level, which**
1089 **takes an integer, starting with 0. A 0 means full power on. Printer supports some**
1090 **number of levels above that, if any. Then an operator could turn the device to full**
1091 **power at the beginning of the day, so the first submission doesn't have to wait for the**
1092 **power save mode to restore full power.**

1093
1094 "synchronize" (boolean)

1095 The client OPTIONALLY supplies this attribute. The Printer object OPTIONALLY supports this
1096 attribute. This attribute indicates whether or not the printer is to synchronize the checkpoint data for
1097 the current job ("when" = 'now') with the pages that have actually printed. If the value of the "when"
1098 attribute is not 'now' or the "when" attribute is not supplied, then the "synchronize" attribute has no
1099 meaning and the Printer MUST ignore it. If this attribute is supported, then a value of 'true' implies
1100 that the Printer will be able to resume the job at the point of synchronization when the Printer is
1101 restarted. If the implementation does not support resuming a job (either automatically or with the
1102 Resume-Job operation) after a Shutdown-Printer with "when" = 'now', then it does not implement
1103 this attribute. In this case, check-pointing implies that the job may be resumed in the future, exactly
1104 from the point and in the state and resource context from which it left off.

1105
1106
1107 If the Printer supports this attribute but the client does not supply it, the Printer is assumed to
1108 perform synchronization ('true' behavior). If the Printer does not support this attribute, the Printer is
1109 assumed to not synchronize ('false' behavior).

1110
1111
1112 **ISSUE 16: Is the current job automatically restarted when the Printer is restarted? Or does some**
1113 **client have to issue a Restart-Job operation?**

1114 **The question is moot, if we remove the Restart-Job operation, as**
1115 **suggested:**

1116
1117 **TH 7/26: Remove the Shutdown-Printer 'standby' mode concept. Shutdown-**
1118 **Printer always powers off eventually. Also remove Restart-Printer**
1119 **operation all together. Instead change the Disable-Printer and Enable-**
1120 **Printer operations to Disable-Operations and Enable-Operations, so that**
1121 **individual operations are enabled and disabled independent of the state**
1122 **of the Printer and don't otherwise affect the state of the Printer.**

1123 **HRL> Then, how do we restart the printer?**
1124

1125 8.2 Job Operations

1126 All Job operations are directed at Job objects. A client **MUST** always supply some means of identifying the
1127 Job object in order to identify the correct target of the operation. That job identification **MAY** either be a
1128 single Job URI or a combination of a Printer URI with a Job ID. The IPP object implementation **MUST**
1129 support both forms of identification for every job.

1130 8.2.1 Set-Job-Attributes

1131 Type of registration: operation

1132 Proposed name of this operation: Set-Job-Attributes

1133 Object Target: Job

1134 Specification of this operation:

1135 This **OPTIONAL** operation allows a client to set the values of the attributes of a Job object. In the request,
1136 the client supplies the set of Job attribute names and values that are to be set. In the response, the IPP
1137 object returns success or rejects the request with indications of which attribute or attributes could not be set.

1138 This operation is almost identical to the Set-Printer-Attributes operation (see section 8.1.1). The only
1139 differences are that the Set-Job-Attributes operation is directed at a Job object rather than a Printer object,
1140 there is no "document-format" operation attribute used when setting a Job object, and the validation is the
1141 same as the create job operations, i.e., depends on the "xxx-supported" Printer Description attributes.

1142 The validation of the Set-Job-Attributes request is performed as if the job had been submitted originally
1143 with the new values and with "ipp-attribute-fidelity" set to 'true', i.e., all modified attributes **MUST** be
1144 supported along with the attributes not modified. If such a create job operation would have been accepted,
1145 then the Set-Job-Attributes **MUST** be accepted. If such a create job operation would have been rejected,
1146 then the Set-Job-Attributes **MUST** be rejected and the Job **MUST** be unchanged.

1147 The IPP object **MUST** accept or reject the request based on the job's current state and transition the job to
1148 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'

1149 8.2.1.1 Settable and READ-ONLY Job Description attributes

1150 If the Printer supports the "job-message-from-operator" Job Description attribute (see [ipp-mod] section
 1151 4.3.16) and the client explicitly supplies a new value for the "job-message-from-operator" in the request,
 1152 then the Printer MUST set the "job-message-from-operator" Job attribute to this new value.

1153 If the Printer supports the Set-Job-Attributes operation, then it SHOULD support setting of:
 1154 all Job Template ("xxx") attributes (see [ipp-mod] section 4.2 and extensions)
 1155 that the implementation supports.

1156 The following Job Description attributes (see [ipp-mod] section 4.3) MUST NOT be settable, i.e., they are
 1157 READ-ONLY:

1158 job-uri
1159 job-id
1160 job-printer-uri
1161 job-more-info
1162 job-originating-user-name - set in create operation
1163 job-state
1164 job-state-reasons
1165 job-state-message
1166 number-of-documents
1167 output-device-assigned
1168 time-at-creation
1169 time-at-processing
1170 time-at-completed
1171 job-printer-up-time
1172 date-time-at-creation
1173 date-time-at-processing
1174 date-time-at-completed
1175 number-of-intervening-jobs
1176 job-k-octets
1177 job-k-octets-processed
1178 job-impressions-completed
1179 job-media-sheets-completed
1180 attributes-charset - set in create operation
1181 attributes-natural-language - set in create operation

1182 The remaining Job Description attributes MAY be settable using the Set-Job-Attributes operation,
1183 depending on implementation.

1184 Whether or not the Set-Job-Attributes operation affects jobs that are submitted using job submission
1185 protocols other than IPP, depends on implementation, i.e., on whether the IPP protocol is being used as a
1186 universal management protocol or just to manage IPP jobs, respectively. See "printer-controls-other-
1187 protocols" (section 4.4).

1188 *Access Rights:* Authentication and access control (see [ipp-mod] sections 1, 8.3, and 8.5) apply to this
1189 operation.

1190 8.2.1.2 Set-Job-Attributes Request

1191 The following sets of attributes are part of the Set-Job-Attributes Request:

1192 Group 1: Operation Attributes

1193 Natural Language and Character Set:

1194 The "attributes-charset" and "attributes-natural-language" attributes as described in [ipp-mod]
1195 section 3.1.4.1.

1196 Target:

1197 Either (1) the "printer-uri" (uri) plus "job-id" (integer(1:MAX)) or (2) the "job-uri" (uri) operation
1198 attribute(s) which define the target for this operation as described in [ipp-mod] section 3.1.5.
1199
1200

1201 Requesting User Name:

1202 The "requesting-user-name" (name(MAX)) attribute SHOULD be supplied by the client as
1203 described in [ipp-mod] section 8.3.
1204
1205

1206 Group 2: Job Attributes

1207 The client MUST supply a set of Job attributes as defined in [ipp-mod] section 4.2 Job Template
1208 Attributes ("xxx" attributes) and section 4.3 Job Description Attributes. Each Job attribute supplied
1209 in Group 2 replaces the value(s) of the corresponding Job attribute on the target Job object. For
1210 attributes that can have multiple values (1setOf), all values supplied by the client replace all values
1211 of the corresponding Job object attribute.
1212

1213 8.2.1.3 Set-Job-Attributes Response

1214 The Printer object returns the following sets of attributes as part of the Set-Job-Attributes Response:

1215 Group 1: Operation Attributes

1216 Status Message:

1217 In addition to the REQUIRED status code returned in every response, the response OPTIONALLY
1218 includes a "status-message" (text(255)) and/or a "detailed-status-message" (text(MAX)) operation
1219 attribute as described in [ipp-mod] sections 13 and 3.1.6.
1220

1221 Natural Language and Character Set:

1222 The "attributes-charset" and "attributes-natural-language" attributes as described in [ipp-mod]
1223 section 3.1.4.2.
1224

1225 Group 2: Unsupported Attributes

1226 See [ipp-mod] section 3.1.7 for details on returning Unsupported Attributes.
1227

1228 The attributes returned are the same as for the create operation with the same new attribute values.
1229 In the case of attributes that are supported, but are not settable by the implementation, i.e., are not
1230 among the values of the Printer's "settable-attributes" Printer Description attribute (see section 4.1),
1231 the Printer object returns the client-supplied attribute(s) with a substituted value of 'not-supported'
1232 (same out-of-band value as for attributes that are not supported). This value's syntax type is "out-of-
1233 band" and its encoding is defined by special rules for "out-of-band" values in the "Encoding and
1234 Transport" document [IPP-PRO]. Its value indicates that the attribute is either not settable or is not
1235 supported at all.
1236

1237 8.2.2 Reprocess-Job Operation

1238 This OPTIONAL operation is a create job operation that allows a client to re-process a copy of a job that
1239 had been retained in the queue after processing completed, was canceled, or was aborted (see [ipp-mod]
1240 section 4.3.7.2). This operation is the same as the Restart-Job operation (see [ipp-mod] section 3.3.7),
1241 except that the Printer creates a new job that is a copy of the target job and the target job is unchanged. The
1242 new job is assigned new values to the "job-uri" and "job-id" attributes and the new job's Job Description
1243 attributes that accumulate job progress, such as "job-impressions-completed", "job-media-sheets-
1244 completed", and "job-k-octets-processed", are initialized to 0 as with any create job operation. The target
1245 job moves to the Job History after a suitable period, independent of whether one or more Reprocess-Job
1246 operations have been performed on it.

1247 If the Set-Job-Attributes operation is supported, then the "job-hold-until" operation attribute MUST be
1248 supported with at least the 'indefinite' value, so that a client can modify the new job before it is scheduled
1249 for processing using the Set-Job-Attributes operation. After modifying the job, the client can release the
1250 job for processing, by using the Release-Job operation specifying the newly assigned "job-uri" or "job-id"
1251 for the new job.

1252 8.2.3 Cancel-Current-Job Operation

1253 This OPTIONAL operation allows a client to cancel the current job on the target Printer or the specified job
1254 if it is the current job on the Printer. See [ipp-mod] section 3.3.3 for the semantics of canceling a job.
1255 Since a Job might already be marking by the time a Cancel-Current-Job is received, some media sheet
1256 pages might be printed before the job is actually terminated.

1257 If the client does not supply a "job-id" operation attribute, the Printer MUST accept the request and cancel
1258 the current job if there is a current job in the 'processing' or 'processing-stopped' state; otherwise, it MUST
1259 reject the request and return the 'client-error-not-possible' status code. If more than one job is in the
1260 'processing' or 'processing-stopped' states, the one that is marking is canceled and the others are unaffected.

1261 Warning: On a shared printer, there is a race condition. Between the time that a user issues this operation
1262 and its acceptance, the current job might change to a different job. If the user or operator is authenticated to
1263 cancel the new job, the wrong job is canceled. To prevent this race from canceling the wrong job, the client
1264 MAY supply the "job-id" operation attribute which is checked against the current job's job-id. If the job
1265 identified by the "job-id" attribute is not the current job on the Printer, i.e., is not in the 'processing' or
1266 'processing-stopped' states, the Printer MUST reject this operation and return the 'client-error-not-possible'
1267 status code. Otherwise, the Printer cancels the specified job.

1268 *Access Rights:* Authentication and access control (see [ipp-mod] sections 1, 8.3, and 8.5) apply to this
1269 operation.

1270 The Cancel-Current-Job Request and Cancel-Current-Job Response have the same attribute groups and
1271 attributes as the Resume-Printer operation (see [ipp-mod] section 3.2.8), including the new "job-message-
1272 from-operator" operation attribute (see section 3.2), with the addition of the following Group 1 Operation
1273 attributes in the request:

1274 "job-id" (integer(1:MAX)):

1275 The client OPTIONALLY supplies this Operation attribute in order to verify that the identified job
1276 is still the current job on the target Printer object. The IPP object MUST supports this operation
1277 attribute, if it supports this operation.

1278

1279 8.2.4 Pause-Current-Job operation

1280 **ISSUE 17 - Since the semantics of Pause-Current-Job is different from Pause-Printer, in that other jobs are**
1281 **processed, while this job is stopped, should we have a different name for the verb, such as Suspend-**
1282 **Current-Job, instead of Pause-Current-Job. Otherwise, users may be mistakenly think that the printer is**
1283 **paused when the job is paused. If the name is changes, then the 'job-paused' job state reason would also be**
1284 **changed to 'job-suspended'.**

1285 This OPTIONAL operation allows a client to stop the current job on the target Printer or the specified job if
1286 it is the current job on the Printer, and allow other jobs to be processed instead. The Printer moves the
1287 current job or the target job to the 'processing-stopped' state and sets the 'job-paused' value in the job's "job-
1288 state-reasons" attribute and processes other jobs.

1289 If the client does not supply a "job-id" operation attribute, the Printer MUST accept the request and pause
1290 the current job if there is a current job in the 'processing' or 'processing-stopped' state; otherwise, it MUST
1291 reject the request and return the 'client-error-not-possible' status code. If more than one job is in the
1292 'processing' or 'processing-stopped' states, all of them are paused.

1293 **Warning:** On a shared printer, there is a race condition. Between the time that a user issues this operation
1294 and its acceptance, the current job might change to a different job. If the user or operator is authenticated to
1295 pause the new job, the wrong job is paused. To prevent this race from pausing the wrong job, the client
1296 MAY supply the "job-id" operation attribute which is checked against the current job's job-id. If the job
1297 identified by the "job-id" attribute is not the current job on the Printer, i.e., is not in the 'processing' or
1298 'processing-stopped' states, the Printer MUST reject this operation and return the 'client-error-not-possible'
1299 status code. Otherwise, the Printer pauses the specified job and processed other jobs.

1300 A paused job is resumed using the Resume-Job operation (see section 8.2.5). If the Pause-Current-Job
1301 operation is supported, then the Resume-Job operation MUST be supported, and vice-versa.

1302 The Printer MUST reject a Release-Job request (and return the 'client-error-not-possible') for a job that has
1303 been paused , i.e., for a job in the 'processing-stopped' state, with the 'job-paused' value in its "job-state-
1304 reasons" attribute. The Hold-Job and Release-Job operations are for holding and releasing held jobs, not
1305 pausing and resuming paused jobs.

1306 *Access Rights:* Authentication and access control (see [ipp-mod] sections 1, 8.3, and 8.5) apply to this
1307 operation.

1308 The Pause-Current-Job Request and Pause-Current-Job Response have the same attribute groups and
1309 attributes as the Resume-Printer operation (see [ipp-mod] section 3.2.8), including the new "job-message-
1310 from-operator" operation attribute (see section 3.2), the new "when" operation attribute (see section 3.4),
1311 with the addition of the following Group 1 Operation attributes in the request:

1312 "job-id" (integer(1:MAX)):

1313 The client **OPTIONALLY** supplies this Operation attribute in order to verify that the identified job
1314 is still the current job on the target Printer object. The IPP object **MUST** supports this operation
1315 attribute, if it supports this operation.

1316

1317

1318 "synchronize" (boolean)

1319 The client **OPTIONALLY** supplies this attribute. The Printer object **OPTIONALLY** supports this
1320 attribute. This attribute indicates whether or not the printer is to synchronize the checkpoint data for
1321 the current job being paused with the pages that have actually printed. If this attribute is supported,
1322 then a value of 'true' implies that the Printer will be able to resume the job at the point of
1323 synchronization when the job is resumed.

1324

1325 If the Printer supports this attribute but the client does not supply it, the Printer is assumed to
1326 perform synchronization ('true' behavior). If the Printer does not support this attribute, the Printer is
1327 assumed to not synchronize ('false' behavior).

1328

1329 8.2.5 Resume-Job operation

1330 This **OPTIONAL** operation allows a client to stop the target job and allow other jobs to be processed
1331 instead. The Printer moves the target job to the 'pending' state and removes the 'job-paused' value from the
1332 job's "job-state-reasons" attribute.

1333 If the target job is not in the 'processing-stopped' state with the 'job-paused' value in the job's "job-state-
1334 reasons" attribute, the Printer rejects the request and returns the 'client-error-not-possible' status code, since
1335 the job was not paused.

1336 If the Resume-Job operation is supported, then the Pause-Current-Job operation **MUST** be supported, and
1337 vice-versa.

1338 *Access Rights:* Authentication and access control (see [ipp-mod] sections 1, 8.3, and 8.5) apply to this
1339 operation.

1340 The Resume-Job Request and Resume-Job Response have the same attribute groups and attributes as the
1341 Release-Job operation (see [ipp-mod] section 3.3.6), including the new "job-message-from-operator"
1342 operation attribute (see section 3.2).

1343 8.2.6 Promote-Job operation

1344 This OPTIONAL operation allows a client to make the pending target job be processed next after the
1345 current job completes. This operation is specially useful in a production printing environment where the
1346 operator is involved in job scheduling.

1347 If the target job is in the 'pending' state, this operation does not change the job's state, but causes the job to
1348 be processed after the current job(s) complete. If the target job is not in the 'pending' state, the Printer
1349 rejects the request and returns the 'client-error-not-possible' status code. The Printer returns the target job
1350 immediately after the current job(s) in a Get-Jobs response (see [ipp-mod] section 3.2.6) for the 'not-
1351 completed' jobs.

1352 When the current job completes, is canceled, paused, or aborted, the target of this operation is processed
1353 next.

1354 If a client issues this request (again) before the target of the operation of the original request started
1355 processing, the target of this new request is scheduled before the previous job that was to be processed next.

1356 Note: IPP is specified not to require queues for job scheduling, since there are other implementations for
1357 scheduling multiple jobs. However, if an implementation does implement queues for jobs, then the
1358 Promote-Job puts the specified job at the front of the queue. A subsequent Promote-Job before the first job
1359 starts processing puts that specified job at the front of the queue, so that it is "in front" of the previously
1360 promoted job.

1361 *Access Rights:* Authentication and access control (see [ipp-mod] sections 1, 8.3, and 8.5) apply to this
1362 operation.

1363 The Promote-Job Request and Promote-Job Response have the same attribute groups and attributes as the
1364 Cancel-Job operation (see [ipp-mod] section 3.3.3), including the new "job-message-from-operator"
1365 operation attribute (see section 3.2).

1366 8.2.7 Space-Current-Job operation

1367 This OPTIONAL operation allows a client to repeat or skip a specified number of impressions for the
1368 current job on the target Printer or the specified job if it is the current job on the Printer. The Printer repeats
1369 or skips the indicated number of impressions specified by the "back-space" or "forward-space" operation
1370 attribute, respectively. This operation is typically supported in a continuous forms implementation for
1371 synchronizing the web after forms run out or media change.

1372 If the client does not supply a "job-id" operation attribute, the Printer MUST accept this request in any state,
1373 whether or not there is a current job, and advance or backspace the media the indicated number of
1374 impressions specified by the "back-space" or "forward-space" operation attribute, respectively. If more than
1375 one job is in the 'processing' or 'processing-stopped' states, the one that is marking is spaced and the others
1376 are unaffected.

1377 It is reasonable, although not MANDATORY), to perform Space-Current-Job while the Printer is 'stopped';
1378 (paused or possibly for other reasons), or 'processing'. Between the time that a user issues this operation
1379 and its acceptance, the current job might change to a different job. To prevent this race from spacing the
1380 wrong job, the client MAY supply the "job-id" operation attribute which is checked against the current job's
1381 job-id. If the job identified by the "job-id" attribute is not the current job on the Printer, i.e., is not in the
1382 'processing' or 'processing-stopped' states, or is not the job that has impressions in the media path even if the
1383 job has completed, the Printer MUST reject this operation and return the 'client-error-not-possible' status
1384 code. Otherwise, the Printer advances or backspaces the media the indicated number of impressions
1385 specified by the "back-space" or "forward-space" operation attribute, respectively.

1386 *Access Rights:* Authentication and access control (see [ipp-mod] sections 1, 8.3, and 8.5) apply to this
1387 operation.

1388 The Space-Current-Job Request and Space-Current-Job Response have the same attribute groups and
1389 attributes as the Resume-Printer operation (see [ipp-mod] section 3.2.8), including the new "job-message-
1390 from-operator" operation attribute (see section 3.2), with the addition of the following Group 1 Operation
1391 attributes in the request:

1392 "job-id" (integer(1:MAX)):

1393 The client OPTIONALLY supplies this Operation attribute in order to verify that the identified job
1394 is still the current job on the target Printer object. The IPP object MUST support this operation
1395 attribute, if it supports this operation.

1396 "back-space" (integer(1:MAX)):

1397 The client OPTIONALLY supplies this Operation attribute. The IPP object OPTIONALLY
1398 supports this operation attribute, if it is able to repeat impressions.

1399 If the client supplies a value that specifies more impressions than the job has performed, the job is
1400 positioned at the beginning without any indication.

1401 "forward-space" (integer(1:MAX)):

1402 The client OPTIONALLY supplies this Operation attribute. The IPP object OPTIONALLY
1403 supports this operation attribute, if it is able to skip impressions.

1404 If the client supplies a value that specifies more impressions than remain in the job, the job is
1405 positioned at the end without any indication.

1406

1407 9. IANA Considerations

1408 The operations and attributes in this registration proposal will be published by IANA according to the
1409 procedures in RFC 2566 [rfc2566] section 6.4 for operations with the following URL:

1410 <ftp://isi.edu/iana/assignments/ipp/operations/set2.txt>

1411 10. Internationalization Considerations

1412 This document has the same localization considerations as the [ipp-mod].

1413 11. Security Considerations

1414 The IPP Model and Semantics document [ipp-mod] discusses high level security requirements (Client
1415 Authentication, Server Authentication and Operation Privacy). Client Authentication is the mechanism by
1416 which the client proves its identity to the server in a secure manner. Server Authentication is the mechanism
1417 by which the server proves its identity to the client in a secure manner. Operation Privacy is defined as a
1418 mechanism for protecting operations from eavesdropping.

1419 12. Author's Addresses

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1445 13. References

1446 [ipp-mod]

1447 R. deBry, T. Hastings, R. Herriot, S. Isaacson, P. Powell, "Internet Printing Protocol/1.0: Model and
1448 Semantics", <draft-ietf-ipp-model-v11-03.txt>, June, 1999.

1449 [RFC2566]

1450 R. deBry, T. Hastings, R. Herriot, S. Isaacson, P. Powell, "Internet Printing Protocol/1.0: Model and
1451 Semantics", RFC 2566, April 1999.

1452 14. Change History

1453 This section summarizes the changes. Each sub-section is in reverse chronological order.

1454 14.1 Changes to the September 19, 1999 version to make the October 22, 1999 version1455 Adding or removing ISSUES that don't change the document are not listed here. The following changes to
1456 the September 19, 1999 version to make the October 22, 1999 version as a result of the IPP WG meeting in
1457 Denver, 9/99:1458 1. Added the Interpreter object.1459 2. Added the "device-name" operation attribute to handle passing operations through the IPP Printer object
1460 to the device.1461 3. Added the out-of-band 'not-settable' to allow the Set-Job-Attributes and Set-Printer-Attributes response
1462 to indicate the difference between an unsupported attribute and a supported, but not settable, attribute in
1463 the Unsupported Attributes Group.1464 4. Removed "when-values-supported" and "job-settable-attributes" and "printer-settable-attributes" and
1465 "interpreter-settable-attributes" from the list of attributes that MUST be read-only. So an administrator
1466 could sub-set the policy on what when values are supported or which attributes can be set.

1467 14.2 Changes to the July 19, 1999 version to make the September 19, 1999 version

1468 The following changes to the July 19, 1999 version to make the September 19, 1999 version as a result of
1469 the IPP WG meeting in Alaska, 8/99:

1470 1. Refer to proposal as "Set2" rather than "Administrative" operations.

1471 2. Revise the emphasis on administrator throughout the document, although the word administrator
1472 remains wherever appropriate.

- 1473 3. Convert non-process-run-out from an operations attribute to an operation.
- 1474 4. Added Issue 21: For all these "access" caveats, why not just say... 'authentication and access control
1475 (see ipp-mod sections 1, 8.3 and 8.5) applies to this operation".?
- 1476 5. Added Issue 22: Why? This is backward, if you ask me (HRL).
- 1477 6. Per resolution of Issue 2, the "settable-attributes" Printer Description attribute, was replaced with three
1478 Printer Description attributes: "printer-settable-attributes", "job-settable-attributes", and "interpreter-
1479 settable-attributes". The latter for those implementations that have different values for Printer attributes
1480 in the Get-Printer-Attributes and Set-Printer-Attributes operations, depending on the value of the
1481 "document-format" operation attribute supplied by the client. If and when we get a Document object,
1482 then we can add a "document-settable-attributes" Printer Description attribute.
- 1483 14.3 Changes to the June 30, 1999 version to make the July 19, 1999 version
- 1484 The following changes to the June 30, 1999 version to make the July 19, 1999 version as a result of the IPP
1485 WG meeting in Copenhagen, 7/7/99-7/8/99, and the IPP telecon, 7/14/1999:
- 1486 1. Sections 2.1 and 2.2: Clarified that the way to remove a message from the operator was for the client to
1487 supply a zero-length or all white space text string which is copied as usual to the "xxx-message-from-
1488 operator" attribute.
- 1489 2. Section 2.3: Added "factory-settings" (boolean) operation attribute to the Get-Printer-Attributes
1490 operation.
- 1491 3. Section 2.4: Added the "when" operation attribute to the Pause-Current-Job operation.
- 1492 4. Section 2.4: Made the "when" operation attribute OPTIONAL for use in operations (Pause-Printer,
1493 Reset-Printer, Shutdown-Printer, and Pause-Current-Job operations).
- 1494 5. Sections 2.5: Added table of operation attributes for the Printer operations to make it easy to compare.
- 1495 6. Sections 2.6: Added table of operation attributes for the Job operations to make it easy to compare.
- 1496 7. Section 3.1: Added "settable-attributes" (1setOf type2 keyword) READ-ONLY Printer Description
1497 attribute.
- 1498 8. Section 3.2: Added "printer-controls-other-protocols" (boolean) Printer Description attribute
- 1499 9. Section 3.3: Added the READ-ONLY "printer-message-time" (integer(MIN:MAX)) Printer
1500 Description attribute to keep time message updated in time ticks.
- 1501 10. Section 4.2: Deleted the 'process-next' 'job-state-reasons' value, so that repeated Promote-Job
1502 operations promote each job "to the front of the queue".

- 1503 11. Sections 6.1.1.1 and 6.2.1.1: Replaced the table that listed all attributes with one that lists only the
1504 attributes that MUST be READ-ONLY.
- 1505 12. Section 6.1.1.1: Indicated that attributes that are not specified as READ-ONLY in this document MAY
1506 be settable. If they control behavior, that changing their values MUST change the behavior.
- 1507 13. Section 6.1.1.2 and 6.2.1.2: Deleted the "ipp-attribute-fidelity" operation attribute from the Set-Printer-
1508 Attributes and Set-Job-Attributes operations. All set operations are atomic.
- 1509 14. Section 6.1.1.2: Add the concept of the Interpreter object to handle attributes whose values vary in the
1510 Set-Printer-Attributes and Get-Printer-Attributes, depending on the value of the "document-format"
1511 operation attribute.
- 1512 15. Sections 6.1.1.3 and 6.2.1.2: Changed the "out-of-band" 'not-settable' value back to the existing 'not-
1513 supported' value.
- 1514 16. Section 6.1.2 and 6.1.3: Added "job-type" operation attribute to Disable-Printer and Enable-Printer
1515 operations with values: 'network-jobs', 'walk-up-jobs', and 'all-jobs'.
- 1516 17. Section 6.1.5: Clarified that Restart-Printer brings up the Printer disabled and paused, since that is the
1517 eventual state that Shutdown-Printer leaves the printer in.
- 1518 18. Section 6.1.5: Indicated that if Restart-Printer is supported, then Shutdown-Printer MUST be
1519 supported.
- 1520 19. Section 6.1.6: Deleted Space-Printer operation. Keep Space-Current-Job operation only which has a
1521 "job-id" operation attribute that a client MAY supply.
- 1522 20. Section 6.1.6: Clarified that Shutdown-Printer is for a long period of time, not just to reset the device or
1523 change attribute values. Also that Shutdown performs an immediate Disable-Printer and an eventual
1524 Pause-Printer.
- 1525 21. Sections 6.2.3, 6.2.4, and 6.2.7 : Added a "job-id" operation attribute to Cancel-Current-Job, Pause-
1526 Current-Job, and Space-Current-Job that a client MAY supply to check for race condition where current
1527 job changes
- 1528 22. Section 6.2.4: Combined Pause-Job into Pause-Current-Job operation.
- 1529 23. Sections 6.2.4 and 6.2.5: Pause-Current-Job puts job in 'processing-stopped' state, not 'pending-held'
1530 state.
- 1531 24. Section 6.2.6: Simplified Promote-Job, so that it behaves as if the job were put at the front of the
1532 queue.

1533 15. Appendix A: Full Copyright Statement

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