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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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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 on end user functionality with a
151 few administrative operations included. This document defines additional OPTIONAL end user, operator,
152 and administrator operations used to control Jobs and Printers. This document is a registration proposal for
153 an extension to IPP/1.0 and IPP/1.1 following the registration procedures in those documents.

154 2. New objects

155 This section defines the new Interpreter object.

156 2.1 Interpreter object

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

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

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

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

181 3. New Operation attributes

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

184 3.1 New operation attribute: "printer-message-from-operator" (text(127))

185 Type of registration: attribute

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

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

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

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

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

191

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

193

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

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

204

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

208

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

214

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

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

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

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

219 Disable-Printer - see section 8.1.2

220 Enable-Printer - see section 8.1.3

221 Reset-Printer - see section 8.1.4

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

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

234 3.2 New operation attribute: "job-message-from-operator" (text(127))

235 Type of registration: attribute
236 Proposed keyword name of this attribute: "job-message-from-operator"
237 Types of attribute (Operation, Job Template, Job Description, Printer Description): Operation
238 Operations to be used with if the attribute is an operation attribute: See below
239 Object (Job, Printer, etc. if bound to an object): Job (already in IPP/1.0 and IPP/1.1)
240 Attribute syntax(es) (include 1setOf and range as in Section 4.2): text(127)
241

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

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

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

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

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

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

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

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

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

280 3.3 New operation attribute for Get-Printer-Attributes: "factory-settings" (boolean)

281 Type of registration: attribute
282 Proposed keyword name of this attribute: "factory-settings"
283 Types of attribute (Operation, Job Template, Job Description, Printer Description): Operation
284 Operations to be used with if the attribute is an operation attribute: Get-Printer-Attributes
285 Object (Job, Printer, etc. if bound to an object): N/A
286 Attribute syntax(es) (include 1setOf and range as in Section 4.2): boolean
287

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

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

301 3.4 New operation attribute for Pause-Printer: "when" (type2 keyword)

302 Type of registration: attribute
303 Proposed keyword name of this attribute: "when"

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

309
 310 Specification of this attribute (follow the style of IPP Model Section 4.2):

311 "when" (type2 keyword)

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

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

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

324
 325 **HRL> Or, "just say NO". The client can't determine the values of**
 326 **"when" supported. The client may specify a value of when and the**
 327 **implementation will do it's best to deliver as close to the desired**
 328 **behavior as possible within the constraints of the device or**
 329 **environment. The client may determine the actual result based on**
 330 **final status and/or notification feedback.**

331

332

333 Standard keyword values are:

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

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

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

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

342

343 3.5 New **OPTIONAL** operation attribute for any Job or Printer operation: "device-name" (name(127))

344 Type of registration: attribute

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

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

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

350

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

352 "device-name" (name(127))

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

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

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

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

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

372 3.5.1 Revised text for [ipp-mod] for the "device-name" extension

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

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

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

383 3.6 Summary of the operation attributes for the Printer operations

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

387 Legend:

388 R - REQUIRED for a Printer to support

389 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
device-name	O	O	O	O	O	O	O	O	O	O	O

390 3.7 Summary of the operation attributes for the Job operations

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

396 Legend:

397 R - REQUIRED for a Printer to support

398 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**	
device-name	O	O	O	O	O	O	O	O	O	O	O	O

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

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

404 4. New Printer Description Attributes

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

407 4.1 printer-settable-attributes (1setOf type2 keyword)

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

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

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

431 4.4.? printer-settable-attributes (1setOf type2 keyword)

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

438 4.2 interpreter-settable-attributes (1setOf type2 keyword)

439 Type of registration: attribute

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

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

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

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

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

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

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

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

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

450 4.4.? interpreter-settable-attributes (1setOf type2 keyword)

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

458 4.3 job-settable-attributes (1setOf type2 keyword)

459 Type of registration: attribute

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

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

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

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

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

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

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

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

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

470 4.4.? job-settable-attributes (1setOf type2 keyword)

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

476 4.4 printer-controls-other-protocols (boolean)

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

488 4.4.? printer-controls-other-protocols (boolean)

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

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

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

503 4.5 printer-message-time (integer(MIN:MAX))

504 Type of registration: attribute
505 Proposed keyword name of this attribute: printer-message-time
506 Types of attribute (Operation, Job Template, Job Description, Printer Description): Printer Description
507 Operations to be used with if the attribute is an operation attribute: N/A
508 Object (Job, Printer, etc. if bound to an object): Printer

509 Attribute syntax(es) (include 1setOf and range as in Section 4.2): integer(MIN:MAX)
510 If attribute syntax is 'keyword' or 'enum', is it type2 or type3: N/A
511 If this is a Printer attribute, MAY the value returned depend on "document-format" (See Section 6.2): No
512 If this is a Job Template attribute, how does its specification depend on the value of the "multiple-
513 document-handling" attribute: N/A
514 Specification of this attribute (follow the style of IPP Model Section 4.2):
515 4.4.? printer-message-time (integer(MIN:MAX))

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

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

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

527 4.6 printer-message-date-time (dateTime)

528 Type of registration: attribute
529 Proposed keyword name of this attribute: printer-message-date-time
530 Types of attribute (Operation, Job Template, Job Description, Printer Description): Printer Description
531 Operations to be used with if the attribute is an operation attribute: N/A
532 Object (Job, Printer, etc. if bound to an object): Printer
533 Attribute syntax(es) (include 1setOf and range as in Section 4.2): dateTime
534 If attribute syntax is 'keyword' or 'enum', is it type2 or type3: N/A
535 If this is a Printer attribute, MAY the value returned depend on "document-format" (See Section 6.2): No
536 If this is a Job Template attribute, how does its specification depend on the value of the "multiple-
537 document-handling" attribute: N/A
538 Specification of this attribute (follow the style of IPP Model Section 4.2):
539 4.4.? printer-message-date-time (dateTime)

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

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

548 4.7 printer-message-operation (type2 keyword)

549 Type of registration: attribute

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

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

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

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

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

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

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

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

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

560 4.4.? printer-message-operation (type2 enum)

561 This READ-ONLY Printer Description attribute contains the operation that was used to changed the
562 Printer's "printer-message-from-operator" by the operator using any operation where the client supplied the
563 "printer-message-from-operator" operation attribute (see section 3.1) or explicitly set using the Set-Printer-
564 Attributes operation (see section 8.1.1). This attribute allows the users to know which operation was used
565 to change the "printer-message-from-operator" attribute when it was last set.

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

567 4.8 when-values-supported (1setOf type2 keyword)

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

573 Type of registration: attribute

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

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

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

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

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

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

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

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

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

584 4.4.? when-values-supported (1setOf type2 keyword)

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

590 4.9 device-names-supported (1setOf name(127))

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

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

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

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

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

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

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

609 5.1 Value for "printer-state-reasons": 'standby'

610 Type of registration: type2 keyword attribute value

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

612 Proposed keyword name of this keyword value: standby

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

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

617 5.2 Value for "job-state-reasons": 'job-paused'

618 Type of registration: type2 keyword attribute value
619 Name of attribute to which this keyword specification is to be added: job-state-reasons
620 Proposed keyword name of this keyword value: job-paused
621 Specification of this keyword value (follow the style of IPP Model Section 4.1.2.3):
622 'job-paused': The job has been paused while processing using the Pause-Current-Job operations and
623 other jobs can be processed on the Printer. The Job can be resumed using the Resume-Job operation
624 which removes this value.
625

626 6. New status codes

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

628 6.1 New status code: 'client-error-attributes-not-settable'

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

635 13.1.4.20 client-error-attributes-not-settable (0x0413)

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

642 6.2 New status code: 'server-error-printer-is-in-standby-mode'

643 Type of registration: status code
644 Keyword symbolic name of this status code value: 'server-error-printer-is-in-standby-mode'
645 Numeric value (to be assigned by the IPP Designated Expert in consultation with IANA):
646 Operations that this status code may be used with: Shutdown-Printer
647 Specification of this status code (follow the style of IPP Model Section 13 APPENDIX B: Status Codes
648 and Suggested Status Code Messages):

649 13.1.5.8 server-error-printer-is-in-standby-mode

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

653 7. New out-of-band values

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

656 7.1 'not-settable' out of band value

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

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

662 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

Operation Name	Operation-Id	Brief description
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

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

666 8.1 Printer Operations

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

670 8.1.1 Set-Printer-Attributes Operation

671 Type of registration: operation
 672 Proposed name of this operation: Set-Printer-Attributes
 673 Object Target: Printer
 674 Specification of this operation:

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

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

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

684 8.1.1.1 Settable and READ-ONLY Printer Description attributes

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

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

- 691 all Job Template Default ("xxx-default") attributes
- 692 all Job Template Supported ("xxx-supported") attributes

693 all Job Template Ready ("xxx-ready") attributes
694 that the implementation supports (see [ipp-mod] section 4.2 and extensions).

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

697 printer-state
698 printer-state-reasons
699 printer-state-message
700 printer-is-accepting-jobs - see Enable-Printer/Disable-Printer
701 queued-job-count
702 printer-message-time - see Set-Printer-Attributes when setting "printer-message-from-operator"
703 printer-message-date-time - see Set-Printer-Attributes when setting "printer-message-from-operator"
704 printer-message-operation - see Set-Printer-Attributes when setting "printer-message-from-operator"
705 printer-up-time

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

711 For example, if the "operations-supported" Printer Description attribute (see [ipp-mod] section
712 4.4.15) is settable, then changing its value MUST affect the operations that the implementation
713 accepts or rejects. Such an implementation will need to be able to reject values for operations that it
714 contains no code support for.

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

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

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

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

727 8.1.1.2 Set-Printer-Attributes Request

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

729 Group 1: Operation Attributes

730 Natural Language and Character Set:

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

733

734 Target:

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

737

738 Requesting User Name:

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

741

742

743 "document-format" (mimeMediaType):

744 The client SHOULD supply this attribute. The Printer object MUST support this attribute. This
745 attribute is useful for a client to select the Interpreter object to which the attribute modification
746 should be applied. Each Printer object is modeled to contain one or more Interpreter objects. Those
747 Printer attributes whose values vary from Interpreter to Interpreter, are modeled as Interpreter
748 objects, while those that do not are Printer object attributes. Thus the target of a Get-Printer-
749 Attributes or Set-Printer-Attributes operation is either the Printer object or the Interpreter object
750 identified by the "document-format" operation attribute supplied by the client. Except for Get-
751 Printer-Attributes and Set-Printer-Attributes, there are no other operations with the Interpreter object
752 as a target. See [ipp-mod] section 3.2.5.1 "Get-Printer-Attributes Request".

753

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

757

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

764

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

772

773 If the client supplies a value for the "document-format" Operation attribute that is not supported by
774 the Printer, i.e., is not among the values of the Printer object's "document-format-supported"

775 attribute, the Printer object MUST reject the operation and return the 'client-error-document-format-
776 not-supported' status code.
777

778 Group 2: Printer Attributes

779 The client MUST supply a set of Printer attributes as defined in [ipp-mod] section 4.2 Job Template
780 Attributes ("xxx-default", "xxx-supported", and "xxx-ready" attributes) and section 4.4 Printer
781 Description Attributes. Each Printer attribute supplied in Group 2 replaces the value(s) of the
782 corresponding Printer attribute on the target Printer object. If a Printer object attribute had not been
783 configured yet and so had the 'no-value' out-of-band value (see [ipp-mod] 4.1), the supplied value(s)
784 replace the 'no-value' value. For attributes that can have multiple values (1setOf), all values
785 supplied by the client replace all values of the corresponding Printer object attribute.
786

787 8.1.1.3 Set-Printer-Attributes Response

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

789 Group 1: Operation Attributes

790 Status Message:

791 In addition to the REQUIRED status code returned in every response, the response OPTIONALLY
792 includes a "status-message" (text(255)) and/or a "detailed-status-message" (text(MAX)) operation
793 attribute as described in [ipp-mod] sections 13 and 3.1.6.
794

795 Natural Language and Character Set:

796 The "attributes-charset" and "attributes-natural-language" attributes as described in [ipp-mod]
797 section 3.1.4.2.
798

799 Group 2: Unsupported Attributes

800 See [ipp-mod] section 3.1.7 for details on returning Unsupported Attributes.
801

802 In the case of attributes that are supported, but are not settable by the implementation, i.e., are not
803 among the values of the Printer's "settable-attributes" Printer Description attribute (see section 4.1),
804 the Printer object returns the client-supplied attribute(s) with a substituted value of 'not-supported'
805 (same out-of-band value as for attributes that are not supported). This value's syntax type is "out-of-
806 band" and its encoding is defined by special rules for "out-of-band" values in the "Encoding and
807 Transport" document [IPP-PRO]. Its value indicates that the attribute is either not settable or is not
808 supported at all.
809
810

811 8.1.2 Disable-Printer Operation

812 Type of registration: operation

813 Proposed name of this operation: Disable-Printer

814 Object Target: Printer

815 Specification of this operation:

816 This OPTIONAL operation allows a client to stop the Printer object from accepting jobs, i.e., cause the
817 Printer to reject subsequent create job operations (Print-Job, Print-URI, and Create-Job operation) and
818 return the 'server-error-not-accepting-jobs' status code. The Printer still accepts all other operations. All
819 previously submitted Jobs and currently processing Jobs continue unaffected. The Printer sets the value of
820 its "printer-is-accepting-jobs" READ-ONLY Printer Description attribute to 'false' (see [ipp-mod] section
821 4.4.20), no matter what the previous value was. This operation has no immediate effect on the Printer's
822 "printer-state" and "printer-state-reasons" attributes.

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

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

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

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

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

834 The Disable-Printer Request and Disable-Printer Response have the same attribute groups and attributes as
835 the Resume-Printer operation (see [ipp-mod] sections 3.2.7.1 and 3.2.7.2), including the new "printer-
836 message-from-operator" operation attribute (see section 3.1), and with the addition of the following Group
837 1 operation attribute in the request:

838 "job-type" (type2 keyword):

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

842

843 Standard keyword values are:

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

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

846 'all-jobs' - disable all type of jobs

847 8.1.3 Enable-Printer Operation

848 Type of registration: operation

849 Proposed name of this operation: Enable-Printer

850 Object Target: Printer

851 Specification of this operation:

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

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

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

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

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

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

869 The Enable-Printer Request and Enable-Printer Response have the same attribute groups and attributes as
870 the Resume-Printer operation (see [ipp-mod] sections 3.2.8.1 and 3.2.8.2), including the new "printer-
871 message-from-operator" operation attribute (see section 3.1), and with the addition of the following Group
872 1 operation attribute in the request:

873 "job-type" (type2 keyword):

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

877

878 Standard keyword values are:

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

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

881 'all-jobs' - enable all types of jobs

882 8.1.4 Reset-Printer operation

883 Type of registration: operation

884 Proposed name of this operation: Reset-Printer

885 Object Target: Printer

886 Specification of this operation:

887 This OPTIONAL operation allows a client to reset the Printer in a number of ways, depending on the
888 "reset-function" operation attribute. The keyword values of this attribute map one-to-one to the enum
889 values that the NMS writes into the prtGeneralReset object in the Printer MIB [RFC1759] to affect a reset

890 operation. As in the Printer MIB, the 'reset-to-nvram' (soft reset) value MUST be supported, if this
891 operation is supported. The other values are OPTIONAL.

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

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

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

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

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

908 "reset-function" (type3 keyword):

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

912 Standard keyword values are:

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

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

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

919 8.1.5 Restart-Printer operation

920 Type of registration: operation

921 Proposed name of this operation: Restart-Printer

922 Object Target: Printer

923 Specification of this operation:

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

928 ISSUE 11: What state does the Printer comes back up on Restart-Printer and how can the client control?

929 Possible alternatives:

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

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

939 TH 7/26: Remove the Shutdown-Printer 'standby' mode concept.
 940 Shutdown-Printer always powers off eventually. Also remove
 941 Restart-Printer operation all together. Instead change the
 942 Disable-Printer and Enable-Printer operations to Disable-Operations
 943 and Enable-Operations, so that individual operations are enabled
 944 and disabled independent of the state of the Printer and don't
 945 otherwise affect the state of the Printer.

946
 947 HRL 9/18: How can the state of the printer not be effected when you
 948 disable or enable it? Don't understand 2nd half of this issue
 949 resolution.

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

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

954 If the Restart-Printer operation is supported, then the Shutdown-Printer operation MUST be supported,
 955 since the Restart-Printer operation is meaningful only after a Shutdown-Printer operation has been
 956 performed. However, if the Shutdown-Printer operation is supported, the Restart-Printer NEED NOT be
 957 supported.

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

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

- 960 – Completely power off (walk to printer to bring it back up)
- 961 – Power off but listen for "restart" - shutdown to standby

962 Denver meeting> Also consider restart attributes.

- 963 – Restart to Standby (disabled and paused) (two step bring up)
- 964 – Restart (fully).
- 965 – Restart sych

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

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

971 8.1.6 Non-Process-Run-Out Operation

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

975 Type of registration: operation

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

977 Object Target: Printer

978 Specification of this operation:

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

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

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

988 8.1.7 Shutdown-Printer Operation

989 Type of registration: operation

990 Proposed name of this operation: Shutdown-Printer

991 Object Target: Printer

992 Specification of this operation:

993 This OPTIONAL operation allows a client to shutdown a Printer, i.e., stop processing jobs and power off in
994 some implementation-dependent manner. The purpose of Shutdown-Printer is to shutdown the Printer for
995 an extended period, not to reset the device(s) or modify a Printer attribute. See Reset-Printer (section 8.1.4)
996 for the way to reset the device(s). See the Disable-Printer operation (section 8.1.2) for a way for the client
997 to stop the Printer from accepting Job Creation requests without stopping processing or shutting down.

998 The Printer is disabled immediately (see the Disable-Printer operation in section 8.1.2). The Printer adds
999 the 'shutdown' value (see [ipp-mod] section 4.4.11) to its "printer-state-reasons" Printer Description
1000 attribute. The "when" operation attribute specifies how much processing occurs before the Printer is paused

1001 (see [ipp-mod] section 3.2.7) and the shutdown is complete. All other requests continue to be accepted
1002 until the printer is powered down.

1003 ISSUE 14 - Need to look at life cycle of the Printer versus standby/power-down and the other operations
1004 that can be accepted. There can be appreciable time between acceptance of this operation and when the
1005 final state of the printer, either standby or powered down is reached. Is it ok for non-submission operations
1006 to continue to be accepted during this time? May need 'moving-to-shutdown'. What about 'moving-to-
1007 standby'?

1008 TH> Add 'moving-to-shutdown' which the Shutdown-Printer sets
1009 immediately (analogous to 'moving-to-paused'). Then the 'shutdown'
1010 values means that the shutdown has completed (and is only meaningful to
1011 a server implementation that hosts the Printer object). Thus the server
1012 can still respond to a Get-Printer-Attributes operation after the
1013 Printer is shutdown as stated in IPP/1.1.

1014
1015 HRL> Is this granularity really achievable enough of a wide enough
1016 variety of environments to be reliable or, in reality, will this be
1017 implementation dependent?

1018 Whether or not the Shutdown-Printer operation affects jobs that were submitted to the device using job
1019 submission protocols other than IPP, depends on implementation, i.e., on whether the IPP protocol is being
1020 used as a universal management protocol or just to manage IPP jobs, respectively. See "printer-controls-
1021 other-protocols" (section 4.4).

1022 The Printer object MUST accept this operation in any state and transition the Printer object to the 'idle'
1023 state.

1024 *Access Rights:* Authentication and access control (see [ipp-mod] sections 1, 8.3, and 8.5) apply to this
1025 operation.

1026 The Shutdown-Printer Request and Shutdown-Printer Response have the same attribute groups and
1027 attributes as the Pause-Printer operation (see [ipp-mod] sections 3.2.7.1 and 3.2.7.2), including the new
1028 "printer-message-from-operator" operation attribute (see section 3.1), the new "when" operation attribute
1029 (see section 3.4), and with the addition of the following Group 1 operation attributes in the request:

1030 "shutdown-function" (type2 keyword)

1031 The client OPTIONALLY supplies this attribute. The Printer object OPTIONALLY supports this
1032 attribute. This attribute indicates which shutdown function is to be performed.

1033
1034 Standard keyword values are:

1035 'standby' - shutdown the Printer, but leave it in standby-mode (disabled and paused), which
1036 means that Get-Printer-Attributes and Restart-Printer operations are accepted.
1037 'power-off' - shutdown the Printer and power it off. No operations are accepted after power
1038 off.

1039 ISSUE 15 - Should we separate setting the device's power saver mode from shutting the
1040 power off? We could have a separate operation, say, Set-Power-Saver-Level, which
1041 takes an integer, starting with 0. A 0 means full power on. Printer supports some

1042 number of levels above that, if any. Then an operator could turn the device to full
1043 power at the beginning of the day, so the first submission doesn't have to wait for the
1044 power save mode to restore full power.

1045
1046 "synchronize" (boolean)

1047 The client OPTIONALLY supplies this attribute. The Printer object OPTIONALLY supports this
1048 attribute. This attribute indicates whether or not the printer is to synchronize the checkpoint data for
1049 the current job ("when" = 'now') with the pages that have actually printed. If the value of the "when"
1050 attribute is not 'now' or the "when" attribute is not supplied, then the "synchronize" attribute has no
1051 meaning and the Printer MUST ignore it. If this attribute is supported, then a value of 'true' implies
1052 that the Printer will be able to resume the job at the point of synchronization when the Printer is
1053 restarted. If the implementation does not support resuming a job (either automatically or with the
1054 Resume-Job operation) after a Shutdown-Printer with "when" = 'now', then it does not implement
1055 this attribute. In this case, check-pointing implies that the job may be resumed in the future, exactly
1056 from the point and in the state and resource context from which it left off.

1057
1058
1059 If the Printer supports this attribute but the client does not supply it, the Printer is assumed to
1060 perform synchronization ('true' behavior). If the Printer does not support this attribute, the Printer is
1061 assumed to not synchronize ('false' behavior).

1062
1063
1064 **ISSUE 16: Is the current job automatically restarted when the Printer is restarted? Or does some**
1065 **client have to issue a Restart-Job operation?**

1066 The question is moot, if we remove the Restart-Job operation, as
1067 suggested:

1068
1069 **TH 7/26: Remove the Shutdown-Printer 'standby' mode concept. Shutdown-**
1070 **Printer always powers off eventually. Also remove Restart-Printer**
1071 **operation all together. Instead change the Disable-Printer and Enable-**
1072 **Printer operations to Disable-Operations and Enable-Operations, so that**
1073 **individual operations are enabled and disabled independent of the state**
1074 **of the Printer and don't otherwise affect the state of the Printer.**
1075 **HRL> Then, how do we restart the printer?**

1076 1077 8.2 Job Operations

1078 All Job operations are directed at Job objects. A client MUST always supply some means of identifying the
1079 Job object in order to identify the correct target of the operation. That job identification MAY either be a
1080 single Job URI or a combination of a Printer URI with a Job ID. The IPP object implementation MUST
1081 support both forms of identification for every job.

1082 8.2.1 Set-Job-Attributes

1083 Type of registration: operation

1084 Proposed name of this operation: Set-Job-Attributes

1085 Object Target: Job

1086 Specification of this operation:

1087 This OPTIONAL operation allows a client to set the values of the attributes of a Job object. In the request,
 1088 the client supplies the set of Job attribute names and values that are to be set. In the response, the IPP
 1089 object returns success or rejects the request with indications of which attribute or attributes could not be set.

1090 This operation is almost identical to the Set-Printer-Attributes operation (see section 8.1.1). The only
 1091 differences are that the Set-Job-Attributes operation is directed at a Job object rather than a Printer object,
 1092 there is no "document-format" operation attribute used when setting a Job object, and the validation is the
 1093 same as the create job operations, i.e., depends on the "xxx-supported" Printer Description attributes.

1094 The validation of the Set-Job-Attributes request is performed as if the job had been submitted originally
 1095 with the new values and with "ipp-attribute-fidelity" set to 'true', i.e., all modified attributes MUST be
 1096 supported along with the attributes not modified. If such a create job operation would have been accepted,
 1097 then the Set-Job-Attributes MUST be accepted. If such a create job operation would have been rejected,
 1098 then the Set-Job-Attributes MUST be rejected and the Job MUST be unchanged.

1099 The IPP object MUST accept or reject the request based on the job's current state and transition the job to
 1100 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'

1101 8.2.1.1 Settable and READ-ONLY Job Description attributes

1102 If the Printer supports the "job-message-from-operator" Job Description attribute (see [ipp-mod] section
 1103 4.3.16) and the client explicitly supplies a new value for the "job-message-from-operator" in the request,
 1104 then the Printer MUST set the "job-message-from-operator" Job attribute to this new value.

1105 If the Printer supports the Set-Job-Attributes operation, then it SHOULD support setting of:
 1106 all Job Template ("xxx") attributes (see [ipp-mod] section 4.2 and extensions)

1107 that the implementation supports.

1108 The following Job Description attributes (see [ipp-mod] section 4.3) MUST NOT be settable, i.e., they are
1109 READ-ONLY:

1110 job-uri
1111 job-id
1112 job-printer-uri
1113 job-more-info
1114 job-originating-user-name - set in create operation
1115 job-state
1116 job-state-reasons
1117 job-state-message
1118 number-of-documents
1119 output-device-assigned
1120 time-at-creation
1121 time-at-processing
1122 time-at-completed
1123 job-printer-up-time
1124 date-time-at-creation
1125 date-time-at-processing
1126 date-time-at-completed
1127 number-of-intervening-jobs
1128 job-k-octets
1129 job-k-octets-processed
1130 job-impressions-completed
1131 job-media-sheets-completed
1132 attributes-charset - set in create operation
1133 attributes-natural-language - set in create operation

1134 The remaining Job Description attributes MAY be settable using the Set-Job-Attributes operation,
1135 depending on implementation.

1136 Whether or not the Set-Job-Attributes operation affects jobs that are submitted using job submission
1137 protocols other than IPP, depends on implementation, i.e., on whether the IPP protocol is being used as a
1138 universal management protocol or just to manage IPP jobs, respectively. See "printer-controls-other-
1139 protocols" (section 4.4).

1140 *Access Rights:* Authentication and access control (see [ipp-mod] sections 1, 8.3, and 8.5) apply to this
1141 operation.

1142 8.2.1.2 Set-Job-Attributes Request

1143 The following sets of attributes are part of the Set-Job-Attributes Request:

1144 Group 1: Operation Attributes

1145 Natural Language and Character Set:

1146 The "attributes-charset" and "attributes-natural-language" attributes as described in [ipp-mod]
1147 section 3.1.4.1.

1148

1149 Target:

1150 Either (1) the "printer-uri" (uri) plus "job-id" (integer(1:MAX)) or (2) the "job-uri" (uri) operation
1151 attribute(s) which define the target for this operation as described in [ipp-mod] section 3.1.5.
1152

1153 Requesting User Name:

1154 The "requesting-user-name" (name(MAX)) attribute SHOULD be supplied by the client as
1155 described in [ipp-mod] section 8.3.
1156
1157

1158 Group 2: Job Attributes

1159 The client MUST supply a set of Job attributes as defined in [ipp-mod] section 4.2 Job Template
1160 Attributes ("xxx" attributes) and section 4.3 Job Description Attributes. Each Job attribute supplied
1161 in Group 2 replaces the value(s) of the corresponding Job attribute on the target Job object. For
1162 attributes that can have multiple values (1setOf), all values supplied by the client replace all values
1163 of the corresponding Job object attribute.
1164

1165 8.2.1.3 Set-Job-Attributes Response

1166 The Printer object returns the following sets of attributes as part of the Set-Job-Attributes Response:

1167 Group 1: Operation Attributes

1168 Status Message:

1169 In addition to the REQUIRED status code returned in every response, the response OPTIONALLY
1170 includes a "status-message" (text(255)) and/or a "detailed-status-message" (text(MAX)) operation
1171 attribute as described in [ipp-mod] sections 13 and 3.1.6.
1172

1173 Natural Language and Character Set:

1174 The "attributes-charset" and "attributes-natural-language" attributes as described in [ipp-mod]
1175 section 3.1.4.2.
1176

1177 Group 2: Unsupported Attributes

1178 See [ipp-mod] section 3.1.7 for details on returning Unsupported Attributes.
1179

1180 The attributes returned are the same as for the create operation with the same new attribute values.
1181 In the case of attributes that are supported, but are not settable by the implementation, i.e., are not
1182 among the values of the Printer's "settable-attributes" Printer Description attribute (see section 4.1),
1183 the Printer object returns the client-supplied attribute(s) with a substituted value of 'not-supported'
1184 (same out-of-band value as for attributes that are not supported). This value's syntax type is "out-of-
1185 band" and its encoding is defined by special rules for "out-of-band" values in the "Encoding and
1186 Transport" document [IPP-PRO]. Its value indicates that the attribute is either not settable or is not
1187 supported at all.
1188

1189 8.2.2 Reprocess-Job Operation

1190 This OPTIONAL operation is a create job operation that allows a client to re-process a copy of a job that
1191 had been retained in the queue after processing completed, was canceled, or was aborted (see [ipp-mod]
1192 section 4.3.7.2). This operation is the same as the Restart-Job operation (see [ipp-mod] section 3.3.7),
1193 except that the Printer creates a new job that is a copy of the target job and the target job is unchanged. The
1194 new job is assigned new values to the "job-uri" and "job-id" attributes and the new job's Job Description
1195 attributes that accumulate job progress, such as "job-impressions-completed", "job-media-sheets-
1196 completed", and "job-k-octets-processed", are initialized to 0 as with any create job operation. The target
1197 job moves to the Job History after a suitable period, independent of whether one or more Reprocess-Job
1198 operations have been performed on it.

1199 If the Set-Job-Attributes operation is supported, then the "job-hold-until" operation attribute MUST be
1200 supported with at least the 'indefinite' value, so that a client can modify the new job before it is scheduled
1201 for processing using the Set-Job-Attributes operation. After modifying the job, the client can release the
1202 job for processing, by using the Release-Job operation specifying the newly assigned "job-uri" or "job-id"
1203 for the new job.

1204 8.2.3 Cancel-Current-Job Operation

1205 This OPTIONAL operation allows a client to cancel the current job on the target Printer or the specified job
1206 if it is the current job on the Printer. See [ipp-mod] section 3.3.3 for the semantics of canceling a job.
1207 Since a Job might already be marking by the time a Cancel-Current-Job is received, some media sheet
1208 pages might be printed before the job is actually terminated.

1209 If the client does not supply a "job-id" operation attribute, the Printer MUST accept the request and cancel
1210 the current job if there is a current job in the 'processing' or 'processing-stopped' state; otherwise, it MUST
1211 reject the request and return the 'client-error-not-possible' status code. If more than one job is in the
1212 'processing' or 'processing-stopped' states, the one that is marking is canceled and the others are unaffected.

1213 Warning: On a shared printer, there is a race condition. Between the time that a user issues this operation
1214 and its acceptance, the current job might change to a different job. If the user or operator is authenticated to
1215 cancel the new job, the wrong job is canceled. To prevent this race from canceling the wrong job, the client
1216 MAY supply the "job-id" operation attribute which is checked against the current job's job-id. If the job
1217 identified by the "job-id" attribute is not the current job on the Printer, i.e., is not in the 'processing' or
1218 'processing-stopped' states, the Printer MUST reject this operation and return the 'client-error-not-possible'
1219 status code. Otherwise, the Printer cancels the specified job.

1220 *Access Rights:* Authentication and access control (see [ipp-mod] sections 1, 8.3, and 8.5) apply to this
1221 operation.

1222 The Cancel-Current-Job Request and Cancel-Current-Job Response have the same attribute groups and
1223 attributes as the Resume-Printer operation (see [ipp-mod] section 3.2.8), including the new "job-message-
1224 from-operator" operation attribute (see section 3.2), with the addition of the following Group 1 Operation
1225 attributes in the request:

1226 "job-id" (integer(1:MAX)):

1227 The client OPTIONALLY supplies this Operation attribute in order to verify that the identified job
1228 is still the current job on the target Printer object. The IPP object MUST supports this operation
1229 attribute, if it supports this operation.

1230

1231 8.2.4 Pause-Current-Job operation

1232 **ISSUE 17 - Since the semantics of Pause-Current-Job is different from Pause-Printer, in that other jobs are**
1233 **processed, while this job is stopped, should we have a different name for the verb, such as Suspend-**
1234 **Current-Job, instead of Pause-Current-Job. Otherwise, users may be mistakenly think that the printer is**
1235 **paused when the job is paused. If the name is changes, then the 'job-paused' job state reason would also be**
1236 **changed to 'job-suspended'.**

1237 This OPTIONAL operation allows a client to stop the current job on the target Printer or the specified job if
1238 it is the current job on the Printer, and allow other jobs to be processed instead. The Printer moves the
1239 current job or the target job to the 'processing-stopped' state and sets the 'job-paused' value in the job's "job-
1240 state-reasons" attribute and processes other jobs.

1241 If the client does not supply a "job-id" operation attribute, the Printer MUST accept the request and pause
1242 the current job if there is a current job in the 'processing' or 'processing-stopped' state; otherwise, it MUST
1243 reject the request and return the 'client-error-not-possible' status code. If more than one job is in the
1244 'processing' or 'processing-stopped' states, all of them are paused.

1245 **Warning:** On a shared printer, there is a race condition. Between the time that a user issues this operation
1246 and its acceptance, the current job might change to a different job. If the user or operator is authenticated to
1247 pause the new job, the wrong job is paused. To prevent this race from pausing the wrong job, the client
1248 MAY supply the "job-id" operation attribute which is checked against the current job's job-id. If the job
1249 identified by the "job-id" attribute is not the current job on the Printer, i.e., is not in the 'processing' or
1250 'processing-stopped' states, the Printer MUST reject this operation and return the 'client-error-not-possible'
1251 status code. Otherwise, the Printer pauses the specified job and processed other jobs.

1252 A paused job is resumed using the Resume-Job operation (see section 8.2.5). If the Pause-Current-Job
1253 operation is supported, then the Resume-Job operation MUST be supported, and vice-versa.

1254 The Printer MUST reject a Release-Job request (and return the 'client-error-not-possible') for a job that has
1255 been paused , i.e., for a job in the 'processing-stopped' state, with the 'job-paused' value in its "job-state-
1256 reasons" attribute. The Hold-Job and Release-Job operations are for holding and releasing held jobs, not
1257 pausing and resuming paused jobs.

1258 *Access Rights:* Authentication and access control (see [ipp-mod] sections 1, 8.3, and 8.5) apply to this
1259 operation.

1260 The Pause-Current-Job Request and Pause-Current-Job Response have the same attribute groups and
1261 attributes as the Resume-Printer operation (see [ipp-mod] section 3.2.8), including the new "job-message-
1262 from-operator" operation attribute (see section 3.2), the new "when" operation attribute (see section 3.4),
1263 with the addition of the following Group 1 Operation attributes in the request:

1264 "job-id" (integer(1:MAX)):

1265 The client **OPTIONALLY** supplies this Operation attribute in order to verify that the identified job
1266 is still the current job on the target Printer object. The IPP object **MUST** supports this operation
1267 attribute, if it supports this operation.

1268

1269

1270 "synchronize" (boolean)

1271 The client **OPTIONALLY** supplies this attribute. The Printer object **OPTIONALLY** supports this
1272 attribute. This attribute indicates whether or not the printer is to synchronize the checkpoint data for
1273 the current job being paused with the pages that have actually printed. If this attribute is supported,
1274 then a value of 'true' implies that the Printer will be able to resume the job at the point of
1275 synchronization when the job is resumed.

1276

1277 If the Printer supports this attribute but the client does not supply it, the Printer is assumed to
1278 perform synchronization ('true' behavior). If the Printer does not support this attribute, the Printer is
1279 assumed to not synchronize ('false' behavior).

1280

1281 8.2.5 Resume-Job operation

1282 This **OPTIONAL** operation allows a client to stop the target job and allow other jobs to be processed
1283 instead. The Printer moves the target job to the 'pending' state and removes the 'job-paused' value from the
1284 job's "job-state-reasons" attribute.

1285 If the target job is not in the 'processing-stopped' state with the 'job-paused' value in the job's "job-state-
1286 reasons" attribute, the Printer rejects the request and returns the 'client-error-not-possible' status code, since
1287 the job was not paused.

1288 If the Resume-Job operation is supported, then the Pause-Current-Job operation **MUST** be supported, and
1289 vice-versa.

1290 *Access Rights:* Authentication and access control (see [ipp-mod] sections 1, 8.3, and 8.5) apply to this
1291 operation.

1292 The Resume-Job Request and Resume-Job Response have the same attribute groups and attributes as the
1293 Release-Job operation (see [ipp-mod] section 3.3.6), including the new "job-message-from-operator"
1294 operation attribute (see section 3.2).

1295 8.2.6 Promote-Job operation

1296 This OPTIONAL operation allows a client to make the pending target job be processed next after the
1297 current job completes. This operation is specially useful in a production printing environment where the
1298 operator is involved in job scheduling.

1299 If the target job is in the 'pending' state, this operation does not change the job's state, but causes the job to
1300 be processed after the current job(s) complete. If the target job is not in the 'pending' state, the Printer
1301 rejects the request and returns the 'client-error-not-possible' status code. The Printer returns the target job
1302 immediately after the current job(s) in a Get-Jobs response (see [ipp-mod] section 3.2.6) for the 'not-
1303 completed' jobs.

1304 When the current job completes, is canceled, paused, or aborted, the target of this operation is processed
1305 next.

1306 If a client issues this request (again) before the target of the operation of the original request started
1307 processing, the target of this new request is scheduled before the previous job that was to be processed next.

1308 Note: IPP is specified not to require queues for job scheduling, since there are other implementations for
1309 scheduling multiple jobs. However, if an implementation does implement queues for jobs, then the
1310 Promote-Job puts the specified job at the front of the queue. A subsequent Promote-Job before the first job
1311 starts processing puts that specified job at the front of the queue, so that it is "in front" of the previously
1312 promoted job.

1313 *Access Rights:* Authentication and access control (see [ipp-mod] sections 1, 8.3, and 8.5) apply to this
1314 operation.

1315 The Promote-Job Request and Promote-Job Response have the same attribute groups and attributes as the
1316 Cancel-Job operation (see [ipp-mod] section 3.3.3), including the new "job-message-from-operator"
1317 operation attribute (see section 3.2).

1318 8.2.7 Space-Current-Job operation

1319 This OPTIONAL operation allows a client to repeat or skip a specified number of impressions for the
1320 current job on the target Printer or the specified job if it is the current job on the Printer. The Printer repeats
1321 or skips the indicated number of impressions specified by the "back-space" or "forward-space" operation
1322 attribute, respectively. This operation is typically supported in a continuous forms implementation for
1323 synchronizing the web after forms run out or media change.

1324 If the client does not supply a "job-id" operation attribute, the Printer MUST accept this request in any state,
1325 whether or not there is a current job, and advance or backspace the media the indicated number of
1326 impressions specified by the "back-space" or "forward-space" operation attribute, respectively. If more than
1327 one job is in the 'processing' or 'processing-stopped' states, the one that is marking is spaced and the others
1328 are unaffected.

1329 It is reasonable, although not MANDATORY), to perform Space-Current-Job while the Printer is 'stopped'
1330 (paused or possibly for other reasons), or 'processing'. Between the time that a user issues this operation
1331 and its acceptance, the current job might change to a different job. To prevent this race from spacing the
1332 wrong job, the client MAY supply the "job-id" operation attribute which is checked against the current job's
1333 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
1334 'processing' or 'processing-stopped' states, or is not the job that has impressions in the media path even if the
1335 job has completed, the Printer MUST reject this operation and return the 'client-error-not-possible' status
1336 code. Otherwise, the Printer advances or backspaces the media the indicated number of impressions
1337 specified by the "back-space" or "forward-space" operation attribute, respectively.

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

1340 The Space-Current-Job Request and Space-Current-Job Response have the same attribute groups and
1341 attributes as the Resume-Printer operation (see [ipp-mod] section 3.2.8), including the new "job-message-
1342 from-operator" operation attribute (see section 3.2), with the addition of the following Group 1 Operation
1343 attributes in the request:

1344 "job-id" (integer(1:MAX)):

1345 The client OPTIONALLY supplies this Operation attribute in order to verify that the identified job
1346 is still the current job on the target Printer object. The IPP object MUST supports this operation
1347 attribute, if it supports this operation.

1348 "back-space" (integer(1:MAX)):

1349 The client OPTIONALLY supplies this Operation attribute. The IPP object OPTIONALLY
1350 supports this operation attribute, if it is able to repeat impressions.

1351 If the client supplies a value that specifies more impressions than the job has performed, the job is
1352 positioned at the beginning without any indication.

1353 "forward-space" (integer(1:MAX)):

1354 The client OPTIONALLY supplies this Operation attribute. The IPP object OPTIONALLY
1355 supports this operation attribute, if it is able to skip impressions.

1356 If the client supplies a value that specifies more impressions than remain in the job, the job is
1357 positioned at the end without any indication.

1358

1359 9. IANA Considerations

1360 The operations and attributes in this registration proposal will be published by IANA according to the
1361 procedures in RFC 2566 [rfc2566] section 6.4 for operations with the following URL:

1362 <ftp://isi.edu/iana/assignments/ipp/operations/set2.txt>

1363 10. Internationalization Considerations

1364 This document has the same localization considerations as the [ipp-mod].

1365 11. Security Considerations

1366 The IPP Model and Semantics document [ipp-mod] discusses high level security requirements (Client
1367 Authentication, Server Authentication and Operation Privacy). Client Authentication is the mechanism by
1368 which the client proves its identity to the server in a secure manner. Server Authentication is the mechanism
1369 by which the server proves its identity to the client in a secure manner. Operation Privacy is defined as a
1370 mechanism for protecting operations from eavesdropping.

1371 12. Author's Addresses

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1397 13. References

1398 [ipp-mod]

1399 R. deBry, T. Hastings, R. Herriot, S. Isaacson, P. Powell, "Internet Printing Protocol/1.0: Model and
1400 Semantics", <draft-ietf-ipp-model-v11-03.txt>, June, 1999.

1401 [RFC2566]

1402 R. deBry, T. Hastings, R. Herriot, S. Isaacson, P. Powell, "Internet Printing Protocol/1.0: Model and
1403 Semantics", RFC 2566, April 1999.

1404 14. Change History

1405 This section summarizes the changes. Each sub-section is in reverse chronological order.

1406 14.1 Changes to the September 19, 1999 version to make the October 22, 1999 version

1407 Adding or removing ISSUES that don't change the document are not listed here. The following changes to
1408 the September 19, 1999 version to make the October 22, 1999 version as a result of the IPP WG meeting in
1409 Denver, 9/99:

1410 1. Added the Interpreter object.

1411 2. Added the "device-name" operation attribute to handle passing operations through the IPP Printer object
1412 to the device.1413 3. Added the out-of-band 'not-settable' to allow the Set-Job-Attributes and Set-Printer-Attributes response
1414 to indicate the difference between an unsupported attribute and a supported, but not settable, attribute in
1415 the Unsupported Attributes Group.1416 4. Removed "when-values-supported" and "job-settable-attributes" and "printer-settable-attributes" and
1417 "interpreter-settable-attributes" from the list of attributes that MUST be read-only. So an administrator
1418 could sub-set the policy on what when values are supported or which attributes can be set.

1419 14.2 Changes to the July 19, 1999 version to make the September 19, 1999 version

1420 The following changes to the July 19, 1999 version to make the September 19, 1999 version as a result of
1421 the IPP WG meeting in Alaska, 8/99:

1422 1. Refer to proposal as "Set2" rather than "Administrative" operations.

1423 2. Revise the emphasis on administrator throughout the document, although the word administrator
1424 remains wherever appropriate.

- 1425 3. Convert non-process-run-out from an operations attribute to an operation.
- 1426 4. Added Issue 21: For all these "access" caveats, why not just say... 'authentication and access control
1427 (see ipp-mod sections 1, 8.3 and 8.5) applies to this operation".?
- 1428 5. Added Issue 22: Why? This is backward, if you ask me (HRL).
- 1429 6. Per resolution of Issue 2, the "settable-attributes" Printer Description attribute, was replaced with three
1430 Printer Description attributes: "printer-settable-attributes", "job-settable-attributes", and "interpreter-
1431 settable-attributes". The latter for those implementations that have different values for Printer attributes
1432 in the Get-Printer-Attributes and Set-Printer-Attributes operations, depending on the value of the
1433 "document-format" operation attribute supplied by the client. If and when we get a Document object,
1434 then we can add a "document-settable-attributes" Printer Description attribute.
- 1435 14.3 Changes to the June 30, 1999 version to make the July 19, 1999 version
- 1436 The following changes to the June 30, 1999 version to make the July 19, 1999 version as a result of the IPP
1437 WG meeting in Copenhagen, 7/7/99-7/8/99, and the IPP telecon, 7/14/1999:
- 1438 1. Sections 2.1 and 2.2: Clarified that the way to remove a message from the operator was for the client to
1439 supply a zero-length or all white space text string which is copied as usual to the "xxx-message-from-
1440 operator" attribute.
- 1441 2. Section 2.3: Added "factory-settings" (boolean) operation attribute to the Get-Printer-Attributes
1442 operation.
- 1443 3. Section 2.4: Added the "when" operation attribute to the Pause-Current-Job operation.
- 1444 4. Section 2.4: Made the "when" operation attribute OPTIONAL for use in operations (Pause-Printer,
1445 Reset-Printer, Shutdown-Printer, and Pause-Current-Job operations).
- 1446 5. Sections 2.5: Added table of operation attributes for the Printer operations to make it easy to compare.
- 1447 6. Sections 2.6: Added table of operation attributes for the Job operations to make it easy to compare.
- 1448 7. Section 3.1: Added "settable-attributes" (1setOf type2 keyword) READ-ONLY Printer Description
1449 attribute.
- 1450 8. Section 3.2: Added "printer-controls-other-protocols" (boolean) Printer Description attribute
- 1451 9. Section 3.3: Added the READ-ONLY "printer-message-time" (integer(MIN:MAX)) Printer
1452 Description attribute to keep time message updated in time ticks.
- 1453 10. Section 4.2: Deleted the 'process-next' 'job-state-reasons' value, so that repeated Promote-Job
1454 operations promote each job "to the front of the queue".

- 1455 11. Sections 6.1.1.1 and 6.2.1.1: Replaced the table that listed all attributes with one that lists only the
1456 attributes that MUST be READ-ONLY.
- 1457 12. Section 6.1.1.1: Indicated that attributes that are not specified as READ-ONLY in this document MAY
1458 be settable. If they control behavior, that changing their values MUST change the behavior.
- 1459 13. Section 6.1.1.2 and 6.2.1.2: Deleted the "ipp-attribute-fidelity" operation attribute from the Set-Printer-
1460 Attributes and Set-Job-Attributes operations. All set operations are atomic.
- 1461 14. Section 6.1.1.2: Add the concept of the Interpreter object to handle attributes whose values vary in the
1462 Set-Printer-Attributes and Get-Printer-Attributes, depending on the value of the "document-format"
1463 operation attribute.
- 1464 15. Sections 6.1.1.3 and 6.2.1.2: Changed the "out-of-band" 'not-settable' value back to the existing 'not-
1465 supported' value.
- 1466 16. Section 6.1.2 and 6.1.3: Added "job-type" operation attribute to Disable-Printer and Enable-Printer
1467 operations with values: 'network-jobs', 'walk-up-jobs', and 'all-jobs'.
- 1468 17. Section 6.1.5: Clarified that Restart-Printer brings up the Printer disabled and paused, since that is the
1469 eventual state that Shutdown-Printer leaves the printer in.
- 1470 18. Section 6.1.5: Indicated that if Restart-Printer is supported, then Shutdown-Printer MUST be
1471 supported.
- 1472 19. Section 6.1.6: Deleted Space-Printer operation. Keep Space-Current-Job operation only which has a
1473 "job-id" operation attribute that a client MAY supply.
- 1474 20. Section 6.1.6: Clarified that Shutdown-Printer is for a long period of time, not just to reset the device or
1475 change attribute values. Also that Shutdown performs an immediate Disable-Printer and an eventual
1476 Pause-Printer.
- 1477 21. Sections 6.2.3, 6.2.4, and 6.2.7 : Added a "job-id" operation attribute to Cancel-Current-Job, Pause-
1478 Current-Job, and Space-Current-Job that a client MAY supply to check for race condition where current
1479 job changes
- 1480 22. Section 6.2.4: Combined Pause-Job into Pause-Current-Job operation.
- 1481 23. Sections 6.2.4 and 6.2.5: Pause-Current-Job puts job in 'processing-stopped' state, not 'pending-held'
1482 state.
- 1483 24. Section 6.2.6: Simplified Promote-Job, so that it behaves as if the job were put at the front of the
1484 queue.

1485 15. Appendix A: Full Copyright Statement

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