

1 INTERNET-DRAFT - 14 ISSUES are numbered and highlighted like this
2 <draft-ietf-ipp-ops-set2-01.txt>

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October 29~~2~~, 1999

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 The Interpreter object is added for those implementations that make a distinction on the values of some
42 Printer attributes depending on the document-format, such as "resolution-supported".

43 In addition, two operation attributes are defined: "printer-message-from-operator" and "job-message-from-
44 operator" are included to set the corresponding Printer and Job Description attributes with the same names.
45 And the "when" operation attribute is added to the IPP/1.1 Pause-Printer operation as well as some of the
46 Set2 Printer operations.

47 New Printer Description attributes are added, along with additional values for the "printer-state-reasons"
48 and "job-state-reasons" attributes.

49 Finally, nNew status codes: 'client-error-attributes-not-settable' and 'server-error-printer-is-in-standby-mode'
50 are added.

51 Finally, the 'not-settable' out-of-band value is added for use with the Set-Printer-Attributes and Set-Job-
52 Attributes operations.

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

58 This document is intended for registration following the registration procedures of IPP/1.0 [RFC2566] and
59 IPP/1.1 [ipp-mod]. This version includes the comments discussed at the IPP telecon, on 6/23/1999,
60 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
61 August, 1999 IPP meeting in Alaska and subsequent phone conferences and discussions. Specifically, the
62 9/16 update refers to this set of extensions simply as "Set2" rather than using the term "Administrative"
63 which was misleading, controversial and incorrect as an overall description. Also, two new attributes have
64 been proposed to clarify the intent of each operation in terms of its target, the Printer vs. the Print Job.
65 Unresolved ISSUES are highlighted like this in the .doc and .pdf files.

66 The full set of IPP documents includes:

- 67 Design Goals for an Internet Printing Protocol [RFC2567]
- 68 Rationale for the Structure and Model and Protocol for the Internet Printing Protocol [RFC2568]
- 69 Internet Printing Protocol/1.1: Model and Semantics (this document)
- 70 Internet Printing Protocol/1.1: Encoding and Transport [IPP-PRO]
- 71 Internet Printing Protocol/1.1: Implementer's Guide [IPP-IIG]
- 72 Mapping between LPD and IPP Protocols [RFC2569]

73

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

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

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

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

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

95

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158 1. Introduction

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

164 2. New objects

165 This section defines the new Interpreter object and the use of the Printer object to represent fan-out.

166 4.1.2.1 Interpreter object

167 The Interpreter object models the document format interpreters that are contained in the Printer object. The
168 purpose of the Interpreter object is to model those Printer attributes whose value depends on which
169 interpreter is being used to process the document. Depending on implementation, the Printer object
170 attributes whose values ("xxx-supported" and "xxx-default") depend on the interpreter, i.e., on the
171 "document-format" of the document being processed, are considered to be Interpreter object attributes
172 instead. A Get-Printer-Attributes operation returns Printer and Interpreter objects-attributes as specified in
173 the "requested-attributes" operation attribute supplied by the client. Depending on the value of the
174 "document-format" attribute supplied by the client in the Get-Printer-Attributes request (or the "document-
175 format-default", if the client omits the "document-format" attribute), selects the corresponding Interpreter
176 object.

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

182 Note: the addition of the Interpreter object is completely compatible with IPP/1.0 and IPP/1.1 (see the
183 description of the "document-format" operation attribute in [ipp-mod] section 3.2.5.1 Get-Printer-Attributes
184 request). The protocol and semantics are the same whether or not the Interpreter object is used to
185 distinguish attributes that depend on the "document-format". Consequently, there is no "interpreters-
186 supported" Printer Description attribute. In order to determine which Interpreter objects there MAY be, the
187 client can request the values of the Printer's "document-format-supported" attribute.

188 Note: The Interpreter object is really a sub-class of the Printer object, rather than being a full fledged object
189 in the sense that the Job and Printer objects are. There are no operations defined solely for the Interpreter
190 object. The Get-Printer-Attributes and Set-Printer-Attributes operations operate on the Interpreter object if
191 the implementation has the concept of an Interpreter object. However, if the IPP Printer implementation

192 does not contain Interpreter objects, the same Interpreter object attributes are considered Printer object
193 attributes, instead.

194 2.2 Use of the Printer object to represent fan-out

195 The IPP/1.1 Model and Semantics introduces the semantic concept of an IPP Printer object that represents
196 more than one output device (see [ipp-mod] section 2.1). However, there was no way to represent the
197 individual states of the devices or to perform operations on selected devices. This specification generalizes
198 the semantics of the Printer object to represent such "subordinate" fan-out devices as IPP Printer objects.
199 Thus a "parent" Printer object MAY support two or more subordinate Printer objects in order to represent
200 fan-out. Such a parent Printer object MUST support the "subordinate-printers-supported" (1setOf uri)
201 Printer Description attribute.

202 A conforming subordinate Printer object NEED NOT support all of the REQUIRED operations. For
203 example a subordinate Printer NEED NOT support a Print-Job operation, unless it is a networked printer
204 that supports the IPP Protocol. In such a case, the subordinate Printer MAY be configured so that its access
205 control list only permits the parent Printer to submit jobs to it. A subordinate Printer MAY, in turn, have
206 subordinate Printers.

207 **ISSUE 01 - What sub-set of the REQUIRED IPP/1.1 operations MUST a subordinate Printer object**
208 **support? Get-Printer-Attributes? Any others?**

209 **ISSUE 02 - Are there any IPP Printer or Job operations that a subordinate Printer MUST NOT support?**

210 **ISSUE 03 - Are all the REQUIRED attributes of a Printer object REQUIRED for a subordinate Printer**
211 **object?**

212 The degenerate case of a Printer having only a single subordinate Printer is not allowed.

213 Each subordinate Printer object has a URI which is used as the target of each operation on the subordinate
214 Printer. The means for configuring URIs for subordinate Printer objects is implementation-dependent as
215 are all URIs. However, there are two distinct approaches:

216 a. When the implementation wants to make sure that no operation on a subordinate Printer object as
217 a target "sneaks by" the parent Printer object (or the subordinate Printer is fronting for a device that
218 is not networked), the host part of the URI specifies the host of the parent Printer. Then the parent
219 Printer object can easily reflect the state of the subordinate Printer objects in the parent's Printer
220 object state and state reasons as the operation passes "through" the parent Printer object.

221 b. When the subordinate Printer is networked and the implementation allows operations to go
222 directly to the subordinate Printer (with proper access control) without knowledge of the parent
223 Printer object, the host part of the URI is different than the host part of the parent Printer object. In
224 such a case, the parent Printer object MUST keep its "printer-state" and "printer-state-reasons" up to
225 date, either by polling the subordinate Printer object or by subscribing to events with the subordinate

226 Printer object (see [ipp-not-spec] for means to do this when the subordinate Printer object supports
227 IPP notification).

228 2.3 Device object

229 In order to control the physical device, the Device object is introduced. Its semantics are defined in [ipp-
230 set3]. The Device object has attributes that represent physical characteristics of the device, such as input
231 trays, output bins, and finishing equipment. Thus the Printer object remains as the representative of a
232 logical entity or service, while the Device object represents a physical entity. The operations in this Set2
233 document operate only on Printer objects, not on Device objects. However, some of the Set2 Printer
234 operations have analogous Device operations. For example, the Shutdown-Printer and Shutdown-Device
235 operations are defined in Set2 and Set3, respectively.

236 3. New Operation attributes

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

239 3.1 New operation attribute: "printer-message-from-operator" (text(127))

240 Type of registration: attribute

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

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

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

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

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

246

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

248

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

250 The client OPTIONALLY supplies this attribute. The Printer object SHOULD supports this
251 operation attribute if it supports the corresponding Printer Description attribute. The value of this
252 attribute is a message from the operator about the Printer object on which the operator is performing
253 the operation. If supported, the Printer copies the value to the Printer's "printer-message-from-
254 operator" Printer Description attribute (see [ipp-mod] section 4.4.25), automatically sets the value of
255 the Printer's "printer-message-time" with the current value of the Printer's "printer-up-time"
256 attribute, the value of the "printer-message-date-time" with the current value of the Printer's printer-
257 current-date-time" attribute, and the value of the Printer's "printer-message-operation" with the
258 operation-id value of this operation (see [ipp-mod] section 4.4.15).

259

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

263

264 If the client supplies this attribute with a zero-length text value or with a value consisting solely of
265 white space, the Printer copies that value as any other value to the Printer's "printer-message-from-
266 operator" and sets the "printer-message-time", "printer-message-date-time", and "printer-message-
267 operation" attributes. Supplying such a value is the way that the operator indicates that there is no
268 longer a printer message from the operator (rather than using the "out-of-band" 'no-value' value).
269

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

271 Pause-Printer - see [ipp-mod] section 3.2.7
272 Resume-Printer - see [ipp-mod] section 3.2.8
273 Purge-Jobs - see [ipp-mod] section 3.2.9
274 Disable-Printer - see section 8.1.2
275 Enable-Printer - see section 8.1.3
276 ~~Reset-Printer - see section 8.1.4~~
277 Restart-Printer - see section 8.1.4
278 ~~Non-Process-Run-Out - see section 8.1.6~~
279 Shutdown-Printer - see section 8.1.5
280

281 The "printer-message-from-operator" operation attribute MUST NOT be supported as an operation attribute
282 for the Set-Printer-Attributes operation. If the operator wants to set the Printer's "printer-message-from-
283 operator" Printer Description attribute when issuing the Set-Printer-Attributes operation, the client supplies
284 the "printer-message-from-operator" with its new value as one of the Printer Description attributes in Group
285 2 in the request. The Printer also updates the Printer's "printer-message-date-time" and "printer-message-
286 operation" Printer Description attributes. If the client does not explicitly supply the "printer-message-from-
287 operator" with its new value, the Printer leaves the value of the Printer's "printer-message-from-operator"
288 Printer Description attribute unchanged.

289 3.2 New operation attribute: "job-message-from-operator" (text(127))

290 Type of registration: attribute

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

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

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

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

295 Attribute syntax(es) (include 1setOf and range as in Section 4.2): text(127)
296

297 Specification of this attribute (follow the style of IPP Model Section 4.2):
298

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

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

305

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

308

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

313

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

316

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

318

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

319

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

320

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

321

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

322

Reprocess-Job - see section 8.2.2

323

Cancel-Current-Job - see section 8.2.3

324

Pause-Current-Job - see section 8.2.4

325

Resume-Job - see section 8.2.5

326

Promote-Job - see section 8.2.6

327

~~Space-Current-Job - see section 8.2.7~~

328

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

335

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

336

Type of registration: attribute

337

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

338

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

339

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

340

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

341

Attribute syntax(es) (include lsetOf and range as in Section 4.2): boolean

342

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

344 "factory-settings" (boolean)

345 The client OPTIONALLY supplies this attribute. The Printer object OPTIONALLY supports this
346 attribute, if it supports the Set-Printer-Attributes operation. If the client omits this attribute or
347 supplies the 'false' value, the Printer returns the current values of the requested attributes that are
348 settable, i.e., the values that have been set by previous Set-Printer-Attributes. If the client supplies
349 the 'true' value, the Printer returns the factory settings, i.e., the inherent values supported by the
350 implementation as shipped from the manufacturer or established at install time. This operation
351 attribute allows an operator to determine which values are supported in an implementation after
352 having modified a settable attribute. Attributes that are not settable are not affected by this
353 operation attribute, so that the Printer returns the same values for non-settable attribute when either
354 the 'true' or 'false' value has been supplied. If this operation attribute is supported, both 'true' and
355 'false' values MUST be supported.

356 3.4 New operation attribute for Pause-Printer: "when" (type2 keyword)

357 Type of registration: attribute

358 Proposed keyword name of this attribute: "when"

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

360 Operations to be used with if the attribute is an operation attribute: Pause-Printer, ~~Reset Printer, Non-~~
361 ~~Process Run Out~~, Shutdown-Printer, and Pause-Current-Job

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

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

364

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

366 "when" (type2 keyword)

367 The client OPTIONALLY supplies this attribute. The Printer object OPTIONALLY supports this
368 attribute, if it supports this operation. The value of this attribute indicates when to pause, ~~reset, or~~
369 ~~shutdown~~ the printer. If the client omits this attribute, the Printer assumes the 'after-current-job'
370 value. The 'after-current-job' value is REQUIRED to be supported if the "when" attribute is
371 supported; the remaining values are OPTIONAL.

372 Note: There is no way to query to see which values of the "when" attribute are supported for this or
373 any other operation. Since this operation is intended for Operators, rather than End-Users, it did not
374 seem necessary to provide the means to query the supported values.

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

377 ~~—TH> Just add a "when values supported" that applies to all of the~~
378 ~~—four operations supported, with the exception of Pause Current Job.~~
379 ~~—For Pause Current Job, only the 'now' and 'after current copy' have~~
380 ~~—any meaning, so the other two values ('after current job' and~~
381 ~~—'after all') don't apply.~~

382

383 ~~—HRL> Or, "just say NO". The client can't determine the values of~~
384 ~~—"when" supported. The client may specify a value of when and the~~
385 ~~—implementation will do it's best to deliver as close to the desired~~
386 ~~—behavior as possible within the constraints of the device or~~

387 ~~environment. The client may determine the actual result based on~~
 388 ~~final status and/or notification feedback.~~

389

390

391 Standard keyword values are:

392 'now' - ~~cancel the currently printing job(s) and shutdown~~ pause the Printer immediately,
 393 while the current job is processing. See [ipp-mod] section 3.2.7) for the effect on the
 394 Printer's "printer-state" and "printer-state-reasons" attributes. Jobs in the 'held' and
 395 'pending' state remain in those states.

396 'after-current-copy' - ~~shutdown~~ pause the Printer after the current job finishes printing its
 397 current copy. Jobs in the 'held' and 'pending' state remain in those states.

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

400 'after-all' - ~~shutdown~~ pause the Printer after all 'pending' jobs finish printing. Jobs in the
 401 'held' state remain in the 'held' state.

402 Note: The "when" operation attribute is also defined for use with the Shutdown-Printer (see section 8.1.5)
 403 and the Pause-Current-Job (see section 8.2.4) operations, but with a subset of these values.

404 ~~3.5 New OPTIONAL operation attribute for any Job or Printer operation: "device-name" (name(127))~~

405 ~~Type of registration: attribute~~

406 ~~Proposed keyword name of this attribute: "device name"~~

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

408 ~~Operations to be used with if the attribute is an operation attribute: all~~

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

410 ~~Attribute syntax(es) (include 1setOf and range as in Section 4.2): name(127)~~

411

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

413 ~~"device-name" (name(127))~~

414 ~~This OPTIONAL Printer operation attribute contains the name of a device which is associated with~~
 415 ~~this Printer object. The named device is the actual target of the specified Printer operation, that is,~~
 416 ~~the Printer object MUST pass the operation through to the device rather than affecting the Printer~~
 417 ~~object specified by the "printer-uri" operation attribute. See the Job object attribute "output-device-~~
 418 ~~assigned" in [IPP-MOD] which identifies the named device that the job was assigned to by the~~
 419 ~~Printer object. See the Printer object attribute "device-names-supported" in section 4.9 of this~~
 420 ~~document.~~

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

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

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

430 ~~ISSUE 5—Could we specify a minimum set of operations which, if supported, MUST also support~~
 431 ~~the "device-name" operation attribute, if the implementation supports the "device-name" operation~~
 432 ~~attribute on any operation?~~

433 ~~3.5.1 Revised text for [ipp-mod] for the "device-name" extension~~

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

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

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

444 3.5 Summary of the operation attributes for the Printer operations

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

448 Legend:

449 R - REQUIRED for a Printer to support

450 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-Processes-Run-Out	Shut down-Printer
document-format				R	R						
factory-settings				O							
printer-message-from-operator	O	O	O			O	O	⊖	O		O
job-type						O	O				
when	O							⊖			O
reset-function								R			
synchronize											O
shutdown-function											R
device-name	⊖	⊖	⊖	⊖	⊖	⊖	⊖	⊖	⊖	⊖	⊖

451 3.6 Summary of the operation attributes for the Job operations

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

457 Legend:

458 R - REQUIRED for a Printer to support

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

Operation Attribute	Cancel -Job	Cancel- Current -Job	Hold -Job	Rel ease -Job	Space- Curren t-Job	Pause- Curren t-Job	Res ume -Job	Get-Job- Attribute s	Set-Job- Attribute s	Restart- Job	Reproces s-Job	Promo te-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					⊖							
forward-space					⊖							
synchronize					⊖	O						
when						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	⊖	⊖	⊖	⊖	⊖	⊖	⊖	⊖	⊖	⊖	⊖	⊖

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

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

465 4. New Printer Description Attributes

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

468 4.1 printer-settable-attributes (1setOf type2 keyword)

469 ~~ISSUE 7 Keep "printer settable attributes", "interpreter settable attributes", and "job settable attributes"~~
 470 ~~so that a client can determine which subset of the Printer, Interpreter, and Job attributes are settable? The~~

471 ~~decision in Denver was to delete "printer-settable-attributes", "interpreter-settable-attributes", and "job-~~
472 ~~settable-attributes". However, how can the client display to the user what is possible? Just random trying~~
473 ~~seems completely contrary to the query for capabilities philosophy in IPP. Also the IPP Printer has to~~
474 ~~validate whether each Set operation is acceptable or not, so it may as well do such validation with a~~
475 ~~queriable attribute, rather than a hidden (and unconfigurable) mechanism.~~

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

480
481 Type of registration: attribute
482 Proposed keyword name of this attribute: printer-settable-attributes
483 Types of attribute (Operation, Job Template, Job Description, Printer Description): Printer Description
484 Operations to be used with if the attribute is an operation attribute: N/A
485 Object (Job, Printer, etc. if bound to an object): Printer
486 Attribute syntax(es) (include 1setOf and range as in Section 4.2): 1setOf type2 keyword
487 If attribute syntax is 'keyword' or 'enum', is it type2 or type3: type2
488 If this is a Printer attribute, MAY the value returned depend on "document-format" (See Section 6.2): Yes
489 If this is a Job Template attribute, how does its specification depend on the value of the "multiple-
490 document-handling" attribute: N/A
491 Specification of this attribute (follow the style of IPP Model Section 4.2):

492 4.4.? printer-settable-attributes (1setOf type2 keyword)

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

499 ~~4.2interpreter-settable-attributes (1setOf type2 keyword)~~

500 ~~Type of registration: attribute~~
501 ~~Proposed keyword name of this attribute: interpreter-settable-attributes~~
502 ~~Types of attribute (Operation, Job Template, Job Description, Printer Description): Printer Description~~
503 ~~Operations to be used with if the attribute is an operation attribute: N/A~~
504 ~~Object (Job, Printer, etc. if bound to an object): Printer~~
505 ~~Attribute syntax(es) (include 1setOf and range as in Section 4.2): 1setOf type2 keyword~~
506 ~~If attribute syntax is 'keyword' or 'enum', is it type2 or type3: type2~~
507 ~~If this is a Printer attribute, MAY the value returned depend on "document-format" (See Section 6.2): Yes~~
508 ~~If this is a Job Template attribute, how does its specification depend on the value of the "multiple-~~
509 ~~document-handling" attribute: N/A~~
510 ~~Specification of this attribute (follow the style of IPP Model Section 4.2):~~

511 ~~4.4.? interpreter-settable-attributes (1setOf type2 keyword)~~

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

519 4.2 job-settable-attributes (1setOf type2 keyword)

520 Type of registration: attribute

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

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

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

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

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

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

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

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

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

531 4.4.? job-settable-attributes (1setOf type2 keyword)

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

537 4.3 printer-controls-other-protocols (boolean)

538 Type of registration: attribute

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

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

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

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

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

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

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

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

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

549 4.4.? printer-controls-other-protocols (boolean)

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

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

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

564 4.4 printer-message-time (integer(MIN:MAX))

565 Type of registration: attribute

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

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

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

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

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

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

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

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

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

576 4.4.? printer-message-time (integer(MIN:MAX))

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

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

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

588 4.5 printer-message-date-time (dateTime)

589 Type of registration: attribute

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

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

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

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

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

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

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

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

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

600 4.4.? printer-message-date-time (dateTime)

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

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

609 4.6 printer-message-operation (type2 keyword)

610 Type of registration: attribute

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

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

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

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

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

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

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

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

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

621 4.4.? printer-message-operation (type2 enum)

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

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

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

628 ~~4.8when-values-supported (1setOf type2 keyword)~~

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

634 ~~Type of registration: attribute~~

635 ~~Proposed keyword name of this attribute: when-values-supported~~

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

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

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

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

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

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

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

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

645 ~~4.4.? when-values-supported (1setOf type2 keyword)~~

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

651 ~~4.9device-names-supported (1setOf name(127))~~

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

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

658 ~~An Administrator determines device names and configures this attribute to contain those device names via~~
659 ~~IPP Set-Printer-Attributes operation (see section 8.1.1) or by some means outside the scope of this~~

660 ~~document. The precise format of these device names is implementation dependent and MAY depend on the~~
661 ~~protocol stack and the directory namespace.~~

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

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

667 4.7 subordinate-printers-supported (1setOf uri)

668 This Printer attribute is REQUIRED if an implementation supports subordinate Printers (see section 2.2)
669 and contains the URIs of the subordinate Printer objects associated with this Printer object. In order to
670 support subordinate Printer objects, there MUST be at least two subordinate Printer objects.

671 The precise format of the subordinate Printer URIs is implementation dependent (see section 2.2).

672 If the Printer object does not have an associated Device object (see section 2.3), the value of the subordinate
673 Printer object's "printer-name" MAY be used to populate the Job object's "output-device-assigned"
674 attribute (see [ipp-mod] section 4.3.13). The "output-device-assigned" Job attribute identifies the output
675 device to which the Printer object has assigned a job, for example, when a single Printer object is
676 supporting fan-out.

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

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

680 5.1 Value for "printer-state-reasons": 'standby'

681 Type of registration: type2 keyword attribute value

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

683 Proposed keyword name of this keyword value: standby

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

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

688 5.2 Value for "job-state-reasons": 'job-paused'

689 Type of registration: type2 keyword attribute value

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

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

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

693 'job-paused': The job has been paused while processing using the Pause-Current-Job operations and
694 other jobs can be processed on the Printer. The Job can be resumed using the Resume-Job operation
695 which removes this value.
696

697 6. New status codes

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

699 6.1 New status code: 'client-error-attributes-not-settable'

700 Type of registration: status code

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

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

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

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

706 13.1.4.20 client-error-attributes-not-settable (0x0413)

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

713 6.2 New status code: 'server-error-printer-is-in-standby-mode'

714 Type of registration: status code

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

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

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

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

720 13.1.5.8 server-error-printer-is-in-standby-mode

721 The Printer has been shutdown and is only accepting the Restart-Printer (see section 8.1.4) and Get-Printer-
722 Attributes operations. An operator can perform the Restart-Printer operation to allow the Printer to accept
723 other operations.

724 7. New out-of-band values

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

727 7.1 'not-settable' out of band value

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

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

733 The Set 2 operations are summarized in the following table:

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

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

737

738 8.1 Printer Operations

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

742 8.1.1 Set-Printer-Attributes Operation

743 Type of registration: operation
744 Proposed name of this operation: Set-Printer-Attributes
745 Object Target: Printer
746 Specification of this operation:

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

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

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

756 8.1.1.1 Settable and READ-ONLY Printer Description attributes

757 If the Printer supports the "printer-message-from-operator" Printer Description attribute (see [ipp-mod]
758 section 4.4.25) and the client explicitly supplies a new value for the "printer-message-from-operator" in the
759 request, then the Printer MUST set the "printer-message-from-operator" Printer attribute to this new value
760 and MUST also set the "printer-message-time", "printer-message-date-time", and "printer-message-
761 operation" attributes, if supported (see sections 4.4, 4.5, and 4.6).

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

763 all Job Template Default ("xxx-default") attributes
764 all Job Template Supported ("xxx-supported") attributes
765 all Job Template Ready ("xxx-ready") attributes

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

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

769 printer-state
770 printer-state-reasons
771 printer-state-message
772 printer-is-accepting-jobs - see Enable-Printer/Disable-Printer
773 queued-job-count
774 printer-message-time - see Set-Printer-Attributes when setting "printer-message-from-operator"
775 printer-message-date-time - see Set-Printer-Attributes when setting "printer-message-from-operator"
776 printer-message-operation - see Set-Printer-Attributes when setting "printer-message-from-operator"
777 printer-up-time

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

783 For example, if the "operations-supported" Printer Description attribute (see [ipp-mod] section
784 4.4.15) is settable, then changing its value MUST affect the operations that the implementation
785 accepts or rejects. Such an implementation will need to be able to reject values for operations that it
786 contains no code support for.

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

791 See the "factory-settings" operation attribute (see section 3.3) for a way to query the implementation
792 supported values using the Get-Printer-Attributes operation. See the "reset-function" operation attribute of
793 the Reset-Printer-Device operation (see [ipp-set3]section 8.1.4) for a way to restore the values of the Device
794 object to the factory settings.

795 **ISSUE 04 - Ok not to have a way to reset the values of the Printer object to the factory settings, but only**
796 **have a way to reset the factory default settings for the Device object?**

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

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

802

803 8.1.1.2 Set-Printer-Attributes Request

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

805 Group 1: Operation Attributes

806 Natural Language and Character Set:

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

809

810 Target:

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

813

814 Requesting User Name:

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

817

818

819 "document-format" (mimeMediaType):

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

829

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

833

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

840

841 If the client omits this "document-format" operation attribute, the Printer object MUST respond as if
842 the attribute had been supplied with the value of the Printer object's "document-format-default"

843 attribute. It is recommended that the client always supply a value for "document-format", since the
844 Printer object's "document-format-default" may be 'application/octet-stream', in which case the set
845 attributes and values are for the union of the document formats that the Printer can automatically
846 sense. For more details, see the description of the 'mimeType' attribute syntax in [ipp-mod]
847 section 4.1.9.

848

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

853

854 Group 2: Printer Attributes

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

862

863 8.1.1.3 Set-Printer-Attributes Response

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

865 Group 1: Operation Attributes

866 Status Message:

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

870

871 Natural Language and Character Set:

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

874

875 Group 2: Unsupported Attributes

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

877

878 In the case of attributes that are supported, but are not settable by the implementation, i.e., are not
879 among the values of the Printer's "settable-attributes" Printer Description attribute (see section 4.1),
880 the Printer object returns the client-supplied attribute(s) with a substituted value of 'not-supported'
881 (same out-of-band value as for attributes that are not supported). This value's syntax type is "out-of-
882 band" and its encoding is defined by special rules for "out-of-band" values in the "Encoding and

883 Transport" document [IPP-PRO]. Its value indicates that the attribute is either not settable or is not
884 supported at all.

885

886 8.1.2 Disable-Printer Operation

887 Type of registration: operation

888 Proposed name of this operation: Disable-Printer

889 Object Target: Printer

890 Specification of this operation:

891 This OPTIONAL operation allows a client to stop the Printer object from accepting jobs, i.e., cause the
892 Printer to reject subsequent create job operations (Print-Job, Print-URI, and Create-Job operation) and
893 return the 'server-error-not-accepting-jobs' status code. The Printer still accepts all other operations. All
894 previously submitted Jobs and currently processing Jobs continue unaffected. The Printer sets the value of
895 its "printer-is-accepting-jobs" READ-ONLY Printer Description attribute to 'false' (see [ipp-mod] section
896 4.4.20), no matter what the previous value was. This operation has no immediate effect on the Printer's
897 "printer-state" and "printer-state-reasons" attributes.

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

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

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

903 Whether or not the Disable-Printer operation stops jobs that are submitted using job submission protocols
904 other than IPP, depends on implementation, i.e., on whether the IPP protocol is being used as a universal
905 management protocol or just to manage IPP jobs, respectively. See "printer-controls-other-protocols"
906 (section 4.3).

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

909 The Disable-Printer Request and Disable-Printer Response have the same attribute groups and attributes as
910 the Resume-Printer operation (see [ipp-mod] sections 3.2.7.1 and 3.2.7.2), including the new "printer-
911 message-from-operator" operation attribute (see section 3.1), and with the addition of the following Group
912 1 operation attribute in the request:

913 "job-type" (type2 keyword):

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

917

918 Standard keyword values are:

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

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

921 'all-jobs' - disable all type of jobs

922

923 8.1.3 Enable-Printer Operation

924 Type of registration: operation

925 Proposed name of this operation: Enable-Printer

926 Object Target: Printer

927 Specification of this operation:

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

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

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

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

939 Whether or not the Enable-Printer operation allows acceptance of jobs that are submitted using job
940 submission protocols other than IPP, depends on implementation, i.e., on whether the IPP protocol is being
941 used as a universal management protocol or just to manage IPP jobs, respectively. See "printer-controls-
942 other-protocols" (section 4.3).

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

945 The Enable-Printer Request and Enable-Printer Response have the same attribute groups and attributes as
946 the Resume-Printer operation (see [ipp-mod] sections 3.2.8.1 and 3.2.8.2), including the new "printer-
947 message-from-operator" operation attribute (see section 3.1), and with the addition of the following Group
948 1 operation attribute in the request:

949 "job-type" (type2 keyword):

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

953

954 Standard keyword values are:

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

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

957 'all-jobs' - enable all types of jobs

958 ~~8.1.4 Reset Printer operation~~

959 ~~Type of registration: operation~~

960 ~~Proposed name of this operation: Reset Printer~~

961 ~~Object Target: Printer~~

962 ~~Specification of this operation:~~

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

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

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

976 ~~The Printer object MUST accept this operation in any state and transition the Printer object to the 'idle'~~
977 ~~state.~~

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

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

984 ~~"reset-function" (type3 keyword):~~

985 ~~The client OPTIONALLY supplies this attribute. The Printer object MUST support this attribute, if~~
986 ~~it supports this operation. The value of this attribute indicates the reset function to be performed. If~~
987 ~~the client omits this attribute, the Printer assumes the 'reset to nvram' value.~~

988 ~~Standard keyword values are:~~

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

990 ~~'reset to nvram'—Warm start.~~

991 ~~'reset to factory defaults'—reset NVRAM to factory defaults, i.e. to factory settings and/or~~
992 ~~values established at install time.~~

994

995 8.1.4 Restart-Printer operation

996 Type of registration: operation

997 Proposed name of this operation: Restart-Printer

998 Object Target: Printer

999 Specification of this operation:

1000 This OPTIONAL operation allows a client to restart a Printer that has previously been shutdown in standby
1001 mode (see section 8.1.5). Standby mode is indicated by the Printer's "printer-state" being 'stopped' and its
1002 "printer-state-reasons" including the 'standby' and 'paused' values. If the Printer is not in standby mode, the
1003 Printer MUST reject this operation and return the 'client-error-not-possible' status code.

1004 **ISSUE 05: What state does the Printer comes back up on Restart-Printer and how can the client control?**

1005 **Possible alternatives:**

1006 a. Restart-Printer always brings the Printer up Disabled ("printer-is-accepting-jobs" = 'false') and
1007 Paused ("printer-state" = 'stopped', and "printer-state-reasons" = 'paused') which is the state that
1008 Shutdown-Printer leaves the Printer in. Then the operator issues Enable-Printer and Resume-Printer
1009 when want to restore normal operation. The client can automatically issues these addition 2
1010 operations depending on GUI options. Advantages: This is the simplest to implement, allows new
1011 states to be added without changing the Restart-Printer operation, and can have the same GUI
1012 interface as b:

1013 b. Add a REQUIRED operation attribute to Restart-Printer, something like "printer-condition" with
1014 values: 'disabled-and-paused', 'enabled-and-paused', and 'enabled-and-idle'.

1015 ~~TH 7/26: Remove the Shutdown Printer 'standby' mode concept. Shutdown Printer always powers off eventually. Also remove
1016 Restart-Printer operation all together. Instead change the Disable-Printer and Enable-Printer operations to Disable-Operations
1017 and Enable-Operations, so that individual operations are enabled and disabled independent of the state of the Printer and don't
1018 otherwise affect the state of the Printer.~~

1023 ~~HRL 9/18: How can the state of the printer not be effected when you disable or enable it? Don't understand 2nd half of this issue
1024 resolution.~~

1026 **DENVER MEETING>** There was significant confusion as to the meaning of shutdown. If a shutdown
1027 operation halts communications to the printer a restart is not possible. It was agreed to include restart
1028 attributes 'restart-to-standby' (requires a two step process), 'restart-fully', and 'restart-sync'.

1029 **ACTION ITEM (Harry Lewis):** make a complete proposal and submit for approval.

1030 If the Restart-Printer operation is supported, then the Shutdown-Printer operation MUST be supported,
1031 since the Restart-Printer operation is meaningful only after a Shutdown-Printer operation has been

1032 performed. However, if the Shutdown-Printer operation is supported, the Restart-Printer NEED NOT be
1033 supported.

1034 Issue 06: Why? This is backward, if you ask me (HRL).

1035 Denver meeting> Consider "shutdown-attributes" similar to Windows "shutdown". Like:

- 1036 – Completely power off (walk to printer to bring it back up)
- 1037 – Power off but listen for "restart" - shutdown to standby

1038 Denver meeting> Also consider restart attributes.

- 1039 – Restart to Standby (disabled and paused) (two step bring up)
- 1040 – Restart (fully).
- 1041 – Restart sych

1042 *Access Rights:* Authentication and access control (see [ipp-mod] sections 1, 8.3, and 8.5) apply to this
1043 operation.

1044 The Restart-Printer Request and Restart-Printer Response have the same attribute groups and attributes as
1045 the Resume-Printer operation (see [ipp-mod] sections 3.2.8.1 and 3.2.8.2), including the new "printer-
1046 message-from-operator" operation attribute (see section 3.1) and the following Group 1 operation attribute:

1047 ~~8.1.6 Non-Process Run-Out Operation~~

1048 ~~ISSUE 13—Can we think of a name for Non-Process Run-Out that follows the pattern of other IPP~~
1049 ~~operations on Printers, namely Xxxx-Yxxx-Printer? How about Non-Process Run-Out-Printer or more~~
1050 ~~simply Run-Out-Printer?~~

1051 ~~Type of registration: operation~~

1052 ~~Proposed name of this operation: Non-Process Run-Out~~

1053 ~~Object Target: Printer~~

1054 ~~Specification of this operation:~~

1055 ~~This OPTIONAL operation effectively moves the last printed sheet to the exit or stacker. The terminology~~
1056 ~~is common to long path continuous forms devices but may have applicability on shorter devices or in cut-~~
1057 ~~sheet applications.~~

1058 ~~*Access Rights:* Authentication and access control (see [ipp-mod] sections 1, 8.3, and 8.5) apply to this~~
1059 ~~operation.~~

1060 ~~The Non-Process Run-Out Request and Non-Process Run-Out Response have the same attribute groups~~
1061 ~~and attributes as the Pause-Printer operation (see [ipp-mod] sections 3.2.7.1 and 3.2.7.2), including the new~~
1062 ~~"printer-message-from-operator" operation attribute (see section 3.1) and the new "when" operation~~
1063 ~~attribute (see section 3.4).~~

1064

1065 8.1.5 Shutdown-Printer Operation

1066 Type of registration: operation

1067 Proposed name of this operation: Shutdown-Printer

1068 Object Target: Printer

1069 Specification of this operation:

1070 This OPTIONAL operation allows a client to shutdown a Printer, i.e., stop processing jobs and power off in
1071 some implementation-dependent manner. The purpose of Shutdown-Printer is to shutdown the Printer for
1072 an extended period, not to reset the device(s) or modify a Printer attribute. See Reset-Printer-Device [ipp-
1073 set3](section 8.1.4) for the way to reset the device(s). See the Disable-Printer operation (section 8.1.2) for a
1074 way for the client to stop the Printer from accepting Job Creation requests without stopping processing or
1075 shutting down.

1076 The Printer is disabled immediately (see the Disable-Printer operation in section 8.1.2). The Printer adds
1077 the 'shutdown' value (see [ipp-mod] section 4.4.11) to its "printer-state-reasons" Printer Description
1078 attribute. The "when" operation attribute specifies how much processing occurs before the Printer is paused
1079 (see [ipp-mod] section 3.2.7) and the shutdown is complete. All other requests continue to be accepted
1080 until the printer is powered down.

1081 ISSUE 07 - Need to look at life cycle of the Printer versus standby/power-down and the other operations
1082 that can be accepted. There can be appreciable time between acceptance of this operation and when the
1083 final state of the printer, either standby or powered down is reached. Is it ok for non-submission operations
1084 to continue to be accepted during this time? May need 'moving-to-shutdown'. What about 'moving-to-
1085 standby'?

1086 TH> Add 'moving-to-shutdown' which the Shutdown-Printer sets
1087 immediately (analogous to 'moving-to-paused'). Then the 'shutdown'
1088 values means that the shutdown has completed (and is only meaningful to
1089 a server implementation that hosts the Printer object). Thus the server
1090 can still respond to a Get-Printer-Attributes operation after the
1091 Printer is shutdown as stated in IPP/1.1.

1092

1093 HRL> Is this granularity really achievable enough of a wide enough
1094 variety of environments to be reliable or, in reality, will this be
1095 implementation dependent?

1096 Whether or not the Shutdown-Printer operation affects jobs that were submitted to the device using job
1097 submission protocols other than IPP, depends on implementation, i.e., on whether the IPP protocol is being
1098 used as a universal management protocol or just to manage IPP jobs, respectively. See "printer-controls-
1099 other-protocols" (section 4.3).

1100 The Printer object MUST accept this operation in any state and transition the Printer object to the 'idle'
1101 state.

1102 *Access Rights:* Authentication and access control (see [ipp-mod] sections 1, 8.3, and 8.5) apply to this
1103 operation.

1104 The Shutdown-Printer Request and Shutdown-Printer Response have the same attribute groups and
1105 attributes as the Pause-Printer operation (see [ipp-mod] sections 3.2.7.1 and 3.2.7.2), including the new
1106 "printer-message-from-operator" operation attribute (see section 3.1), ~~the new "when" operation attribute~~
1107 ~~(see section 3.4)~~, and with the addition of the following Group 1 operation attributes in the request:

1108 "when" (type2 keyword)

1109 The client OPTIONALLY supplies this attribute. The Printer object OPTIONALLY supports this
1110 attribute, if it supports this operation. The value of this attribute indicates when to pause the printer.
1111 If the client omits this attribute, the Printer assumes the 'after-current-job' value. The 'after-current-
1112 job' value is REQUIRED to be supported if the "when" attribute is supported; the remaining values
1113 are OPTIONAL.

1114 Note: There is no way to query to see which values of the "when" attribute are supported for this or
1115 any other operation. Since this operation is intended for Operators, rather than End-Users, it did not
1116 seem necessary to provide the means to query the supported values.

1117
1118 Standard keyword values are:

1119 'now' - cancel the currently printing job(s) and shutdown the Printer. Jobs in the 'held' and
1120 'pending' state remain in those states.

1121 'after-current-job' - shutdown the Printer after the current job finishes printing (all its copies).
1122 Jobs in the 'held' and 'pending' state remain in those states.

1123 'after-all' - shutdown the Printer after all 'pending' jobs finish printing. Jobs in the 'held' state
1124 remain in the 'held' state.

1125 **ISSUE 08 - Ok to remove the 'after-current-copy' value from Shutdown-Printer?**

1126
1127 ~~"shutdown-function" (type2 keyword)~~

1128 ~~The client OPTIONALLY supplies this attribute. The Printer object OPTIONALLY supports this~~
1129 ~~attribute. This attribute indicates which shutdown function is to be performed.~~

1130
1131 ~~Standard keyword values are:~~

1132 ~~'standby'—shutdown the Printer, but leave it in standby mode (disabled and paused), which~~
1133 ~~means that Get-Printer-Attributes and Restart-Printer operations are accepted.~~

1134 ~~'power-off'—shutdown the Printer and power it off. No operations are accepted after power~~
1135 ~~off.~~

1136 ~~ISSUE 15—Should we separate setting the device's power saver mode from shutting the~~
1137 ~~power off? We could have a separate operation, say, Set-Power-Saver-Level, which~~
1138 ~~takes an integer, starting with 0. A 0 means full power on. Printer supports some~~
1139 ~~number of levels above that, if any. Then an operator could turn the device to full~~
1140 ~~power at the beginning of the day, so the first submission doesn't have to wait for the~~
1141 ~~power save mode to restore full power.~~

1142 **ISSUE 09 - Ok to have removed the "shutdown-function" operation attribute with values**
1143 **'stand-by' vs. 'power-off' Shutdown-Printer on the grounds that for the Printer object**
1144 **they have no meaning. Power-off is for the Shutdown-Device operation.**

1145 "synchronize" (boolean)

1146 The client OPTIONALLY supplies this attribute. The Printer object OPTIONALLY supports this
1147 attribute. This attribute indicates whether or not the printer is to synchronize the checkpoint data for
1148 the current job ("when" = 'now') with the pages that have actually printed. If the value of the "when"
1149 attribute is not 'now' or the "when" attribute is not supplied, then the "synchronize" attribute has no
1150 meaning and the Printer MUST ignore it. If this attribute is supported, then a value of 'true' implies
1151 that the Printer will be able to resume the job at the point of synchronization when the Printer is
1152 restarted. If the implementation does not support resuming a job (either automatically or with the
1153 Resume-Job operation) after a Shutdown-Printer with "when" = 'now', then it does not implement
1154 this attribute. In this case, check-pointing implies that the job may be resumed in the future, exactly
1155 from the point and in the state and resource context from which it left off.
1156

1157
1158 If the Printer supports this attribute but the client does not supply it, the Printer is assumed to
1159 perform synchronization ('true' behavior). If the Printer does not support this attribute, the Printer is
1160 assumed to not synchronize ('false' behavior).
1161

1162
1163 **ISSUE 10: Is the current job automatically restarted when the Printer is restarted? Or does some
1164 client have to issue a Restart-Job operation?**

1165 ~~The question is moot, if we remove the Restart Job operation, as
1166 suggested.~~

1167
1168 ~~TH 7/26: Remove the Shutdown Printer 'standby' mode concept. Shutdown
1169 Printer always powers off eventually. Also remove Restart Printer
1170 operation all together. Instead change the Disable Printer and Enable
1171 Printer operations to Disable Operations and Enable Operations, so that
1172 individual operations are enabled and disabled independent of the state
1173 of the Printer and don't otherwise affect the state of the Printer.
1174 HRL> Then, how do we restart the printer?~~

1175

1176 8.2 Job Operations

1177 All Job operations are directed at Job objects. A client **MUST** always supply some means of identifying the
1178 Job object in order to identify the correct target of the operation. That job identification **MAY** either be a
1179 single Job URI or a combination of a Printer URI with a Job ID. The IPP object implementation **MUST**
1180 support both forms of identification for every job.

1181 8.2.1 Set-Job-Attributes

1182 Type of registration: operation

1183 Proposed name of this operation: Set-Job-Attributes

1184 Object Target: Job

1185 Specification of this operation:

1186 This **OPTIONAL** operation allows a client to set the values of the attributes of a Job object. In the request,
1187 the client supplies the set of Job attribute names and values that are to be set. In the response, the IPP
1188 object returns success or rejects the request with indications of which attribute or attributes could not be set.

1189 This operation is almost identical to the Set-Printer-Attributes operation (see section 8.1.1). The only
1190 differences are that the Set-Job-Attributes operation is directed at a Job object rather than a Printer object,
1191 there is no "document-format" operation attribute used when setting a Job object, and the validation is the
1192 same as the create job operations, i.e., depends on the "xxx-supported" Printer Description attributes.

1193 The validation of the Set-Job-Attributes request is performed as if the job had been submitted originally
1194 with the new values and with "ipp-attribute-fidelity" set to 'true', i.e., all modified attributes **MUST** be
1195 supported along with the attributes not modified. If such a create job operation would have been accepted,
1196 then the Set-Job-Attributes **MUST** be accepted. If such a create job operation would have been rejected,
1197 then the Set-Job-Attributes **MUST** be rejected and the Job **MUST** be unchanged.

1198 The IPP object **MUST** accept or reject the request based on the job's current state and transition the job to
1199 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'

1200 8.2.1.1 Settable and READ-ONLY Job Description attributes

1201 If the Printer supports the "job-message-from-operator" Job Description attribute (see [ipp-mod] section
1202 4.3.16) and the client explicitly supplies a new value for the "job-message-from-operator" in the request,
1203 then the Printer MUST set the "job-message-from-operator" Job attribute to this new value.

1204 If the Printer supports the Set-Job-Attributes operation, then it SHOULD support setting of:
1205 all Job Template ("xxx") attributes (see [ipp-mod] section 4.2 and extensions)
1206 that the implementation supports.

1207 The following Job Description attributes (see [ipp-mod] section 4.3) MUST NOT be settable, i.e., they are
1208 READ-ONLY:

1209 job-uri
1210 job-id
1211 job-printer-uri
1212 job-more-info
1213 job-originating-user-name - set in create operation
1214 job-state
1215 job-state-reasons
1216 job-state-message
1217 number-of-documents
1218 output-device-assigned
1219 time-at-creation
1220 time-at-processing
1221 time-at-completed
1222 job-printer-up-time
1223 date-time-at-creation
1224 date-time-at-processing
1225 date-time-at-completed
1226 number-of-intervening-jobs
1227 job-k-octets
1228 job-k-octets-processed
1229 job-impressions-completed
1230 job-media-sheets-completed
1231 attributes-charset - set in create operation
1232 attributes-natural-language - set in create operation

1233 The remaining Job Description attributes MAY be settable using the Set-Job-Attributes operation,
1234 depending on implementation.

1235 Whether or not the Set-Job-Attributes operation affects jobs that are submitted using job submission
1236 protocols other than IPP, depends on implementation, i.e., on whether the IPP protocol is being used as a
1237 universal management protocol or just to manage IPP jobs, respectively. See "printer-controls-other-
1238 protocols" (section 4.3).

1239 *Access Rights:* Authentication and access control (see [ipp-mod] sections 1, 8.3, and 8.5) apply to this
1240 operation.

1241 8.2.1.2 Set-Job-Attributes Request

1242 The following sets of attributes are part of the Set-Job-Attributes Request:

1243 Group 1: Operation Attributes

1244 Natural Language and Character Set:

1245 The "attributes-charset" and "attributes-natural-language" attributes as described in [ipp-mod]
1246 section 3.1.4.1.

1247

1248 Target:

1249 Either (1) the "printer-uri" (uri) plus "job-id" (integer(1:MAX)) or (2) the "job-uri" (uri) operation
1250 attribute(s) which define the target for this operation as described in [ipp-mod] section 3.1.5.

1251

1252 Requesting User Name:

1253 The "requesting-user-name" (name(MAX)) attribute SHOULD be supplied by the client as
1254 described in [ipp-mod] section 8.3.

1257 Group 2: Job Attributes

1258 The client MUST supply a set of Job attributes as defined in [ipp-mod] section 4.2 Job Template
1259 Attributes ("xxx" attributes) and section 4.3 Job Description Attributes. Each Job attribute supplied
1260 in Group 2 replaces the value(s) of the corresponding Job attribute on the target Job object. For
1261 attributes that can have multiple values (1setOf), all values supplied by the client replace all values
1262 of the corresponding Job object attribute.

1264 8.2.1.3 Set-Job-Attributes Response

1265 The Printer object returns the following sets of attributes as part of the Set-Job-Attributes Response:

1266 Group 1: Operation Attributes

1267 Status Message:

1268 In addition to the REQUIRED status code returned in every response, the response OPTIONALLY
1269 includes a "status-message" (text(255)) and/or a "detailed-status-message" (text(MAX)) operation
1270 attribute as described in [ipp-mod] sections 13 and 3.1.6.

1272 Natural Language and Character Set:

1273 The "attributes-charset" and "attributes-natural-language" attributes as described in [ipp-mod]
1274 section 3.1.4.2.

1276 Group 2: Unsupported Attributes

1277 See [ipp-mod] section 3.1.7 for details on returning Unsupported Attributes.

1278
1279 The attributes returned are the same as for the create operation with the same new attribute values.
1280 In the case of attributes that are supported, but are not settable by the implementation, i.e., are not
1281 among the values of the Printer's "settable-attributes" Printer Description attribute (see section 4.1),
1282 the Printer object returns the client-supplied attribute(s) with a substituted value of 'not-supported'
1283 (same out-of-band value as for attributes that are not supported). This value's syntax type is "out-of-
1284 band" and its encoding is defined by special rules for "out-of-band" values in the "Encoding and
1285 Transport" document [IPP-PRO]. Its value indicates that the attribute is either not settable or is not
1286 supported at all.

1287

1288 8.2.2 Reprocess-Job Operation

1289 This OPTIONAL operation is a create job operation that allows a client to re-process a copy of a job that
1290 had been retained in the queue after processing completed, was canceled, or was aborted (see [ipp-mod]
1291 section 4.3.7.2). This operation is the same as the Restart-Job operation (see [ipp-mod] section 3.3.7),
1292 except that the Printer creates a new job that is a copy of the target job and the target job is unchanged. The
1293 new job is assigned new values to the "job-uri" and "job-id" attributes and the new job's Job Description
1294 attributes that accumulate job progress, such as "job-impressions-completed", "job-media-sheets-
1295 completed", and "job-k-octets-processed", are initialized to 0 as with any create job operation. The target
1296 job moves to the Job History after a suitable period, independent of whether one or more Reprocess-Job
1297 operations have been performed on it.

1298 If the Set-Job-Attributes operation is supported, then the "job-hold-until" operation attribute MUST be
1299 supported with at least the 'indefinite' value, so that a client can modify the new job before it is scheduled
1300 for processing using the Set-Job-Attributes operation. After modifying the job, the client can release the
1301 job for processing, by using the Release-Job operation specifying the newly assigned "job-uri" or "job-id"
1302 for the new job.

1303

1304 8.2.3 Cancel-Current-Job Operation

1305 This OPTIONAL operation allows a client to cancel the current job on the target Printer or the specified job
1306 if it is the current job on the Printer. See [ipp-mod] section 3.3.3 for the semantics of canceling a job.
1307 Since a Job might already be marking by the time a Cancel-Current-Job is received, some media sheet
1308 pages might be printed before the job is actually terminated.

1309 If the client does not supply a "job-id" operation attribute, the Printer MUST accept the request and cancel
1310 the current job if there is a current job in the 'processing' or 'processing-stopped' state; otherwise, it MUST
1311 reject the request and return the 'client-error-not-possible' status code. If more than one job is in the
1312 'processing' or 'processing-stopped' states, the one that is marking is canceled and the others are unaffected.

1313 Warning: On a shared printer, there is a race condition. Between the time that a user issues this operation
1314 and its acceptance, the current job might change to a different job. If the user or operator is authenticated to
1315 cancel the new job, the wrong job is canceled. To prevent this race from canceling the wrong job, the client
1316 MAY supply the "job-id" operation attribute which is checked against the current job's job-id. If the job
1317 identified by the "job-id" attribute is not the current job on the Printer, i.e., is not in the 'processing' or
1318 'processing-stopped' states, the Printer MUST reject this operation and return the 'client-error-not-possible'
1319 status code. Otherwise, the Printer cancels the specified job.

1320 *Access Rights:* Authentication and access control (see [ipp-mod] sections 1, 8.3, and 8.5) apply to this
1321 operation.

1322 The Cancel-Current-Job Request and Cancel-Current-Job Response have the same attribute groups and
1323 attributes as the Resume-Printer operation (see [ipp-mod] section 3.2.8), including the new "job-message-
1324 from-operator" operation attribute (see section 3.2), with the addition of the following Group 1 Operation
1325 attributes in the request:

1326 "job-id" (integer(1:MAX)):

1327 The client OPTIONALLY supplies this Operation attribute in order to verify that the identified job
1328 is still the current job on the target Printer object. The IPP object MUST supports this operation
1329 attribute, if it supports this operation.

1330

1331 8.2.4 Pause-Current-Job operation

1332 **ISSUE 11 - Since the semantics of Pause-Current-Job is different from Pause-Printer, in that other jobs are**
1333 **processed, while this job is stopped, should we have a different name for the verb, such as Suspend-**
1334 **Current-Job, instead of Pause-Current-Job. Otherwise, users may be mistakenly think that the printer is**
1335 **paused when the job is paused. If the name is changes, then the 'job-paused' job state reason would also be**
1336 **changed to 'job-suspended'.**

1337 This OPTIONAL operation allows a client to stop the current job on the target Printer or the specified job if
1338 it is the current job on the Printer, and allow other jobs to be processed instead. The Printer moves the
1339 current job or the target job to the 'processing-stopped' state and sets the 'job-paused' value in the job's "job-
1340 state-reasons" attribute and processes other jobs.

1341 If the client does not supply a "job-id" operation attribute, the Printer MUST accept the request and pause
1342 the current job if there is a current job in the 'processing' or 'processing-stopped' state; otherwise, it MUST
1343 reject the request and return the 'client-error-not-possible' status code. If more than one job is in the
1344 'processing' or 'processing-stopped' states, all of them are paused.

1345 **Warning:** On a shared printer, there is a race condition. Between the time that a user issues this operation
1346 and its acceptance, the current job might change to a different job. If the user or operator is authenticated to
1347 pause the new job, the wrong job is paused. To prevent this race from pausing the wrong job, the client
1348 MAY supply the "job-id" operation attribute which is checked against the current job's job-id. If the job
1349 identified by the "job-id" attribute is not the current job on the Printer, i.e., is not in the 'processing' or
1350 'processing-stopped' states, the Printer MUST reject this operation and return the 'client-error-not-possible'
1351 status code. Otherwise, the Printer pauses the specified job and processed other jobs.

1352 A paused job is resumed using the Resume-Job operation (see section 8.2.5). If the Pause-Current-Job
1353 operation is supported, then the Resume-Job operation MUST be supported, and vice-versa.

1354 The Printer MUST reject a Release-Job request (and return the 'client-error-not-possible') for a job that has
1355 been paused , i.e., for a job in the 'processing-stopped' state, with the 'job-paused' value in its "job-state-
1356 reasons" attribute. The Hold-Job and Release-Job operations are for holding and releasing held jobs, not
1357 pausing and resuming paused jobs.

1358 **ISSUE 12 - Ok for Pause-Job to reject a request for a Job that is already paused (like Cancel-Job), instead**
1359 **of accepting the request?**

1360 *Access Rights:* Authentication and access control (see [ipp-mod] sections 1, 8.3, and 8.5) apply to this
1361 operation.

1362 The Pause-Current-Job Request and Pause-Current-Job Response have the same attribute groups and
1363 attributes as the Resume-Printer operation (see [ipp-mod] section 3.2.8), including the new "job-message-
1364 from-operator" operation attribute (see section 3.2), ~~the new "when" operation attribute (see section 3.4),~~
1365 with the addition of the following Group 1 Operation attributes in the request:

1366 "job-id" (integer(1:MAX)):

1367 The client OPTIONALLY supplies this Operation attribute in order to verify that the identified job
1368 is still the current job on the target Printer object. The IPP object MUST supports this operation
1369 attribute, if it supports this operation.

1370 "when" (type2 keyword)

1371 The client OPTIONALLY supplies this attribute. The Printer object OPTIONALLY supports this
1372 attribute, if it supports this operation. The value of this attribute indicates when to pause the printer.
1373 If the client omits this attribute, the Printer assumes the 'after-current-copy' value. The 'after-
1374 current-copy' value is REQUIRED to be supported if the "when" attribute is supported; the
1375 remaining values are OPTIONAL.

1376 Note: There is no way to query to see which values of the "when" attribute are supported for this or
1377 any other operation. Since this operation is intended for Operators, rather than End-Users, it did not
1378 seem necessary to provide the means to query the supported values.

1379 Standard keyword values are:

1381 'now' - pause the current Job immediately, while the current Job is processing.

1382 'after-current-copy' - pause the current Job after the current Job finishes printing its current
1383 copy.

1384 **ISSUE 13 - Ok that the only values for the "when" operation attribute for the Pause-Current-Job are**
1385 **'now' and 'after-current-copy' with 'now' being the default and REQUIRED?**

1386 "synchronize" (boolean)

1387 The client OPTIONALLY supplies this attribute. The Printer object OPTIONALLY supports this
1388 attribute. This attribute indicates whether or not the printer is to synchronize the checkpoint data for
1389 the current job being paused with the pages that have actually printed. If this attribute is supported,
1390 then a value of 'true' implies that the Printer will be able to resume the job at the point of
1391 synchronization when the job is resumed.
1392

1393
1394 If the Printer supports this attribute but the client does not supply it, the Printer is assumed to
1395 perform synchronization ('true' behavior). If the Printer does not support this attribute, the Printer is
1396 assumed to not synchronize ('false' behavior).

1397

1398 8.2.5 Resume-Job operation

1399 This OPTIONAL operation allows a client to ~~stop-resume~~ the target job ~~and allow other jobs to be~~
1400 ~~processed instead~~ at the point where it was paused. The Printer moves the target job to the 'pending' state
1401 and removes the 'job-paused' value from the job's "job-state-reasons" attribute.

1402 If the target job is not in the 'processing-stopped' state with the 'job-paused' value in the job's "job-state-
1403 reasons" attribute, the Printer rejects the request and returns the 'client-error-not-possible' status code, since
1404 the job was not paused.

1405 **ISSUE 14 - Ok to return an error (like Cancel-Job), rather than having Resume-Job accept the request even**
1406 **if the Job is already resumed (i.e., not paused)?**

1407 If the Resume-Job operation is supported, then the Pause-Current-Job operation MUST be supported, and
1408 vice-versa.

1409 *Access Rights:* Authentication and access control (see [ipp-mod] sections 1, 8.3, and 8.5) apply to this
1410 operation.

1411 The Resume-Job Request and Resume-Job Response have the same attribute groups and attributes as the
1412 Release-Job operation (see [ipp-mod] section 3.3.6), including the new "job-message-from-operator"
1413 operation attribute (see section 3.2).

1414

1415 8.2.6 Promote-Job operation

1416 This OPTIONAL operation allows a client to make the pending target job be processed next after the
1417 current job completes. This operation is specially useful in a production printing environment where the
1418 operator is involved in job scheduling.

1419 If the target job is in the 'pending' state, this operation does not change the job's state, but causes the job to
1420 be processed after the current job(s) complete. If the target job is not in the 'pending' state, the Printer
1421 rejects the request and returns the 'client-error-not-possible' status code. The Printer returns the target job
1422 immediately after the current job(s) in a Get-Jobs response (see [ipp-mod] section 3.2.6) for the 'not-
1423 completed' jobs.

1424 When the current job completes, is canceled, paused, or aborted, the target of this operation is processed
1425 next.

1426 If a client issues this request (again) before the target of the operation of the original request started
1427 processing, the target of this new request is scheduled before the previous job that was to be processed next.

1428 Note: IPP is specified not to require queues for job scheduling, since there are other implementations for
1429 scheduling multiple jobs. However, if an implementation does implement queues for jobs, then the
1430 Promote-Job puts the specified job at the front of the queue. A subsequent Promote-Job before the first job
1431 starts processing puts that specified job at the front of the queue, so that it is "in front" of the previously
1432 promoted job.

1433 *Access Rights:* Authentication and access control (see [ipp-mod] sections 1, 8.3, and 8.5) apply to this
1434 operation.

1435 The Promote-Job Request and Promote-Job Response have the same attribute groups and attributes as the
1436 Cancel-Job operation (see [ipp-mod] section 3.3.3), including the new "job-message-from-operator"
1437 operation attribute (see section 3.2).

1438 ~~8.2.7Space-Current-Job-operation~~

1439 ~~This OPTIONAL operation allows a client to repeat or skip a specified number of impressions for the~~
1440 ~~current job on the target Printer or the specified job if it is the current job on the Printer. The Printer repeats~~
1441 ~~or skips the indicated number of impressions specified by the "back-space" or "forward-space" operation~~
1442 ~~attribute, respectively. This operation is typically supported in a continuous forms implementation for~~
1443 ~~synchronizing the web after forms run out or media change.~~

1444 ~~If the client does not supply a "job-id" operation attribute, the Printer MUST accept this request in any state,~~
1445 ~~whether or not there is a current job, and advance or backspace the media the indicated number of~~
1446 ~~impressions specified by the "back-space" or "forward-space" operation attribute, respectively. If more than~~
1447 ~~one job is in the 'processing' or 'processing-stopped' states, the one that is marking is spaced and the others~~
1448 ~~are unaffected.~~

1449 ~~It is reasonable, although not MANDATORY), to perform Space Current Job while the Printer is 'stopped'~~
1450 ~~(paused or possibly for other reasons), or 'processing'. Between the time that a user issues this operation~~
1451 ~~and its acceptance, the current job might change to a different job. To prevent this race from spacing the~~
1452 ~~wrong job, the client MAY supply the "job-id" operation attribute which is checked against the current job's~~
1453 ~~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~~
1454 ~~'processing' or 'processing-stopped' states, or is not the job that has impressions in the media path even if the~~
1455 ~~job has completed, the Printer MUST reject this operation and return the 'client-error-not-possible' status~~
1456 ~~code. Otherwise, the Printer advances or backspaces the media the indicated number of impressions~~
1457 ~~specified by the "back-space" or "forward-space" operation attribute, respectively.~~

1458 ~~*Access Rights:* Authentication and access control (see [ipp-mod] sections 1, 8.3, and 8.5) apply to this~~
1459 ~~operation.~~

1460 ~~The Space Current Job Request and Space Current Job Response have the same attribute groups and~~
1461 ~~attributes as the Resume Printer operation (see [ipp-mod] section 3.2.8), including the new "job-message-~~
1462 ~~from-operator" operation attribute (see section 3.2), with the addition of the following Group 1 Operation~~
1463 ~~attributes in the request:~~

1464 ~~"job-id" (integer(1:MAX)):~~

1465 ~~The client OPTIONALLY supplies this Operation attribute in order to verify that the identified job~~
1466 ~~is still the current job on the target Printer object. The IPP object MUST supports this operation~~
1467 ~~attribute, if it supports this operation.~~

1468 ~~"back-space" (integer(1:MAX)):~~

1469 ~~The client OPTIONALLY supplies this Operation attribute. The IPP object OPTIONALLY~~
1470 ~~supports this operation attribute, if it is able to repeat impressions.~~

1471 ~~If the client supplies a value that specifies more impressions than the job has performed, the job is~~
1472 ~~positioned at the beginning without any indication.~~

1473 ~~"forward-space" (integer(1:MAX)):~~

1474 ~~The client OPTIONALLY supplies this Operation attribute. The IPP object OPTIONALLY~~
1475 ~~supports this operation attribute, if it is able to skip impressions.~~

1476 ~~If the client supplies a value that specifies more impressions than remain in the job, the job is~~
1477 ~~positioned at the end without any indication.~~

1478

1479 9. IANA Considerations

1480 The operations and attributes in this registration proposal will be published by IANA according to the
1481 procedures in RFC 2566 [rfc2566] section 6.4 for operations with the following URL:

1482 ftp.isi.edu/iana/assignments/ipp/operations/set2.txt

1483 10. Internationalization Considerations

1484 This document has the same localization considerations as the [ipp-mod].

1485 11. Security Considerations

1486 The IPP Model and Semantics document [ipp-mod] discusses high level security requirements (Client
1487 Authentication, Server Authentication and Operation Privacy). Client Authentication is the mechanism by
1488 which the client proves its identity to the server in a secure manner. Server Authentication is the mechanism
1489 by which the server proves its identity to the client in a secure manner. Operation Privacy is defined as a
1490 mechanism for protecting operations from eavesdropping.

1491 12. Author's Addresses

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1517 13. References

1518 [ipp-mod]

1519 R. deBry, T. Hastings, R. Herriot, S. Isaacson, P. Powell, "Internet Printing Protocol/1.0: Model and
1520 Semantics", <draft-ietf-ipp-model-v11-03.txt>, June, 1999.

1521 [RFC2566]

1522 R. deBry, T. Hastings, R. Herriot, S. Isaacson, P. Powell, "Internet Printing Protocol/1.0: Model and
1523 Semantics", RFC 2566, April 1999.

1524 14. Change History

1525 This section summarizes the changes. Each sub-section is in reverse chronological order.

1526 14.1 Changes to the October 22, 1999 version to make the November 1, 1999 version

1527 Adding or removing ISSUES that don't change the document are not listed here. The following changes to
1528 the October 22, 1999 version to make the November 1, 1999 version as a result of the IPP WG meeting in
1529 Durham, 10/99:

- 1530 1. Removed the Reset-Printer, Non-Process-Run-Out, and Space-Current-Job operations from this Set2
1531 spec and moved them to a new Set3 spec for use with the new Device object, renaming them
1532 appropriately, to Reset-Device, Non-Process-Run-Out-Device, and Space-Device.
- 1533 2. Add the concept of parent and subordinate Printer objects to formally represent fan-out. Mentioned the
1534 Device object that is in a new [ipp-set3] spec.
- 1535 3. Distributed the definition of the "when" operation attribute to the Pause-Printer (IPP/1.1), Shutdown-
1536 Printer, and Pause-Current-Job operations and listed the values that are appropriate to that operation
1537 only:
1538 Pause-Printer: 'now', 'after-current-copy', 'after-current-job' (default), and 'after-all'.
1539 Shutdown-Printer: 'now', 'after-current-job' (default), and 'after-all'
1540 Pause-Current-Job: 'now', 'after-current-copy' (default)
- 1541 4. Deleted the "device-name" operation attribute and the "device-names-supported" (1setOf name(127))
1542 Printer Description attribute. The latter will be part of the [ipp-set3] document.

1543 5. Kept the "job-settable-attributes" (1setOf type2 keyword) and "printer-settable-attributes" (1setOf type2
1544 keyword), but deleted the "interpreter-settable-attributes (1setOf type2 keyword), since the Interpreter
1545 object and its attributes are really a sub-class of the Printer object.

1546 6. Deleted the "when-values-supported" (1setOf type2 keyword) Printer Description attribute.

1547 7. Added the "subordinate-printers-supported" (1setOf uri) Printer Description attribute.

1548 14.2 Changes to the September 19, 1999 version to make the October 22, 1999 version

1549 Adding or removing ISSUES that don't change the document are not listed here. The following changes to
1550 the September 19, 1999 version to make the October 22, 1999 version as a result of the IPP WG meeting in
1551 Denver, 9/99:

1552 1. Added the Interpreter object.

1553 2. Added the "device-name" operation attribute to handle passing operations through the IPP Printer object
1554 to the device.

1555 3. Added the out-of-band 'not-settable' to allow the Set-Job-Attributes and Set-Printer-Attributes response
1556 to indicate the difference between an unsupported attribute and a supported, but not settable, attribute in
1557 the Unsupported Attributes Group.

1558 4. Removed "when-values-supported" and "job-settable-attributes" and "printer-settable-attributes" and
1559 "interpreter-settable-attributes" from the list of attributes that MUST be read-only. So an administrator
1560 could sub-set the policy on what when values are supported or which attributes can be set.

1561 14.3 Changes to the July 19, 1999 version to make the September 19, 1999 version

1562 The following changes to the July 19, 1999 version to make the September 19, 1999 version as a result of
1563 the IPP WG meeting in Alaska, 8/99:

1564 1. Refer to proposal as "Set2" rather than "Administrative" operations.

1565 2. Revise the emphasis on administrator throughout the document, although the word administrator
1566 remains wherever appropriate.

1567 3. Convert non-process-run-out from an operations attribute to an operation.

1568 4. Added Issue 21: For all these "access" caveats, why not just say... 'authentication and access control
1569 (see ipp-mod sections 1, 8.3 and 8.5) applies to this operation" .?'

1570 5. Added Issue 22: Why? This is backward, if you ask me (HRL).

1571 6. Per resolution of Issue 2, the "settable-attributes" Printer Description attribute, was replaced with three
1572 Printer Description attributes: "printer-settable-attributes", "job-settable-attributes", and "interpreter-

1573 settable-attributes". The latter for those implementations that have different values for Printer attributes
1574 in the Get-Printer-Attributes and Set-Printer-Attributes operations, depending on the value of the
1575 "document-format" operation attribute supplied by the client. If and when we get a Document object,
1576 then we can add a "document-settable-attributes" Printer Description attribute.

1577 14.4 Changes to the June 30, 1999 version to make the July 19, 1999 version

1578 The following changes to the June 30, 1999 version to make the July 19, 1999 version as a result of the IPP
1579 WG meeting in Copenhagen, 7/7/99-7/8/99, and the IPP telecon, 7/14/1999:

- 1580 1. Sections 2.1 and 2.2: Clarified that the way to remove a message from the operator was for the client to
1581 supply a zero-length or all white space text string which is copied as usual to the "xxx-message-from-
1582 operator" attribute.
- 1583 2. Section 2.3: Added "factory-settings" (boolean) operation attribute to the Get-Printer-Attributes
1584 operation.
- 1585 3. Section 2.4: Added the "when" operation attribute to the Pause-Current-Job operation.
- 1586 4. Section 2.4: Made the "when" operation attribute OPTIONAL for use in operations (Pause-Printer,
1587 Reset-Printer, Shutdown-Printer, and Pause-Current-Job operations).
- 1588 5. Sections 2.5: Added table of operation attributes for the Printer operations to make it easy to compare.
- 1589 6. Sections 2.6: Added table of operation attributes for the Job operations to make it easy to compare.
- 1590 7. Section 3.1: Added "settable-attributes" (1setOf type2 keyword) READ-ONLY Printer Description
1591 attribute.
- 1592 8. Section 3.2: Added "printer-controls-other-protocols" (boolean) Printer Description attribute
- 1593 9. Section 3.3: Added the READ-ONLY "printer-message-time" (integer(MIN:MAX)) Printer
1594 Description attribute to keep time message updated in time ticks.
- 1595 10. Section 4.2: Deleted the 'process-next' "job-state-reasons" value, so that repeated Promote-Job
1596 operations promote each job "to the front of the queue".
- 1597 11. Sections 6.1.1.1 and 6.2.1.1: Replaced the table that listed all attributes with one that lists only the
1598 attributes that MUST be READ-ONLY.
- 1599 12. Section 6.1.1.1: Indicated that attributes that are not specified as READ-ONLY in this document MAY
1600 be settable. If they control behavior, that changing their values MUST change the behavior.
- 1601 13. Section 6.1.1.2 and 6.2.1.2: Deleted the "ipp-attribute-fidelity" operation attribute from the Set-Printer-
1602 Attributes and Set-Job-Attributes operations. All set operations are atomic.

- 1603 14. Section 6.1.1.2: Add the concept of the Interpreter object to handle attributes whose values vary in the
1604 Set-Printer-Attributes and Get-Printer-Attributes, depending on the value of the "document-format"
1605 operation attribute.
- 1606 15. Sections 6.1.1.3 and 6.2.1.2: Changed the "out-of-band" 'not-settable' value back to the existing 'not-
1607 supported' value.
- 1608 16. Section 6.1.2 and 6.1.3: Added "job-type" operation attribute to Disable-Printer and Enable-Printer
1609 operations with values: 'network-jobs', 'walk-up-jobs', and 'all-jobs'.
- 1610 17. Section 6.1.5: Clarified that Restart-Printer brings up the Printer disabled and paused, since that is the
1611 eventual state that Shutdown-Printer leaves the printer in.
- 1612 18. Section 6.1.5: Indicated that if Restart-Printer is supported, then Shutdown-Printer MUST be
1613 supported.
- 1614 19. Section 6.1.6: Deleted Space-Printer operation. Keep Space-Current-Job operation only which has a
1615 "job-id" operation attribute that a client MAY supply.
- 1616 20. Section 6.1.6: Clarified that Shutdown-Printer is for a long period of time, not just to reset the device or
1617 change attribute values. Also that Shutdown performs an immediate Disable-Printer and an eventual
1618 Pause-Printer.
- 1619 21. Sections 6.2.3, 6.2.4, and 6.2.7 : Added a "job-id" operation attribute to Cancel-Current-Job, Pause-
1620 Current-Job, and Space-Current-Job that a client MAY supply to check for race condition where current
1621 job changes
- 1622 22. Section 6.2.4: Combined Pause-Job into Pause-Current-Job operation.
- 1623 23. Sections 6.2.4 and 6.2.5: Pause-Current-Job puts job in 'processing-stopped' state, not 'pending-held'
1624 state.
- 1625 24. Section 6.2.6: Simplified Promote-Job, so that it behaves as if the job were put at the front of the
1626 queue.

1627 15. Appendix A: Full Copyright Statement

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