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Internet Printing Protocol/1.1: Set2 Operations

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Abstract

This document specifies 164 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 97 Printer object operations that operators/administrators may perform on a Printer object:

Set-Printer-Attributes

Enable-Printer

Disable-Printer

Pause-Printer-After-Current-Job (IPP/1.1 Pause-Printer clarified)

Pause-Printer-After-All-Current-Jobs

Deactivate-Printer

Activate-Printer

Restart-Printer

Shutdown-Printer

Startup-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

38 Reprocess-Job
39 Cancel-Current-Job (though the target is the Printer object)
40 ~~Pause~~~~Suspend~~-Current-Job (though the target is the Printer object)
41 Resume-Job
42 Promote-Job

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

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

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

51 New status codes: 'client-error-attributes-not-settable' and 'server-error-printer-is-in-standby-mode' are
52 added.

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

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

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

67 Unresolved ISSUES are highlighted like this in the .doc and .pdf files.

68 The full set of IPP documents includes:

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

75

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

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

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

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

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

97

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195

196 1 Introduction

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

202 2 Terminology

203 This section defines terminology used throughout this document.

204 1.1.1 Conformance Terminology

205 Capitalized terms, such as MUST, MUST NOT, REQUIRED, SHOULD, SHOULD NOT, MAY, NEED
206 NOT, and OPTIONAL, have special meaning relating to conformance. These terms are defined in [ipp-
207 mod] section 12.1 on conformance terminology, most of which is taken from RFC 2119 [RFC2119].

208 The following specialization of these terms apply to this document:

209 REQUIRED: if an implementation supports the extensions described in this document, it MUST
210 support a REQUIRED feature.

211 OPTIONAL: if an implementation supports the extensions described in this document, it MAY support
212 an OPTIONAL feature.

213 1.1.2 Other terminology

214 This document uses terms such as "attributes", "keywords", and "support". These terms have special
215 meaning and are defined in the model terminology [ipp-mod] section 12.2.

216 **IPP Printer object (or Printer for short)** - a software abstraction defined by [ipp-mod].

217 **Output-Device** - the physical imaging mechanism that an IPP Printer controls.

218 **Output-Device fan-out** - a configuration in which an IPP Printer controls more than one output-device.

219 **Printer fan-out** - a configuration in which an IPP Printer object controls more than one subordinate IPP
220 Printer object.

221 **Printer fan-in** - a configuration in which an IPP Printer object is controlled by more than one IPP
222 Printer object.

223 **Subordinate Printer** - an IPP Printer object that is controlled by another IPP Printer object. Such a
224 Subordinate Printer MAY have one or more Subordinate Printers.

225 **Leaf Printer** - a Subordinate Printer that has no Subordinate Printers.

226 **Non-Leaf Printer** - an IPP Printer object that has one or more Subordinate Printers.

227 **Chained Printer** - a Non-Leaf Printer that has exactly one Subordinate Printer.

228 **Job Creation operations** - IPP operations that create a Job object: Print-Job, Print-URI, and Create-
229 Job.

230 3 Requirements and Use Cases

231 The following requirements and usage cover both the Set2 and Set3 [ipp-set3] operations. They are
232 presented here together to show the parallelism.

233 1. Have separate operations for affecting the IPP Printer versus affecting the output-device, so its clear
234 what the intent of each is and implementers can implement one or the other or both.

235 2. Support fan-out of Printer objects.

236 3. Support fan-out of output-devices.

237 4. Support fan-in of Printer objects, as long as it doesn't make the semantics more complicated when not
238 supporting fan-in.

239 5. Instead of having operation attributes that alter the behavior of the operation significantly, have separate
240 operations, so that it is simple and clear to a client which semantics the Printer is supporting (by
241 querying the "operations-supported" attribute) and it is simple to describe the capabilities of a Printer
242 implementation in written documentation.

243 6. Need a Printer operation to prevent a Printer object from accepting new IPP jobs, but currently accepted
244 jobs continue unaffected to be scheduled and processed. Need a companion one to restore the Printer
245 object to accept new IPP jobs.

246 Usage: Operator is preparing to take the IPP Printer out of service.

247 Suggested name and operations: **Disable-Printer** and **Enable-Printer**

248 7. Need a Device operation to prevent an output device from accepting any new jobs from any job
249 submission protocol and a companion one to restore the output device to accepting any jobs.

250 Usage: Operator is preparing to take the output device out of service.

251 Suggested name and operations: **Disable-Device** and **Enable Device**

252 8. Need a Printer operation to stop the processing after the current IPP job completes and not start
253 processing any additional IPP jobs, but continue to accept new IPP jobs. Need a companion operation
254 to start processing IPP jobs again.

255 Usage: Operator wants to gracefully stop the IPP Printer as the next job boundary. This operation is
256 also invoked implicitly by the Deactivate-Printer and the Shutdown-Printer.

257 Suggested name and operations: **Pause-Printer-After-Current-Job**, **Resume-Printer**

258 9. Need a Device operation to stop the processing the current job "immediately", no matter what protocol.
259 Its like the Pause button on the output device. This operation is for emergencies. The stop point
260 depends on implementation, but can be mid page, end of page, end of sheet, or after a few sheets for
261 output devices that can't stop that quickly. The paper path isn't run out. Need a companion operation to
262 start processing the current any-protocol job without losing any thing.

263 Usage: Operator sees something bad about to happen, such as the paper is about to jam, or the toner is
264 running out, or the device is overheating or wants to add more paper.

265 Suggested name and operations: **Pause-Device-Now, Resume-Device**

266 10. Need a Printer operation to stop the processing of IPP jobs after all of the currently accepted jobs that
267 have been processed, but any newly accepted jobs go into the 'processing-held' state.

268 Usage: This allows an operator to reconfigure the output device in order to let jobs that are held waiting
269 for resources, such as special media, to get a chance. Then the operator uses Resume-Printer after
270 reconfiguring. He repeats the two operations to restore the output device to its normal media.

271 Suggested name and operations: **Pause-Device-After-All-Current-Jobs, Resume-Device**

272 11. Need a Device operation to stop the processing the current any-protocol job at a convenient point, such
273 as after the current copy (or end of job if last or only copy). Need a companion operation to start
274 processing the current any-protocol job or next job without losing any thing.

275 Usage: The operator wants to empty the output bin that is near full. The paper path is run out.

276 Suggested name and operations: **Pause-Device-After-Current-Copy, Resume-Device**

277 12. Need a Device operation that always pauses on a job boundary, no matter how many copies, in order to
278 not break up a job. Need a companion operation to start processing the current any-protocol job or next
279 job without losing any thing.

280 Usage: The operator wants to empty the output bin that is near full, but he doesn't want to break up a
281 job in case it has multiple copies. The paper path is run out.

282 Suggested name and operations: **Pause-Device-After-Current-Job, Resume-Device**

283 13. Need a Printer operation that combines Disable-Printer, Pause-Printer-After-Current-Job, and rejects all
284 other Job, Printer, and Device operations, except Job and Printer queries, System Administrator Set-
285 Printer-Attributes, and the companion operation to resume activity. In other words, this operation
286 makes the Printer a read-only object in a graceful manner for end-users and the operator.

287 Usage: The administrator wants to reconfigure the Printer object using the Set-Printer-Attributes
288 operation without disturbing the current in process work, but wants to make sure that the operator isn't
289 also trying to change the Printer object as part of running the Printer.

290 Suggested name and operation: **Deactivate-Printer, Activate-Printer**

291 14. Need a Device operation that combines Disable-Device, Pause-Device-After-Current-Copy (Current-
292 Job?), and rejects all other Device operations, except Job and Printer queries and the companion
293 operation to resume activity. In other words, this operation makes the output-device a read-only object
294 in a graceful manner.

295 Usage: The field service person wants to open up the device without disturbing the current in process
296 work, perhaps to replace staples, or replace the toner cartridge.

297 Suggested name and operation: **Deactivate-Device, Activate-Device**

298 15. Need a Printer operation to recover from the IPP Printer software that has gotten confused (run out of
299 heap memory or gotten into a state that it doesn't seem to be able to get out of). This is a condition that
300 shouldn't happen, but does in real life. Any volatile information is saved if possible before the software
301 is re-initialized. No companion operation is needed to undo this. We don't want to go back to the
302 "confused" state :-).

303 Usage: The IPP Printer software has gotten confused or isn't responding properly.

304 Suggested name and operation: **Restart-Printer**

305 16. Need a Device operation to recover from the output device hardware and software that has gotten
306 confused (gotten into a state that it doesn't seem to be able to get out of, run out of heap memory, etc.).
307 This is a condition that shouldn't happen, but does in real life. Any volatile information is saved if
308 possible before the software and hardware is re-initialized. This is the same and has the same options as
309 the Printer MIB reset. No companion operation is needed to undo this. We don't want to go back to the
310 "confused" state :-).

311 Usage: The output device has gotten confused or need resetting to some initial conditions.

312 Suggested name and operation: **Reset-Device**

313 17. Need a Printer operation to put the IPP Printer object out of business with no way in the protocol to
314 bring that instantiation back to life. (but see Startup-Printer which brings a new instantiation to life
315 with the same URL).

316 Usage: The Printer is being moved or the building's power is being shut off.

317 Suggested name and operation: **Shutdown-Printer**

318 18. Need a Printer operation to bring an IPP Printer to life when there is an already running host. Note:
319 This operation is unlikely to be supported for the embedded Printer configuration.

320 Usage: After the host is started (by means outside the IPP protocol), the operator is able to ask the host
321 to bring up any number of Printer objects (that the host has been configured in some way) each with
322 distinct URLs.

323 Suggested name and operation: **Startup-Printer**

324 19. Need a Device operation to power off the output device after writing out any software state. It is
 325 assumed that other operations have more gracefully prepared the output device for this drastic and
 326 immediate. There is no companion Device operation to bring the power back on.

327 Usage: The output device is going to be moved, the power in the building is going to be shutoff, the
 328 repair man has arrived and needs to take the output device apart.

329 Suggested name and operation: **Power-Off-Device**

330 3.1 List of the Printer and Device operations

331 The list of Printer and Device operations are:

<u>Printer operation</u>	<u>Corresponding Device operation equivalent</u>
<u>Get-Printer-Attribute</u>	<u>no</u>
<u>Set-Printer-Attributes</u>	<u>no</u>
<u>Disable-Printer</u>	<u>Disable-Device</u>
<u>Enable-Printer</u>	<u>Enable-Device</u>
<u>no</u>	<u>Pause-Device-Now</u>
<u>no</u>	<u>Pause-Device-After-Current-Copy</u>
<u>Pause-Printer-After-Current-Job</u> (= IPP/1.1 Pause-Job??)	<u>Pause-Device-Current-Job</u>
<u>Pause-Printer-After-All-Current-Jobs</u>	<u>no</u>
<u>Resume-Printer</u>	<u>Resume-Device</u>
<u>Deactivate-Printer</u>	<u>Deactivate-Device</u>
<u>Activate-Printer</u>	<u>Activate-Device</u>
<u>Purge-Jobs</u>	<u>Purge-Device</u>
<u>Restart-Printer</u>	<u>Reset-Device</u>
<u>Shutdown-Printer</u>	<u>Power-Off-Device</u>
<u>Startup-Printer</u>	<u>no</u>

332 4 New objects and new relationships of existing objects

333 This section defines the new Interpreter object and the use of the IPP Printer object to represent IPP Printer
 334 fan-out and IPP Printer fan-in.

335 4.1.1 Interpreter object

336 The Interpreter object models the document format interpreters that are contained in the Printer object. The
 337 purpose of the Interpreter object is to model those Printer attributes whose value depends on which
 338 interpreter is being used to process the document. Depending on implementation, the Printer object

339 attributes whose values ("xxx-supported" and "xxx-default") depend on the interpreter, i.e., on the
340 "document-format" of the document being processed, are considered to be Interpreter object attributes
341 instead. A Get-Printer-Attributes operation returns Printer and Interpreter attributes as specified in the
342 "requested-attributes" operation attribute supplied by the client. Depending on the value of the "document-
343 format" attribute supplied by the client in the Get-Printer-Attributes request (or the "document-format-
344 default", if the client omits the "document-format" attribute), selects the corresponding Interpreter object.

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

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

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

362 [4.2.2](#) Use of the Printer object to represent IPP Printer fan-out and IPP Printer fan-in

363 This section defines how the Printer object MAY be used to represent IPP Printer fan-out and IPP Printer
364 fan-in. Fan-out is where an IPP Printer is used to represent other IPP Printer objects. Fan-in is where
365 several IPP Printer objects are used to represent another IPP Printer object.

366 4.2.1 IPP Printer fan-out

367 The IPP/1.1 Model and Semantics introduces the semantic concept of an IPP Printer object that represents
368 more than one output device (see [ipp-mod] section 2.1). This concept is called "output device fan-out".
369 However, there was no way to represent the individual states of the output devices or to perform operations
370 on a specific output device when there was fan-out. This specification generalizes the semantics of the
371 Printer object to represent such "subordinate" fan-out output devices as IPP Printer objects. This concept is
372 called "Printer object fan-out". A Printer object that has a subordinate Printer object is called a "non-leaf"
373 Printer object. Thus a "non-leaf" Printer object MAY support one or more subordinate Printer objects in
374 order to represent Printer object fan-out. A Printer object that does not have any subordinate Printer objects
375 is called a "leaf" Printer object.

376 [4.2.2](#) IPP Printer fan-in

377 The IPP/1.1 Model and Semantics did not preclude the semantic concept of multiple IPP Printer objects that
378 represent a single output device (see [ipp-mod] section 2.1). However, there was no way for the client to
379 determine that there was a fan-in configuration, nor was there a way to perform operations on the
380 subordinate device. This specification generalizes the semantics of the Printer object to allow several "non-
381 leaf" IPP Printer objects to represent a single "subordinate" Printer object. Thus a "non-leaf" Printer object
382 MAY share a subordinate Printer object with one or more other non-leaf Printer objects in order to
383 represent IPP Printer fan-in. As with fan-out (see section 4.2), when a Printer object is a non-leaf, it MUST
384 NOT have an associated output device. As with fan-out, a leaf Printer object has an associated output
385 device(s). As with fan-out, the non-leaf Printer objects submit jobs to their subordinate Printer objects and
386 otherwise control the subordinate Printer. As with fan-out, whether pending jobs are kept in the non-leaf
387 Printers until the subordinate Printer can accept them or are kept in the subordinate Printer depends on
388 implementation and/or configuration policy.

389 [4.2.3](#) Printer object attributes used to represent Printer fan-out and Printer fan-in

390 Each non-leaf Printer object submits jobs to its immediate subordinate Printers and otherwise controls the
391 subordinate Printers using IPP or other protocols. Whether pending jobs are kept in the non-leaf Printer
392 until a subordinate Printer can accept them or are kept in the subordinate Printers depends on
393 implementation and/or configuration policy. Furthermore, a subordinate Printer object MAY, in turn, have
394 subordinate Printer objects. Thus a Printer object can be both a non-leaf Printer and a subordinate Printer.

395 A subordinate Printer object MUST be a conforming Printer object, so it MUST support all of the
396 REQUIRED operations and attributes. However, with access control, the subordinate Printer MAY be
397 configured so that end-user clients are not permitted to perform any operations (or just Get-Printer-
398 Attributes) while one or more non-leaf Printer object(s) are permitted to perform any operation.

399 The following Printer Description attributes are defined to represent the relationship between Printer
400 object(s) and their subordinate Printer object(s):

- 401 1. "subordinate-printers-supported" (1setOf uri) - contains the URI of the immediate subordinate Printer
402 object(s). Each non-leaf Printer object MUST support this Printer Description attribute. A leaf Printer
403 object either does not support the "subordinate-printers-supported" attribute or does so with the 'no-
404 value' out-of-band value (see [ipp-mod] section 4.1), [depending on implementation](#).
- 405 2. "parent-printers-supported" (1setOf uri) - contains the URI of the non-leaf printer object(s) for which this
406 Printer object is the immediate subordinate, i.e., this Printer's immediate "parent" or "parents". Each
407 subordinate Printer object MUST support this Printer Description attribute. A Printer that has no
408 parents, either does not support the "parent-printers-supported" attribute or does so with the 'no-value'
409 out-of-band value (see [ipp-mod] section 4.1), [depending on implementation](#).

410 4.2.4 Subordinate Printer URI

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

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

419 b. When the subordinate Printer is networked and the implementation allows operations to go
420 directly to the subordinate Printer (with proper access control) without knowledge of the parent
421 Printer object, the host part of the URI is different than the host part of the parent Printer object. In
422 such a case, the parent Printer object MUST keep its "printer-state" and "printer-state-reasons" up to
423 date, either by polling the subordinate Printer object or by subscribing to events with the subordinate
424 Printer object (see [ipp-not-spec] for means to ~~do this~~ subscribe to event notification when the
425 subordinate Printer object supports IPP notification).

426 ~~4.1.5~~ 4.2.5 Printer object attributes used to represent output device fan-out

427 When a Printer object is a non-leaf, it MUST NOT have an associated output device. Only leaf IPP Printer
428 objects are allowed to have one or more associated output devices. Each leaf Printer object MAY support
429 the "output-devices-supported" (1setOf name(127)) to indicate the user-friendly name(s) of the output
430 device(s) that the leaf Printer object represents. It is RECOMMENDED that each leaf Printer object have
431 only one associated output device, so that the individual output devices can be represented completely and
432 controlled completely by clients. In other words, the Printer's "output-devices-supported" attribute
433 SHOULD have only one value.

434

435 [1.1.6.2.6](#) Figures to show all possible configurations

436 [Figure 1](#)~~Figure 1~~, [Figure 2](#)~~Figure 2~~, and [Figure 3](#)~~Figure 3~~ are taken from [ipp-mod] to show the
437 configurations possible with IPP/1.0 and IPP/1.1 where all Printer objects are leaf Printer objects. The
438 remaining figures show additional configurations that this document defines using non-leaf and leaf Printer
439 objects. Legend for all figures:

440 ----> indicates a network protocol with the direction of its requests

441

442 ##### indicates a Printer object which is either:

443 - embedded in an output device or

444 - hosted in a server. The Printer object

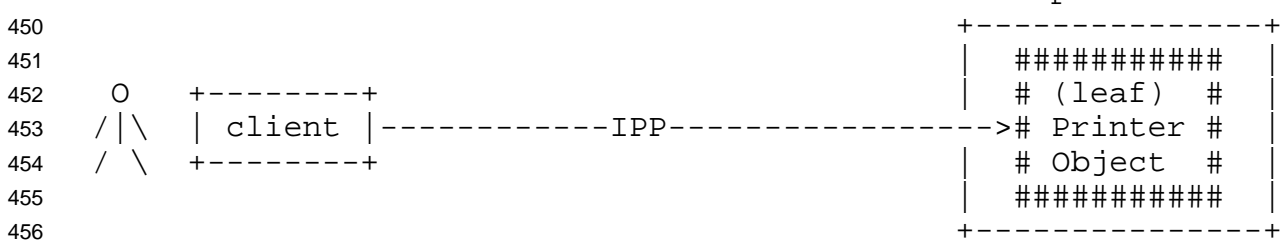
445 might or might not be capable of queuing/spooling.

446

447 any indicates any network protocol or direct

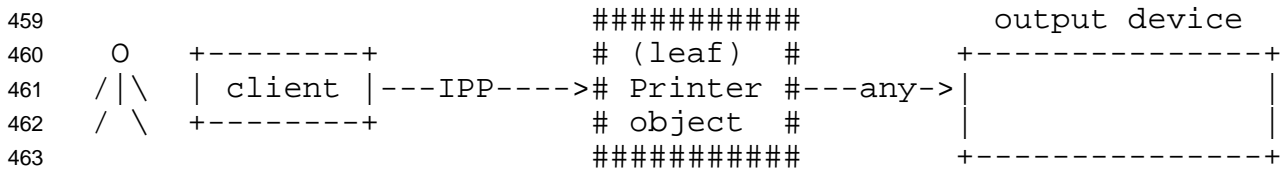
448 connect, including IPP

449



457 **Figure 1 - embedded Printer object**

458



465 **Figure 2 - hosted Printer object**

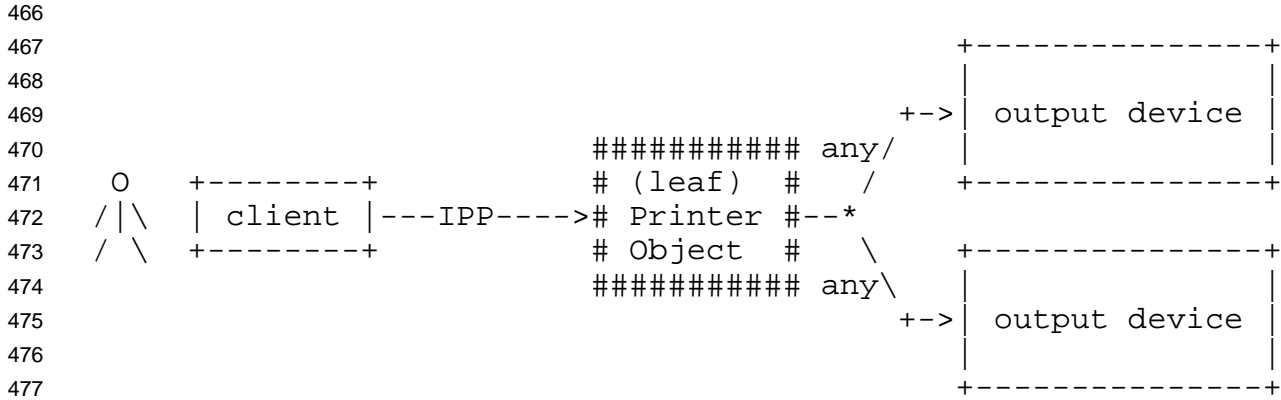
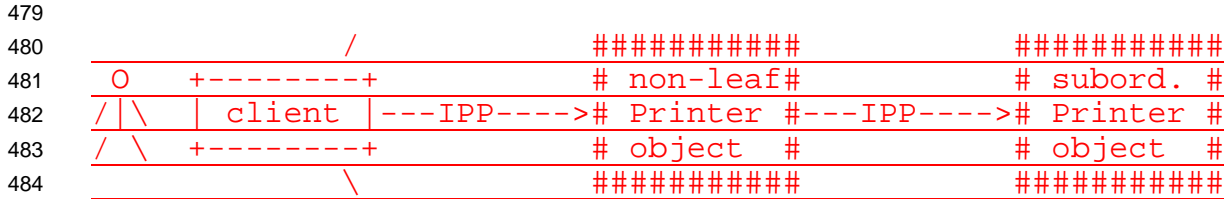


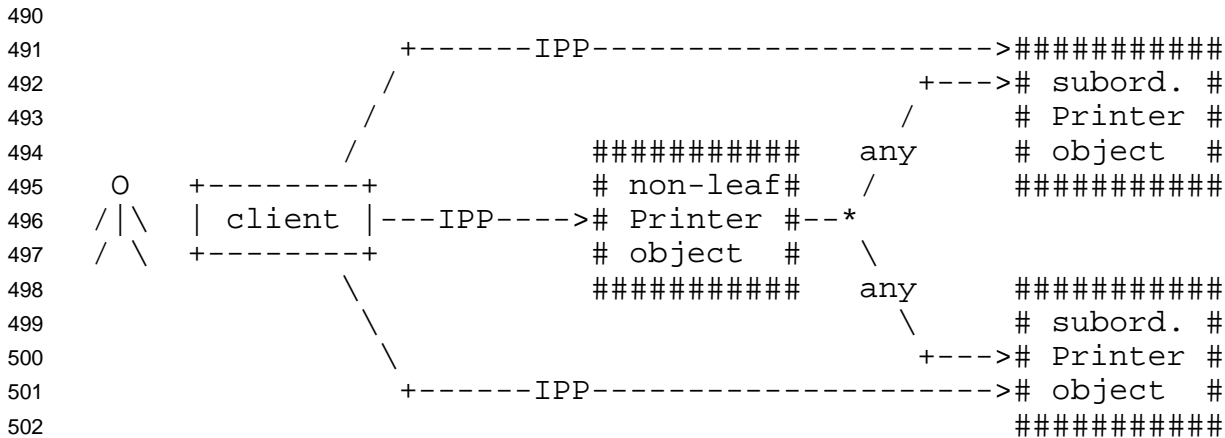
Figure 33 - output device fan out

478



485
 486 The subordinate Printer can be a non-leaf Printer as in Figure 44,
 487 Figure 5~~Figure 5~~, or Figure 6~~Figure 6~~, or can be a leaf Printer as in
 488 Figure 1, Figure 2~~Figure 2~~, or Figure 3~~Figure 3~~.

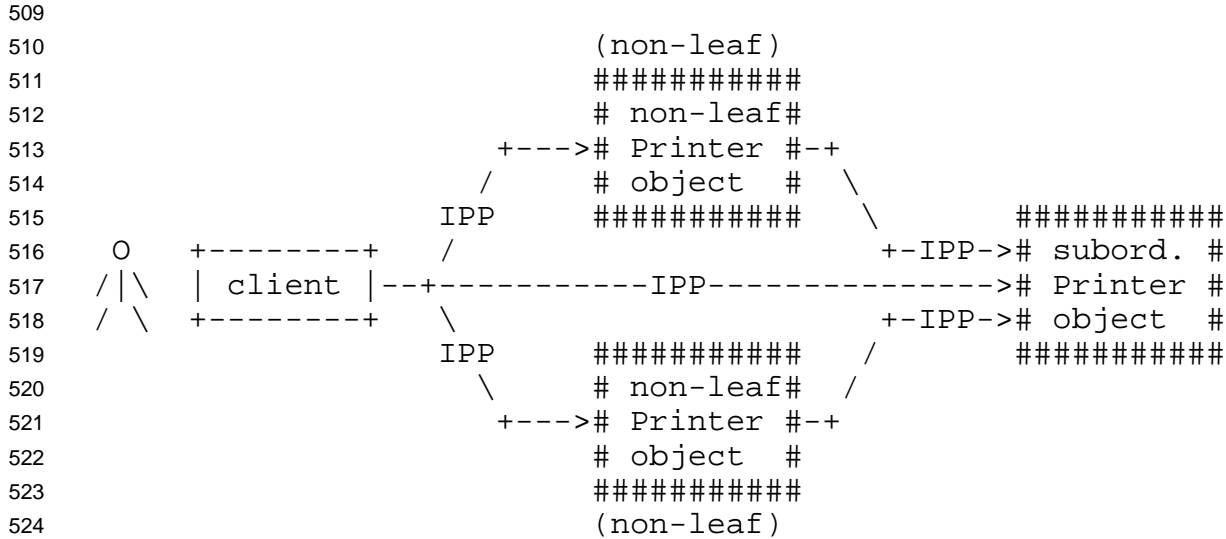
489 **Figure 44 - Chained IPP Printer**



503
 504 The subordinate Printer can be a non-leaf Printer as in Figure 44,
 505 Figure 5~~Figure 5~~, or Figure 6~~Figure 6~~, or can be a leaf Printer as in
 506 Figure 1, Figure 2~~Figure 2~~, or Figure 3~~Figure 3~~.

507 **Figure 55 - IPP Printer fan out**

508



526 The subordinate Printer can be a non-leaf Printer as in [Figure 44](#),
527 [Figure 5](#)~~Figure 5~~, or [Figure 6](#)~~Figure 6~~, or can be a leaf Printer as in
528 [Figure 1](#), [Figure 2](#)~~Figure 2~~, or [Figure 3](#)~~Figure 3~~.

529 **Figure 66 - IPP Printer fan in**

530 [4.3.3](#) Forwarding requests

531 This section describes the forwarding of Job and Printer requests to subordinate Printer objects.

532 4.3.1 Forwarding requests that affect Printer objects

533 In ~~both Printer fan-out, and Printer fan-in, and Chained Printers,~~ the non-leaf IPP Printer object MUST
534 NOT forward the Printer operations that affect Printer objects to its subordinate Printer objects. If a client
535 wants to explicitly target a subordinate Printer, the client MUST specify the URI of the subordinate Printer.
536 The client can determine the URI of any subordinate Printers by querying the Printer's "subordinate-
537 printers-supported (1setOf uri) attribute (see section 6.6).

538 Table 1~~Table 1~~ lists the operations that affect Printer objects and the forwarding behavior that a non-leaf
539 Printer MUST exhibit to its immediate subordinate Printers. Printer operations that affect jobs have a
540 different forwarding rule (see section 4.3.2 and Table 2~~Table 2~~):

541 **Table 1 - Forwarding operations that affect Printer objects**

Printer operation	Non-leaf Printer action
Set2 Printer operations:	
Set-Printer-Attributes	MUST NOT forward to any of its subordinate Printers
Enable-Printer	MUST NOT forward to any of its subordinate Printers
Disable-Printer	MUST NOT forward to any of its subordinate Printers
<u>Pause-Printer-After-All-</u>	<u>MUST NOT forward to any of its subordinate Printers</u>

<u>Current-Jobs</u>	
<u>Deactivate-Printer</u>	<u>MUST NOT forward to any of its subordinate Printers</u>
<u>Activate-Printer</u>	<u>MUST NOT forward to any of its subordinate Printers</u>
Restart-Printer	MUST NOT forward to any of its subordinate Printers
Shutdown-Printer	MUST NOT forward to any of its subordinate Printers
<u>Startup-Printer</u>	<u>MUST NOT forward to any of its subordinate Printers</u>
IPP/1.1 Printer operations:	
Get-Printer-Attributes	MUST NOT forward to any of its subordinate Printers
Pause-Printer	MUST NOT forward to any of its subordinate Printers
Resume-Printer	MUST NOT forward to any of its subordinate Printers

542

543 ~~ISSUE 01—Should the purpose of the corresponding device operations, such as Pause-Device, Disable-~~
544 ~~Device, and Shutdown-Device (see [ipp-set3], to be forwarded by Printer objects to their subordinate~~
545 ~~Printers down to the leaf Printers objects in order to affect their corresponding output device? Using device~~
546 ~~operations in this way would relieve the operator client from having to work its way down the Printer object~~
547 ~~chain in order to affect an output device of a leaf Printer object.~~

548 ~~ISSUE 02—If a Printer object MUST forward a device operation down to the leaf Printer objects, would~~
549 ~~fanning out such forwarded device operations be too drastic? If yes, then maybe the device operations~~
550 ~~would need an operation attribute to say whether or not to allow fan-out of device operations, with the~~
551 ~~default value being 'false'.~~

552 ~~ISSUE 03—Does the administrator need a Printer object attribute that says whether or not this Printer object~~
553 ~~is to forward device operations when it has more than one subordinate Printer object? The default would be~~
554 ~~'false'.~~

555 4.1.24.3.2 Forwarding requests that affect Jobs

556 Unlike Printer operations that only affect Printer objects (see section 4.3.1), a non-leaf Printer object MUST
557 forward operations that directly affect jobs to the appropriate Job object(s) in one or more of its immediate
558 subordinate Printer objects. Forwarding is REQUIRED since the purpose of such a Job operation is to
559 affect the indicated job which itself may have been forwarded. Such forwarding MAY be immediate or
560 queued, depending on the operation and the implementation. For example, a non-leaf Printer object MAY
561 queue/spool jobs, feeding a job at a time to its subordinate Printer(s), or MAY forward jobs immediately to
562 one of its subordinate Printers. In either case, the non-leaf Printer object is forwarding Job Creation
563 operations to one of its subordinate Printers. Only the time of forwarding of the Job Creation operations
564 depends on whether the policy is to queue/spool jobs in the non-leaf Printer or the subordinate Printer.

565 When a non-leaf Printer object creates a Job object in its subordinate Printer, whether that non-leaf Printer
566 object keeps a fully formed Job object or just keeps a mapping from the "job-ids" that it assigned to those
567 assigned by its subordinate Printer object is IMPLEMENTATION-DEPENDENT. In either case, the non-
568 leaf Printer MUST be able to accept and carry out future Job operations that specify the "job-id" that the
569 non-leaf Printer assigned and returned to the job submitting client.

570 [Table 2](#) lists the operations that directly affect jobs and the forwarding behavior that a non-leaf
 571 Printer MUST exhibit to its subordinate Printers:

572 **Table 22 - Forwarding operations that affect Jobs objects**

Job operation	Non-leaf Printer action
Set2 Job operations:	
Set-Job-Attributes	MUST forward to the appropriate Job in one of its subordinate Printers
Reprocess-Job	MUST forward to the appropriate Job in one of its subordinate Printers
Cancel-Current-Job	MUST forward to the appropriate Job in one of its subordinate Printers
Pause Suspend - Current-Job	MUST forward to the appropriate Job in one of its subordinate Printers
Resume-Job	MUST forward to the appropriate Job in one of its subordinate Printers
Promote-Job	MUST forward to the appropriate Job in one of its subordinate Printers
IPP/1.1 Printer operations:	
Print-Job	MUST forward immediately or queue to the appropriate subordinate Printer
Print-URI	MUST forward immediately or queue to the appropriate subordinate Printer
Validate-Job	MUST forward to the appropriate subordinate Printer
Create-Job	MUST forward immediately or queue to the appropriate subordinate Printer
Get-Jobs	MUST forward to <i>all</i> its subordinate Printers
Purge-Jobs	MUST forward to <i>all</i> its subordinate Printers
IPP/1.1 Job operations:	
Send-Document	MUST forward immediately or queue to the appropriate Job in one of its subordinate Printers
Send-URI	MUST forward immediately or queue to the appropriate Job in one of its subordinate Printers
Cancel-Job	MUST forward to the appropriate Job in one of its subordinate Printers
Get-Job-Attributes	MUST forward to the appropriate Job in one of its subordinate Printers, if the non-leaf Printer doesn't know the complete status of the Job object
Hold-Job	MUST forward to the appropriate Job in one of its subordinate Printers
Release-Job	MUST forward to the appropriate Job in one of its subordinate Printers
Restart-Job	MUST forward to the appropriate Job in one of its subordinate Printers

573 **ISSUE 01: Do we want to define whether the response to the client for Job operations can happen before**
 574 **the non-leaf Printer gets the response from its subordinate Printer or MUST the non-leaf Printer wait until**
 575 **its gets the response from its subordinate Printer?**

576 The following Job Description attributes are defined to help represent Job relationships for fan-out and
 577 forwarding of jobs:

- 578 1. "output-device-assigned" (name(127)) - from [ipp-mod]: This attribute identifies the output device to
 579 which the Printer object has assigned this job. If an output device implements an embedded Printer

580 object, the Printer object NEED NOT set this attribute. If a print server implements a Printer object, the
 581 value MAY be empty (zero-length string) or not returned until the Printer object assigns an output
 582 device to the job. This attribute is particularly useful when a single Printer object supports multiple
 583 devices (so called "fan-out").

584 2. "original-requesting-user-name" (name(MAX)) - operation attribute containing the user name of the
 585 original user, i.e., corresponds to the "requesting-user-name" operation attribute that the original client
 586 supplied to the first Printer object.

587 **ISSUE 02 - The "requesting-user-name" operation attribute is the parent Printer's host, not the original**
 588 **requesting user, correct?)**

589 **ISSUE 03 - Presumably the "job-originating-user-name" remains as the authenticated original user, not the**
 590 **parent Printer's authenticated host, correct?**

591 5 New Operation attributes

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

594 ~~4.4.5.1~~ "printer-message-from-operator" (text(127))

595 ~~Type of registration: attribute~~

596 ~~Proposed keyword name of this attribute: "printer message from operator"~~

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

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

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

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

601

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

603

604 ~~"printer message from operator" (text(127))~~

605 The client OPTIONALLY supplies this attribute. The Printer object SHOULD supports this operation
 606 attribute if it supports the corresponding Printer Description attribute. The value of this attribute is a
 607 message from the operator about the Printer object on which the operator is performing the operation. If
 608 supported, the Printer copies the value to the Printer's "printer-message-from-operator" Printer Description
 609 attribute (see [ipp-mod] section 4.4.25), automatically sets the value of the Printer's "printer-message-time"
 610 with the current value of the Printer's "printer-up-time" attribute, the value of the "printer-message-date-
 611 time" with the current value of the Printer's printer-current-date-time" attribute, and the value of the
 612 Printer's "printer-message-operation" with the operation-id value of this operation (see [ipp-mod] section
 613 4.4.15).

614

615 If the client omits this attribute, the Printer does not change the value of its "printer-message-from-
 616 operator", "printer-message-time", "printer-message-date-time", and "printer-message-operation" Printer

617 Description attributes.

618

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

624

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

626 `Pause-Printer` - see [ipp-mod] section 3.2.7

627 `Resume-Printer` - see [ipp-mod] section 3.2.8

628 `Purge-Jobs` - see [ipp-mod] section 3.2.9

629 `Disable-Printer` - see section 11.2

630 `Enable-Printer` - see section 11.2.2

631 `Pause-Printer-After-Current-Job` (IPP/1.1 `Pause-Printer` clarified) - see section 11.3.2

632 `Pause-Printer-After-All-Current-Jobs` - see section

633 `Deactivate-Printer` - see section 11.4.1

634 `Activate-Printer` - see section 11.4.2

635 `Restart-Printer` - see section 11.5.1

636 `Shutdown-Printer` - see section 11.5.2

637 `Startup-Printer` - see section 11.5.3

638

639 The "printer-message-from-operator" operation attribute MUST NOT be supported as an operation attribute
 640 for the Set-Printer-Attributes operation. If the operator wants to set the Printer's "printer-message-from-
 641 operator" Printer Description attribute when issuing the Set-Printer-Attributes operation, the client supplies
 642 the "printer-message-from-operator" with its new value as one of the Printer Description attributes in Group
 643 2 in the request. The Printer also updates the Printer's "printer-message-date-time" and "printer-message-
 644 operation" Printer Description attributes. If the client does not explicitly supply the "printer-message-from-
 645 operator" with its new value, the Printer leaves the value of the Printer's "printer-message-from-operator"
 646 Printer Description attribute unchanged.

647 ~~4.2.2~~ "job-message-from-operator" (text(127))

648 ~~Type of registration: attribute~~

649 ~~Proposed keyword name of this attribute: "job message from operator"~~

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

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

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

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

654

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

656

657 ~~"job message from operator" (text(127))~~

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

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

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

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

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

672 Cancel-Job - see [ipp-mod] section 3.2.4
673 Hold-Job - see [ipp-mod] section 3.3.5
674 Release-Job - see [ipp-mod] section 3.3.6
675 Restart-Job - see [ipp-mod] section 3.3.7
676 Reprocess-Job - see section 12.2
677 Cancel-Current-Job - see section 12.3
678 ~~PauseSuspend~~-Current-Job - see section 12.4
679 Resume-Job - see section 12.4.2
680 Promote-Job - see section 12.5
681

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

688 ~~4.3.3~~ "factory-settings" (boolean) - new operation attribute for Get-Printer-Attributes:

689 ~~Type of registration: attribute~~

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

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

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

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

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

695

696 ~~Specification of this attribute (follow the style of IPP Model Section 4.2):~~
697 ~~"factory-settings" (boolean)~~

698 The client **OPTIONALLY** supplies this attribute. The Printer object **OPTIONALLY** supports this attribute,
699 if it supports the Set-Printer-Attributes operation. If the client omits this attribute or supplies the 'false'
700 value, the Printer returns the current values of the requested attributes that are settable, i.e., the values that
701 have been set by previous Set-Printer-Attributes. If the client supplies the 'true' value, the Printer returns
702 the factory settings, i.e., the inherent values supported by the implementation as shipped from the
703 manufacturer or established at install time. This operation attribute allows an operator to determine which
704 values are supported in an implementation after having modified a settable attribute. Attributes that are not
705 settable are not affected by this operation attribute, so that the Printer returns the same values for non-
706 settable attribute when either the 'true' or 'false' value has been supplied. If this operation attribute is
707 supported, both 'true' and 'false' values **MUST** be supported.

708 ~~5.4 New operation attribute for Pause Printer: "when" (type2 keyword)~~

709 ~~Type of registration: attribute~~

710 ~~Proposed keyword name of this attribute: "when"~~

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

712 ~~Operations to be used with if the attribute is an operation attribute: Pause Printer, Shutdown Printer, and~~
713 ~~Pause Current Job~~

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

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

716
717 ~~Specification of this attribute (follow the style of IPP Model Section 4.2):~~

718 ~~"when" (type2 keyword)~~

719 ~~The client **OPTIONALLY** supplies this attribute. The Printer object **OPTIONALLY** supports this~~
720 ~~attribute, if it supports this operation. The value of this attribute indicates when to pause the printer.~~
721 ~~If the client omits this attribute, the Printer assumes the 'now' value. The 'now' value is **REQUIRED**~~
722 ~~to be supported if the "when" attribute is supported; the remaining values are **OPTIONAL**.~~

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

726
727 ~~Standard keyword values are:~~

728 ~~'now'—pause the Printer immediately, while the current job is processing. See [ipp-mod]~~
729 ~~section 3.2.7) for the effect on the Printer's "printer-state" and "printer-state-reasons"~~
730 ~~attributes. Jobs in the 'held' and 'pending' state remain in those states.~~

731 ~~'after-current-copy'—pause the Printer after the current job finishes printing its current copy.~~
732 ~~Jobs in the 'held' and 'pending' state remain in those states.~~

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

735 ~~'after-all'—pause the Printer after all 'pending' jobs finish printing. Jobs in the 'held' state~~
736 ~~remain in the 'held' state.~~

737 ~~Note: The "when" operation attribute is also defined for use with the Shutdown Printer (see section 10.1.5)~~
 738 ~~and the Pause Current Job (see section 10.2.4) operations, but with a subset of these values.~~

739 ~~1.4.5.4~~ Summary of the operation attributes for the Printer operations

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

743 Legend:

744 R - REQUIRED for a Printer to support

745 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	Restart-Printer	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									
synchronize									O
shutdown-function									R

746 ~~5.65.5~~ Summary of the operation attributes for the Job operations

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

752 Legend:

753 R - REQUIRED for a Printer to support

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

Operation Attribute	Cancel-Job	Cancel-Current-Job	Hold-Job	Release-Job	Pause Suspend-Current-Job	Resume-Job	Get-Job-Attributes	Set-Job-Attributes	Restart-Job	Reprocess-Job	Promote-Job
printer-uri		R			R						
printer-uri/job-id or job-uri	R		R	R		R	R	R	R	R	R
job-id		R			R						
requested-attributes							R				
back-space											

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

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

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

760 6 New Printer Description Attributes

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

763 ~~4.4.1~~ printer-settable-attributes (1setOf type2 keyword)

764 ~~Type of registration: attribute~~

765 ~~Proposed keyword name of this attribute: printer-settable-attributes~~

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

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

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

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

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

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

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

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

775 ~~4.4.2 printer-settable-attributes (1setOf type2 keyword)~~

776 This READ-ONLY Printer attribute identifies the Printer object attributes that are settable in this
777 implementation, i.e., that are settable using the Set-Printer-Attributes operations (see section 11.1). This
778 attribute MUST be supported if the Set-Printer-Attributes operations is supported. The Printer MUST
779 reject attempts to set any Printer attributes that are not one of the values of this attribute in this list, returning
780 the 'client-error-attributes-not-settable' status code (see section 9.1). The value of this attribute MAY

781 depend on the value of the "document-format" operation attribute supplied in the Get-Printer-Attributes
782 operation (see [ipp-mod] section 3.2.5.1).

783 Standard keyword values are:

784 'none': There are no settable Printer attributes.

785 'xxx': Where 'xxx' is any of the keyword attribute names in the list defined in section 11.1.1

786 ~~4.2.2~~ job-settable-attributes (1setOf type2 keyword)

787 ~~Type of registration: attribute~~

788 ~~Proposed keyword name of this attribute: job-settable-attributes~~

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

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

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

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

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

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

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

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

798 ~~4.4.2~~ job-settable-attributes (1setOf type2 keyword)

799 This READ-ONLY Printer attribute identifies the Job object attributes that are settable in this
800 implementation, i.e., that are settable using the Set-Job-Attributes operations ([see section 12.1](#)). This
801 attribute MUST be supported if the Set-Job-Attributes operations is supported. The Printer MUST reject
802 attempts to set any Job attributes that are not [one of the values of this attribute in the list](#), returning the
803 'client-error-attributes-not-settable' status code (see section 9.1).

804 Standard keyword values are:

805 'none': There are no settable Job attributes.

806 'xxx': Where 'xxx' is any of the keyword attribute names in the list defined in section 12.1.1

807 ~~6.3~~printer-controls-other-protocols (boolean)

808 ~~Type of registration: attribute~~

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

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

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

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

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

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

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

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

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

819 ~~4.4.2 printer-controls-other-protocols (boolean)~~

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

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

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

834 ~~6.46.3 printer-message-time (integer(MIN:MAX))~~

835 ~~Type of registration: attribute~~

836 ~~Proposed keyword name of this attribute: printer-message-time~~

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

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

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

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

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

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

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

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

846 ~~4.4.2 printer-message-time (integer(MIN:MAX))~~

847 This READ-ONLY Printer Description attribute contains the time that the Printer's "printer-message-from-
848 operator" was changed by the operator using any operation where the client supplied the "printer-message-
849 from-operator" operation attribute (see section 5.1) or was explicitly set using the Set-Printer-Attributes
850 operation (see section 11.1). This attribute allows the users to know when the "printer-message-from-
851 operator" attribute was last set.

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

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

858 ~~6.56.4~~ printer-message-date-time (dateTime)

859 ~~Type of registration: attribute~~

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

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

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

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

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

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

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

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

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

870 ~~4.4.? printer-message-date-time (dateTime)~~

871 This READ-ONLY Printer Description attribute contains the date and time that the Printer's "printer-
872 message-from-operator" was changed by the operator using any operation where the client supplied the
873 "printer-message-from-operator" operation attribute (see section 5.1) or was explicitly set using the Set-
874 Printer-Attributes operation (see section 11.1). This attribute allows the users to know when the "printer-
875 message-from-operator" attribute was last set. This attribute MUST be supported if the Printer supports
876 both the "printer-message-from-operator" and the "printer-current-date-time" attributes.

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

879 ~~6.66.5~~ printer-message-operation (type2 keyword)

880 ~~Type of registration: attribute~~

881 ~~Proposed keyword name of this attribute: printer-message-operation~~

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

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

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

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

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

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

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

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

891 ~~4.4.? printer-message-operation (type2-enum)~~

892 This READ-ONLY Printer Description attribute contains the operation that was used to change the
 893 Printer's "printer-message-from-operator" by the operator using any operation where the client supplied the
 894 "printer-message-from-operator" operation attribute (see section 5.1) or explicitly set using the Set-Printer-
 895 Attributes operation (see section 11.1). This attribute allows the users to know which operation was used to
 896 change the "printer-message-from-operator" attribute when it was last set.

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

898 ~~6.76.6~~ subordinate-printers-supported (1setOf uri)

899 This Printer attribute is REQUIRED if an implementation supports subordinate Printers (see section 4.2)
 900 and contains the URIs of the immediate subordinate Printer object(s) associated with this Printer object.

901 The precise format of the subordinate Printer URIs is implementation dependent (see section 4.2.4).

902 If the Printer object does not have an associated ~~output device Device object (see [ipp-set3])~~, the value of
 903 the subordinate Printer object's "printer-name" MAY be used to populate the Job object's "output-device-
 904 assigned" attribute (see [ipp-mod] section 4.3.13). The "output-device-assigned" Job attribute identifies the
 905 output device to which the Printer object has assigned a job, for example, when a single Printer object is
 906 supporting Device fan-out or Printer fan-out.

907 7 Additional Values for "printer-state-reasons"

908 This section defines additional values for the "printer-state-reasons" Printer Description attribute.

909 ~~4.17.1~~ 'deactivatedstandby'

910 ~~Type of registration: type2 keyword attribute value~~

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

912 ~~Proposed keyword name of this keyword value: standby~~

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

914 ~~'deactivatedstandby': The Printer has been deactivatedshutdown in standby mode. Only the~~
 915 ~~RestartActivate-Printer, Get-Job-Attributes, Get-Jobs, and Get-Printer-Attributes, and any other~~
 916 ~~Get-XXX operations that may be defined are accepted in this state; all other operations are rejected~~
 917 ~~with the 'server-error-printer-is-deactivatedin-standby-mode'.~~

918 **ISSUE 04 - What new 'moving-to-xxx' and 'xxx' values do we need to support the new operations**
 919 **defined in this document?**

920 ~~4.27.2~~ 'moving-to-paused-all'

921 'moving-to-paused-all': Someone has paused the Printer object using the Pause-Printer-After-All-
 922 Current-Jobs operation (see section 11.3.3) or other means, but the output-device(s) are taking an
 923 appreciable time to stop. Later, when all output has stopped, the "printer-state" becomes 'stopped',
 924 and the 'paused' value replaces the 'moving-to-paused' value in the "printer-state-reasons" attribute.

925 This value MUST be supported, if the Pause-Printer-After-All-Current-Jobs operation is supported
 926 and the implementation takes significant time to pause a device in certain circumstances.

927 ~~4.37.3~~ 'printer-deactivated'

928 'printer-deactivated': Someone has issued a Deactivate-Printer operation for the Printer object (see
 929 section 11.4.1) and the Printer is in the process of becoming deactivated or has become deactivated.
 930 The Printer MUST reject all requests except Activate-Printer, queries (Get-Printer-Attributes, Get-
 931 Job-Attributes, Get-Jobs, etc.), Send-Document, and Send-URI (so that partial job submission can
 932 be completed - see section 11.2.1) and return the 'server-error-service-unavailable' status code.

933
 934

935 8 Additional Values for "job-state-reasons"

936 This section defines additional values for the "job-state-reasons" Job Description attribute.

937 ~~4.18.1~~ 'job-~~suspended~~paused'

938 ~~Type of registration: type2 keyword attribute value~~

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

940 ~~Proposed keyword name of this keyword value: job-paused~~

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

942 'job-~~suspended~~paused': The job has been ~~suspended~~paused while processing using the ~~Pause~~Suspend-
 943 Current-Job operations and other jobs can be processed on the Printer. The Job can be resumed
 944 using the Resume-Job operation which removes this value.

945

946 9 Additional status codes

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

948 ~~4.19.1~~ 'client-error-attributes-not-settable' (0x0413)

949 ~~Type of registration: status code~~

950 ~~Keyword symbolic name of this status code value: 'client error attributes not settable'~~

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

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

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

955 ~~13.1.4.20 client error attributes not settable (0x0413)~~

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

962 ~~1.29.2 'server-error-printer-is-deactivatedin-standby-mode' (0x????)~~

963 ~~Type of registration: status code~~

964 ~~Keyword symbolic name of this status code value: 'server_error_printer_is_in_standby_mode'~~

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

966 ~~Operations that this status code may be used with: Shutdown Printer~~

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

969 ~~13.1.5.8 server error printer is in standby mode~~

970 The Printer has been ~~deactivated using the Deactivate-Printer operation~~~~shutdown~~ and is only accepting the
 971 ~~Restart~~~~Activate~~-Printer (see section 11.5.1), ~~Get-Job-Attributes, Get-Jobs, and~~ Get-Printer-Attributes, ~~and~~
 972 ~~any other Get-Xxxx~~ operations. An operator can perform the ~~Activate~~~~Restart~~-Printer operation to allow the
 973 Printer to accept other operations.

974 10 Additional out-of-band values

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

977 ~~1.10.1 'not-settable' out of band value~~

978 The 'not-settable' out of band value is used by the IPP Printer in a Set-Job-Attributes or Set-Printer-
 979 Attributes response to indicate an attribute that was supplied, ~~is supported~~ but is ~~defined to be a READ-~~
 980 ~~ONLY attribute, is~~ not settable in that implementation or as defined by the policy for that system, because it
 981 is not in the "job-settable-attributes"~~on the one hand, or the "interpreter-settable-attributes"~~ or "printer-
 982 settable-attributes", ~~respectivelyon the other hand.~~

983 11 ~~Definition of the~~ Set 2 ~~Printer~~ operations

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

987 The Set 2 Printer operations are summarized in ~~the following table~~ Table 33:

988

Table 33 - Printer operation Operation-Id assignments

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 <u>Job Creation</u> operations
Disable-Printer	0x??	Prevents the target Printer from accepting create-job <u>Job Creation</u> operations
<u>Pause-Printer-After-All-Current-Jobs</u>	<u>0x??</u>	<u>Finishes processing all currently pending jobs. Any new jobs are placed in the 'pending-held' state.</u>
<u>Deactivate-Printer</u>	<u>0x??</u>	<u>Puts the Printer into a read-only deactivated state.</u>
<u>Activate-Printer</u>	<u>0x??</u>	<u>Restores the Printer to normal activity</u>
Restart-Printer	0x??	Restarts the target Printer <u>and re-initializes the software</u> from a standby shutdown mode
Shutdown-Printer	0x??	Shuts down the target Printer <u>in several ways</u> so that it cannot be restarted or queried
<u>Startup-Printer</u>	<u>0x??</u>	<u>Starts up the instance of the Printer object</u>

989 All of the operations in this ~~document~~registration proposal specification are OPTIONAL for an IPP object
 990 to support. Unless the specification of an OPTIONAL operation requires support of another OPTIONAL
 991 operation, conforming implementations may support any combination of these operations. Many of the
 992 operations come in pairs and so both are REQUIRED if either one is implemented.

993

994 ~~4.4.11.1~~ Set-Printer-Attributes Operation995 ~~Type of registration: operation~~996 ~~Proposed name of this operation: Set-Printer-Attributes~~997 ~~Object Target: Printer~~998 ~~Specification of this operation:~~

999 This OPTIONAL operation allows a client to set the values of the attributes of a Printer object. In the
1000 request, the client supplies the set of Printer attribute names and values that are to be set. In the response,
1001 the Printer object returns success or rejects the request with indications of which attribute or attributes
1002 could not be set.

1003 How the Printer object validates the client-supplied attributes in the Set-Printer-Attributes request is
1004 implementation-dependent, since there are no corresponding Printer attributes that specify the allowed
1005 values that may be set on the Printer object.

1006 The Printer MUST accept this operation in any state, i.e., for any of the values of the Printer object's
1007 "printer-state" attribute.

1008 ~~4.4.11.1.1~~ Settable and READ-ONLY Printer Description attributes

1009 If the Printer supports the "printer-message-from-operator" Printer Description attribute (see [ipp-mod]
1010 section 4.4.25) and the client explicitly supplies a new value for the "printer-message-from-operator" in the
1011 request, then the Printer MUST set the "printer-message-from-operator" Printer attribute to this new value
1012 and MUST also set the "printer-message-time", "printer-message-date-time", and "printer-message-
1013 operation" attributes, if supported (see sections 6.3, 6.4, and 6.5).

1014 If the Printer supports the Set-Printer-Attributes operation, then it SHOULD support setting of:

- 1015 all Job Template Default ("xxx-default") attributes
- 1016 all Job Template Supported ("xxx-supported") attributes
- 1017 all Job Template Ready ("xxx-ready") attributes

1018 that the implementation supports (see [ipp-mod] section 4.2 and extensions).

1019 The following Printer Description attributes (see [ipp-mod] section 4.4) MUST NOT be settable, i.e., they
1020 are READ-ONLY:

1021 printer-state
 1022 printer-state-reasons
 1023 printer-state-message
 1024 printer-is-accepting-jobs - see Enable-Printer/Disable-Printer
 1025 queued-job-count
 1026 ~~printer-message-time - see Set-Printer-Attributes when setting "printer-message-from-operator"~~
 1027 ~~printer-message-date-time - see Set-Printer-Attributes when setting "printer-message-from-operator"~~
 1028 ~~printer-message-operation - see Set-Printer-Attributes when setting "printer-message-from-operator"~~
 1029 printer-up-time

1030 The following Set2 Printer Description attributes are READ-ONLY:

1031 printer-message-time - see Set-Printer-Attributes when setting "printer-message-from-operator"
 1032 printer-message-date-time - see Set-Printer-Attributes when setting "printer-message-from-operator"
 1033 printer-message-operation - see Set-Printer-Attributes when setting "printer-message-from-operator"

1034 Note: From now on, all extensions that define new object attributes will indicate whether or not they are
 1035 READ-ONLY, by including the "READ-ONLY" adjective in their descriptions. If "READ-ONLY" is
 1036 omitted, it is assumed that the attribute MAY be settable by the appropriate Set-Xxx operation.

1037 The remaining Printer Description attributes MAY be settable using the Set-Printer-Attributes operation,
 1038 depending on implementation. If "xxx-supported" Printer Description attribute are settable, then they
 1039 MUST affect the behavior of the implementation. If they are READ-ONLY then they reflect the
 1040 implementation and cannot be changed using the Set-Printer-Attributes operation. Consider the following
 1041 examples:

1042 For example, if the "operations-supported" Printer Description attribute (see [ipp-mod] section
 1043 4.4.15) is settable in a particular implementation, then changing its value with a Set-Printer-
 1044 Attributes operation MUST affect the operations that the implementation accepts or rejects. Such
 1045 an implementation will need to be able to reject values for operations that it contains no code
 1046 support for. If the "operations-supported" Printer Description attribute is not settable in a particular
 1047 implementation, then that implementation MUST reject an attempt to set it with a Set-Printer-
 1048 Attributes operation and return the 'client-error-attributes-not-settable' status code (see section 9.1).

1049 As another example, if the "ipp-versions-supported" Printer Description attribute (see [ipp-mod]
 1050 section 4.4.14) is settable in a particular implementation, then changing its value with a Set-Printer-
 1051 Attributes operation MUST affect the protocol versions that are accepted or rejected. Such an
 1052 implementation will need to be able to reject values for versions~~operations~~ that it contains no code
 1053 support for.

1054 See the "factory-settings" operation attribute (see section 5.3) for a way to query the implementation
 1055 supported values using the Get-Printer-Attributes operation. ~~See the "reset-function" operation attribute of~~
 1056 ~~the Reset-Device operation (see [ipp-set3]) for a way to restore the values of the Device object to the~~
 1057 ~~factory settings.~~

1058 ~~ISSUE 07—Ok not to have a way to reset the values of the Printer object to the factory settings, but only~~
 1059 ~~have a way to reset the factory default settings for the Device object?~~

1060 *Access Rights:* The authenticated user (see [ipp-mod] section 8.3) performing this operation must be an
1061 operator or administrator of the Printer object (see [ipp-mod] Sections 1 and 8.5). ~~Authentication and~~
1062 ~~access control (see [ipp-mod] sections 1, 8.3, and 8.5) apply to this operation.~~

1063 Most Printer attributes will require administrator privileges to set, such as "xxx-supported", while some will
1064 require operator privileges only, such as "media-ready" and "printer-message-from-operator". Which
1065 attributes require which privileges depends on implementation and MAY depend on site policy.

1066 ~~1.1.2~~11.1.2 Set-Printer-Attributes Request

1067 The following sets of attributes are part of the Set-Printer-Attributes Request:

1068 Group 1: Operation Attributes

1069 Natural Language and Character Set:

1070 The "attributes-charset" and "attributes-natural-language" attributes as described in [ipp-mod]
1071 section 3.1.4.1.

1072

1073 Target:

1074 The "printer-uri" (uri) operation attribute which is the target for this operation as described in [ipp-
1075 mod] section 3.1.5.

1076

1077 Requesting User Name:

1078 The "requesting-user-name" (name(MAX)) attribute SHOULD be supplied by the client as
1079 described in [ipp-mod] section 8.3.

1080

1081 "document-format" (mimeMediaType):

1082 The client SHOULD supply this attribute. The Printer object MUST support this attribute. This
1083 attribute is useful for a client to select the Interpreter object to which the attribute modification
1084 should be applied. Each Printer object is modeled to contain one or more Interpreter objects. Those
1085 Printer attributes whose values vary from Interpreter to Interpreter, are modeled as Interpreter
1086 objects, while those that do not are Printer object attributes. Thus the target of a Get-Printer-
1087 Attributes or Set-Printer-Attributes operation is either the Printer object or the Interpreter object
1088 identified by the "document-format" operation attribute supplied by the client. Except for Get-
1089 Printer-Attributes and Set-Printer-Attributes, there are no other operations with the Interpreter object
1090 as a target. See [ipp-mod] section 3.2.5.1 "Get-Printer-Attributes Request".

1091

1092 If a client wants to set an attribute [foref](#) all of the Interpreter objects to the same value, it can query
1093 the Printer's "document-format-supported" Printer Description attribute and perform separate Set-
1094 Printer-Attributes for each document format supported.

1095

1096 If the Printer object does not distinguish between different sets of supported values for each
1097 different document format when validating jobs in the create and Validate-Job operations, it MUST
1098 NOT distinguish between different document formats in the Set-Printer-Attributes operation. If the
1099 Printer object does distinguish between different sets of supported values for each different

1100 document format specified by the client, this specialization applies only to the same Printer
1101 attributes as the Get-Printer-Attributes operation (see [ipp-mod] section 3.2.5.1).

1102
1103 If the client omits this "document-format" operation attribute, the Printer object MUST respond as if
1104 the attribute had been supplied with the value of the Printer object's "document-format-default"
1105 attribute. It is recommended that the client always supply a value for "document-format", since the
1106 Printer object's "document-format-default" may be 'application/octet-stream', in which case the set
1107 attributes and values are for the union of the document formats that the Printer can automatically
1108 sense. For more details, see the description of the 'mimeMediaType' attribute syntax in [ipp-mod]
1109 section 4.1.9.

1110
1111 If the client supplies a value for the "document-format" Operation attribute that is not supported by
1112 the Printer, i.e., is not among the values of the Printer object's "document-format-supported"
1113 attribute, the Printer object MUST reject the operation and return the 'client-error-document-format-
1114 not-supported' status code.
1115

1116 Group 2: Printer Attributes

1117 The client MUST supply a set of Printer attributes as defined in [ipp-mod] section 4.2 Job Template
1118 Attributes ("xxx-default", "xxx-supported", and "xxx-ready" attributes), ~~and~~ section 4.4 Printer
1119 Description Attributes, and any attribute extensions supported by the Printer. Each Printer attribute
1120 supplied in Group 2 replaces the value(s) of the corresponding Printer attribute on the target Printer
1121 object. If a Printer object attribute had not been configured yet and so had the 'no-value' out-of-band
1122 value (see [ipp-mod] 4.1), the supplied value(s) replace the 'no-value' value. For attributes that can
1123 have multiple values (1setOf), all values supplied by the client replace all values of the
1124 corresponding Printer object attribute.
1125

1126 ~~4.1.3~~ 11.1.3 Set-Printer-Attributes Response

1127 The Printer object returns the following sets of attributes as part of the Get-Printer-Attributes Response:

1128 Group 1: Operation Attributes

1129 Status Message:

1130 In addition to the REQUIRED status code returned in every response, the response OPTIONALLY
1131 includes a "status-message" (text(255)) and/or a "detailed-status-message" (text(MAX)) operation
1132 attribute as described in [ipp-mod] sections 13 and 3.1.6.
1133

1134 Natural Language and Character Set:

1135 The "attributes-charset" and "attributes-natural-language" attributes as described in [ipp-mod]
1136 section 3.1.4.2.
1137

1138 Group 2: Unsupported Attributes

1139 See [ipp-mod] section 3.1.7 for details on returning Unsupported Attributes.

1140

1141

1142

1143

1144

1145

1146

1147

In the case of attributes that are supported, but are not settable by the implementation, i.e., are not among the values of the Printer's "printer-settable-attributes" Printer Description attribute (see section 6.1), the Printer object returns the client-supplied attribute(s) with a substituted out-of-band value of 'not-~~settable~~supported' (see section 10.1)~~(same out-of-band value as for attributes that are not supported)~~. This value's syntax type is "out-of-band" and its encoding is defined by special rules for "out-of-band" values in the "Encoding and Transport" document [IPP-PRO]. Its value indicates that the attribute is supported, but is ~~either~~-not settable-~~or is not supported at all~~.

1148

1149 ~~1.2~~11.2 The Disable and Enable Printer Operations

1150 This section defines the OPTIONAL Disable-Printer and Enable-Printer operations that stop and start the
1151 IPP Printer object from accepting new IPP jobs. If either of these operations are supported, both MUST be
1152 supported.

1153 These operations allow the operator to control whether or not the Printer will accept new Job Creation
1154 (Print-Job, Print-URI, and Create-Job) operations. These operations have no other effect on the Printer, so
1155 that the Printer continues to accept all other operations and continues to schedule and process jobs
1156 normally. In other words, these operation control the "input of new jobs" to the IPP Printer while the Pause
1157 and Resume operations (see section 11.3) independently control the "output of new jobs" from the IPP
1158 Printer to the output device.

1159 The Disable and Enable Printer operations MUST NOT affect the submission of jobs using other job
1160 submission protocols to the associated output device; the Disable and Enable Device operations (see [ipp-
1161 set3]) are intended to stop the acceptance of all jobs by the associated output device(s).

1162 ~~1.1.1~~11.2.1 Disable-Printer Operation1163 ~~Type of registration: operation~~1164 ~~Proposed name of this operation: Disable-Printer~~1165 ~~Object Target: Printer~~1166 ~~Specification of this operation:~~

1167 This OPTIONAL operation allows a client to stop the Printer object from accepting new jobs, i.e., cause the
1168 Printer to reject subsequent ~~create-job~~Job Creation operations (~~Print-Job, Print-URI, and Create-Job~~
1169 ~~operation~~) and return the 'server-error-not-accepting-jobs' status code. The Printer still accepts all other
1170 operations, including Validate-Job, Send-Document and Send-URI operations. Thus a Disable-Printer
1171 operation allows a client to continue submitting multiple documents of a multiple document job if the
1172 Create-Job operation had already been accepted. All previously created or submitted Jobs and currently
1173 processing Jobs continue unaffected.

1174 The IPP Printer MUST accept the request in any state. The Printer sets the value of its "printer-is-
1175 accepting-jobs" READ-ONLY Printer Description attribute to 'false' (see [ipp-mod] section 4.4.20), no
1176 matter what the previous value was. This operation has no immediate or direct effect on the Printer's
1177 "printer-state" and "printer-state-reasons" attributes.

1178 ~~Note: Use the Enable-Printer operation (section 10.1.3) to enable a Printer to accept Jobs again.~~1179 ~~If the Disable-Printer operation is supported, then the Enable-Printer operation MUST be supported, and~~
1180 ~~vice-versa.~~1181 ~~Note: Use the Enable-Printer and Disable-Printer operations to allow or prevent input to a Printer. Use the~~
1182 ~~Pause-Printer and Resume-Printer operations to prevent or allow output from the Printer.~~

1183 ~~Whether or not the Disable-Printer operation stops jobs that are submitted using job submission protocols~~
1184 ~~other than IPP, depends on implementation, i.e., on whether the IPP protocol is being used as a universal~~
1185 ~~management protocol or just to manage IPP jobs, respectively. See "printer-controls-other-protocols"~~
1186 ~~(section 6.3).~~

1187 *Access Rights:* ~~The authenticated user (see [ipp-mod] section 8.3) performing this operation must be an~~
1188 ~~operator or administrator of the Printer object (see [ipp-mod] Sections 1 and 8.5). Authentication and~~
1189 ~~access control (see [ipp-mod] sections 1, 8.3, and 8.5) apply to this operation.~~

1190 The Disable-Printer Request and Disable-Printer Response have the same attribute groups and attributes as
1191 the ~~ResumePause~~Printer operation (see [ipp-mod] sections 3.2.7.1 and 3.2.7.2), including the new "printer-
1192 message-from-operator" operation attribute (see section 5.1), ~~and with the addition of the following Group~~
1193 ~~operation attribute in the request:~~

1194 "job-type" (type2 keyword):

1195 ~~The client OPTIONALLY supplies this attribute. The Printer object OPTIONALLY supports this~~
1196 ~~attribute. The value of this attribute indicates the type of job to be disabled. If the client omits this~~
1197 ~~attribute, the Printer assumes the 'network-jobs' value.~~

1198 ~~Standard keyword values are:~~

1200 ~~'network-jobs'—disable jobs submitted using the create-job operations.~~

1201 ~~'walk-up-jobs'—disable jobs submitted locally, such as walkup-copy jobs~~

1202 ~~'all-jobs'—disable all type of jobs~~

1203

1204 ~~1.1.2~~11.2.2 Enable-Printer Operation1205 ~~Type of registration: operation~~1206 ~~Proposed name of this operation: Enable-Printer~~1207 ~~Object Target: Printer~~1208 ~~Specification of this operation:~~

1209 This OPTIONAL operation allows a client to start the Printer object accepting jobs, i.e., cause the Printer to
1210 accept subsequent ~~create-job~~Job Creation operations (~~Print Job, Print URI, and Create Job operation~~). The
1211 Printer still accepts all other operations. All previously submitted Jobs and currently processing Jobs
1212 continue unaffected.

1213 The IPP Printer MUST accept the request in any state. The Printer sets the value of its "printer-is-
1214 accepting-jobs" READ-ONLY Printer Description attribute to 'true' (see [ipp-mod] section 4.4.20), no
1215 matter what the previous value was. This operation has no immediate or direction effect on the Printer's
1216 "printer-state" and "printer-state-reasons" attributes.

1217 ~~Note: Use the Disable-Printer operation (section 10.1.2) to stop a Printer from accepting Jobs.~~

1218 ~~If the Enable-Printer operation is supported, then the Disable-Printer operation MUST be supported, and
1219 vice-versa.~~

1220 ~~Note: Use the Enable-Printer and Disable-Printer operations to allow or prevent input to a Printer. Use the
1221 Pause-Printer and Resume-Printer operations to prevent or allow output from the Printer.~~

1222 ~~Whether or not the Enable-Printer operation allows acceptance of jobs that are submitted using job
1223 submission protocols other than IPP, depends on implementation, i.e., on whether the IPP protocol is being
1224 used as a universal management protocol or just to manage IPP jobs, respectively. See "printer-controls-
1225 other-protocols" (section 6.3).~~

1226 *Access Rights:* The authenticated user (see [ipp-mod] section 8.3) performing this operation must be an
1227 operator or administrator of the Printer object (see [ipp-mod] Sections 1 and 8.5). Authentication and
1228 access control (see [ipp-mod] sections 1, 8.3, and 8.5) apply to this operation.

1229 The Enable-Printer Request and Enable-Printer Response have the same attribute groups and attributes as
1230 the Resume-Printer operation (see [ipp-mod] sections 3.2.8.1 and 3.2.8.2), including the new "printer-
1231 message-from-operator" operation attribute (see section 5.1), ~~and with the addition of the following Group
1232 1 operation attribute in the request:~~

1233 ~~"job-type" (type2 keyword):~~

1234 ~~The client OPTIONALLY supplies this attribute. The Printer object OPTIONALLY supports this
1235 attribute. The value of this attribute indicates the type of job to be enabled. If the client omits this
1236 attribute, the Printer assumes the 'network-jobs' value.~~

1237

1238 ~~Standard keyword values are:~~

1239 ~~'network-jobs'—enable jobs submitted using the create-job operations.~~

1240 ~~'walk-up jobs'—enable jobs submitted locally, such as walkup-copy jobs~~
1241 ~~'all jobs'—enable all types of jobs~~

1242 1.3.1.3 The Pause and Resume Printer operations

1243 This section clarifies the OPTIONAL IPP/1.1 Pause-Printer (to be Pause-Printer-After-Current-Job) and
1244 Resume-Printer (see [ipp-mod] sections 3.2.7 and 3.2.8) and defines the OPTIONAL Pause-Printer-After-
1245 All-Current-Jobs operations. These operations affect the scheduling of IPP jobs. If either of the Pause
1246 operations are supported, then the Resume-Printer operation MUST be supported.

1247 These operations allow the operator to control whether or not the Printer will send new IPP jobs to the
1248 associated output device(s) that the IPP Printer object represents. These operations have no other effect on
1249 the Printer, so that the Printer continues to accept all operations. In other words, these operation control the
1250 "output of new jobs" to the output device(s) while the Disable and Enable Printer operations (see section
1251 11.2) independently control the "input of new jobs" to the IPP Printer.

1252 The Pause and Resume Printer operations MUST NOT affect jobs that were submitted using other job
1253 submission protocols to the associated output device; the Pause and Resume Device operations (see [ipp-
1254 set3]) are intended to stop the acceptance of all jobs by the associated output device(s).

1255 1.1.1.3.1 IPP/1.1 Pause-Printer operation clarified to be Pause-Printer-After-Current-Job

1256 IPP/1.1 defines the Pause-Printer operation (see [ipp-mod] section 3.2.7) with a number of implementation
1257 options:

1258 This OPTIONAL operation allows a client to stop the Printer object from scheduling jobs on all its
1259 devices. Depending on implementation, the Pause-Printer operation MAY also stop the Printer
1260 from processing the current job or jobs. Any job that is currently being printed is either stopped as
1261 soon as the implementation permits or is completed, depending on implementation. The Printer
1262 object MUST still accept create operations to create new jobs, but MUST prevent any jobs from
1263 entering the 'processing' state.

1264 If the Pause-Printer operation is supported, then the Resume-Printer operation MUST be supported,
1265 and vice-versa.

1266 The IPP Printer stops the current job(s) on its device(s) that were in the 'processing' or 'processing-
1267 stopped' states as soon as the implementation permits. If the implementation will take appreciable
1268 time to stop, the IPP Printer adds the 'moving-to-paused' value to the Printer object's "printer-state-
1269 reasons" attribute (see section [ipp-mod] 4.4.12). When the device(s) have all stopped, the IPP
1270 Printer transitions the Printer object to the 'stopped' state, removes the 'moving-to-paused' value, if
1271 present, and adds the 'paused' value (see [ipp-mod] 4.4.12) to the Printer object's "printer-state-
1272 reasons" attribute.

1273 The Set2 and Set3 documents define distinct operations in order to disambiguate the Pause-Printer
1274 operation as shown in Table 44. Set2 Printer operations affect only Jobs submitted using IPP, while Set3

1275 Device operations affect all jobs no matter what job submission protocol was used to submit them to the
 1276 output device.

1277 **Table 44 - Set2 and Set3 Pause and Resume operations**

<u>Set2 and Set3 Pause and Resume Printer and Device operations</u>	<u>Description</u>
<u>Pause-Printer-After-Current-Job</u>	<u>Stops the IPP Printer from sending new IPP Jobs to the output device(s) after the current jobs finish</u>
<u>Pause-Printer-After-All-Current-Jobs</u>	<u>Stops the IPP Printer from sending IPP Jobs that are accepted subsequently to the output device(s). All currently pending jobs are scheduled and printed.</u>
<u>Resume-Printer</u>	<u>Starts the IPP Printer sending IPP Jobs to the output device again.</u>
<u>Pause-Device-Now</u>	<u>Stops the output device immediately from producing marked media (current page, sheet, depending on implementation) for any job. Like the Pause button on the output device.</u>
<u>Pause-Device-After-Current-Copy</u>	<u>Stops the output device from producing marked media after the current copy of the current job.</u>
<u>Pause-Device-After-Current-Job</u>	<u>Stops the output device from producing marked media after the current job.</u>
<u>Resume-Device</u>	<u>Starts the output device processing any jobs again.</u>

1278 **ISSUE 05 - Should Pause-Printer-After-Current-Job be a new operation with a new operation-id code or be**
 1279 **a clarification of the existing IPP/1.1 Pause-Printer operation and use its operation-id? Or should the**
 1280 **Pause-Device-Now operation be a new operation-id code or be the clarification of the existing IPP/1.1**
 1281 **Pause-Printer operation and use its operation-id? Or should both Pause-Printer-After-Current-Job and**
 1282 **Pause-Device-Now be new operation-id codes and leave the IPP/1.1 Pause-Printer with its current**
 1283 **ambiguous (implementer free-for-all) semantics?**

1284 11.3.2 Pause-Printer-After-Current-Job

1285 This OPTIONAL operation allows a client to stop the Printer object from starting to send IPP jobs to any of
 1286 its output devices or subordinate Printers. If the IPP Printer is in the middle of sending an IPP job to an
 1287 output device or subordinate Printer, the IPP Printer MUST complete sending that Job. However, after
 1288 receiving this operation, the IPP Printer MUST NOT start to send any additional IPP jobs to any of its
 1289 output devices or subordinate Printers. In addition, after having received this operation, the IPP Printer
 1290 MUST NOT start processing any more jobs, so additional jobs MUST NOT enter the 'processing' state.

1291 If the IPP Printer is not sending an IPP Job to the output device or subordinate Printer (whether or not the
 1292 output device or subordinate Printer is busy processing any jobs), the IPP Printer object transitions
 1293 immediately to the 'stopped' state by setting its "printer-state" attribute to 'stopped', removing the 'moving-
 1294 to-paused' value, if present, from its "printer-state-reasons" attribute, and adding the 'paused' value to its
 1295 "printer-state-reasons" attribute.

1296 If the implementation will take appreciable time to complete sending an IPP job that it has started sending
 1297 to an output device or subordinate Printer, the IPP Printer adds the 'moving-to-paused' value to the Printer
 1298 object's "printer-state-reasons" attribute (see section [ipp-mod] 4.4.12). When the IPP Printer has
 1299 completed sending IPP jobs that it was in the process of sending, the Printer object transitions to the
 1300 'stopped' state by setting its "printer-state" attribute to 'stopped', removing the 'moving-to-paused' value, if
 1301 present, from its "printer-state-reasons" attribute, and adding the 'paused' value to its "printer-state-reasons"
 1302 attribute.

1303 This operation MUST NOT affect the acceptance of Job Creation requests (see Disable-Printer section
 1304 11.2.1).

1305 For any jobs that are 'pending' or 'pending-held', the 'printer-stopped' value of the jobs' "job-state-reasons"
 1306 attribute also applies. However, the IPP Printer NEED NOT update those jobs' "job-state-reasons"
 1307 attributes and only need return the 'printer-stopped' value when those jobs are queried using the Get-Job-
 1308 Attributes or Get-Jobs operations (so-called "lazy evaluation").

1309 ~~Whether the Pause-Printer operation affects jobs that were submitted to the device from other sources than~~
 1310 ~~the IPP Printer object in the same way that the Pause-Printer operation affects jobs that were submitted to~~
 1311 ~~the IPP Printer object using IPP, depends on implementation, i.e., on whether the IPP protocol is being used~~
 1312 ~~as a universal management protocol or just to manage IPP jobs, respectively.~~

1313 The IPP Printer MUST accept the request in any state and transition the Printer to the indicated new
 1314 "printer-state" before returning as follows:

Current "printer-state"	New "printer-state"	"printer- state- reasons"	IPP Printer's response status code and action:
'idle'	'stopped'	'paused'	'successful-ok'
'processing'	'processing'	'moving-to- paused'	OPTION 1: 'successful-ok'; Later, when all output has stopped <u>the IPP Printer has finished sending IPP jobs</u> , the "printer-state" becomes 'stopped', and the 'paused' value replaces the 'moving-to-paused' value in the "printer-state-reasons" attribute
'processing'	'stopped'	'paused'	OPTION 2: 'successful-ok'; <u>the IPP Printer wasn't in the middle of sending an IPP job to the output device</u> all device output stopped immediately
'stopped'	'stopped'	'paused'	'successful-ok'

1315 **ISSUE 06 - Or should the Printer's "printer-state" attribute be independent of the Pause Printer operations**
 1316 **so that the Pause Printer operations don't set the "printer-state" to 'stopped', i.e., the "printer-state" tries to**
 1317 **reflect 'idle', 'processing', or 'stopped' of the output device(s) as best it can independent of whether the IPP**
 1318 **Printer object is paused or not?**

1319 ~~Access Rights: The authenticated user (see [ipp-mod] section 8.3) performing this operation must be an~~
 1320 ~~operator or administrator of the Printer object (see [ipp-mod] Sections 1 and 8.5). The authenticated user~~
 1321 ~~(see [ipp-mod] section 8.3) performing this operation must be an operator or administrator of the Printer~~

1322 ~~object (see [ipp-mod] sections 1 and 8.5). Otherwise, the IPP Printer MUST reject the operation and return:~~
1323 ~~'client-error-forbidden', 'client-error-not-authenticated', or 'client-error-not-authorized' as appropriate.~~

1324 The Pause-Printer-After-Current-Job Request and Pause-Printer-After-Current-Job Response have the same
1325 attribute groups and attributes as the Pause-Printer operation (see [ipp-mod] sections 3.2.7.1 and 3.2.7.2),
1326 including the new "printer-message-from-operator" operation attribute (see section 5.1).

1327 ~~4.4.3~~11.3.3 Pause-Printer-After-All-Current-Jobs

1328 **ISSUE 07: Would a better name for Pause-Printer-After-All-Current-Jobs be Hold-Future-Jobs?**
1329 **Unfortunately, unlike Pause-Printer-After-All-Current-Jobs which gets to 'paused', the state transition**
1330 **would just be to 'idle' when all of the current jobs have completed? But what operation would undo this**
1331 **condition? Do-Not-Hold-Future-Jobs, Release-All-Jobs? Or how about having a single Schedule-Jobs**
1332 **operation that has a parameter that says whether to hold all future jobs or not?**

1333 This OPTIONAL operation allows a client to complete the current 'pending' IPP Jobs but not start
1334 processing any subsequently received IPP Jobs. If the IPP Printer is in the middle of sending an IPP job to
1335 an output device or subordinate Printer, the IPP Printer MUST complete sending that Job. Furthermore, the
1336 IPP Printer MUST send all of the current 'pending' IPP Jobs to the output device(s) or subordinate IPP
1337 Printer object(s). Any subsequently received Job Creation operations will cause the IPP Printer to put the
1338 Job into the 'pending-held' state until the Printer is resumed using the Resume-Printer operation.

1339 If the IPP Printer has no 'pending' IPP Jobs and is not sending an IPP Job to an output device or subordinate
1340 Printer (whether or not the output device or subordinate Printer is busy processing any jobs), the IPP Printer
1341 object transitions immediately to the 'stopped' state by setting its "printer-state" attribute to 'stopped',
1342 removing the 'moving-to-paused-all' value, if present, from its "printer-state-reasons" attribute, and adding
1343 the 'paused' value to its "printer-state-reasons" attribute.

1344 **ISSUE 08: Any better name than 'moving-to-paused-all' Printer state reason to distinguish Pause-Printer-**
1345 **After-All-Current-Jobs from Pause-Printer-After-Current-Job which uses 'moving-to-paused'?**

1346 If the IPP Printer has 'pending' jobs or the implementation will take appreciable time to complete sending
1347 an IPP job that it has started sending to an output device or subordinate Printer, the IPP Printer adds the
1348 'moving-to-paused-all' value to the Printer object's "printer-state-reasons" attribute (see section [ipp-mod]
1349 4.4.12). When the IPP Printer has completed sending IPP jobs that it was in the process of sending and all
1350 its 'pending' jobs, the Printer object transitions to the 'stopped' state by setting its "printer-state" attribute to
1351 'stopped', removing the 'moving-to-paused-all' value, if present, from its "printer-state-reasons" attribute,
1352 and adding the 'paused' value to its "printer-state-reasons" attribute.

1353 This operation MUST NOT affect the acceptance of Job Creation requests (see Disable-Printer section
1354 11.2.1), except to put the Jobs into the 'pending-held' state, instead of the 'pending' or 'processing' state.

1355 For any jobs that are 'pending' or 'pending-held', the 'printer-stopped' value of the jobs' "job-state-reasons"
1356 attribute also applies. However, the IPP Printer NEED NOT update those jobs' "job-state-reasons"
1357 attributes and only need return the 'printer-stopped' value when those jobs are queried using the Get-Job-
1358 Attributes or Get-Jobs operations (so-called "lazy evaluation").

1359 The IPP Printer MUST accept the request in any state and transition the Printer to the indicated new
 1360 "printer-state" before returning as follows:

<u>Current</u> <u>"printer-state"</u>	<u>New</u> <u>"printer-state"</u>	<u>"printer-</u> <u>state-</u> <u>reasons"</u>	<u>IPP Printer's response status code and action:</u>
<u>'idle'</u> <u>'processing'</u>	<u>'stopped'</u> <u>'processing'</u>	<u>'paused'</u> <u>'moving-to-</u> <u>paused-all'</u>	<u>'successful-ok'</u> <u>'successful-ok';</u> Later, when the IPP Printer has finished sending IPP jobs, the <u>"printer-state"</u> becomes <u>'stopped'</u> , and the <u>'paused'</u> value replaces the <u>'moving-to-</u> <u>paused-all'</u> value in the <u>"printer-state-reasons"</u> attribute
<u>'processing'</u>	<u>'stopped'</u>	<u>'paused'</u>	<u>'successful-ok';</u> the IPP Printer didn't have any <u>'pending'</u> jobs and wasn't in the middle of sending an IPP job to the output device
<u>'stopped'</u>	<u>'stopped'</u>	<u>'paused'</u>	<u>'successful-ok'</u>

1361 **ISSUE 09:** Or should the Printer's "printer-state" attribute be independent of the Pause Printer operations
 1362 so that the Pause Printer operations don't set the "printer-state" to 'stopped', i.e., the "printer-state" tries to
 1363 reflect 'idle', 'processing', or 'stopped' of the output device(s) as best it can independent of whether the IPP
 1364 Printer object is paused or not?

1365 Access Rights: The authenticated user (see [ipp-mod] section 8.3) performing this operation must be an
 1366 operator or administrator of the Printer object (see [ipp-mod] Sections 1 and 8.5).

1367 The Pause-Printer-After-All-Current-Jobs Request and Pause-Printer-After-All-Current-Jobs Response
 1368 have the same attribute groups and attributes as the Pause-Printer operation (see [ipp-mod] sections 3.2.7.1
 1369 and 3.2.7.2), including the new "printer-message-from-operator" operation attribute (see section 5.1).

1370 1.4.11.4 Deactivate and Activate Printer operations

1371 This section defines the OPTIONAL Deactivate-Printer and Activate-Printer operations that stop and start
 1372 the IPP Printer object from accepting all requests except queries and performing work. If either of these
 1373 operations are supported, both MUST be supported.

1374 These operations allow the operator to put the Printer into a dormant read-only condition and to take it out
 1375 of such a condition. These operations are a combination of the Deactivate and Pause operations, plus
 1376 preventing the acceptance of any other requests, except queries.

1377 The Deactivate and Activate Printer operations MUST NOT affect the submission of jobs using other job
 1378 submission protocols to the associated output device; the Deactivate and Activate Device operations (see
 1379 [ipp-set3]) are intended to stop the associated output device(s) from performing work and accepting
 1380 operations, except query operations.

1381 11.4.1 Deactivate-Printer operation

1382 This OPTIONAL operation allows a client to stop the Printer object from starting to send IPP jobs to any of
1383 its output devices or subordinate Printers (Pause-Printer-After-Current-Job) and stop the Printer object from
1384 accepting any, but query requests. The Printer performs a Disable-Printer and a Pause-Printer-After-
1385 Current-Job operation immediately, including use of all of the "printer-state-reasons" if these two
1386 operations cannot be completed immediately. In addition, the Printer MUST immediately reject all
1387 requests, except Activate-Printer, queries (Get-Printer-Attributes, Get-Job-Attributes, Get-Jobs, etc.), Send-
1388 Document, and Send-URI (so that partial job submission can be completed - see section 11.2.1) and return
1389 the 'server-error-service-unavailable' status code.

1390 The IPP Printer MUST accept the request in any state. Immediately, the Printer MUST set the 'printer-
1391 deactivated' value in its "printer-state-reasons" attribute.

1392 Access Rights: The authenticated user (see [ipp-mod] section 8.3) performing this operation must be an
1393 operator or administrator of the Printer object (see [ipp-mod] Sections 1 and 8.5).

1394 The Deactivate-Printer Request and Deactivate-Printer Response have the same attribute groups and
1395 attributes as the Pause-Printer operation (see [ipp-mod] sections 3.2.7.1 and 3.2.7.2), including the new
1396 "printer-message-from-operator" operation attribute (see section 5.1).

1397 ~~1.1.2~~ 11.4.2 Activate-Printer operation

1398 This OPTIONAL operation allows a client to undo the effects of the Deactivate-Printer, i.e., allow the
1399 Printer object to start sending IPP jobs to any of its output devices or subordinate Printers (Pause-Printer-
1400 After-Current-Job) and start the Printer object from accepting any requests. The Printer performs an
1401 Enable-Printer and a Resume-Printer operation immediately. In addition, the Printer MUST immediately
1402 start accepting all requests.

1403 The IPP Printer MUST accept the request in any state. Immediately, the Printer MUST immediately
1404 remove the 'printer-deactivated' value from its "printer-state-reasons" attribute.

1405 Access Rights: The authenticated user (see [ipp-mod] section 8.3) performing this operation must be an
1406 operator or administrator of the Printer object (see [ipp-mod] Sections 1 and 8.5).

1407 The Activate-Printer Request and Activate-Printer Response have the same attribute groups and attributes
1408 as the Pause-Printer operation (see [ipp-mod] sections 3.2.7.1 and 3.2.7.2), including the new "printer-
1409 message-from-operator" operation attribute (see section 5.1).

1410 ~~1.5~~ 11.5 Restart-Printer, Shutdown-Printer, and Startup-Printer operations

1411 This section defines the OPTIONAL Restart-Printer, Shutdown-Printer, and Startup-Printer operations that
1412 initialize, shutdown, and startup the Printer object, respectively. Each of these operations is OPTIONAL
1413 and any combination MAY be supported.

1414 The Restart-Printer, Shutdown-Printer, and Startup-Printer operations MUST NOT affect the submission of
1415 jobs using other job submission protocols to the associated output device; the Reset-Device and Power-Off-
1416 Device operations (see [ipp-set3]) are intended to initialize or power off the associated output device(s).

1417 ~~11.2.2.3~~11.5.1 Restart-Printer operation

1418 ~~Type of registration: operation~~

1419 ~~Proposed name of this operation: Restart-Printer~~

1420 ~~Object-Target: Printer~~

1421 ~~Specification of this operation:~~

1422 This OPTIONAL operation allows a client to restart a Printer object whose operation is in need of
1423 initialization because of incorrect or erratic behavior, i.e., perform the effect of a software re-boot. The
1424 implementation MUST attempt to save any information about Jobs and the Printer object before re-
1425 initializing. However, this operation MAY have drastic consequences on the running system, so the
1426 operator should first try the Deactivate-Printer to minimize the effect on the current state of the system.
1427 The effects of previous Disable-Printer, Pause Printer, and Deactivate-Printer operations are lost.

1428 The IPP Printer MUST accept the request in any state. The Printer object MUST initialize its Printer's
1429 "printer-state" to 'idle', remove the state reasons from its "printer-state-reasons" attribute, and its "printer-is-
1430 accepting-jobs" attribute to 'true', that has previously been shutdown in standby mode (see section 11.5.2).
1431 Standby mode is indicated by the Printer's "printer-state" being 'stopped' and its "printer-state-reasons"
1432 including the 'standby' and 'paused' values. If the Printer is not in standby mode, the Printer MUST reject
1433 this operation and return the 'client error not possible' status code.

1434 ~~ISSUE 08: What state does the Printer comes back up on Restart-Printer and how can the client control?~~
1435 ~~Possible alternatives:~~

1436 ~~a. Restart-Printer always brings the Printer up Disabled ("printer-is-accepting-jobs" = 'false') and~~
1437 ~~Paused ("printer-state" = 'stopped', and "printer-state-reasons" = 'paused') which is the state that~~
1438 ~~Shutdown-Printer leaves the Printer in. Then the operator issues Enable-Printer and Resume-Printer~~
1439 ~~when want to restore normal operation. The client can automatically issues these addition 2~~
1440 ~~operations depending on GUI options. Advantages: This is the simplest to implement, allows new~~
1441 ~~states to be added without changing the Restart-Printer operation, and can have the same GUI~~
1442 ~~interface as b:~~

1443 ~~b. Add a REQUIRED operation attribute to Restart-Printer, something like "printer-condition" with~~
1444 ~~values: 'disabled-and-paused', 'enabled-and-paused', and 'enabled-and-idle'.~~

1445 ~~DENVER MEETING> There was significant confusion as to the meaning of shutdown. If a shutdown~~
1446 ~~operation halts communications to the printer a restart is not possible. It was agreed to include restart~~
1447 ~~attributes 'restart-to-standby' (requires a two-step process), 'restart-fully', and 'restart-sync'.~~

1448 ~~ACTION ITEM (Harry Lewis): make a complete proposal and submit for approval.~~

1449 ~~If the Restart-Printer operation is supported, then the Shutdown-Printer operation MUST be supported,~~
1450 ~~since the Restart-Printer operation is meaningful only after a Shutdown-Printer operation has been~~
1451 ~~performed. However, if the Shutdown-Printer operation is supported, the Restart-Printer NEED NOT be~~
1452 ~~supported.~~

1453 ~~Issue 09: Why? This is backward, if you ask me (HRL).~~

1454 ~~Denver meeting> Consider "shutdown-attributes" similar to Windows "shutdown". Like:~~

1455 ~~—Completely power off (walk to printer to bring it back up~~

1456 ~~—Power off but listen for "restart"—shutdown to standby~~

1457 ~~Denver meeting> Also consider restart attributes:~~

1458 ~~—Restart to Standby (disabled and paused) (two step bring up)~~

1459 ~~—Restart (fully):~~

1460 ~~—Restart sych~~

1461 *Access Rights:* The authenticated user (see [ipp-mod] section 8.3) performing this operation must be an
1462 operator or administrator of the Printer object (see [ipp-mod] Sections 1 and 8.5).~~Authentication and access~~
1463 ~~control (see [ipp-mod] sections 1, 8.3, and 8.5) apply to this operation.~~

1464 The Restart-Printer Request and Restart-Printer Response have the same attribute groups and attributes as
1465 the ResumePause-Printer operation (see [ipp-mod] sections 3.2.8.1 and 3.2.8.2), including the new "printer-
1466 message-from-operator" operation attribute (see section 5.1).~~and the following Group 1 operation attribute:~~

1467

1468 ~~11.2.2.4~~11.5.2 Shutdown-Printer Operation

1469 ~~Type of registration: operation~~

1470 ~~Proposed name of this operation: Shutdown-Printer~~

1471 ~~Object Target: Printer~~

1472 ~~Specification of this operation:~~

1473 This OPTIONAL operation allows a client to shutdown a Printer, i.e., stop processing jobs and make the
1474 Printer object no longer available for any operations using the IPP protocol~~power off in some~~
1475 ~~implementation-dependent manner.~~ There is no way to bring the instance of the Printer object back to
1476 being used, except for the Startup-Printer (see section 11.5.3) which starts up a new instance of the Printer
1477 object for hosted implementations. The purpose of Shutdown-Printer is to shutdown the Printer for an
1478 extended period, not to reset the device(s) or modify a Printer attribute. See Restart-Printer (section
1479 11.5.1), Startup-Printer (section), and Reset-Device [ipp-set3] for the way to initialize the software or reset
1480 the output device(s). See the Disable-Printer operation (section 11.2) for a way for the client to stop the
1481 Printer from accepting Job Creation requests without stopping processing or shutting down.

1482 The Printer ~~is disabled immediately (see the Disable-Printer operation in section 11.2).~~ ~~The Printer~~ adds the
1483 'shutdown' value (see [ipp-mod] section 4.4.11) immediately to its "printer-state-reasons" Printer
1484 Description attribute and performs a Deactivate-Printer operation (see section 11.4.1). ~~The "when"~~
1485 ~~operation attribute specifies how much processing occurs before the Printer is paused (see [ipp-mod]~~
1486 ~~section 3.2.7) and the shutdown is complete. All other requests continue to be accepted until the printer is~~
1487 ~~powered down.~~

1488 ~~ISSUE 10—Need to look at life cycle of the Printer versus standby/power down and the other operations~~
1489 ~~that can be accepted. There can be appreciable time between acceptance of this operation and when the~~
1490 ~~final state of the printer, either standby or powered down is reached. Is it ok for non-submission operations~~
1491 ~~to continue to be accepted during this time? May need 'moving to shutdown'. What about 'moving to~~
1492 ~~standby'?~~

1493 ~~TH> Add 'moving to shutdown' which the Shutdown-Printer sets~~
1494 ~~immediately (analogous to 'moving to paused'). Then the 'shutdown'~~
1495 ~~values means that the shutdown has completed (and is only meaningful to~~
1496 ~~a server implementation that hosts the Printer object). Thus the server~~
1497 ~~can still respond to a Get-Printer-Attributes operation after the~~
1498 ~~Printer is shutdown as stated in IPP/1.1.~~

1500 ~~HRL> Is this granularity really achievable enough of a wide enough~~
1501 ~~variety of environments to be reliable or, in reality, will this be~~
1502 ~~implementation dependent?~~

1503 ~~Whether or not the Shutdown-Printer operation affects jobs that were submitted to the device using job~~
1504 ~~submission protocols other than IPP, depends on implementation, i.e., on whether the IPP protocol is being~~
1505 ~~used as a universal management protocol or just to manage IPP jobs, respectively. See "printer-controls-~~
1506 ~~other-protocols" (section 1.1).~~

1507 The Printer object MUST accept this operation in any state and transition the Printer object through the
1508 "printer-states" and "printer-state-reasons" defined for the Deactivate-Printer operation until the activity is
1509 completed and the Printer object disappears. ~~to the 'idle' state.~~

1510 *Access Rights:* The authenticated user (see [ipp-mod] section 8.3) performing this operation must be an
1511 operator or administrator of the Printer object (see [ipp-mod] Sections 1 and 8.5). ~~Authentication and access~~
1512 ~~control (see [ipp-mod] sections 1, 8.3, and 8.5) apply to this operation.~~

1513 The Shutdown-Printer Request and Shutdown-Printer Response have the same attribute groups and
1514 attributes as the Pause-Printer operation (see [ipp-mod] sections 3.2.7.1 and 3.2.7.2), including the new
1515 "printer-message-from-operator" operation attribute (see section 5.1). ~~and with the addition of the~~
1516 ~~following Group 1 operation attributes in the request:~~

1517 "when" (type2 keyword)

1518 ~~The client OPTIONALLY supplies this attribute. The Printer object OPTIONALLY supports this~~
1519 ~~attribute, if it supports this operation. The value of this attribute indicates when to pause the printer.~~
1520 ~~If the client omits this attribute, the Printer assumes the 'after-current-job' value. The 'after-current-~~
1521 ~~job' value is REQUIRED to be supported if the "when" attribute is supported; the remaining values~~
1522 ~~are OPTIONAL.~~

1523 ~~Note: There is no way to query to see which values of the "when" attribute are supported for this or~~
1524 ~~any other operation. Since this operation is intended for Operators, rather than End-Users, it did not~~
1525 ~~seem necessary to provide the means to query the supported values.~~

1526
1527 Standard keyword values are:

1528 'now'—cancel the currently printing job(s) and shutdown the Printer. Jobs in the 'held' and
1529 'pending' state remain in those states.

1530 'after-current-job'—shutdown the Printer after the current job finishes printing (all its copies).
1531 Jobs in the 'held' and 'pending' state remain in those states.

1532 'after-all'—shutdown the Printer after all 'pending' jobs finish printing. Jobs in the 'held' state
1533 remain in the 'held' state.

1534 ISSUE 11—Ok to remove the 'after-current-copy' value from Shutdown-Printer?

1535
1536 ISSUE 12—Ok to have removed the "shutdown-function" operation attribute with values
1537 'stand-by' vs. 'power-off' Shutdown-Printer on the grounds that for the Printer object
1538 they have no meaning. Power-off is for the Shutdown-Device operation.

1539 "synchronize" (boolean)

1540 ~~The client OPTIONALLY supplies this attribute. The Printer object OPTIONALLY supports this~~
1541 ~~attribute. This attribute indicates whether or not the printer is to synchronize the checkpoint data for~~
1542 ~~the current job ("when" = 'now') with the pages that have actually printed. If the value of the "when"~~
1543 ~~attribute is not 'now' or the "when" attribute is not supplied, then the "synchronize" attribute has no~~
1544 ~~meaning and the Printer MUST ignore it. If this attribute is supported, then a value of 'true' implies~~
1545 ~~that the Printer will be able to resume the job at the point of synchronization when the Printer is~~
1546 ~~restarted. If the implementation does not support resuming a job (either automatically or with the~~
1547 ~~Resume Job operation) after a Shutdown-Printer with "when" = 'now', then it does not implement~~
1548 ~~this attribute. In this case, check-pointing implies that the job may be resumed in the future, exactly~~
1549 ~~from the point and in the state and resource context from which it left off.~~

1551

1552 ~~If the Printer supports this attribute but the client does not supply it, the Printer is assumed to~~
1553 ~~perform synchronization ('true' behavior). If the Printer does not support this attribute, the Printer is~~
1554 ~~assumed to not synchronize ('false' behavior).~~

1555

1556

1557 ~~ISSUE 13: Is the current job automatically restarted when the Printer is restarted? Or does some~~
1558 ~~client have to issue a Restart-Job operation?~~

1559 11.5.3 Startup-Printer operation

1560 This OPTIONAL operation allows a client to startup an instance of a Printer object, provided that there isn't
1561 already one instantiated. The purpose of Startup-Printer is to allow a hosted implementation of the IPP
1562 Printer object to be started after the host is available (by means outside this document). See Restart-Printer
1563 (section 11.5.1) and Reset-Device [ipp-set3] for the way to initialize the software or reset the output
1564 device(s) when the IPP Printer object has already been instantiated.

1565 The host MUST accept this operation only when the Printer object has not been instantiated. If the Printer
1566 object already exists, the host must return the 'client-error-not-possible' status code.

1567 The result of this operation MUST be with the Printer object's "printer-state" set to 'idle', the state reasons
1568 removed from its "printer-state-reasons" attribute, and its "printer-is-accepting-jobs" attribute set to 'true'.

1569 Access Rights: The authenticated user (see [ipp-mod] section 8.3) performing this operation must be an
1570 operator or administrator of the Printer object (see [ipp-mod] Sections 1 and 8.5).

1571 The Shutdown-Printer Request and Shutdown-Printer Response have the same attribute groups and
1572 attributes as the Pause-Printer operation (see [ipp-mod] sections 3.2.7.1 and 3.2.7.2), including the new
1573 "printer-message-from-operator" operation attribute (see section 5.1).

1574

1575 12 Definition of the Set2 Job Operations

1576 All Job operations are directed at Job objects. A client MUST always supply some means of identifying the
1577 Job object in order to identify the correct target of the operation. That job identification MAY either be a
1578 single Job URI or a combination of a Printer URI with a Job ID. The IPP object implementation MUST
1579 support both forms of identification for every job.

1580 The Set2 Job Operations are summarized in Table 5~~Table 5~~:

1581 **Table 5 - Job operation Operation-Id assignments**

Operation Name	Operation-Id	Brief description
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 <u>Suspend</u> -Current-Job	0x??	Pauses <u>Suspends</u> 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

1582

1583 ~~12.1~~12.1 Set-Job-Attributes

1584 ~~Type of registration: operation~~
1585 ~~Proposed name of this operation: Set Job Attributes~~
1586 ~~Object Target: Job~~
1587 ~~Specification of this operation:~~

1588 This OPTIONAL operation allows a client to set the values of the attributes of a Job object. In the request,
1589 the client supplies the set of Job attribute names and values that are to be set. In the response, the IPP
1590 object returns success or rejects the request with indications of which attribute or attributes could not be set.

1591 This operation is almost identical to the Set-Printer-Attributes operation (see section 11.1). The only
1592 differences are that the Set-Job-Attributes operation is directed at a Job object rather than a Printer object,
1593 there is no "document-format" operation attribute used when setting a Job object, and the validation is the
1594 same as the create job operations, i.e., depends on the "xxx-supported" Printer Description attributes.

1595 The validation of the Set-Job-Attributes request is performed as if the job had been submitted originally
 1596 with the new values and with "ipp-attribute-fidelity" set to 'true', i.e., all modified attributes **MUST** be
 1597 supported along with the attributes not modified. If such a create job operation would have been accepted,
 1598 then the Set-Job-Attributes **MUST** be accepted. If such a create job operation would have been rejected,
 1599 then the Set-Job-Attributes **MUST** be rejected and the Job **MUST** be unchanged.

1600 The IPP object **MUST** accept or reject the request based on the job's current state and transition the job to
 1601 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'

1602 [4.1.12.1.1](#) 12.1.1 Settable and READ-ONLY Job Description attributes

1603 If the Printer supports the "job-message-from-operator" Job Description attribute (see [ipp-mod] section
 1604 4.3.16) and the client explicitly supplies a new value for the "job-message-from-operator" in the request,
 1605 then the Printer **MUST** set the "job-message-from-operator" Job attribute to this new value.

1606 If the Printer supports the Set-Job-Attributes operation, then it **SHOULD** support setting of:
 1607 all Job Template ("xxx") attributes (see [ipp-mod] section 4.2 and extensions)
 1608 that the implementation supports.

1609 The following Job Description attributes (see [ipp-mod] section 4.3) **MUST NOT** be settable, i.e., they are
 1610 READ-ONLY:

1611 job-uri
1612 job-id
1613 job-printer-uri
1614 job-more-info
1615 job-originating-user-name - set in create operation
1616 job-state
1617 job-state-reasons
1618 job-state-message
1619 number-of-documents
1620 output-device-assigned
1621 time-at-creation
1622 time-at-processing
1623 time-at-completed
1624 job-printer-up-time
1625 date-time-at-creation
1626 date-time-at-processing
1627 date-time-at-completed
1628 number-of-intervening-jobs
1629 job-k-octets
1630 job-k-octets-processed
1631 job-impressions-completed
1632 job-media-sheets-completed
1633 attributes-charset - set in Job Creation operation
1634 attributes-natural-language - set in Job Creation operation

1635 The following Set2 Job Description attributes are READ-ONLY:

1636 original-requesting-user-name - set in Job Creation operation

1637 Note: From now on, all extensions that define new object attributes will indicate whether or not they are
1638 READ-ONLY, by including the "READ-ONLY" adjective in their descriptions. If "READ-ONLY" is
1639 omitted, it is assumed that the attribute MAY be settable by the appropriate Set-Xxx operation.

1640 The remaining Job Description attributes MAY be settable using the Set-Job-Attributes operation,
1641 depending on implementation.

1642 ~~Whether or not the Set Job Attributes operation affects jobs that are submitted using job submission~~
1643 ~~protocols other than IPP, depends on implementation, i.e., on whether the IPP protocol is being used as a~~
1644 ~~universal management protocol or just to manage IPP jobs, respectively. See "printer-controls-other-~~
1645 ~~protoeols" (section 1.1).~~

1646 *Access Rights:* The authenticated user (see [ipp-mod] section 8.3) performing this operation must either be
1647 the job owner (as determined in the Job Creation operation) or an operator or administrator of the Printer
1648 object (see [ipp-mod] Sections 1 and 8.5). Authentication and access control (see [ipp-mod] sections 1, 8.3,
1649 and 8.5) apply to this operation.

1650 ~~1.1.2~~12.1.2 Set-Job-Attributes Request

1651 The following sets of attributes are part of the Set-Job-Attributes Request:

1652 Group 1: Operation Attributes

1653 Natural Language and Character Set:

1654 The "attributes-charset" and "attributes-natural-language" attributes as described in [ipp-mod]
1655 section 3.1.4.1.

1656

1657 Target:

1658 Either (1) the "printer-uri" (uri) plus "job-id" (integer(1:MAX)) or (2) the "job-uri" (uri) operation
1659 attribute(s) which define the target for this operation as described in [ipp-mod] section 3.1.5.

1660

1661 Requesting User Name:

1662 The "requesting-user-name" (name(MAX)) attribute SHOULD be supplied by the client as
1663 described in [ipp-mod] section 8.3.

1664

1665

1666 Group 2: Job Attributes

1667 The client MUST supply a set of Job attributes as defined in [ipp-mod] section 4.2 Job Template
1668 Attributes ("xxx" attributes), ~~and~~ section 4.3 Job Description Attributes, **and any attribute extensions**
1669 **supported by the Printer**. Each Job attribute supplied in Group 2 replaces the value(s) of the
1670 corresponding Job attribute on the target Job object. For attributes that can have multiple values
1671 (1setOf), all values supplied by the client replace all values of the corresponding Job object
1672 attribute.

1673

1674 ~~4.1.3~~ **12.1.3** Set-Job-Attributes Response

1675 The Printer object returns the following sets of attributes as part of the Set-Job-Attributes Response:

1676 Group 1: Operation Attributes

1677 Status Message:

1678 In addition to the REQUIRED status code returned in every response, the response OPTIONALLY
1679 includes a "status-message" (text(255)) and/or a "detailed-status-message" (text(MAX)) operation
1680 attribute as described in [ipp-mod] sections 13 and 3.1.6.

1681

1682 Natural Language and Character Set:

1683 The "attributes-charset" and "attributes-natural-language" attributes as described in [ipp-mod]
1684 section 3.1.4.2.

1685

1686 Group 2: Unsupported Attributes

1687 See [ipp-mod] section 3.1.7 for details on returning Unsupported Attributes.

1688

1689 ~~The attributes returned are the same as for the create operation with the same new attribute values.~~

1690 In the case of attributes that are supported, but are not settable by the implementation, i.e., are not
1691 among the values of the Printer's "**job**-settable-attributes" Printer Description attribute (see section

1692 6.1), the Printer object returns the client-supplied attribute(s) with a substituted out-of-band value of
1693 'not-~~settable~~supported' (see section 10.1) (~~same out-of-band value as for attributes that are not~~
1694 ~~supported~~). This value's syntax type is "out-of-band" and its encoding is defined by special rules for
1695 "out-of-band" values in the "Encoding and Transport" document [IPP-PRO]. Its value indicates that
1696 the attribute is supported, but is either not settable ~~or is not supported at all~~.

1697

1698 [4.2.12.2](#) Reprocess-Job Operation

1699 This OPTIONAL operation is a create job operation that allows a client to re-process a copy of a job that
1700 had been retained in the queue after processing completed, was canceled, or was aborted (see [ipp-mod]
1701 section 4.3.7.2). This operation is the same as the Restart-Job operation (see [ipp-mod] section 3.3.7),
1702 except that the Printer creates a new job that is a copy of the target job and the target job is unchanged. The
1703 new job is assigned new values to the "job-uri" and "job-id" attributes and the new job's Job Description
1704 attributes that accumulate job progress, such as "job-impressions-completed", "job-media-sheets-
1705 completed", and "job-k-octets-processed", are initialized to 0 as with any create job operation. The target
1706 job moves to the Job History after a suitable period, independent of whether one or more Reprocess-Job
1707 operations have been performed on it.

1708 If the Set-Job-Attributes operation is supported, then the "job-hold-until" operation attribute MUST be
1709 supported with at least the 'indefinite' value, so that a client can modify the new job before it is scheduled
1710 for processing using the Set-Job-Attributes operation. After modifying the job, the client can release the
1711 job for processing, by using the Release-Job operation specifying the newly assigned "job-uri" or "job-id"
1712 for the new job.

1713

1714 [12.3](#) Cancel-Current-Job Operation

1715 This OPTIONAL operation allows a client to cancel the current job on the target Printer or the specified job
1716 if it is the current job on the Printer. See [ipp-mod] section 3.3.3 for the semantics of canceling a job.
1717 Since a Job might already be marking by the time a Cancel-Current-Job is received, some media sheet
1718 pages might be printed before the job is actually terminated.

1719 **ISSUE 10: Should Cancel-Current-Job really be moved to Set3 as a Device operation, i.e., Cancel-Current-**
1720 **Device-Job or do we need both a Printer and a Device operation that cancels the current job?**

1721 If the client does not supply a "job-id" operation attribute, the Printer MUST accept the request and cancel
1722 the current job if there is a current job in the 'processing' or 'processing-stopped' state; otherwise, it MUST
1723 reject the request and return the 'client-error-not-possible' status code. If more than one job is in the
1724 'processing' or 'processing-stopped' states, the one that is marking is canceled and the others are unaffected.

1725 Warning: On a shared printer, there is a race condition. Between the time that a user issues this operation
1726 and its acceptance, the current job might change to a different job. If the user or operator is authenticated to
1727 cancel the new job, the wrong job is canceled. To prevent this race from canceling the wrong job, the client
1728 MAY supply the "job-id" operation attribute which is checked against the current job's job-id. If the job
1729 identified by the "job-id" attribute is not the current job on the Printer, i.e., is not in the 'processing' or
1730 'processing-stopped' states, the Printer MUST reject this operation and return the 'client-error-not-possible'
1731 status code. Otherwise, the Printer cancels the specified job.

1732 *Access Rights:* The authenticated user (see [ipp-mod] section 8.3) performing this operation must either be
1733 the job owner (as determined in the Job Creation operation) or an operator or administrator of the Printer
1734 object (see [ipp-mod] Sections 1 and 8.5). ~~Authentication and access control (see [ipp-mod] sections 1, 8.3,~~
1735 ~~and 8.5) apply to this operation.~~

1736 The Cancel-Current-Job Request and Cancel-Current-Job Response have the same attribute groups and
1737 attributes as the Resume-Printer operation (see [ipp-mod] section 3.2.8), including the new "job-message-
1738 from-operator" operation attribute (see section 5.2), with the addition of the following Group 1 Operation
1739 attributes in the request:

1740 "job-id" (integer(1:MAX)):

1741 The client OPTIONALLY supplies this Operation attribute in order to verify that the identified job
1742 is still the current job on the target Printer object. The IPP object MUST support this operation
1743 attribute, if it supports this operation.

1744

1745 [1.4.12.4 Suspend and Resume Job operations](#)

1746 This section defines the Suspend-Current-Job and Resume-Job operations. These operations allow an
1747 operator or user to suspend a job while it is processing and allow other jobs to be processed and the resume
1748 the suspended job at a later point in time without losing any of the output.

1749 If either of these operations is supported, they both MUST be supported.

1750 The Hold-Job and Release-Job operations ([ipp-mod] section 3.3.5) are for holding and releasing held jobs,
1751 not suspending and resuming suspended jobs.

1752 [1.4.12.4.1 Suspend](#)~~Pause~~-Current-Job operation

1753 ~~ISSUE 14—Since the semantics of Pause-Current-Job is different from Pause-Printer, in that other jobs are~~
1754 ~~processed, while this job is stopped, should we have a different name for the verb, such as Suspend-~~
1755 ~~Current-Job, instead of Pause-Current-Job. Otherwise, users may be mistakenly think that the printer is~~
1756 ~~paused when the job is paused. If the name is changes, then the 'job-paused' job state reason would also be~~
1757 ~~changed to 'job-suspended'.~~

1758 This OPTIONAL operation allows a client to stop the current job on the target Printer or the specified job if
1759 it is the current job on the Printer, and allow other jobs to be processed instead. The Printer moves the
1760 current job or the target job to the 'processing-stopped' state and sets the 'job-~~paused~~suspended' value (see
1761 section 8.1) in the job's "job-state-reasons" attribute and processes other jobs.

1762 If the client does not supply a "job-id" operation attribute, the Printer MUST accept the request and ~~pause~~
1763 suspend the current job if there is a current job in the 'processing' or 'processing-stopped' state; otherwise, it
1764 MUST reject the request and return the 'client-error-not-possible' status code. If more than one job is in the
1765 'processing' or 'processing-stopped' states, all of them are ~~paused~~suspended.

1766 Warning: On a shared printer, there is a race condition. Between the time that a user issues this operation
1767 and its acceptance, the current job might change to a different job. If the user or operator is authenticated to
1768 ~~pause~~suspend the new job, the wrong job is ~~paused~~suspended. To prevent this race from pausing the wrong
1769 job, the client MAY supply the "job-id" operation attribute which is checked against the current job's job-id.
1770 If the job identified by the "job-id" attribute is not the current job on the Printer, i.e., is not in the
1771 'processing' or 'processing-stopped' states, the Printer MUST reject this operation and return the 'client-
1772 error-not-possible' status code. Otherwise, the Printer ~~pause~~suspends the specified job and processed other
1773 jobs.

1774 ~~A paused job is resumed using the Resume-Job operation (see section 12.5). If the Pause-Current-Job~~
1775 ~~operation is supported, then the Resume-Job operation MUST be supported, and vice-versa.~~

1776 The Printer MUST reject a ~~Release~~Resume-Job request (and return the 'client-error-not-possible') for a job
1777 that has been ~~pause~~suspended, i.e., for a job in the 'processing-stopped' state, with the 'job-~~pause~~suspended'

1778 value in its "job-state-reasons" attribute. ~~The Hold Job and Release Job operations are for holding and~~
1779 ~~releasing held jobs, not pausing and resuming paused jobs.~~

1780 ~~ISSUE 15—Ok for Pause Job to reject a request for a Job that is already paused (like Cancel Job), instead~~
1781 ~~of accepting the request?~~

1782 *Access Rights:* ~~The authenticated user (see [ipp-mod] section 8.3) performing this operation must either be~~
1783 ~~the job owner (as determined in the Job Creation operation) or an operator or administrator of the Printer~~
1784 ~~object (see [ipp-mod] Sections 1 and 8.5). Authentication and access control (see [ipp-mod] sections 1, 8.3,~~
1785 ~~and 8.5) apply to this operation.~~

1786 The ~~PauseSuspend~~-Current-Job Request and ~~PauseSuspend~~-Current-Job Response have the same attribute
1787 groups and attributes as the ~~ResumePause~~-Printer operation (see [ipp-mod] section 3.2.8), including the
1788 new "job-message-from-operator" operation attribute (see section 5.2), with the addition of the following
1789 Group 1 Operation attributes in the request:

1790 "job-id" (integer(1:MAX)):

1791 The client OPTIONALLY supplies this Operation attribute in order to verify that the identified job
1792 is still the current job on the target Printer object. The IPP object MUST support this operation
1793 attribute, if it supports this operation.

1794 ~~"when" (type2 keyword)~~

1795 ~~The client OPTIONALLY supplies this attribute. The Printer object OPTIONALLY supports this~~
1796 ~~attribute, if it supports this operation. The value of this attribute indicates when to pause the printer.~~
1797 ~~If the client omits this attribute, the Printer assumes the 'after current copy' value. The 'after-~~
1798 ~~current copy' value is REQUIRED to be supported if the "when" attribute is supported; the~~
1799 ~~remaining values are OPTIONAL.~~

1800 ~~Note: There is no way to query to see which values of the "when" attribute are supported for this or~~
1801 ~~any other operation. Since this operation is intended for Operators, rather than End-Users, it did not~~
1802 ~~seem necessary to provide the means to query the supported values.~~

1803
1804 Standard keyword values are:

1805 'now'—~~pause the current Job immediately, while the current Job is processing.~~

1806 'after current copy'—~~pause the current Job after the current Job finishes printing its current~~
1807 ~~copy.~~

1808 ~~ISSUE 16—Ok that the only values for the "when" operation attribute for the Pause Current Job are~~
1809 ~~'now' and 'after current copy' with 'now' being the default and REQUIRED?~~

1810
1811 ~~"synchronize" (boolean)~~

1812 ~~The client OPTIONALLY supplies this attribute. The Printer object OPTIONALLY supports this~~
1813 ~~attribute. This attribute indicates whether or not the printer is to synchronize the checkpoint data for~~
1814 ~~the current job being paused with the pages that have actually printed. If this attribute is supported,~~
1815 ~~then a value of 'true' implies that the Printer will be able to resume the job at the point of~~
1816 ~~synchronization when the job is resumed.~~

1817

1818 ~~If the Printer supports this attribute but the client does not supply it, the Printer is assumed to~~
1819 ~~perform synchronization ('true' behavior). If the Printer does not support this attribute, the Printer is~~
1820 ~~assumed to not synchronize ('false' behavior).~~

1821

1822 ~~1.1.2~~12.4.2 Resume-Job operation

1823 This OPTIONAL operation allows a client to resume the target job at the point where it was
1824 ~~paused~~suspended. The Printer moves the target job to the 'pending' state and removes the 'job-~~paused~~'
1825 suspended' value from the job's "job-state-reasons" attribute.

1826 If the target job is not in the 'processing-stopped' state with the 'job-~~paused~~'suspended' value in the job's
1827 "job-state-reasons" attribute, the Printer rejects the request and returns the 'client-error-not-possible' status
1828 code, since the job was not ~~paused~~suspended.

1829 ~~ISSUE 17—Ok to return an error (like Cancel Job), rather than having Resume Job accept the request even
1830 if the Job is already resumed (i.e., not paused)?~~

1831 ~~If the Resume Job operation is supported, then the Pause Current Job operation MUST be supported, and
1832 vice versa.~~

1833 *Access Rights:* ~~The authenticated user (see [ipp-mod] section 8.3) performing this operation must either be
1834 the job owner (as determined in the Job Creation operation) or an operator or administrator of the Printer
1835 object (see [ipp-mod] Sections 1 and 8.5). Authentication and access control (see [ipp-mod] sections 1, 8.3,
1836 and 8.5) apply to this operation.~~

1837 The Resume-Job Request and Resume-Job Response have the same attribute groups and attributes as the
1838 Release-Job operation (see [ipp-mod] section 3.3.6), including the new "job-message-from-operator"
1839 operation attribute (see section 5.2).

1840

1841 [4.5.12.5](#) Promote-Job operation

1842 This OPTIONAL operation allows a client to make the pending target job be processed next after the
1843 current job completes. This operation is specially useful in a production printing environment where the
1844 operator is involved in job scheduling.

1845 If the target job is in the 'pending' state, this operation does not change the job's state, but causes the job to
1846 be processed after the current job(s) complete. If the target job is not in the 'pending' state, the Printer
1847 rejects the request and returns the 'client-error-not-possible' status code. The Printer returns the target job
1848 immediately after the current job(s) in a Get-Jobs response (see [ipp-mod] section 3.2.6) for the 'not-
1849 completed' jobs.

1850 When the current job completes, is canceled, ~~paused~~[suspended](#), or aborted, the target of this operation is
1851 processed next.

1852 If a client issues this request (again) before the target of the operation of the original request started
1853 processing, the target of this new request is scheduled before the previous job that was to be processed next.

1854 ~~Note:~~IPP is specified not to require queues for job scheduling, since there are other implementation
1855 [techniques](#) for scheduling multiple jobs, [such as re-evaluating a criteria function for each job on a](#)
1856 [scheduling cycle](#). However, if an implementation does implement queues for jobs, then the Promote-Job
1857 puts the specified job at the front of the queue. A subsequent Promote-Job before the first job starts
1858 processing puts that specified job at the front of the queue, so that it is "in front" of the previously promoted
1859 job.

1860 *Access Rights:* [The authenticated user \(see \[ipp-mod\] section 8.3\) performing this operation must be an](#)
1861 [operator or administrator of the Printer object \(see \[ipp-mod\] Sections 1 and 8.5\).](#)~~Authentication and access~~
1862 ~~control (see [ipp-mod] sections 1, 8.3, and 8.5) apply to this operation.~~

1863 The Promote-Job Request and Promote-Job Response have the same attribute groups and attributes as the
1864 Cancel-Job operation (see [ipp-mod] section 3.3.3), including the new "job-message-from-operator"
1865 operation attribute (see section 5.2).

1866

1867 13 IANA Considerations

1868 The operations and attributes in this registration proposal will be published by IANA according to the
1869 procedures in RFC 2566 [rfc2566] section 6.4 for operations with the following URL:

1870 <ftp.isi.edu/iana/assignments/ipp/operations/set2.txt>

1871 14 Internationalization Considerations

1872 This document has the same localization considerations as the [ipp-mod].

1873 15 Security Considerations

1874 The IPP Model and Semantics document [ipp-mod] discusses high level security requirements (Client
1875 Authentication, Server Authentication and Operation Privacy). Client Authentication is the mechanism by
1876 which the client proves its identity to the server in a secure manner. Server Authentication is the mechanism
1877 by which the server proves its identity to the client in a secure manner. Operation Privacy is defined as a
1878 mechanism for protecting operations from eavesdropping.

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1905 17 References

1906 [ipp-mod]

1907 R. deBry, T. Hastings, R. Herriot, S. Isaacson, P. Powell, "Internet Printing Protocol/1.0: Model and
1908 Semantics", <draft-ietf-ipp-model-v11-03.txt>, June, 1999.

1909 [RFC2566]

1910 R. deBry, T. Hastings, R. Herriot, S. Isaacson, P. Powell, "Internet Printing Protocol/1.0: Model and
1911 Semantics", RFC 2566, April 1999.

1912 18 Change History

1913 This section summarizes the changes. Each sub-section is in reverse chronological order. Adding or
1914 removing ISSUES that don't change the document are not listed here.

1915 [1.18.1 Changes to the November 16, 1999 version to make the December 8, 1999 version](#)

1916 The following changes to the November 16, 1999 version to make the December 8, 1999 version as a result
1917 of the IPP WG telecons and mailing list discussion:

1918 1. Introduced the separation of Printer operation from Device operations. Removed the "printer-controls-
1919 other-protocols" (boolean) Printer Description attribute. Printer operations affect only IPP jobs and
1920 objects, while the Device operations affect the output device. Set2 has the Printer operations and Set3
1921 has the Device operations. But do both sets of operations with only the Printer object and only the
1922 "printer-uri" target.

1923 2. Remove the "when" operation attribute and added distinct Pause operations instead: Pause-Printer-
1924 After-Current-Job (IPP/1.1 Pause-Printer clarified), Pause-Printer-After-All-Current-Jobs

1925 3. Added Deactivate-Printer and Activate-Printer which do Disable-Printer, Pause-Printer-After-Current-
1926 Job, and only allow query, Send-Document, Send-URI, and Activate-Printer operations. This is a
1927 clearer "shutdown" that can be brought back up using the protocol.

1928 4. Clarified that Shutdown-Printer cannot be brought back via the protocol, though added Startup-Printer
1929 for hosted implementations to instantiate a fresh copy of the Printer object.

1930 5. Changed the name of Pause-Current-Job to Suspend-Current-Job, since other jobs can be processed on
1931 the Printer (unlike Pause-Printer).

- 1932 [6. Added the Terminology section](#)
- 1933 [7. Added the Requirements and Use Cases section](#)
- 1934 [8. Added pictures of chained Printers, Printer fan-out, and Printer fan-in.](#)
- 1935 [9. Added the concept of subordinate Printers and the "subordinate-printers-supported" \(1setOf uri\) Printer](#)
1936 [Description attribute to describe the configuration.](#)
- 1937 [10. Added the forwarding rules: IPP Printer objects MUST NOT forward Printer operations to subordinate](#)
1938 [IPP Printer objects, except for the chained Printer configuration. IPP Printer objects MUST forward](#)
1939 [Job operations to the intended Job object.](#)
- 1940 [11. Removed the "synchronize" operation attribute from all operations.](#)
- 1941 [12. Renamed 'standby' to 'deactivated' Printer state reason.](#)
- 1942 [13. Added 'moving-to-paused-all' Printer state reason for use with Pause-Printer-After-All-Current-Jobs](#)
- 1943 [14. Added 'printer-deactivated' Printer state reason for use with Deactivate-Printer.](#)
- 1944 [15. Renamed job-paused' to 'job-suspended' to go with the rename Suspend-Current-Job operation.](#)
- 1945 [16. Renamed 'server-error-printer-is-in-standby-mode' status code to 'server-error-printer-is-deactivate'.](#)
- 1946 [17. Grouped attributes that come in pairs.](#)
- 1947 [18. Changed Shutdown-Printer so that there is no operation to come back to life, except Startup-Printer](#)
1948 [which starts a new instance \(but there can only be one instance per Printer object\).](#)
- 1949 18.2 Changes to the November 1, 1999 version to make the November 16, 1999 version
- 1950 [The following changes to the October 22, 1999 version to make the November 1, 1999 version as a result of](#)
1951 [the IPP WG meeting in Durham, 10/99:](#)
- 1952 1. Formally defined IPP Printer fan-out, IPP Printer fan-in, and output device fan-out. Added figures to
1953 show IPP Printer fan-out and IPP Printer fan-in.
- 1954 2. Added "parent-printers-supported (1setOf uri) Printer Description attribute to point back up the Printer
1955 hierarchy.
- 1956 3. Added the requirements for forwarding operations that affect Jobs and for not forwarding operations
1957 that affect Printers.
- 1958 4. Added "original-requesting-user-name" (name(MAX)) to represent the original end user, not the parent
1959 Printer's host.

- 1960 5. Changed the default for "when" for the Pause-Printer operation from 'after-current-job' to 'now', since
1961 that is the behavior in IPP/1.1 where the "when" operation attribute is not defined.
- 1962 6. Allowed a non-leaf Printer to have only one subordinate Printer.
- 1963 7. Changed most of the "parent" Printer terminology to "non-leaf" Printer to contrast more clearly with
1964 "leaf" Printer objects. The term "parent" is only used when talking about a subordinate's immediate
1965 parent Printer object.
- 1966 8. Added "original-requesting-user-name" (name (MAX)) to the list of READ-ONLY Job Description
1967 attributes.
- 1968 18.3 Changes to the October 22, 1999 version to make the November 1, 1999 version
- 1969 The following changes to the October 22, 1999 version to make the November 1, 1999 version as a result of
1970 the IPP WG meeting in Durham, 10/99:
- 1971 1. Removed the Reset-Printer, Non-Process-Run-Out, and Space-Current-Job operations from this Set2
1972 spec and moved them to a new Set3 spec for use with the new Device object, renaming them
1973 appropriately, to Reset-Device, Non-Process-Run-Out-Device, and Space-Device.
- 1974 2. Added the concept of parent and subordinate Printer objects to formally represent fan-out. Mentioned
1975 the Device object that is in a new [ipp-set3] spec.
- 1976 3. Distributed the definition of the "when" operation attribute to the Pause-Printer (IPP/1.1), Shutdown-
1977 Printer, and Pause-Current-Job operations and listed the values that are appropriate to that operation
1978 only:
1979 Pause-Printer: 'now', 'after-current-copy', 'after-current-job' (default), and 'after-all'.
1980 Shutdown-Printer: 'now', 'after-current-job' (default), and 'after-all'
1981 Pause-Current-Job: 'now', 'after-current-copy' (default)
- 1982 4. Deleted the "device-name" operation attribute and the "device-names-supported" (1setOf name(127))
1983 Printer Description attribute. The latter will be part of the [ipp-set3] document.
- 1984 5. Kept the "job-settable-attributes" (1setOf type2 keyword) and "printer-settable-attributes" (1setOf type2
1985 keyword), but deleted the "interpreter-settable-attributes" (1setOf type2 keyword), since the Interpreter
1986 object and its attributes are really a sub-class of the Printer object.
- 1987 6. Deleted the "when-values-supported" (1setOf type2 keyword) Printer Description attribute.
- 1988 7. Added the "subordinate-printers-supported" (1setOf uri) Printer Description attribute.

- 1989 18.4 Changes to the September 19, 1999 version to make the October 22, 1999 version
- 1990 Adding or removing ISSUES that don't change the document are not listed here. The following changes to
1991 the September 19, 1999 version to make the October 22, 1999 version as a result of the IPP WG meeting in
1992 Denver, 9/99:
- 1993 1. Added the Interpreter object.
 - 1994 2. Added the "device-name" operation attribute to handle passing operations through the IPP Printer object
1995 to the device.
 - 1996 3. Added the out-of-band 'not-settable' to allow the Set-Job-Attributes and Set-Printer-Attributes response
1997 to indicate the difference between an unsupported attribute and a supported, but not settable, attribute in
1998 the Unsupported Attributes Group.
 - 1999 4. Removed "when-values-supported" and "job-settable-attributes" and "printer-settable-attributes" and
2000 "interpreter-settable-attributes" from the list of attributes that MUST be read-only. So an administrator
2001 could sub-set the policy on what when values are supported or which attributes can be set.
- 2002 18.5 Changes to the July 19, 1999 version to make the September 19, 1999 version
- 2003 The following changes to the July 19, 1999 version to make the September 19, 1999 version as a result of
2004 the IPP WG meeting in Alaska, 8/99:
- 2005 1. Refer to proposal as "Set2" rather than "Administrative" operations.
 - 2006 2. Revise the emphasis on administrator throughout the document, although the word administrator
2007 remains wherever appropriate.
 - 2008 3. Convert non-process-run-out from an operations attribute to an operation.
 - 2009 4. Added Issue 21: For all these "access" caveats, why not just say... 'authentication and access control
2010 (see ipp-mod sections 1, 8.3 and 8.5) applies to this operation'.?
 - 2011 5. Added Issue 22: Why? This is backward, if you ask me (HRL).
 - 2012 6. Per resolution of Issue 2, the "settable-attributes" Printer Description attribute, was replaced with three
2013 Printer Description attributes: "printer-settable-attributes", "job-settable-attributes", and "interpreter-
2014 settable-attributes". The latter for those implementations that have different values for Printer attributes
2015 in the Get-Printer-Attributes and Set-Printer-Attributes operations, depending on the value of the
2016 "document-format" operation attribute supplied by the client. If and when we get a Document object,
2017 then we can add a "document-settable-attributes" Printer Description attribute.

- 2018 18.6 Changes to the June 30, 1999 version to make the July 19, 1999 version
- 2019 The following changes to the June 30, 1999 version to make the July 19, 1999 version as a result of the IPP
2020 WG meeting in Copenhagen, 7/7/99-7/8/99, and the IPP telecon, 7/14/1999:
- 2021 1. Sections 2.1 and 2.2: Clarified that the way to remove a message from the operator was for the client to
2022 supply a zero-length or all white space text string which is copied as usual to the "xxx-message-from-
2023 operator" attribute.
 - 2024 2. Section 2.3: Added "factory-settings" (boolean) operation attribute to the Get-Printer-Attributes
2025 operation.
 - 2026 3. Section 2.4: Added the "when" operation attribute to the Pause-Current-Job operation.
 - 2027 4. Section 2.4: Made the "when" operation attribute OPTIONAL for use in operations (Pause-Printer,
2028 Reset-Printer, Shutdown-Printer, and Pause-Current-Job operations).
 - 2029 5. Sections 2.5: Added table of operation attributes for the Printer operations to make it easy to compare.
 - 2030 6. Sections 2.6: Added table of operation attributes for the Job operations to make it easy to compare.
 - 2031 7. Section 3.1: Added "settable-attributes" (1setOf type2 keyword) READ-ONLY Printer Description
2032 attribute.
 - 2033 8. Section 3.2: Added "printer-controls-other-protocols" (boolean) Printer Description attribute
 - 2034 9. Section 3.3: Added the READ-ONLY "printer-message-time" (integer(MIN:MAX)) Printer
2035 Description attribute to keep time message updated in time ticks.
 - 2036 10. Section 4.2: Deleted the 'process-next' "job-state-reasons" value, so that repeated Promote-Job
2037 operations promote each job "to the front of the queue".
 - 2038 11. Sections 6.1.1.1 and 6.2.1.1: Replaced the table that listed all attributes with one that lists only the
2039 attributes that MUST be READ-ONLY.
 - 2040 12. Section 6.1.1.1: Indicated that attributes that are not specified as READ-ONLY in this document MAY
2041 be settable. If they control behavior, that changing their values MUST change the behavior.
 - 2042 13. Section 6.1.1.2 and 6.2.1.2: Deleted the "ipp-attribute-fidelity" operation attribute from the Set-Printer-
2043 Attributes and Set-Job-Attributes operations. All set operations are atomic.
 - 2044 14. Section 6.1.1.2: Add the concept of the Interpreter object to handle attributes whose values vary in the
2045 Set-Printer-Attributes and Get-Printer-Attributes, depending on the value of the "document-format"
2046 operation attribute.
 - 2047 15. Sections 6.1.1.3 and 6.2.1.2: Changed the "out-of-band" 'not-settable' value back to the existing 'not-
2048 supported' value.

- 2049 16. Section 6.1.2 and 6.1.3: Added "job-type" operation attribute to Disable-Printer and Enable-Printer
2050 operations with values: 'network-jobs', 'walk-up-jobs', and 'all-jobs'.
- 2051 17. Section 6.1.5: Clarified that Restart-Printer brings up the Printer disabled and paused, since that is the
2052 eventual state that Shutdown-Printer leaves the printer in.
- 2053 18. Section 6.1.5: Indicated that if Restart-Printer is supported, then Shutdown-Printer MUST be
2054 supported.
- 2055 19. Section 6.1.6: Deleted Space-Printer operation. Keep Space-Current-Job operation only which has a
2056 "job-id" operation attribute that a client MAY supply.
- 2057 20. Section 6.1.6: Clarified that Shutdown-Printer is for a long period of time, not just to reset the device or
2058 change attribute values. Also that Shutdown performs an immediate Disable-Printer and an eventual
2059 Pause-Printer.
- 2060 21. Sections 6.2.3, 6.2.4, and 6.2.7 : Added a "job-id" operation attribute to Cancel-Current-Job, Pause-
2061 Current-Job, and Space-Current-Job that a client MAY supply to check for race condition where current
2062 job changes
- 2063 22. Section 6.2.4: Combined Pause-Job into Pause-Current-Job operation.
- 2064 23. Sections 6.2.4 and 6.2.5: Pause-Current-Job puts job in 'processing-stopped' state, not 'pending-held'
2065 state.
- 2066 24. Section 6.2.6: Simplified Promote-Job, so that it behaves as if the job were put at the front of the
2067 queue.

2068 19 Appendix A: Full Copyright Statement

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